



STS-129/ISS-ULF3 MOD Flight Readiness Review

***JSC Mission Operations Directorate
Flight Director Office***

DA8/Bryan C. Lunney

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October 15, 2009

Agenda Item 3

Agenda



- **DA8 COFR Requirements/Endorsements**
 - COFR Requirements/Endorsements Summary
 - New Operations – A/E Topics, Shuttle, ISS, MCC
 - Safety Status Review
 - Flight Rules (Generic Volumes A, B, C, D; STS-129/ULF3 Annex)
 - FDF/ODF/SODF
 - Mission Staffing: Training/Certification/Work Guidelines Compliance
 - Non-Critical Processors/Applications (backup)
 - Emergency Mission Control Center (EMCC)/Backup Control Center (BCC) (backup)
 - Command Procedures (backup)
 - Contingency Shuttle Crew Support/Rescue Flight: STS-130 (LON vehicle) (backup)
 - Flight Techniques & Joint Operations Panels (backup)
 - Level II Actions
- **Standard Open Work (backup)**
- **Non-Standard Open Work**
- **Exceptions**
- **Items of Interest**
- **Flight Readiness Statement**



DA8 COFR Requirements/Endorsements



REQUIREMENT (SHUTTLE)	FD	PI	Safety	SPAN	SMG	Team 4
Non-Crit Processors/Applications	G				G	
EMCC	G				G	G
Certified Flight Controllers	G			G	G	G
Flight Rules	G					
FDF	G	G				
FTP - New Ops	G					
Flight Anomaly Resolution	G			G		
Anomaly - Procedure	G					
Exceptions/Action Items From Prior Readiness Reviews	G	G	G	G	G	G
CIL/Hazards	G		G			
No Constraints	G	G				
Level II (Program) Actions	G	G				
Mission Requirements	G					
Exception/Resolution	G	G				
Command Procedures	G					
Flt Prep Process Plan Requirements Met		G				
Contractor Process Insight		G				



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.



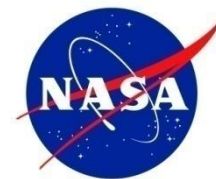
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DA8 COFR Requirements/Endorsements



REQUIREMENT (STATION)	Flight Director	Program Integration	Ops Safety	SPAN	Team 4								
Non-Crit Processors/Applications	G						G	Ready to Support Flight/Only Standard Open work					
BCC	G				G								
Certified Flight Controllers	G			G	G								
Flight Rules	G												
ODF/SODF	G												
JOP - New Ops	G						Y	Non Standard Open work with expected resolution prior to flight.					
Flight Anomaly Resolution	G			G									
Anomaly - Procedure	G												
Exceptions/Action Items From Prior Readiness Reviews	G	G	G	G	G								
CIL/Hazards	G		G				R	Open work without expected resolution without assistance, prior to flight, or unavoidable constraint violation.					
No Constraints	G	G											
Level II (Program) Actions	G	G											
Flight/Increment Planning (Mission Requirements)	Y												
Exception/Resolution	G	G											
Command Procedures	G							N/A					
Contractor Process Insight		G											





Ascent/Entry Topics



Preliminary Launch Window Times for STS-129/ULF3

KSC Day Window Open	KSC Date	RNDZ Day	ET Photo Umbilical	ET Photo Handheld	Open (EST)	Open (GMT)	In-Plane (GMT)	FD3 Close (GMT)	FD4 Close (GMT)
Thursday	12-Nov	FD3	Light	Dark	15:59:21	20:59:21	21:04:21	21:09:21	
Friday	13-Nov	FD3/FD4	Light	Partly Lit	15:38:15	20:38:15	20:38:39	20:43:39	20:46:53
Saturday	14-Nov	FD3	Light	Partly Lit	15:11:07	20:11:07	20:16:07	20:21:07	
Sunday	15-Nov	FD3/FD4	Light	Light	14:49:26	19:49:26	19:50:25	19:55:25	19:58:39
Monday	16-Nov	FD3	Light	Light	14:22:54	19:22:54	19:27:54	19:32:54	
Tuesday	17-Nov	FD3/FD4	Light	Light	14:00:33	19:00:33	19:02:12	19:07:12	19:10:26
Wednesday	18-Nov	FD3	Light	Light	13:34:40	18:34:40	18:39:40	18:44:40	
Thursday	19-Nov	FD3/FD4	Light	Light	13:11:34	18:11:34	18:13:58	18:18:58	18:22:12
Friday	20-Nov	FD3	Light	Light	12:46:27	17:46:27	17:51:27	17:56:27	
Saturday	21-Nov	FD3/FD4	Light	Light	12:22:33	17:22:33	17:25:45	17:30:45	17:33:59
Sunday	22-Nov	FD3	Light	Light	11:58:13	16:58:13	17:03:13	17:08:13	

