STS-120/10A Flight Readiness Review

JSC Mission Operations Directorate
Flight Director Office

DA8/J.D. Hassmann, R. LaBrode, N. Knight
September 17, 2007
Agenda

• DA8 COFR Requirements/Endorsements
  – COFR Requirements/Endorsements Summary
  – Space Flight Meteorology Group (SMG)
  – Flight Rules (Generic Volumes A, B, C, D; STS-120/10A Annex)
  – FDF/ODF/SODF
  – Mission Staffing: Training/Certification/Work Guidelines Compliance
  – Non-Critical Processors/Applications
  – Emergency Mission Control Center (EMCC)/Backup Control Center (BCC)
  – Safety Status Review
  – Command Procedures
  – Contingency Shuttle Crew Support/Rescue Flight (STS-320)
  – 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)

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* FCOH

- Ready to Support Flight/Only Standard Open work
- Non Standard Open work with expected resolution prior to flight.
- Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation.
- N/A

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Mission Operations Directorate  
Flight Director Office  
DA8/Hassmann, LaBrode, Knight - 120/10A MOD FRR - 9/17/07  
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## DA8 COFR Requirements/Endorsements

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Mission Operations Directorate
Flight Director Office
DA8/Hassmann, LaBrode, Knight - 120/10A MOD FRR - 9/17/07
New Operations
(FTP and JOP Summaries in Backup Charts)
Ascent/Entry Agenda

• ET Photography/Launch Window
• New Operations
  – First Flight of OI-32 Flight Software
  – Prelaunch Conjunction Screening Protocol (PRCB Action)
  – DOLILU manual procedure for ET Attach Load Indicators (SICB Action)
• Spaceflight Meteorology Group (SMG)
ET Photography/Launch Window Summary

• Launch Period is officially October 23 – December 14th.
  – Currently no Range conflicts during this launch period.
• ISS Reboost Plan will provide FD 3 Rendezvous from October 23 through November 7th.
  – 3.05 m/s maneuver to meet the Soyuz landing and set up for sequential FD3 opportunities.
  – Will work to schedule additional ISS reboost for launch delays if required.
• Launch Date Summary
  – Daylight launch dates are October 23rd through November 1st.
  – Daylight ET Umbilical Photography: October 23rd through November 6th.
    » Optimal ET Umbilical Photography Lighting does not occur until December 12th.
  – Daylight ET Crew Handheld Photography: October 23rd through November 9th.
    » Optimal Crew Handheld Photography Lighting from October 27th through November 8th.
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<th>Day</th>
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<th>RNDZ</th>
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<td>Daylight</td>
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**NOTES:**

1) Dark Launch when shaded.
2) Launch Window shown at 10 minutes but may be less on launch day due to limited APM.
3) Eastern Standard Time begins (GMT-5 hours) at 2am on 11/4.
4) Assumes 3.05 m/sec ISS Phasing burn on September 24th.
5) Launch period October 23 - December 14 (Beta < 65 deg)
6) Optimal ET Umbilical lighting does not occur until Dec 12th.
7) Optimal ET Handheld lighting occurs between October 27th and Nov 8th.
8) FD3/FD4 are days where both a FD3 and FD4 pane can be utilized to extend the window.
New Operations – A/E

- First Flight of OI-32 Flight Software
  - Ascent/Entry operations include the following new capability all of which have been exercised by MCC in simulations.
    - Heads Up Display (HUD) available in the BFS.
      - Now consistent with PASS landing operations.
      - No Flight Rules or Crew procedure changes required.
    - BFS Transient Halt Software
      - Minimizes operational impacts due to transients by immediately regaining function.
      - Crew procedures updated to reflect new capability.
    - Automated SSME Throttle Down
      - Software now automatically throttles down the last remaining SSME to minimum power level to protect against turbine overspeed.
      - Flight rules and Crew procedures updated for two SSME and single SSME operations.
    - IMU/IMU Matrix Align
      - Provides the ability to quickly regain an IMU in OPS 3.
      - No A/E Flight Rule or Crew procedure changes required.
    - PASS Trajectory Display
      - Provides PASS insight to MECO cutoff cue which is used for Manual MECO scenarios.
      - No Flight Rule or Crew procedure changes required.
    - BFS Data Tapes Available during Powered Flight
      - If BFS engaged, provides crew with basic flight instrument data (mach/velocity, alpha, altitude, altitude rate, acceleration) during powered flight.
      - No Flight Rules or Crew procedures changes required.
    - OMS Crossfeed Valve Software Mask
      - New capability to mask a failed microswitch status during prelaunch to allow full function of the OMS Crossfeed valves during abort dumps.
      - LCC update in work.
New Operations – A/E

