



STS-116/12A.1 MOD Flight Readiness Review



**JSC Mission Operations Directorate
Flight Director Office**

**DA8/John M. Curry
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DA8/J. Steve Stich
DA8/Norman D. Knight**



**Mission Operations Directorate
Flight Director Office**

November 8, 2006

Agenda



- DA8 COFR Requirements/Endorsements
 - Flight Techniques & Joint Ops Panels/New Operations
 - Space Flight Meteorology Group (SMG)
 - Flight Rules (Volume A, B, C, D, 116/12A.1 Annex)
 - FDF and ODF
 - 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-300)
 - FCOH (SSP & ISS)
 - Level II Actions
- Standard Open Work
- Non-Standard Open Work
- Exceptions
- Flight Readiness Summary





DA8 COFR Requirements/Endorsements



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DA8/Curry, Ceccacci, Stich, Knight COFR 116/12A.1 MOD FRR 11/ 08/06 Final

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		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												
Flt Prep Process Plan Requirements Met		G								N/A			
Contractor Process Insight		G											



DA8 COFR Requirements/Endorsements



REQUIREMENT (STATION)	Flight Director	Program Integration	Ops Safety	SPAN	Procedures	Team 4						
Non-Crit Processors/Applications	G				G				G	Ready to support the flight		
BCC	G				G	G						
Training - MCC/POIC/POCC	G			Y		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 (A/E FTP) – Ascent



- **Launch Window/ET Photography-** first dark launch since RTF
 - December 6-17 launch period consists of dark launch, FD 3 rendezvous each day, and no Year End Roll-Over (YERO) for planned 12+2 duration mission
 - No ET umbilical or crew handheld photography for launches through Dec 18
 - If launch dates after Dec 17 are determined to be viable with YERO
 - » ET umbilical photography in daylight on Dec 19
 - » Crew ET Handheld photography in daylight on Dec 22
- **SSME Advanced Health Monitoring System (AHMS)**
 - First flight of new AHMS Controller on SSME 2058 (Right Engine)
 - Synchronous vibration redline mitigates HPOT and HPFTP catastrophic event
 - Redline in Monitor Mode thus controller cannot command vibration shutdown on STS-116
 - MCC can monitor the vibration data and will take no action on first flight
 - Flight rules in Volume A PCN 7 for both active and monitor modes
 - A/E FTP has open PRCB action to determine when to activate redline (post STS-116)
- **LH2 ECO Sensor LCC**
 - MOD continues to support 3 of 4 LH2 ECO Sensor LCC discussions
 - SEI will bring 3 of 4 proposal for one failed wet LH2 ECO sensor to 11/9 or 11/16 PRCB
 - Plan would be to launch that same day rather than detank/retank and stand-down a day
 - DA8 concurs with this proposal
- **APU WSB** – first flight of Water/PGME mixture in all 3 Water Spray Boilers (WSB)
 - Successful flight day 1 APU/WSB 3 restart demonstration DTO on STS-114 and STS-121



New Operations (A/E FTP) – Ascent (Cont)



- **Ascent/Entry Flight Techniques Panels** – Three panels held prior to STS-116.
- **STS-115 Post Flight** -Reviewed mission support including trajectory and systems performance, Space Flight Meteorology, Landing Site and MCC/Network support.
 - ARD Response to Erroneous Telemetry IFA- ARDMON software fix requires 3 consecutive telemetry frames to initiate abort in ARD
 - MCC Onboard Fault Summary (OFS) IFA-software upgrade to attempt restart in response to ratty data, DPS team more closely monitors application health and status
- **Stuck RTLS Procedure Update** -expand stuck RTLS capability to enhance crew survivability
 - Use powered pitch around plus 5 seconds as cue to return to auto
 - Ascent Checklist Procedures updated for STS-116
- **High Energy TAL Procedure** - eliminated thermal violations to enhance crew survivability
 - 100 foot per second earlier Roll To Heads Up Cue
 - Maneuver using 4-5 degree per second roll rate
 - Ascent Checklist Procedures updated for STS-116
- **SSME Pc Shift-** power cycle SSME controller with Pc Shift to achieve rendezvous
 - A/E FTP determined that the risk trade balance should be to cycle the main engine controller, give up redundancy, and achieve rendezvous capability when possible
 - Rule will be placed in STS-116 Fight Specific Annex
- **SSME 60 Kilobit Data-** certified data stream downlisted by Orbiter FM system
 - Additional insight into performance with data from both prime and back-up SSME controller
 - A/E FTP determined that data is acceptable for real-time use, verified during STS-115 test



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New Operations (A/E FTP)– Deorbit/Entry