NOTES:

- 1) Day launch from November 9 through December 4
- 2) Beta cutout (Beta > 60 deg) begins on November 20 for 11+1+2 day mission.
- 3) FD3/FD4 are days where both a FD3 and a FD4 pane may be utilized to extend the launch window.
- 4) Optimal ET Umbilical lighting occurs between November 11 through December 8
- 5) Optimal ET Handheld lighting occurs between November 15 and December 8
- 6) November 13 and 14 are "Partly Lit" because sunset occurs during the normal ET handheld photo time
- 7) November 13, 15, 17, 19, and 21 window open constrained by phase angle



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Ascent/Entry Topics



- **COLA Cutouts**

- Air Force Instruction (directive memo) from the 14'th Air Force “may” modify COLA cutout methodology starting with STS-129
 - Launch window screened against all “Active” satellites instead of only “mannable” satellites
 - Impacts to launch window expected to be minimal
 - DM working to mitigate impacts by asking Air Force to screen against shuttle-specific launch insertion box
 - Previously briefed at STS 128/17A MOD FRR



New Operations: Shuttle



- **Weather Flight Rule Modification**
 - KSC/45'th Weather authoring LCC modification to reduce launch trajectory standoff distances from electrified anvil clouds
 - Modification based on recent Lightning Advisory Panel study.
 - AEFTP #248 (4/30/09) reviewed Lightning Advisory Panel findings that identified the reduced standoff distance.
 - SMG authoring corresponding modification to Vol A Landing Site Weather Criteria
 - Updated Flight Rule will be reviewed at AEFTP #252 on 10/16
 - Update targeted for Annex Flight Rules, PCN 1
- **Also previously briefed at STS-128/17A FRR, but not implemented for STS-128 due to some open questions.**



New Operations: Shuttle



- **Docking with SRMS grappled to ELC1**
 - ELC1 will be grappled immediately following FD2 TPS Inspection OBSS Stow by the SRMS
 - SRMS will remain grappled to ELC1 through docking
 - Robotic operations are streamlined leading up to FD3 ELC1 unberth/hand-off to SSRMS
 - Engineering robotics (ER) loads analysis complete with no issues
- **Orbiter Variable Alt DAP Delay Time:**
 - STS-129/ULF3 is first time use of capability
 - Variable delay timer mitigates lifetime structural loads issues
 - All STS-129/ULF3 orbiter only and mated attitude control plans reflect change





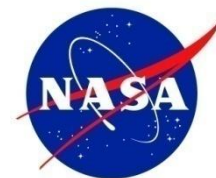
New Operations: Shuttle



- **STS-129 is flying on OV-104 *Atlantis*, which is a non-SSPTS vehicle**
- **Prelaunch estimates show pad hold capability is limited to ~66 hrs**
- **On-orbit docked only powerdowns are required to achieve pad hold greater than 48 hours:**
 - ~130W power down to achieve 72 hours of pad hold
 - ~640W power down to achieve 96 hours of pad hold
 - Powerdowns are above the standard Group B powerdown and would be implemented only during docked ops (MET 001/23:00 – 009/12:00)
- **Pad Hold powerdown plans pre-coordinated with MOD, Orbiter, Engineering, Flight Crew and KSC via the STS-129/ULF3 JOP and Orbiter Project Tech Tag-up (OPOTT)**
 - See Backup chart for details



Shuttle: Items of Interest



- **TPS Inspection Flat Field must not occur entirely on TDRS-Z:**
 - Based on STS-128/17A lesson learned, where DAT could not calibrate TPS inspection data results due to TDRS-Z KU bandwidth limitation
 - Constraint applies to Flat Field Surveys during both FD2 and Late Inspections
 - Plans are in place to deconflict Flat Field TPS Inspection activities with TDRS-Z
- **Orbiter Power Contactor Assembly (PCA) risk mitigation:**
 - Primary Logics & Drivers to remain powered from launch through docking
 - Cryo budgeted to account for extra power use
- **Shuttle LiOH change-out requirements for elevated PPCO₂**
 - Same flight rule and LiOH change-out methodology used during STS-128/17A will be used for STS-129/ULF3
 - When PPCO₂ = 5.0 crew will be directed to change out LiOH as soon as practical (i.e., not an immediate action)
 - No long term elevated PPCO₂ issues are expected based on preflight predicts and planned crew size (total of 12 crew on Shuttle/ISS)
 - Separately, crew will be asked to status the cabin atmosphere during presleep
 - Shuttle will use 6 cans from the ISS Contingency Reserve during the mission leaving ISS with 20 at the end of the mission.