• Prelaunch Conjunction Screening Protocol (PRCB Action)
  – Current protocol has screening performed by JSpOC (DOD) based on a predicted post OMS-2 state vector provided by the FDO at L-1 day and again at L-3 hours.
  – Current Flight Rules require a launch delay to the next even minute if a conjunction is predicted to be within a 5 x 15 x 5 km box (radial, down track, and cross track, respectively).
  – Positional uncertainties exist for all orbiting objects.
    » Down track is the most uncertain and cross track (plane) is the most stable
    » Study performed in 2006 with a limited data set of missions (~15) indicate that a significant uncertainty exists between the predicted OMS-2 vector provided at L-3 hours and actual vector post launch.
      • Radial ~2 km, Down Track ~24 km, and Cross Track ~ 0.4 km
  – For conjuncting objects, the radial miss distance is the most stable.
    » Down track miss distance is the most uncertain.
    » If the objects are not co-planar (likely), cross track and down track distances are coupled.
    » Therefore, predicted cross track miss distance contains a similar amount of uncertainty as down track miss distance and results in the "pizza box" philosophy used for STS Orbit and ISS screening.
  – For on-orbit conjunctions, once object is identified by the screening box, probability of collision (Pc) methodology is used to determine if action is required.
    » This requires an established covariance for both objects.
  – Pc methodology is not used prelaunch because a covariance for predicted insertion vector accuracy has not been established.
    » Uncertainties include: down track position (unconstrained by guidance), guidance timing variations, navigation uncertainties, position constraint release, ascent performance, post MECO +X, MPS dump.
  – New protocol for prelaunch screening may involve a larger screening box to identify potential threats coupled with a smaller take action box that is weighted heavy on the radial miss distance. <PRCB on 9/27>
New Operations – A/E

• **DOLILU manual procedure for ET Attach Load Indicators (SICB Action).**
  - Analysis tools that model the loads for the aft ET attach struts were in error with respect to the strut geometry.
  - ET Project has worked with the community to determine how the correct geometry affects the load indicators for these affected struts.
  - New limits are being established for 4 ET load indicators that are part of the DOLILU loads assessment (SICB 9/18).
  - DOLILU manual procedure for STS-120 will monitor the new limits and automate this check with a software block update for future missions.

• **ET Door Close Procedure**
  - STS-118 IFA – ET Door manual close procedure resulted in potential hardware damage due to uplock latches being driven prior to the doors being fully closed.
  - Procedure has been updated and trained to remove any threat of latching the doors before the door motors reach end of travel.

• **Launch Countdown Timeline Changed.**
  - S0007 launch countdown has been modified to remove 1 hour from the timeline.
    » Driver for this was less time for ice formation and thus minimizing potential debris concerns.
  - ET Tanking will occur 30 minutes later and the T-3 hour hold will also be shortened by 30 minutes.
Spaceflight Meteorology Group (SMG)

- All NWS/SMG software used to create mission critical products or required for mission support is ready for STS-120/10A
- All SMG forecasters required to support STS-120/10A meet currency requirements listed in SMG Training & Certification plan.
  - CONUS and TAL forecasters certifications are current.
- No non-standard open work or exceptions
- Previous open work to reduce TAL support problems closed
  - TAL balloon problems on STS-118 were reduced from previous missions.
  - Improvement due to an enhanced pre and post mission HSFS tag up with weather support personnel to coordinate problem resolution and procedure updates.
  - Flight frequency has also added to this improvement as HSFS weather personnel gain experience.

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-120/10A flight.