- **Continue A/E FTP approved 3-String GPS Ramp Up Plan in preparation for STS-118 (June 2007), first 3-String GPS/ No TACAN flight on OV-105**
 - STS-121 successfully used GPS in BFS after high speed tracking evaluation
 - STS-115 successfully used GPS in the PASS in OPS 3 prior to the deorbit burn and during entry after high speed tracking
 - STS-116 will repeat STS-115 PASS ramp up objectives
 - STS-116 Annex Flight Rule governs GPS operations
 - » PASS/BFS On-Board Navigation must be valid.
 - » Performed only on MCC call.
 - » Flight Director will terminate GPS operation for significant orbiter, MCC, or landing site issues or failures.
- **APU WSB – first flight of Water/PGME mixture in all 3 Water Spray Boilers (WSB)**
 - Successful flight day 1 restart demonstration DTO on STS-114 and STS-121 WSB #3
 - STS-115 also flew with water/PGME in WSB #3
- **First mission with OMS ballast at EOM since STS-32 (January 1990)**
 - Due to payload bay cargo configuration



New Operations-Orbit/Shuttle



- None



New Operations-Orbit/ISS



- **P5 Install Operations**
- **ISS Powerdown Operations in Support of Power Reconfigurations**
- **SAW and SARJ Operation/Constraints**





P5 Install Operations



P5 Install Operations



- **Clearance Issues**

- P4 2A BGA must be locked at 180 deg, P4 4A BGA must be locked at 270 deg before SSRMS/P5 can be positioned outboard of SARJ Interface.
 - » Avoids clearance issues with 4A blanket box, BGA, and SSRMS POA.
- P5/P4 Mating clearances are extremely tight (< 3” from SSU to RTAS Housing).
 - » SSRMS Runaway analysis requires Ops controls to ensure P5 to SSU clearance remains > 1.2”
- External camera views insufficient. EVA crew GCA required (Helmet Cam useful)

- **SSRMS Requirements**

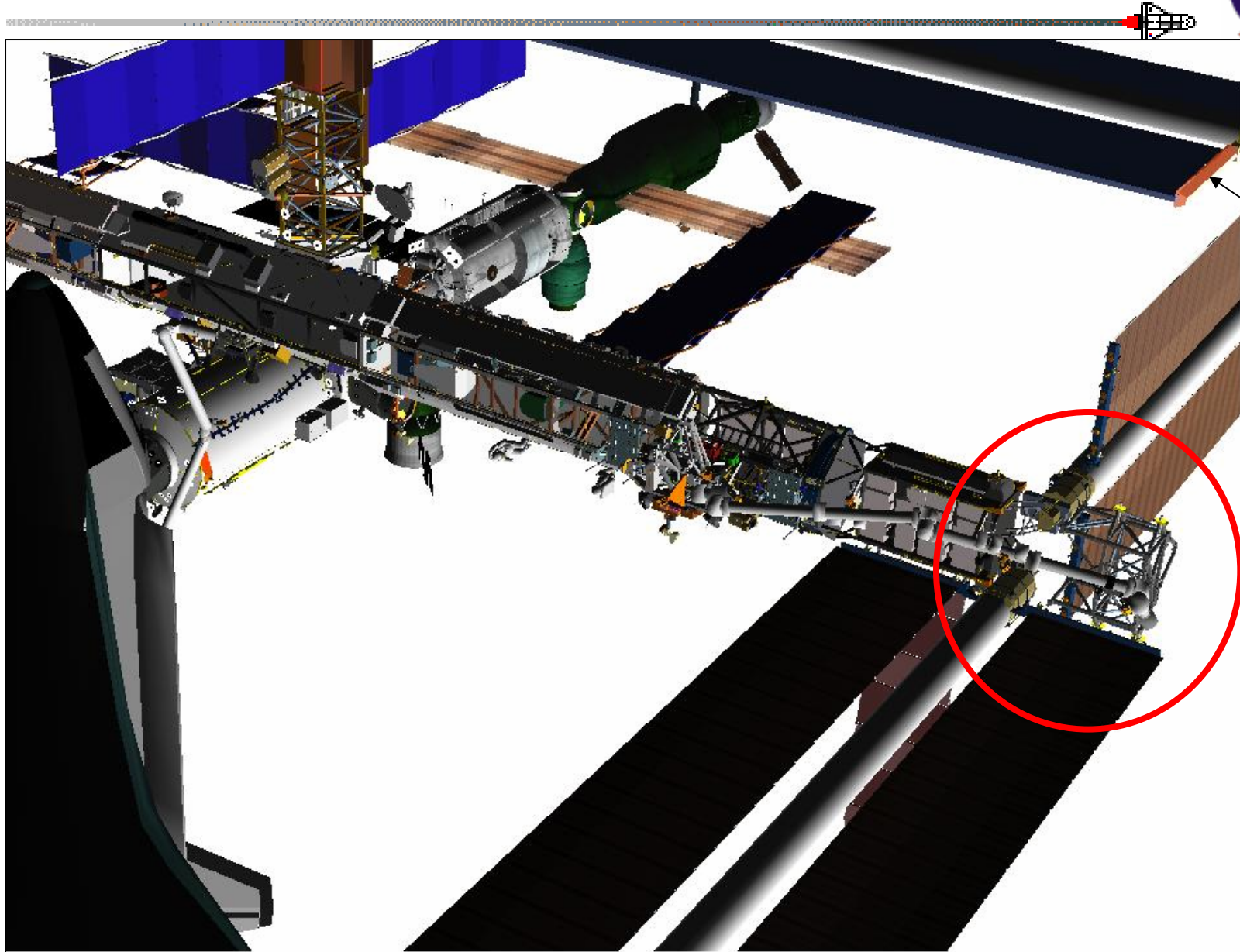
- SSRMS Operator must maneuver P5 to through tight P4 corridor without contacting structure (SSU / BGA cables / 4-bar linkage)
- Slow SSRMS rate designed to preclude SSRMS “runaway” issues while still allowing SSRMS to overcome soft-capture latches
- SSRMS GCA Mating,
 - » EVA crew free floats to view ALL tight clearance points before any SSRMS “GO”
 - » EVA crew helps SSRMS operator align P5 by giving SSRMS alignment
 - » During SSRMS maneuver to launch lock removal position, EV crew provides GCA to the SSRMS operator to maintain at least 1.2 inches (3 cm) of clearance with the 4A Sequential Shunt Unit (SSU).
 - If alignment correction is required, SSRMS Operator may correct mis-alignment while continuing motion along mating axis