Shuttle: Items of Interest



- **Orbiter Docking Mechanism Check-out Required During AOS:**
 - Several issues were noted at KSC during reinstallation of ODS following STS-125/HST SM-4 (ring drove past initial position)
 - Docking mechanism checked out properly following extensive troubleshooting (prior to leaving the OPF)
 - MER CHIT requests FD2 docking mechanism powerup and check-out during AOS (to allow data review prior to FD3 docking)



Shuttle and ISS: Item of Interest



- **ELC 1 must be unberthed prior to ELC2:**
 - Constraint required for Orbiter center of gravity (CG) control at End of Mission (EOM) and for any time deorbit capability (program requirement)
 - If ELC1 unberth is unsuccessful, both ELCs will be round-tripped:
 - Considered an accepted risk by the ISS program during mission design phase to maximize upmass capability on remaining Shuttle flights
 - Constraint documented in Annex Flight Rule (ULF3_C2-82)



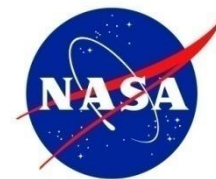
Shuttle and ISS: Item of Interest



- **Leonids meteor shower peaks at GMT 321/21:44 (November 17th at CST 1544)**
 - For an 11/12/09 launch, peak +/- 4 hours overlaps with EVA2
 - For an 11/14/09 launch, peak +/- 4 hours overlaps with EVA1
- **STS-129/ULF3 JOP reviewed options to mitigate MMOD risk:**
 - Use +1 day (perform affected EVA one day later in the mission)
 - Accept increased risk of EV crew MMOD strike (perform EVA as planned)
 - Rely on crew member and flight controller training and existing emergency procedures in event of MMOD strike
 - EVA procedures for EV crew suit leak or EV crewmember incapacitation
 - ISS Rapid Safing/Joint Expedited Egress (JEE)/Joint Expedited Undocking and Separation (JEUS) for Shuttle or ISS cabin leak
 - Modify mission/EVA timeline to deconflict with 8-hour window:
 - Other than insertion of +1 days, no timeline options were identified that were within SCSC requirements and avoided the 8 hour window. Other options discussed include:
 - Use of descending landing opportunities (sleep shift later each day)
 - Perform maximum sleep shifting allowable per SCSC
 - Shorten EVA duration to avoid overlap with 8-hour window
- Forward plan requires discussion with CB, Shuttle and Station Programs to develop a recommendation.



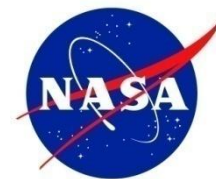
Shuttle and ISS: Item of Interest



- **MRM2 Docking is planned ~5.5 hours prior to STS-129's November 12 launch attempt:**
 - Estimated MRM2 docking time ~ GMT 316/15:37 (Russian Ground Station Daily Orbit 2 ascending node + 20 minutes).
 - Planned STS 129 launch time = GMT 316/21:04.
 - This is a violation of planning GGR&C 3.1.17 (requires 6 days between the events). ISS Program CR 11814 waived the violation in September.
 - MOD concurred with waiving the GGR&C but commented that in order to protect for the case where MRM2 slips past STS 129/ULF-3 new analyses would be required and potentially new ops products based on the results of the analyses.
 - “no MRM2” case not analyzed for STS 129/ULF-3. Engineering requires 3 weeks to perform the analyses and MOD will need another week to update the ops products.
 - Proposed LCC in ULF3_C2-2 to establish the minimum success criteria for the MRM2's docking sequence such that a Shuttle docking would be cleared.
 - Intent is to use LCC as an MMT decision aid on whether or not to proceed with the countdown
 - No ISS crew sleep shift issue (per Flight Surgeon's) for MRM2 docking, since sleep shift is in the same direction as STS-129/ULF3 crew



Shuttle and ISS: Item of Interest



- **ELC 1 and 2 Launch to Activation (LTA) clocks**
 - The ELC's receive power from the Remotely Operated Electrical Umbilical (ROEU) while in the payload bay
 - When attached to ISS they receive power from the Common Attach System (CAS) Umbilical Mating Assembly (UMA).
 - LTA clock from ROEU disconnect to UMA connect is ~6 hours for both ELCs for the November launch window.
 - Nominal transfer time is ~ 4 $\frac{3}{4}$ hours.
 - Limiting component on the ELCs is the ExPRESS Carrier Avionics (ExPCA).
 - Flight specific solar update analysis for November launch window is being performed to increase the LTA clocks. Minor increase expected.
 - ELC 1 is going to an UCCAS site, these sites have some fault tolerance so the probability of not being able to install the ELC within 6 hours is small.
 - ELC 2 is going to a PAS site, these sites have no fault tolerance. ELC 2 installation is planned on FD6 during EVA 2 in case there are problems requiring EVA assistance.
 - MCAS is available as a contingency site but remaining SSRMS ops will be impacted.