/s/ Frank C. Brody
Frank C. Brody
Chief, Spaceflight Meteorology Group
New Operations – EMU Gloves

• **STS-118/13A.1 Flight Rule (13A.1_B15-1)** addressing EVA termination for vectran damage will be carried over to the STS-120 annex
  - Rule rationale will be updated to address specific STS-120 EVA tasks
• **STS-118 techniques for glove inspections** will be implemented on STS-120
  - Glove inspections will be performed at every day/night transition and at the end of each major EVA task
  - MOD is discussing additional glove inspection points with Engineering and the Programs
• **Glove photos**
  - Both EVA crewmembers gloves will be photographed as part of the Post EVA procedure and crew will provide a verbal assessment of glove condition
  - Photos will be downlinked and glove condition will be assessed after each EVA
• **Spare gloves**
  - XA is considering flying an additional pair of gloves (three pairs total) for crew members scheduled to perform three or more EVAs (Parazynski, Wheelock, Whitson, and Tani)
New Operations – TRAD DTO

• Addition of a DTO to verify on-orbit tile repair capability requested by Shuttle Program
  – Final approval expected at 9/24 JPRCB
  – Requires 14+0 mission duration and 5th EVA
  – Requires back-to-back EVAs (DTO EVA4 FD10, PMA2 prep EVA 5 FD11)
    » DTO EVA – Shuttle Crew, EVA 5 – ISS Crew
  – Target time for EVA 4 ~ 4 hrs to allow A/L Prep for EVA 5 the next day

• Overall DTO Objective: To evaluate STA-54 material, EVA procedures and T-RAD hardware during an end-to-end EVA demonstration
New Operations – OI-32

• First Flight of OI-32 Flight Software
  – Orbit operations include the following new capability all of which have been exercised by MCC in simulations.
    » On-Orbit DAP Notch Filter Performance Improvement.
      • Improve fuel usage by having feed forward of predicted rate change to notch filters to eliminate filter induced lag.
      • No Flight Rules or Crew procedure changes required.
    » Hot Stick Rate Estimate Feedforward Improvement
      • Modify forward to scale minimum impulse firing on a hot stick upmode transition.
      • Crew procedures updated to reflect new capability.
    » OPS 2 ADI Rate Switch Scaling Change
      • Rescale so that maximum absolute value displayed for PDF ADI rate pointer scales is 0.1 d/s with switch in low and 2.0 d/s in high.
      • Flight rules and Crew procedures updated for two SSME and single SSME operations.
    » Annunciation of Shuttle Alarms on ISS
      • Allow several Shuttle C&W alarms (Smoke Detection, C&W Master Alarm, SM Alert) to be rung on ISS
    » Lambert Guidance Improvement
      • Eliminates need to retarget a Lambert computed burn should it not be completed by TIG + 90 sec..
      • Crew procedures updated to reflect new capability.
    » IMU/IMU Alignment Upgrade
      • Add function equivalent to a direct uplink to current REFSMMATs. Add capability to recover an IMU quickly by matrix alignment to a referenced IMU.
      • Crew procedures updated to reflect new capability.

• First Flight of OI-32 Flight Software
  – Orbit operations include the following new capability all of which have been exercised by MCC in simulations.
    » THC Command Response Improvement
      • THC Selection Filter will “OR” the signal from current cycle and previous cycle to generate a selected signal for THC validation and processing by THC SOP.
      • No Flight Rules or Crew procedure changes required.
    » Rendezvous Nav Item Entry Corrections.
      • Correct keyboard item entries to Rendezvous Navigation during OPS 2.
      • No Flight Rules or Crew procedure changes required.
    » RMS Auto Mode Cleanup
      • Fix for Severity 2 DR 121214 “RMS Position Hold Doesn’t Hold Position” and other minor RMS changes.
      • Eliminates current Flight Rule which does not allow enabling POHS while in auto mode.
    » Add ET Umbilical Door Command to RTC Table
      • Provide RTC capability to command through MDM FA4 to drive both ET Umbilical Door motors in the closed direction.
      • No Flight Rules or Crew procedure changes required.
    » Phase Plane Modifications to Reduce VRCS Shelf-pulsing
      • Reduces probability of a violation of the SODB limits of 1000 firings/hr for vernier jets
New Operations – SSPTS