- **Time Pressures**

- P5 Install/PVRGF Removal are the only EVA#1 CAT 1 tasks (CP#3 R&R deferred, if req'd)
- Power managed such that SARJ/BGA can remain fixed for entire EVA
- Crew will be slow and methodical to ensure no contact



P5 Short Spacer Install

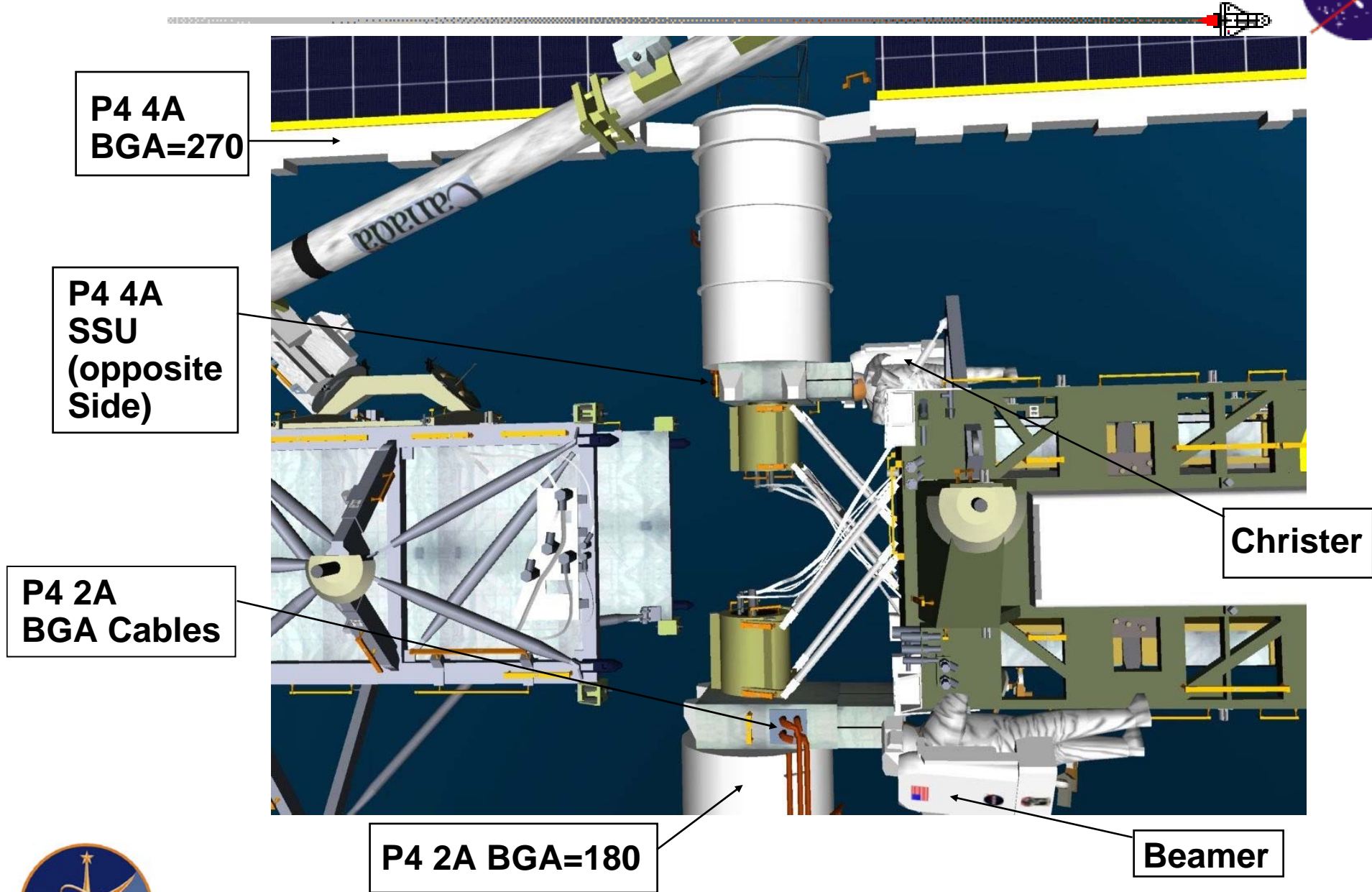


P6 4B SAW (Retracted FD5)



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P5 GCA Install (200 cm)



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ISS Powerdown Operations in Support of Power Reconfigurations



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12a.1 Power Reconfig



EPS Configuration (pre-12A.1)

- ISS power comes from DDCUs in Lab (6) and on Z1 (2)
 - Connected directly to P6 Power Channel outputs (DCSU 2B/4B RBI 6).
 - Truss MBSUs (4) and DDCUs (6) are inactive.
- DDCU cooling is provided by Lab IATCS (heat pipes for Z1 DDCUs).

12a.1 (EVA#2 / EVA#3) Power Reconfiguration to Permanent System

- Power down EPS channels one at a time (EVA 2: Ch. 2/3, EVA 3: Ch. 1/4)
- Disconnect Lab DDCUs from P6 output, connect P6 output to MBSU inputs, connect DDCU (truss and Lab) inputs to MBSU outputs (~2 hrs).
- Activate power distribution (MBSUs and DDCUs) to verify EVA connections successful (15-30 mins).
- Activate EATCS (Time critical due to thermal constraints on passively cooled EPS hardware). (20-30 mins)
- Confirm EATCS providing cooling and complete distribution and load activation.
- Complete powerup of all ISS systems – 12-16 hrs