Shuttle and ISS: Item of Interest



- **Returning ISS Crewmember rotation considered complete at FD3 Hatch Opening:**
 - ISS FE-2/Nicole Stott is last planned ISS crewmember to fly on Shuttle
 - No Soyuz Seat liner (IELK) exchange or mandatory transfer requirements to call crew rotation complete
 - Recumbent seat to be flown on Shuttle for her return
 - In an emergency, Nicole will be considered a Shuttle crew member after hatch opening unless CDR determines otherwise:
 - Preserves the option to return Nicole on 20S if return path to Shuttle is deemed unsafe in real-time
 - Nominally only 2 crew (Williams and Suraev) come home on 20S.
 - Decision is a real-time call by CDR (Shuttle or ISS)
 - STS-129 Shuttle crew and ISS E21 crew trained this scenario trained in Bldg 9 with no issue
 - For timeline purposes FAO and Ops Plan consider her a Station crew member until hatch closure on FD9.
 - For consumable planning ECLSS and EECOM consider her a Station crew member until hatch closure on FD9.



New Operations: ISS



- **EXPRESS Logistics Carrier (ELC)**
 - Total of 4 ELC's are planned to fly to ISS
 - ELC is the unpressurized, external counterpart to the pressurized internal lab, ISPR based EXPRESS Rack.
 - ELCs are designed to conduct science experiments and store Orbital Replacement Units (ORUs) external to the ISS.
 - ELCs attach to the ISS with a Common Attach System (CAS)
 - ELCs have data (1553 and HDRL) and power (primary and secondary) interfaces with ISS.
 - ELC Responsibilities are divided between MCC-H, POIC and MER
 - MCC-H is responsible for transferring the ELCs from the payload bay to the ISS and attaching them, for supplying power and a data connection up to the ELC interface, and for thermal management of the spare ORUs on the ELCs.
 - POIC is responsible for distributing power and data throughout the ELC and operating the experiments and payloads.
 - MER is responsible for sustaining and troubleshooting the ELC hardware and software and the mechanical, power and data interfaces with ISS.



New Operations: ISS



- **High Pressure Gas Tank (HPGT) Transfer**

- A new HPGT (O₂) launches on ELC-2. ELC-2 is transferred to S3 on FD6. During EVA 3 on FD8 the HPGT will be transferred from ELC-2 to the airlock.
- Close clearance (~3-4 inches) is expected between the new tank and the Node 1 WETA
 - Crew will monitor clearances in real-time and if required the WETA will be temporarily moved out of the way and then re-installed after the tank is on the airlock
- The HPGT will be connected into the ISS high pressure O₂ system and a short (~30 minute), gross leak check will be performed by the ground during the EVA
 - EV3 will temporarily isolate both high pressure tanks, the existing one and the new one. Following a successful leak check EV3 will re-open the isolation valves to both tanks.
- **MMOD shields need to be removed from the Airlock to make room for the HPGT. The plan for the shields is TBD.** MOD generated options for external stowage, internal stowage and jettison and provided the options to the ISSPO. The final decision by the ISSPO is pending.



New Operations: ISS



- **Node 1 Modification Kit Installation**

- Node 3 was originally to be installed at Node 1 nadir. ISSPO management decided to change the installation location to Node 1 port and clock Node 3 ninety degrees.
- The IMV, avionics, ITCS supply and return lines and five bulkhead feed-throughs (N2, O2, ARS, waste water and potable water) have to be re-routed from Node 1 nadir to node 1 port. The hardware is divided up into mod kits.
- Total crew time required for all the work is 60 hours (30 hours x 2 crew).
 - The first 11 hours will be performed in the 20S stage (first week of November) with the bulk head feed-through work and subsequent leak check.
 - 46 hours (23 x 2 crew) will be performed by ISS crew during ULF3 docked ops. The work will consist of the mid-bay and alcove procedures (IMV and fluid lines)
 - 3 hours (1.5 x 2 crew) didn't fit in the ULF3 timeline and will be performed after ULF-3. The work will consist of the 1553 and audio cables routing and connections.
 - Shuttle crew will not nominally perform this work. CDR received abbreviated training mainly for mission cognizance and could be used if replanning was required.
- The planning accommodates completion of the work prior to STS-130/20A.