- Station to Shuttle Power Transfer System (SSPTS), first flight of OV-103
  - If SSPTS does not operate as planned, the mission duration will be 12 + 0 and EVA 5 will move to the 10A stage.
New Operations – Shuttle Flight above 60° Beta

- Orbiter will be above 60° Beta between Oct. 28 – Nov. 3, 2007.
  - Potential for thermal conditioning of the orbiter during docked ops and/or prior to deorbit
  - Flight specific thermal analysis is in work by ES
  - If thermal conditioning required:
    » Swap between –XVV and +XVV, while docked
    » Up to 12 hours of PTC, post undocking prior to D/O Prep
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-120/10A
  – Volume A, Final PCN-8 dated 5/24/06
  – Volume B, Final PCN-5, dated 8/27/07
  – Volume C, Final PCN-2, dated 11/20/06
  – Volume D, Final PCN-4, dated 9/18/07

• STS-120/10A flight rule annex
  – Final version will be scheduled for the week of 9/24/07 JPRCB
  – PCN-1 targeted for presentation at 10/15/07 JPRCB
- DA8 has participated in FDF/ODF/SODF processes and procedure reviews as required
- FDF/ODF will be ready to support STS-120/10A
  - OI-32 resulted in multiple procedure updates, all of which have been completed
  - New US procedures for are for PMA2 relocate, Node 2 installation/operations and P6 relocation
Flight Director Mission Staffing: Training/Certification/Work Guideline Compliance

- All STS-120/10A 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-320, 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)

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<th>Position</th>
<th>Flight Specific Cert Status</th>
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<td>Norm Knight</td>
<td>Ascent</td>
<td>Anticipated Oct. 9, 2007</td>
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<tr>
<td>Mike Moses</td>
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<td>Station Planning</td>
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SPAN Mission Staffing:
Training/Work Guideline Compliance

• Sufficient personnel will be provided by the Organizations to properly staff all SPAN positions without violating Work Guidelines
  – Reduced SPAN Manning will be in effect for this mission, first reduction since STS-114/LF1
  – Also will be using Organizational weighted balanced manning for SPAN team initiated with STS-118/13A.1
Non-Critical Processors/Applications

- All DA8 Non-Critical Applications certified
- No application changes since STS-118/13A.1
- Flight Director “Entry” Display Updates
  - Certification completion date scheduled as 9/21/07.
  - Changes made allow com-faulted parameters to be displayed as “bad” data.
  - Not mandatory for STS-120.
EMCC/BCC

• No changes to EMCC procedures since STS-118
• Personnel identified to support EMCC

• No changes to BCC procedures since 13A.1
• Personnel identified to support BCC
SAFETY THREATS

• Protections for freezing/rupturing Node2 IFHX
  – To avoid freezing and rupturing IFHX during Stage EVA, Node 2 Install sequence dependant on Lab TCS loop temp
  – New thermal analysis in work (ECD 9/20/07)
    » Previous analysis assumptions did not match timeline
  – Strategy for Resolution: If No Joy on new analysis adjust EVA timeline to meet analysis constraints

• Plasma mitigation
  – Expect voltage exceedence of 3-6V based on existing criteria (e.g. 40 Volts) after 2 PCU failures
    » Would result in No-Go for “in progress” and future EVAs if 1 PCU failed
  – Strategy for Resolution: Requires new NCR for violations up to 46V (6V above limit) (analysis and NCR in work)

• TRAD DTO
  – Zero failure tolerant to Toxic leak until knob removed
  – Safety assessment pending
  – Strategy for Resolution: Get Knob removed pre-launch, and accept associated delta-pressure structural margin issues
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-320

- STS-120 Ascent/Entry Team will support STS-320
- STS-120/122 Teams will support Orbit Operations as required
Level II (Program) Actions

• As of 9/17/07, there are three Space Shuttle Program “Open Actions/Constraints to Flight” assigned to MOD for STS-120/10A
  – PRCB Action - S063666C - REPORT ON THE POST MECO COLLISION AVOIDANCE DETECTION CAPABILITIES. REPORT TO THE PRCB. (STS-118 MMT DEBRIEF)
  – SICB Action - S052158CT - UPDATE ET FITTING LOAD APPLICATION POINTS. UPDATE DOL PROGRAMS TO INCORPORATE THE ET FITTING LOAD APPLICATION POINTS, REVISION 1, AND REPORT RESULTS TO THE SICB.
  – PRCB Action – S063698 – ENSURE THAT THE STS-120 CREW IS TRAINED TO FLY THE MISSION AND CONDUCT THE ROBOTIC OPERATIONS WITHOUT THE USE OF THE MINICAM. (Crew has been trained – formal closure in work).