Entire USOS vehicle will be powered down and reactivated

During Reconfiguration ISS is Zero Fault Tolerant for most systems



12a.1 Thermal Reconfig



Pre 12a.1 EVAs

- N2 remained in lines for stage leak detection, vented post STS-116 launch.
- Loop B NH3 Fill occurs FD5 **post P64B Retract/SARJ ACT** since it commits ISS to LVLH XVV attitudes for the remainder of the program
- Loop A NH3 Fill occurs FD7 in preparation for EVA#3 (MBSU1/4 Reconfiguration)

Issues driving 12a.1 TCS Reconfiguration to Permanent System

- **ACTIVE THERMAL: MBSU/DDCUs will get hot while we are activating, but analysis indicates we are okay for the duration of the EVA**
 - We'll manage via FR 12a.1_C2-XX in real-time (defines MBSU/DDCU non-Op temperature limits)
 - EVA#2 - MBSU#2 feeds P1(Loop B) Pump Module
 - EVA#3 - MBSU#1 feeds S1(Loop A) Pump Module
- **PASSIVE THERMAL: 1/2 USOS unpowered during EVA, Truss ORUs getting cold.**
 - S-band/Ku Band Thermal Concerns drove split in EVA Crew Reconfig
 - » Concern for Lower Temp Limit violations without heaters
 - » EVA#2 and #3 now split such that Z1 SPDAs are the last EVA task
 - » S-bd and Ku equipment (as well as CMG4 during EVA3) remain powered the majority of the EVA (unpowered time approximately 30 minutes vice 5 hrs)
- **TRRJ: 12A.1 will require extended TRRJ motion for the first time**
 - Rads positioned to balance heat rejection and preclude NH3 manifold freeze
 - If autotrack fails, manual TRRJ positioning per flight rules.