New Operations: ISS



- **CMG Desats**
 - Used during STS 128/17A as a contingency
 - At SSPCB on 9/28 4-pulse pattern desats used by Momentum Manager (MM) was approved for unexpected cases and marginal cases.
 - Will be available for STS 129/ULF-3 if needed.



Ops Safety Issues



- **SGANT/ISS UHF Cable Mate Task on EVA 1**
 - Safety assessment in work (ECD to SRP 10/20)
 - ISS UHF radio (SSSR) must be turned off during the cable mating (nominally ~ 5 minutes)
 - Big Loop will temporarily be unavailable while the ISS UHF radio is off
 - Shuttle UHF radio (SSOR) will remain on and good comm with EV crew and IV is expected.
 - Wireless Video System (WVS) will not be affected, it will remain available.
 - Backup comm protocol being developed in case comm is temporarily lost between IV and EV crew. ECD is L – 3 weeks.

- **Positive Plasma**
 - NCR-ISS-232B Lack of Two-fault Tolerance to EVA Crew Shock in Low Earth Orbit Plasma Environment
 - No Change from last mission
 - Flight specific NCR for STS 129/ULF3 is required. ECD is L – 2 weeks.



Non-Standard Open Work: Safety



- **NCR-P/TV-SDCAM-01 Camera Video Drag-throughs**
 - 4 P/TV camcorder related drag throughs mistakenly left out of the presentation with the temporarily “grandfathered” docked ops drag throughs.
 - NCR is at OA level now awaiting approval. ECD is L-3 weeks.
- **ExPRESS Logistics Carrier (ELC)**
 - Awaiting EVA IPT approval of bolt data for EVA installation procedures (ECD 10/23/09)
 - ELC EVA-2 hazard report revisions required to correctly document payload power inhibits (ECD 10/30/09)
- **AIS-GATOR**
 - Awaiting EVA IPT approval of bolt data for EVA installation procedures (ECD 10/23/09)



Non-Standard Open Work: Shuttle and ISS



Shuttle

- None

ISS

- Finalize the plan for the A/L MMOD Shields. ECD depends on when and what the ISS Program decides.





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, Joint Operations Panels, and the Flight Rules Control Board**
- **The following generic publications are applicable for STS-129/ISS-ULF3**
 - Volume A (STS), Final, PCN-10 dated 5/21/09
 - Volume B (ISS), Final, PCN-17 dated 9/24/09
 - Volume C (Joint), Final, PCN-5 dated 5/18/09
 - Volume D (Soyuz/Progress), Final, PCN-6, dated 5/4/09
- **STS-129/ISS-ULF3 flight rules annex**
 - Final, approved at JPRCB on 9/28/09
 - PCN-1, planned for JPRCB review on 11/2/09
 - Currently tracking ~35 open flight rule CRs





FDF/ODF/SODF



- **DA8 has participated in FDF/ODF/SODF processes and procedure reviews as required**
- **FDF/ODF will be ready to support STS-129/ISS-ULF3**
- **New US procedures are primarily for:**
 - Robotics (ELC 1/2 install, EVA and Node 1 Mod Kit Installation)



Flight Director Mission Staffing



- All STS-129/ISS-ULF3 Flight Directors are certified per Flight Director Certification Guide (DA8-00010), Final, dated May 22, 2009
- Additional certified Flight Directors are available to support Team 4, EMCC, and STS-130/LON flight, as required
- MOD Work Guidelines are met
- Flight-specific certifications are expected to be complete by Oct 20, 2009

Shuttle Flight Directors		ISS Flight Directors	
Michael L. Sarafin	Lead/Orbit 1	Emily J. Nelson	Orbit 1
Gary Horlacher	Orbit 2	Brian T. Smith	Lead/Orbit 2
Paul F. Dye	Planning	Jerry P. Jason	Orbit 3
Bryan Lunney	Ascent/Entry	Rarick and Ridings	Team 4





Level II Actions



- **Two Level II actions are open from STS-128/17A that apply to STS-129/ULF3:**
 - S070048C: Review Reaction Control System (RCS) Thruster Flight Rules And Procedures Relative To Failed Thruster And Lead Scenarios
 - Community revisited generic Flight Rules A6-60 RCS MANIFOLD CLOSURE CRITERIA, A6-61 RCS MANIFOLD/OMS CROSSFEED LINE REPRESSURIZATION, and A6-158 RCS LEAKING JET MANAGEMENT:
 - Existing manifold closure rules were revalidated, including recent Boeing stress analysis
 - More data required to determine if Part B of Rule A6-158 requires an update for FU leaks that were isolated and subsequently saw temperatures below 12 deg F (freezing temp of FU)
 - Requires data from WSTF following post-flight review of STS-128 thruster/manifold hardware
 - S070066: Evaluate Flight Rule C2-112 Requirement For Rbar Pitch Maneuver (RPM) And Determine If Any Updates To the Risk Trades Are Required
 - RPM risk trades and current flight rules were revalidated (no change required)
 - Generic docked orbiter TPS inspection procedures require an update to reflect the current ISS configuration (current published procedure assumes pre-STS-124 config)
 - Both actions were reviewed by Orbit Flight Techniques Panel (OFTP) #239 on 10/9/09 and will be statused at the PRCB on 10/22/09 where closure will be recommended (pending identified forward work).