• All Actions will be closed prior to flight.

• As of 9/17/07, there are no Space Station Program “Open Actions/Constraints to Flight” assigned to MOD for STS-120/10A
Standard Open Work
Standard Open Work

- ISS reboosts on September 24th and ISS drag reduction set up sequential FD 3 rendezvous for first seventeen days of launch period.
Standard Open Work

- Flight Rules
  - STS-120/10A flight rule annex
    » Final version schedule for week of 9/24/07 JPRCB
    » PCN-1 targeted for presentation at 10/15/07 JPRCB
    » No significant issues expected; some open CRs are dependent on analysis that will not be complete in time for the Final

- FDF/SODF
  - Final FDF updates
  - Final SODF updates

- Training
  - Complete STS-120 Ascent/Entry and Orbit integrated simulations (10/18E)
  - Complete Flight Director flight specific certifications (10/09E)
Standard Open Work

- Finalize pressure management plan for docked mission
- Finalize power profile plan for docked mission
- Complete “Road To” Items
Standard Open Work

• MOD INTEGRATED CARGO HAZARD ASSESSMENT (ICHA)
  – STS-120 VERIFICATION TRACKING LOG (ECD: 10/05/07)
• MOD INTEGRATED EXPERIMENT HAZARD ASSESSMENT (IEHA)
  – ISS FLT 10A VERIFICATION TRACKING LOG (ECD: 10/05/07)
• INDEPENDENT SAFETY VERIFICATION REVIEW
  – SHUTTLE ISVR REPORT (ECD: 10/05/07)
Non-standard Open Work
Non-Standard Open Work

• Prelaunch Conjunction Screening Protocol (PRCB Action)
  – Procedure and Flight Rule changes may be required.
• DOLILU ET Attach Load Indicators (SICB Action).
• INDEPENDENT SAFETY VERIFICATION REVIEW
  – ISS ISVR REPORT (Best Case ECD: 10/11/07)
Non-Standard Open Work - OPEN OCADs

- **PHALCON (7+2)**
  - Array mgmt for Plasma
  - LS Constraints
  - Non Fault-bond constraints *
  - Mate/Demate inhibits *

- **EVA (5+11)**
  - Shunt jumper vent thermal clock
  - Sharp Edge
  - ORU venting
  - TRAD Constraints *
  - P6 Install “brakes on” response *
  - RTAS constraints *
  - Tie-down plans *

- **OSO (2+4)**
  - Rack config for return
  - Rack config for reboost
  - CBM constraints *

- **ACO (1+1)**
  - Rack config for N2 Relocate
  - Partially Deployed SAW loads constraints *

- **ECLSS (1+1)**
  - Emerg Egress MRK config
  - N2 Ingress constraint *

- **THOR (2+2)**
  - N2 heater jumpers when on N1
  - N2 Thermal clock
  - Un-retracted FGB array Rad constraint *
  - N2 Ingress constraint *
  - N2 HX freezing constraints *

- **ADCO (+4)**
  - Dock/Undock Moding constraints *
  - Partially bolted RTAS constraints *

- **ROBO (+1)**
  - CBM capture constraint *

- **EGIL (+1)**
  - Mate/Demate inhibits *

Most of these OCADs were submitted within last week

* OCADs expected but not yet submitted
Exceptions

- None
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-120/10A mission.