Power / Thermal Reconfigurations



EVA Procedure/Commanding Plan

- **Pre- EVA: All disciplines will reconfigure critical loads over to the channel that will remain active.**
 - Loads such as CMGs, MDMs, comm will be kept active as long as possible
 - Unless a load requires graceful powerdown, power will simply be removed
- **After Crew Egress from Airlock: Final powerdown sequence to unpower airlock and power channel. This will be done by PHALCON command script to power off DDCUs and open DCSU RBIs**
- **After EVA Reconfiguration Complete: Begin reactivation. Combined PHALCON/ODIN command script will activate power and data distribution to EATCS. THOR then activates EATCS to provide cooling.**
- **After EATCS successfully activated, remaining power distribution activated and critical redundancy restored (C&C MDM, GNC MDM, CMGs, S-band).**
- **Once critical reactivation complete, all disciplines complete reactivation.**

EVA Call-off for Power System R&Rs within 30 minutes after “Go for Act”

EVA Call-off for Backout (1 hr EVA task) within 30 minutes after Power GO

12-16 hours required to successfully reactivate new power channel





SAW and SARJ Operation/Constraints



P4 SAW/SARJ Operating Constraints



- **P4 SAW has many loads/Contamination constraints**
 - Thruster Loads **MUST** be protected due to catastrophic hazard concerns
 - » VRCS L5L or RS Thruster firings with P4 SARJ/BGA in wrong place can bend/break P4 MAST or damage SARJ DLA mechanism
 - Breaking P4 Mast is much bigger concern
 - » All attitudes must also protect against P4 Longeron Shadowing (3 bays in sun and 1 in shadow for 30 min with constant solar vector)
 - Thruster Contamination (VRCS or RS Thrusters)
 - » Protected in nominal timeline (based upon 3%/year deposition limit)
 - » Not protected for contingencies
- **Operations Mitigation Strategy**
 - Flight Rules will define SARJ/BGA KOZs for all possible SARJ/BGA combinations.
 - » Section 2 will define constraints to be protected
 - » New FR Section: 200+ Tables showing **RED/YELLOW/GREEN** Zones
 - **RED:** May BREAK h/w if thruster firing occurs while SARJ/BGA in this zone
 - **YELLOW:** Fatigue/Lifetime issue but will not break h/w (don't protect in contingency)
 - **GREEN:** Thruster firings acceptable with no constraints



New Operations



Possible Section 2 Text (Phalcon CR Submittal: 11/7/06)

P4 SAW will be protected from jet plume loads, longeron shadowing, and contamination during nominal operations based upon the following priority:

- 1. Jet plume loads potential catastrophic hazard (breaking P4 Mast) from VRCS L5L firings and/or Russian Yaw Thruster Firings during maneuvers or attitude control**
- 2. SAW Longeron Shadowing potential catastrophic hazard (mast damage from 3 bays in sun, 1 in shadow with constant solar vector for 30 minutes).**
- 3. Jet Plume loads potential catastrophic hazard (DLA gear damage) from VRCS L5L firings and/or Russian Yaw Thruster Firings during maneuvers or attitude control**
- 4. Contamination deposition from VRCS L5L firings and/or Russian Thruster firings during maneuvers or attitude control**

For contingency cases, only catastrophic hazards will be considered. ISSPO has accepted contamination deposition during off-nominal situations since it is not a catastrophic hazard. Details of appropriate SARJ/BGA angles to protect P4 SAW from above constraints will be documented in FR DOCUMENT TBD.



Space Flight Meteorology Group (SMG)



- All NWS/SMG software used to create mission critical products or required for mission support is ready for STS-116.
- All SMG forecasters required to support STS-116 are certified and meet currency requirements as listed in the SMG Training & Certification plan.
- No non-standard open work or exceptions
- Standard open work to resolve Zaragoza Handar IPRs
 - Missing routine transmissions / IPR – NAVZ-0069
 - Modem inoperable / IPR – NAVZ-0070

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-116/12A.1 flight.

/s/ Frank C. Brody

Frank C. Brody

Chief, Spaceflight Meteorology Group



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Flight Rules



- All required Volume A, B, C, and D Flight Rules have been developed, reviewed, and approved by the appropriate Flight Techniques, JOP, and FRCB forums
- The following publications will be utilized for STS-116/12A.1:
 - Volume A, Final, PCN-7 dated TBD (PCN-6, Dated June 8, 2006)
 - » FOICB on 11/13/2006, PRCB on 11/16/2006
 - Volume B, Final, PCN-5 dated 10/2/06
 - Volume C, Final, PCN-1 dated 6/13/06
 - Volume D, Final, dated 9/26/06
- STS-116/12A.1.1 Flight Rule Annex
 - Flight Rule Cutoff 11/7/06
 - » To be presented at 11/20/06 JPRCB
 - » PCN-1, if required, will be presented at 12/6/06 JPRCB
 - All required rules to support the STS-116/12A.1 mission have been worked through the appropriate Flight Techniques, GJOP, and 116/12A.1 JOP forums and are either developed/approved or are in work to support 11/7/06 cutoff
 - » Significant Open items discussed later



FDF/ODF



- FDF/ODF will be ready to support STS-116/12A.1
- Ascent/Entry:
 - High Energy TAL - previously discussed in New Ascent Operations
 - Stuck RTLS –previously discussed in New Ascent Operations
 - GPS - Enhance safety by using GPS in powerdown procedures
- Orbit:
 - YERO- crew procedure in flight specific Orbit Ops Checklist