Exceptions



- **None**



Flight Readiness Statement



- **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-129/ISS-ULF3 mission and ISS-ULF3 stage**
- **All standard/non-standard open work will be closed out or have a closure plan prior to SSP FRR (10/20/09) with no exceptions**
- **ISSP SORR will be conducted on 10/19/09; closeout for non-standard open work will be reported to ISSP prior to SOMD Level 1 FRR (10/29/09)**



BACKUP



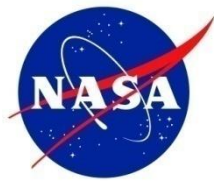
New Operations: Shuttle



- **Orbiter Mated Reboost Configuration 4 Update**
 - Config 4 reboost primary jet firing logic updated (now alternates between forward down jets and attitude hold firings)
 - Decreases probability of a failed or aborted reboost due to attitude envelope exceedence
 - Config 3 (Vernier) reboost is prime method, Config 4 is back-up method if VERN fail occurs
- **ABRS Middeck Payload Power Switch Anomaly:**
 - A power exceedence of payload ICD limit was noted on ABRs power switch during preflight checkout
 - Payload Safety Review Panel (PSRP) recommended to not use payload switch
 - Community agreement (via EME Panel and PSRP) to use payload circuit breaker on ABRs power/unpower via procedure to avoid this issue
- **GLACIER Middeck Payload Power Plan:**
 - GLACIER will launch unpowered and remain that way until powered on FD7 to perform a full cooldown and desiccant moisture removal
 - Payloads will be transferred to GLACIER on FD9 via Double Cold Bags (DCB)



Pad Hold Buy-Back Orbiter Powerdown Equipment Shopping List



	Equipment	Total	Cumulative	Impact/Notes
72 hr Launch Slip	KU STDBY in Blockage	73.2	73.2	Standard
	1 of 6 PGSC day time	44.7	117.9	RPOP Down
	1 of 2 MSN Timer	4	121.9	None
	1 of 3 MDDK FL	11	132.9	Crew preference
96 hr Launch Slip	FES - OFF	225	357.9	Minimal
	1st of 3 MDU day time	44	401.9	RPOP (DOUG) Down
	2nd of 3 MDU's day time	44	445.9	minimal
	ADC 1A/2A (MEDS)	7.4	453.3	Minimal
	ADC 1B/2B (MEDS)	7.4	460.7	Minimal
	GPS String G2	28.6	489.3	None
	MDU (last) for sleep	27.5	516.8	Minimal (crew time)
	MDM FF4*	52.3	569.1	RCS JET TEMP Insight
	1 of 2 EVNT Timer	4	573.1	None
	2 of 4 PGSC's night	44.6	617.7	WinDecom & RPOP Down
IDP (last) for sleep	23	640.7	Minimal (crew time)	
Additional Items	SSV	11.5	652.2	Nice to have for EVA
	MDM FF2*	52.3	704.5	RCS JET TEMP Insight
	MDM FA4*	48.2	752.7	RCS JET TEMP Insight

*Requires MMT Concurrence per FR A2-134

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Spaceflight Meteorology Group



- All forecasters required to support STS-129 meet requirements listed in SMG Training & Certification plan.
- System Changes:
 - **AWIPS:**
 - Build 9.1 update completed Sep 28th – no significant impacts
 - Installed new router for future NOAAnet WAN implementation (Dec 09)
 - Replacement of firewall hardware scheduled for Oct 20th
 - **MIDDs: FDOC released Build 21.2 and updated SMG's local model cluster. See DD presentation for details.**

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-129 flight.