• All standard/non-standard open work will be closed out or have a closure plan prior to **ISSP SORR (9/24)** and **SSP FRR (10/9-10/10/2007)**.
Backup
Remaining STS-120/10A Integrated Sims

- Orbit
  - None

- Ascent/Entry
  - 9/17: Post Insertion
  - 9/20: Entry #2
  - 9/25: Deorbit Prep Simulation
  - 10/2: Ascent #3
  - 10/10: TCDT with KSC
  - 10/16: Entry #3
  - 10/18: Ascent #4
Ascent/Entry Flight Techniques Topics
Applicable to 120/10A
Ascent/Entry Flight Techniques Panel (AEFTP)

- Three Ascent/Entry Flight Techniques Panel (A/E FTPs) held with topics supporting STS-120 thus far with one additional A/E FTP planned on 9/21/07.
  - A/E FTP #228 (Joint with OFTP #230) – OI32 Review
  - A/E FTP #230
    » OI32 Workplan Review
    » Master Timing Unit Failure management for OI32
    » OI32 Throttledown for SSME NPSP Protection
  - A/E FTP #234
    » STS-118 Post Flight Review (8/30/2007) resulted in three IFAs
      • STS-118-D-003: ET Umbilical Door RTL Indication and Latch Command Timing
      • STS-118-D-004: L-2:20 Launch Window Sheet Incorrect Pane 2 Open Time
      • STS-118-D-005: Unexpected Close Conjunction Post OMS-2 burn
    » 482 for ET Umbilical Door Closure procedure is in final review and simpack available for STS-120 training.
    » FDO Procedure update for Launch Window sheet workaround is in final review.
- **A/E FTP #235 planned on 9/21/07**
  - Review of STS-120 Prelaunch Conjunction evaluation process in response to the STS-118 MMT action.
- **A/E FTP community ready to support STS-120 pending final disposition of Prelaunch Conjunction procedure, DOLILU Loads procedure, and the completion of standard open work.**
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 #232 Summary (Continued)

• OI-32 Review
  – Joint FTP with Orbit
  – Reviewed OI32 content and identified required updates to operational products.
  – Also identified topics for further discussion at FTPs.
  – Followup A/E FTP topic reviewed work plan for updating operational products in support of training and flight.

• OI-32 Master Timing Unit Failure Management
  – With a failed MTU, the GPC will use it’s own internal clock as a time source.
  – GPC clocks are not accurate enough to maintain a good time sync with GPS. The end result is that GPS and GPC get out of sync and will not work together.
  – OI-32 provides a FSW update that automatically adjust the time difference to a range acceptable to both LRUs.
    » Initiated via crew item entry and will be inhibited until the MTUs fail.
  – The problem is that MTU failures are not obvious to crew in Ops 3.
  – Actions were assigned to update the FDF for crew indications of an MTU failure.

• OI-32 Throttledown for SSME NPSP Protection
  – OI-32 provides automatic single SSME completion steps, which simplifies crew procedures for manual throttle down and shutdowns.
  – Several procedure and Flight Rule updates were reviewed and concurred with.
A/E FTP #232 Summary (Continued)

• STS-118 Post Flight - Reviewed mission support including trajectory and systems performance, Space Flight Meteorology, Landing Site and MCC/Network support.

• Significant Ascent/Entry conclusions from STS-118:
  – Crosswind DTO
    » Crosswind component from KSC15 wind tower data at touchdown did not exceed 10 knots (DTO requires > 10 kts of crosswind).
    » CDR compensated for a significant left crosswind gust as the vehicle crossed the runway threshold; therefore some crosswind DTO objectives were accomplished.
  – Linux workstations for DOLILU operations
    » A/E FTP agreed to begin the removal of the DOLILU AIX servers and workstations
    » Regression tests, Ascent weather simulation, and TCDT will be accomplished on the Linux system prior to STS-120.
    » STS-120 will be first flight to exclusively use Linux servers and workstations for DOLILU task.
A/E FTP #232 Summary (Continued)