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



- STS-116/12A.1.1 Flight Directors certified per Flight Director Certification Guide (DA8-00010) Final, dated May 15, 2006
- “Four” additional certified Flight Directors available to support Team 4, EMCC and STS-317 work as required
- All MOD Work Guidelines met

Flight Director	Position	Flight Specific Cert Status
Tony Ceccacci	Shuttle Orbit 1, Lead	Anticipated 22 Aug 06
Steve Stich	Shuttle Ascent	Anticipated 14 Aug 06
Matt Abbott	Shuttle Orbit 2	Anticipated 10 Aug 06
Rick La Brode	Shuttle Planning	Anticipated 22 Aug 06
Richard Jones	Shuttle “Team 4”	Anticipated 22 Aug 06
John Curry	Station Orbit 2, Lead	Anticipated 11 Aug 06
Derek Hassmann	Station Orbit 1	Anticipated 11 Aug 06
Joel Montalbano	Station Planning	Anticipated 16 Aug 06
Dana Weigel	Station “Team 4”	Anticipated 11 Aug 06



SPAN Mission Staffing/Training/Certification/ Work Guideline Compliance



- Sufficient personnel 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-115



EMCC



- No changes to EMCC procedures since STS-115
- Personnel identified to support EMCC



STS-116/12A.1 SAFETY STATUS OVERVIEW



DA8 COFR

Category	HRs Open	NCR/AR Open	Open ISS OCADs	Open STS OCADs	Open ISVRs
Shuttle Integration	0	1	-	1	0
Shuttle Orbiter	0	5	-	7	0
Shuttle SSME	0	0	-	-	-
Shuttle ET, SRB, RSRM	0	1	-	-	-
ISS 12A.1	30	3	19	-	9(0 Pre)
GFE					
- EVA	2	0	3	1	1
- Shuttle	7	0	-	8	10(3 Pre)
- Station	4	2	5	-	5
Payload					
- Shuttle	2	1	-	0	0
- Station	2	0	0	-	0



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ISS Safety Issues



- Ability to continue operations after a failure is very limited
 - Out of Family with previous MOD experience (coverage concerns)
 - Marginal safety involvement in integrated risk trades
 - » Expect Non-Beneficial help in RT
- SAW Constraints/Failure Tolerance
 - Plume Load KOZ
 - Longeron Shadowing
 - BGA/SARJ locking
- Viability of ISS post-12A.1
 - CSCS options without Elektron
 - Power Margins (and Prop) implications if 13A delayed significantly
- Regen-ECLS acceleration
- Attitude control down mode options without CMG3



Safety Open Product Status



- **INDEPENDENT SAFETY VERIFICATION REVIEW**
 - ISS FLIGHT 12A.1 ISVR REPORT, ECD: November 30, 2006
 - » Verification of Late Hazard Reports is **NON-STANDARD WORK**



Safety Standard Open Work



- **MOD INTEGRATED CARGO HAZARD ASSESSMENT (ICHA)**
 - STS-116 FINAL REPORT, ECD: 11/08/2006
 - STS-116 VERIFICATION TRACKING LOG, ECD: 11/22/2006
- **MOD INTEGRATED EXPERIMENT HAZARD ASSESSMENT (IEHA)**
 - ISS FLT 12A.1 IEHA FINAL REPORT, ECD: 11/08/2006
 - ISS FLT 12A.1 VERIFICATION TRACKING LOG, ECD: 11/22/2006
- **INDEPENDENT SAFETY VERIFICATION REVIEW**
 - SHUTTLE ISVR REPORT, ECD: 11/08/2006



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-317



- 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-116/12A.1 Ascent/Entry Team will support STS-317
- STS-116/117 Teams will support Orbit Operations as required



Flight Controller Ops Handbook (FCOH)



- FCOH procedures will be ready to support STS-116/12A.1
- Status as of 10/31/2006
 - SSP FCOH (JSC-26843)
 - » Final, Rev C, dated 8/22/06
 - ISS FCOH (JSC-29229)
 - » Final, dated 9/27/06
 - By current operations, ISS FCOH is always up to date on Web site http://mod.jsc.nasa.gov/da8/FCOH/iss_fcoh/ISS_FCOH_TOC.htm
- **Any required changes for STS-116/12A.1 (YERO, etc.) will be incorporated and not anticipated to be an issue**



Level II Actions



- As of 10/31/06, there are no Space Shuttle Program “Open Actions/Constraints to Flight” assigned to MOD for STS-116/12A.1

- One action with STS-116/12A.1 effectivity, paperwork has been submitted:

S063432A (3-1)

Assigned: 8/23/06

Board: OSB STS-115 Flight Readiness Review (FRR)

Investigate the root cause of the flight data file errors in the STS-115 training flow and develop corrective action. Report results to the STS-116 FRR. *Action Effectivity: STS-116*

Due: STS-116 FRR

- MOD Submitted closure on 10/27/06, request OSB.