/s/ Frank C. Brody

Frank C. Brody

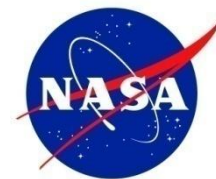
Chief, Spaceflight Meteorology Group

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Flight Director Office

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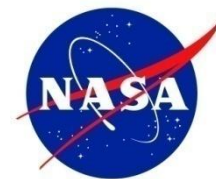
Weather Systems Status



System	Explanation	Risk	Impact
AWIPS Build 9.1	Routine software update to AWIPS Completed September 28 th	Low	Problem transferring large GFS model data files to AWIPS from MIDDs.
AWIPS LDAD Firewall	Scheduled replacement of AWIPS LDAD firewall hardware Target: October 20 th	Low	None anticipated
AWIPS NOAAnet Router	Installed new AWIPS hardware. Work completed September 16 th	None	None
MIDDs Build 21.2	Minor changes to forecast editor (MSFE) and correction of several ARs	Low	One AR written for problem found during User Acceptance Test. Fix implemented.
Model Cluster (CF1)	FDOC updated operating system. SMG installed WRF-EMS Version 3.0 weather model and Point Forecast Software. FDOC and SMG work in progress. No firm date for completion.	Moderate	Potential loss of local models for KSC, EDW, and TAL until upgrade and configuration of WRF completed. However, other models are available.



Special Topics



- **Zaragoza radar data intermittent**
 - Problem with the rotary joint element of the antenna system
 - Spares will not be available before February 2010
 - May impact ability to both evaluate TAL precipitation flight rules and use rain shower allowance at ZZA
 - SMG working with National Weather Service HQ International Affairs Office and Spanish Weather Service (AEMET) to improve radar status reporting by AEMET



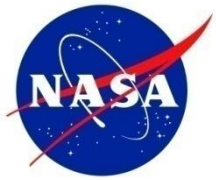
EMCC/BCC



- **No changes to EMCC procedures since STS-128/17A**
 - Personnel are identified to support EMCC, if required
- **Backup Control Center (BCC)**
 - BCC-HOSC is prime for BCC/BAT.
 - Facilities and personnel are ready to support.
 - Checkout occurred and included all Partner Control Centers.
 - June 1, 2009 included HOSC, POIC, JAXA, ESA.
 - July 8, 2009 included MCC-M.
 - BCC updates now provide cmd/tlm connectivity to MCC-M, COL-CC and SSIPC.



Command Procedures



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



Non-Critical Processors/Applications



- **No changes to Flight Director MCC software applications for STS-129/ ISS-ULF3**



STANDARD OPEN WORK



- **INDEPENDENT SAFETY VERIFICATION REVIEW**
 - SHUTTLE ISVR REPORT (ECD: L-2 wk)
 - ISS ISVR REPORT (ECD: L-2 wk)





OPEN NASA OCADs



- **EVA (15)**
 - No Touch Area for GATOR Antenna base
 - ELC Adapter can remain on-orbit with any 3 of 4 latches engaged
 - CTC IA Pinch Point
 - CTC IA Bolt Data
 - LEE FSE heaters constraints (touch temp)
 - LEE if EDF jams use Spare
 - LEE EDFs should be fully torqued and pull tested
 - ELC Mate Demate
 - LEE verify visual mated cue
 - LEE actuate the universal LEE connector
 - If TUS RA FSE EVA knob binds, engage bolt
 - Visual inspection of connectors prior to mating
- **OSO (1)**
 - Node 1 Bulkhead feed through post installation leak check
- **Crew Systems (1)**
 - Work Light usage limitations
- **ROBO (3)**
 - SSRMS simo ops with JEMRMS not allowed when at WS 5, 6 and 7
 - SRMS simo ops with JEMRMS not allowed
 - Robotic ops minimum viewing constraints

•*OCAD not yet submitted



ISS OPEN HAZARD REPORTS



ISS-EXPA-EPS-309

ISS-EVA-0301

ISS-EVA-0302

ELC-IA-02

CTC-IA-MECH-109

HPGT-ULF3-MECH-109

ISS-MCH-0109

ISS-COL-1002

ISS-IVA-0202-AC-Rev B

ISS-MCH-0113

ISS-STR-0108

*** Pre-verified**



**Mission Operations Directorate
Flight Director Office**

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•DA8/Lunney, Sarafin, Smith, Korth 129/ULF3 MOD FRR 10/15/09

CSCS Support/LON



- 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-129 Ascent/Entry Team will support STS-130/LON mission
- Personnel are available to support Orbit Operations as required



Remaining STS-129/ULF3 Integrated Simulations



- **Ascent/Entry**
 - 10/21: TCDT w/ KSC
 - 10/22: Deorbit Prep
 - 10/29: Post Insertion
 - 10/30: Ascent #3
 - 11/3: Entry #3
 - 11/6: Ascent #4
- **Orbit**
 - None



Ascent/Entry Flight Techniques Panel



- **Three Ascent/Entry Flight Techniques Panel (A/E FTPs) were held with topics supporting STS-129/ULF3**
 - A/E FTP #248
 - Lightning Updates to the Abort Landing Weather Flight Rule
 - A/E FTP #251
 - STS-128 Post Flight Review – no significant items
 - A/E FTP #252 (scheduled Fri, 10/16)
 - Lightning Updates to the Abort Landing Weather Flight Rule