• Significant Ascent/Entry issues from STS-118:
  – Flight Day 1 Close Conjunction
    » Post OMS 2, Ascent team notified of conjunction with miss distance of 2.3 km RSS
      (-0.12 x -0.93 x 2.1 km) and Time of Closest Approach (TCA) in ~15 min (MET
      0/01:34).
    » Ascent flight control team did not perform an attitude maneuver or an avoidance
      translational maneuver.
    » For STS-120, DM working with JSpOC to determine appropriate sizing of screening
      box and action box.
    » This item is scheduled for A/E FTP #235 (9/21/07)
  – Launch Window Pane Error
    » Launch window application produced incorrect pane 2 open time.
    » Error was detected 30 minutes later and was corrected.
    » FDO Console Handbook Procedure update will specify required sequence of user
      inputs to avoid launch window application error.
A/E FTP #233 Summary

- ET Umbilical Door RTL Indication and Latch Command Timing
  » ET Door Close Procedure changed prior to STS-114 to accommodate concern for failed microswitch.
    • ET door switch taken to “OFF” when crew sees “Close” talkback
    • “Close” talkback in the cockpit driven by ready-to-latch indication and not the “close” microswitch
  » Concern was raised that the door or latch mechanism could have been damaged by driving the uplocks before the door was fully closed.
  » 482 change will leave ET door switch in “Close” until after the uplock latches are latched.

- OPS 3 Transition Concerns with ADTA #3 Commfaulted
  » User Note (OI-5) documents the possibility of an SM GPC fail-to-sync condition during Ops transitions when LRUs are commfaulted.
  » During STS-118, ADTA #3 was commfaulted and a modification to the Deorbit Checklist was developed, but not implemented.
  » DPS office and software community are weighing risks before recommending permanent change to Deorbit Prep checklist. This item is scheduled for A/E FTP #235 (9/21/07)

- TAL Runway Visual Scene Setup
  » Xenon lights at Zaragoza TAL runway remained powered off until T-9 minutes.
  » NASA agreements with the TAL runway authorities dictate when “ownership” of the TAL runway is turned over to NASA for visual scene setup.
  » DA8 will work with Astronaut Office and KSC Landing & Recovery Division to evaluate the TAL visual scene requirements.
Orbit Flight Techniques and Generic JOP Topics
Applicable to 120/10A
• The Orbit Flight Techniques Panel (OFTP) and Generic Joint Operations Panel (GJOP) conducted an STS-118/13A.1 Post-Flight Review on Aug. 30th.

• No actions applicable to STS-120 were assigned.

• Three Orbit-related MOD IFAs were brought forward from STS-118
  – STS-118-D-001: Ku Mask for SSRMS out of sync with SSRMS operations
  – STS-118-D-002: OBSS Sensor Mode Change for 6 to 2 per MCC Call
  – STS-118-D-006: Building 30M Power Failure

  – None of these IFAs are a constraint to STS-120/10A
STS-120/10A Joint Operations Panel Topics
STS-120/10A JOP Topics

• P6 relocation and activation
  – End-to-end plan for P6 relocation from Z1 to P5 was covered at multiple STS-120/10A JOPs
  – JOP discussions included robotic operations, P6 thermal capability, P6 activation sequence and P6 SAW deploy

• Node 2 ingress
  – The plan and techniques for ingress Node 2 while installed on Node 1 was reviewed at multiple STS-120/10A JOPs
  – JOP discussion included ventilation hardware configuration and constraints for number of crew inside Node 2

• CMG controllability and attitude control plan
  – Attitude control plan and backup attitude control modes for Node 2 installation and P6 relocation were discussed at STS-120/10A JOP #16 on 7/27/07 and JOP #17 on 8/27/07.

• PMA-2 cable disconnection during EVA 4
  – Functions lost when PMA-2/Lab umbilicals are disconnected during EVA 5 were discussed at STS-120/10A JOP #16 on 7/27/07; impacts are understood and acceptable
Russian Joint Operations Panel Topics
Applicable to 120/10A
RJOP Topics

• STS-120/10A Briefings to Russian Teams
  – In work and expected to be completed by launch minus 1 week
SPAN Manning

- ISS SPAN Support: Manning provided by USA CAF Personnel
- ISS SPAN Systems: Manning provided by DI
- SSP SPAN Support: Manning **POSITION DELETED FOR 120/10A**
- SSP SPAN Systems: Manning provided by DS
- SPAN DO: Manning provided by DO **SUPPORT REDUCED FOR 120/10A**
- SPAN DM: Manning provided by DM **SUPPORT REDUCED FOR 120/10A**
- SPAN DX: Manning provided by DX **SUPPORT REDUCED FOR 120/10A**
- SPAN Managers: Manning provided by DM, DO, DX, DI, DS, DA7
SAFETY ISSUES