- As of 10/31/06, there are no Space Station Program “Open Actions/Constraints to Flight” assigned to MOD for STS-116/12A.1

- SSOR for STS-116/12A.1 and Stage being conducted on 11/14/06





Standard Open Work



Standard Open Work



- 116/12A.1 Annex Rules (Inputs due 11/07/06)

- Mission priorities
 - » Updates for late inspection, O2 XFER, and other mission changes
- Mission Extension
 - » Defines +1 Day priorities (CAT 1 Mission Objectives, Focused Inspection, Late Inspection)
- Launch window
 - » Progress Reboost on 11/29 protects daily FD3 pane from 12/7-12/26
- Docked loads updates
- APFR loads updates
- Orbiter/Station attitude control priorities
- Contingency solar array jettison (updated from STS-115 FR)
- Mated FES dump constraints updates
- Power transfer to the RSOS from the USOS updates pending negotiations (*see non-standard open work*)
- Power Cycle SSME Controller for Pc Shift
- Trajectory Matrix including Contingency Payload Return
- Pre-Launch Target Tracking
- Spacehab H2O line Heater failure



Standard Open Work



- Complete STS-116/12A.1 Ascent/Entry simulations
- Complete ISS reboost on 11/29 to set up FD 3 rendezvous on each day in December 6-17 launch period
 - Program YERO decision could complicate reboost plan with additional reboost and increased STS-117 rendezvous altitude (currently 181 nm)
 - Current plan has possible FD 4 rendezvous on December 20, 22, 24, 26
- Final FDF updates including ascent checklist updates based on Flight Design Uplink Cycle
- Final LCC Updates
 - STS-116 Minimum Equipment List (MEL)
 - 3 of 4 ECO LH2 ECO Sensors





Non-standard Open Work



Non-Standard Open Work



- YERO (Year End Rollover)
 - Orbit Ops - YERO Operations (Orbiter re-cycle)
 - FCOH – Ground Year End Rollover (STS-116 Specific)
 - Flight Rules - Updates to current YERO rules and addition of new YERO PLS rules in support of STS-116



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-116/1A.1 mission
- All Standard /Non-Standard “Open Work” will be closed out prior to Level 1 FRR (11/28-29/2006).





Backup



Cat 1 Objectives/Mission Priorities



CAT 1

- FD2 RCC Inspection
- RPM Photography
- Crew Swap - EXP 14 FE for EXP 13 FE (IELK, SOKOL, ISS safety Briefing, Mandatory Crew rotation Transfer items).
- Water Transfer
- P5 Install (EVA #1)
- P6 4B SAW retract to Bay 1 (required to support EVA #2 and EVA #3 Power/Thermal reconfiguration)
- MBSU Power channel 2/3 Reconfig (EVA #2)/EATCS Loop B activation (Ground)
- MBSU Power channel 1 /4 Reconfig (EVA #3)/EATCS Loop B activation (Ground)
- Transfer “Critical Cargo Items”
- SMDP’s to PMA-3 (EVA #3)
- CETA Cart relocations - STDB to Port of MT (EVA #2)



Remaining STS-116/12A.1 Integrated Sims



- Orbit
 - None – all simulations complete
- Ascent/Entry
 - 11/8: Post Insertion
 - 11/13: FDO/Booster
 - 11/16: Terminal Countdown Demonstration Test
 - 11/27: Ascent #3
 - 11/28: Entry #3
 - 12/1: Ascent #4





Ascent/Entry Flight Techniques Panel

Volume A Shuttle Only Flight Rules

Flight Readiness



Ascent/Entry Flight Techniques Panel



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Volume A PCN-7 Flight Rules



- TBD % of Volume A PCN -7 rules merely move the rule from the STS-114, STS-115, or STS-121 Flight Specific Annexes.
- These rules have been discussed at pervious JPRCBs and include:
 - CR 7825 Vent Door Management
 - CR 7766B FC Heater Management
 - CR 7765B FC Loss Definition
 - CR 7767A FC Pump Failure Management
 - CR 7768A Failed-On Fuel Cell Heater
 - CR 7826 PLBD/Starboard MPM Clearance Constraints
 - CR 7824 Ku-Band/OBSS Clearance
 - CR 7722Update Loss of Av Bay Fan
 - CR 7840A Shuttle EOM Orbit Adjust Burns