Ascent/Entry FTP #248 & #252



- **Lightning Updates to the Abort Landing Weather Flight Rule**
 - The Lightning Advisory Panel (LAP) recently released results of a study investigating charging within and near attached and detached anvils.
 - The study demonstrated that the current standoff distances in the Flight Rules and LCCs could be reduced for some cases and eliminated in other cases.
 - Measurements of electric field versus distance from cloud edge confirm field strengths < 3 kV/m, a key threshold to define a hazardous condition
 - The specifics of these reductions and resulting Flight Rule will be reviewed at the AEFTP on 10/16.
 - The updates to the LCC have been approved by the LCC WG, SICB and are headed to the Daily PRCB. The LCC updates should be approved in time support to STS-129/ULF3.





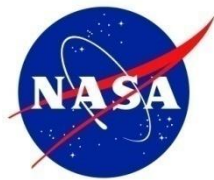
STS-129/ULF-3 JOPs



- **STS-129/ULF3 JOP #1 – 1/30/09**
- **STS-129/ULF3 JOP #2– 03/03/09**
- **STS-129/ULF3 JOP #3– 04/07/09**
- **STS-129/ULF3 JOP #4– 06/02/09**
- **STS-129/ULF3 JOP #5– 07/02/09**
- **STS-129/ULF3 JOP #6– 08/03/09**
- **STS-129/ULF3 JOP #7– 09/16/09**
- **STS-129/ULF3 JOP #8 – 10/07/09**



IP Integration



- **STS-129/ISS-ULF3 Briefings to Russian Teams**
 - RJOP (7/15/09)
 - ECD of L-1 Week
- **STS-129/ULF3 JOP #5 w/ ESA on 7/2/09**
 - Reviewed EVA procedures, safing actions, flight rules and ground coordination required to perform GATOR/AIS antenna install on Columbus Module
- **STS-129/ULF3 JOP #5 w/ JAXA on 7/2/09**
 - Reviewed EVA procedures, safing actions, flight rules and ground coordination required to perform JEM RMS LEE lube



Standard Open Work



- **STS-129/ISS-ULF3 Flight Rules Annex**
 - Final: approved at JPRCB on 09/28/09
 - PCN-1: targeted for JPRCB on 11/2/09
- **FDF/SODF**
 - Final crew review 10/30/09
 - Final errata, L-2 days
- **Training**
 - Complete STS-129/ISS-ULF3 Orbit Flight Specific simulations (10/14/09)
 - Complete STS-129/ISS-ULF3 Ascent/Entry simulations (L-6 days)
 - Complete Flight Director flight specific certifications (ECD 10/20/09)



Standard Open Work



- **Stowage**
 - Agreements are in work through IMMT to support the reconfigurations necessary for ULF3 preparations. Agreements required to support ULF3 mission and stage stowage requirements will be coordinated through SSPCB by the end of October to support ULF3.
- **Water transfer plan and Pressure profile**
 - Complete coordination with MCC-M (ECD L- 8 days)
- **Finalize solar array constraints and power profile plan for docked mission**
 - SACM (L-2 weeks)
 - Power Analysis (ECD L-2 weeks)



Standard Open Work



- **Complete “Road To” Items and Prepack**
 - RPM Training, begins on 10/15 and completed on FD2
 - PAS 1 (site for ELC-2) checkout, ECD is 10/16
 - Pre pack the weeks on 10/16 and 11/2
 - HTV Unberth planned for 10/30 (ULF3 analyses assume it is gone)
 - ISS GNC PPL delivery, ECD is L- 14 days
 - Standard EVA and A/L prep items
 - Translate MT to worksite 7 and walkoff the SSRMS to PDGF 1, ECD is L – 1 week.
 - JEM RMS positioning for the LEE Lube activity, ECD is FD2
 - ITCS samples for return, ECD is FD 2
 - Remove 40 close out panels in Node 1 and temp stow, ECD is FD 2
 - Condensate Tank off load, ECD is prior to docking





SPAN Staffing



- ISS SPAN Support: Staffing provided by USA CAF Personnel
- ISS SPAN Systems: Staffing provided by DI plus support from DA8 and DA7 if required
- SSP SPAN Systems: Staffing provided by DS plus support from DA8 and DA7 if required
- SPAN DO: Staffing provided by DO
- SPAN DM: Staffing provided by DM
- SPAN DX: Staffing provided by DX
- SPAN Managers: Staffing provided by DM, DO, DX. Additional ad hoc support from DA8, DA7, DS, and DI