• ET
  – Walking load induced cracks in Foam (during fabrication)
    » Contributor to cryo pumping failure mode
    » Previously the only consequence was crushed foam (a non-hazard)
  – DTA including ricochet
    » May increase some probabilities
• SSRMS Safing (“brakes on”) during P6 Install
  – Preliminary analysis shows 10 sec to loads exceedance
    » Marginal for crew ability to respond
• Potential for stuck MT to preclude nominal Orbiter undock
  – While SRMS holds P6 for MT translate
  – MSS system is 1 Failure Tolerant
  – Risk Acceptance NCR in work (ECD 9/19/07)
    » FR to Safe after first (LDU, 1553) failure needs to be developed
None
ISS OPEN HAZARD REPORTS

- COL-1002
- COL-1003
- COL-1006
- EME-0602*  
- EPS-0309*
- EPS-0503*
- EVA-0312
- GNC-0701
- MCH-0109
- STR-0108*
- STR-0907*
- STR-1009*
- SWC IP-STR-108*
- TCS-0062*
- TCS-0066
- TCS-1210
- SDTO-10A

* Pre-verified
## ISS OPEN NCRS

<table>
<thead>
<tr>
<th>NCR-ISS-211</th>
<th>Lack of MSS Operability Failure Tolerance</th>
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<td>NCR-ISS-203-B</td>
<td>Lack of Two-Fault Tolerance to EVA Plasma Shock Hazard</td>
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<td>NCR-ISS-212</td>
<td>Lack of RTAS Failure Tolerance for Removal of P6 from Z1</td>
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<td>NCR-ISS-TBD</td>
<td>Lack of Two-Fault Tolerance for Moding at Undock</td>
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<td>NCR-ISS-208</td>
<td>Pins on the Powered Side of the Connector during Mate/Demate</td>
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<tr>
<td>NCR-ISS-TBD</td>
<td>Lack of Two Failure Tolerance to Exceeding Structural Loads if SSRMS Safes during P6 Install</td>
</tr>
<tr>
<td>NCR-TBD</td>
<td>SARJ Locking Constraints Risk (not a constraint to launch)</td>
</tr>
</tbody>
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GFE OPEN HAZARD REPORTS

- STS
  - 90 Degree Camera Autotrac
  - RCC Plug Repair (ECD – 09/28/07)
  - Medical Accessory Kit (MAK) (ECD – 08/30/07)
  - Pan Tilt Unit (OBSS) (PTU) (ECD- TBD)
  - Wing Leading Edge (WLE) Enhanced Wide-Band Micro-Triaxial Accelerometer Unit (EWBMTAU) (ECD – TBD)
  - Wet/Dry Vacuum Cleaner (ECD – TBD)
  - Lens, Fisheye, Nikon 8mm (ECD – 09/18/07)
  - Trajectory Control Sensor Flight Kit (TCS) (ECD – 10/02/07)
    » OCAD not submitted as of 09/12/07
  - T-RAD DTO (ECD – 9/17/07)
GFE OPEN HAZARD REPORTS

- ISS
  - EVA Digital Camera (ECD – TBD)

- EVA
  - Solar Array Contingency Taped Tools (ECD – TBD)
  - Plug Installation and Verification Tool (PIVT) (ECD – TBD)
  - EVA Thermal Sensor (w/Goose Neck Probe ) (ECD – TBD)
  - On-Orbit Installed Gap Spanner (ECD – 09/07/07)
  - Primary Life Support System (PLSS) (ECD – 09/31/07)
PAYLOAD OPEN HAZARD REPORTS

• Shuttle
  – None

• ISS
  – HDTV Camera Lens (ECD: 10/01/07)
  – MSG / InSPACE-2 Integrated (ECD: 9/19/07)
  – Spore
    » ESA PSRP reviewed payload
    » Late manifest, awaiting hazard reports from ESA (ECD: TBD)
  – SSLM (ECD: 9/24/07)