Volume A PCN-7 Flight Rules



- Several minor rule updates in Volume A PCN -7 including CRs:
 - **6388A LES O2 Supply System Loss Management-** updates A17-259 to enhance real-time LES manifold test and to make editorial change to reflect applicable hazard report.
 - **7367 Vacuum Vent Loss Definition-** clarifies pressure limit in A 17-354 where vacuum vent capability lost and makes editorial change to reference applicable hazard report.
 - **7435 ET Door Go/No-Go Criteria-** clarifies rule A10-1001 (MMACS Go/No-Go Criteria) to specify an RTLS abort is required only if ET Door close capability is not recoverable





Orbit Flight Techniques Topics Applicable to 116/12A.1



Orbit Flight Techniques



- No new items in support of STS-116/12A.1





Generic Joint Operations Panel Topics Applicable to 116/12A.1



Generic JOP



- No new items in support of STS-116/12A.1





STS-116/12A.1 Joint Operations Panel Topics



STS-116/12A.1 JOP



Mission Operations Directorate
Flight Director Office

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:



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**
 - IDBR-01*
- **Orbiter**
 - ORBI-007 (Gap filler/Tyvek/Blankets/Putty Repair)*
 - ORBI-249*
 - ORBI-071*
 - ORBI-111* COPVs
 - ORBI-278*
- **ET**
- **SSME**
- **RSRM**
- **SRB**
 - B-60-26*

*** Pre verified**



ISS OPEN HAZARD REPORTS



- COL-1002*
 - COL-1003* (??)
 - ECL-0205* ◆ (11/3/06)
 - ECL-0206* ◆ (11/3/06)
 - ECL-0210* ◆ (11/3/06)
 - ECL-0404* ‡ (11/3/06)
 - EME-0602* ◆ (11/3/06)
 - ENV-1102* ◆ (11/3/06)
 - EPS-0207* ‡ (11/3/06)
 - EPS-0309* ‡ (11/1/06)
 - **EPS-0503*** ‡ (??)
 - **EPS-0504***
 - EVA-0301* ‡ (11/3/06)
 - EVA-0304* ◆ (??)
 - EVA-0307*
 - GNC-0701* (??)
 - IVA-0201* ◆ (11/3/06)
 - IVA-0204* ◆ (11/3/06)
 - IVA-0208* ◆ (11/3/06)
 - MCH-0051* (??)
 - MCH-0109*
 - STR-0115*
 - STR-0074* ◆ (11/3/06)
 - STR-0105* ◆ (11/3/06)
 - STR-0907*
 - **STR-0108*** ‡ (??)
 - STR-1005*
 - TCS-0091* ◆ (11/3/06)
 - TCS-1202*
 - WRM-0137* ‡
 - Class 1 Cont EVA MHAs
 - (TBD) Loss of S-Bd during Reconfig
- * Pre-verified
- ◆ Updates for R-ECLS only
- ‡ Impacted by R-ECLS
- (Closure Date)



ISS Open NCRS



NCR-ISS-188-12A.1 Lack of Two Failure Tolerance to Prevent
Longeron Shadowing (LS)

NCR-ISS-195 Pins on the Powered side of the Connector
due to Bi-directional power during Flight
12A.1 Power Reconfigurations

PMA3-SMDP-NCR-001-12A.1
Noncompliance with Failure Tolerance
Requirements for Service Module Debris
Panel Retention Latching Device



GFE Open Hazard Reports



- **EVA**
 - SAFER
 - Overlay Tile Repair Kit*
- **STS**
 - Foam Applicator Assembly
 - Sensor Package 1
 - Shuttle Cycle Ergometer
 - ISS Digital Camera
 - O2 contingency hose (update)
 - Spacelab Emergency Breathing System
 - High Rate Dosimeter
- **ISS**
 - CWC to ¾" Female QD Adapter
 - Ammonia Respirator
 - High Rate Dosimeter
 - Laptop Portable Speaker Assembly



PAYLOAD OPEN HAZARD REPORTS



• Shuttle

- SMDP TDK (HR-STS116/RSCE/TR2/003)
 - » Sharp edge on tension strap buckles (3 of 12)
 - » Russian hardware
 - » ISS Program accepted no mods to hardware
 - » No-Touch Area to be included in crew procedures
 - » OCAD to be submitted (ECD: 10/31/06)
 - » PSRP Chair requesting Shuttle Program decision on whether an Accepted Risk HR is required (ECD: 11/01/06)
- STP-H2 (CAPE-08)
 - » Accepted Risk HR for partial/incomplete deploy of ICU
 - » NEA and Linear Way of the Lightband Separation System are not 2FT
 - » PSRP approval, pending Shuttle Program approval (ECD: TBD)
- SPACEHAB Integrated
 - » See SMDP TDK above



PAYLOAD OPEN HAZARD REPORTS



- **ISS**

- PFD

- » Reviewed by ESA PSRP

- » Two open HRS (ECD: 10/31/06)

- BCSS-FDI

- » Launched on 12P

- » Returning hardware has not been identified

- » ECD: TBD

