



STS-126/ULF2 MOD Flight Readiness Review



**JSC Mission Operations Directorate
Flight Director Office**

DA8/G. Kerrick, M. Sarafin, B. Lunney, R. Spencer

October 7, 2008

Agenda Item 3

**Mission Operations Directorate
Flight Director Office**

Agenda



- DA8 COFR Requirements/Endorsements
 - COFR Requirements/Endorsements Summary
 - New Operations – A/E Topics, SMG, MCC, Flight Techniques & Joint Operations Panels
 - Safety Status Review
 - Flight Rules (Generic Volumes A, B, C, D; STS-126/ULF2 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)
 - Command Procedures (backup)
 - Contingency Shuttle Crew Support/Rescue Flight: STS-119 (LON vehicle)
 - Level II Actions
- Standard Open Work (backup)
- Non-Standard Open Work
- Exceptions
- 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.



N/A

* FCOH



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DA8 COFR Req'ts/Endorsements (cont.)



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		Y			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)	G										
Exception/Resolution	G	G									
Command Procedures	G						N/A				
Contractor Process Insight		G									



Ascent/Entry Topics



- Launch Window and Lighting Summary

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)
Wednesday	12-Nov	FD4	Dark	Dark	20:38:42	1:38:42	1:43:42	1:48:42	
Thursday	13-Nov	FD3/FD4	Dark	Dark	20:12:59	1:12:59	1:17:59	1:22:59	1:25:42
Friday	14-Nov	FD3	Dark	Dark	19:50:28	0:50:28	0:55:28	1:00:28	
Saturday	15-Nov	FD3/FD4	Dark	Dark	19:24:44	0:24:44	0:29:44	0:34:44	0:37:57
Sunday	16-Nov	FD3	Dark	Dark	19:02:13	0:02:13	0:07:13	0:12:13	
Monday	17-Nov	FD3/FD4	Dark	Dark	18:36:30	23:36:30	23:41:30	23:46:30	23:49:43
Tuesday	18-Nov	FD3	Dark	Dark	18:13:59	23:13:59	23:18:59	23:23:59	
Wednesday	19-Nov	FD3/FD4	Dark	Dark	17:48:16	22:48:16	22:53:16	22:58:16	23:01:29
Thursday	20-Nov	FD3	Dark	Dark	17:25:45	22:25:45	22:30:45	22:35:45	
Friday	21-Nov	FD3/FD4	Dark	Dark	17:00:03	22:00:03	22:05:03	22:10:03	22:13:16
Saturday	22-Nov	FD3	Dark	Dark	16:37:31	21:37:31	21:42:31	21:47:31	
Sunday	23-Nov	FD3/FD4	Daylight	Dark	16:11:49	21:11:49	21:16:49	21:21:49	21:25:02
Monday	24-Nov	FD3	Daylight	Dark	15:49:17	20:49:17	20:54:17	20:59:17	
Tuesday	25-Nov	FD3/FD4	Daylight	Dark	15:23:35	20:23:35	20:28:35	20:33:35	20:36:48
Wednesday	26-Nov	FD3	Daylight	Dark	15:01:03	20:01:03	20:06:03	20:11:03	

NOTES:

- 1) Assumes an 0.8 m/s ISS reboost on 10/2 and another 0.8 m/s reboost on 10/30
- 2) Night launch from November 12 through November 20
- 3) Daylight ET Umbilical Photography begins on November 23
- 4) ET Umbilical camera flash is available and +X manuever will be performed on all days.
- 5) Optimal ET Handheld Photography lighting is not available in this launch window
- 6) FD3/FD4 are days where both a FD3 and a FD4 pane may be utilized to extend the launch window.



Ascent/Entry Topics (cont.)



- **SSME Overboard Mixture Ratio Update**
 - Per 8/28/08 PRCB, the SSME controller commanded mixture ratio will be updated for STS-126.
 - With this update, no ascent performance holdbacks are required.
 - The associated MCC updates will be incorporated per the nominal processes.
- **OI-32 FSW Workaround for Single SSME Completion**
 - OI-32 introduced code to simplify crew task by automating throttle down for two out SSME scenario's but had unexpected consequences.
 - LOCV for certain 2-out SSME scenarios that cause an unplanned re-entry shortly after OMS-1.
 - » Incorrect flight path angle at MECO results when Ascent Guidance continues actively steering towards the altitude planar targets after SSME throttle down.
 - » Consequence is that the OMS-1 burn occurs after the optimum apogee and reentry occurs.
 - Crew procedures incorporated into FDF to remedy this concern based on A/E FTP assessment.
 - » For Single SSME scenarios the Crew will select Manual throttles at 5% propellant remaining, minimum throttles at 2% propellant remaining, followed by Auto throttles.
 - Crew and MCC have trained these.
 - » Flight Rules and Crew procedures in place for STS-126 and subs to alleviate this condition.
- **OI-33 RTLS ET Separation Improvements**
 - Several minor changes made to improve Post MECO attitude control and reduce the risk of recontact with the ET.
 - » MECO target changed from $\alpha = -2^\circ$ to $\alpha = 0^\circ$
 - » Yaw jets used to supplement roll control
 - » Control during severe roll off cases improved
 - » Rudder/Speedbrake deployed to 80.6° at MECO Confirmed



Ascent/Entry Topics (cont.)



- Impacts of UHF Radio failed power amplifier
 - Same configuration as STS-123
 - STS-123 performance and analysis demonstrate that low power configuration is sufficient for required Ascent/Entry operations.
- Edwards Temporary Runway Status
 - EDW Temp runway will be utilized if required for AOA, PLS, or EOM support.
 - No issues for Heavyweight vehicle.
 - Flight Rules and Crew Procedures in place addressing landing/rollout with and without the drag chute.
 - Transition to permanent runway will not occur prior to STS-126 landing.
- Payload Bay monitoring during FCS Checkout
 - The FCS Checkout will be scheduled during daylight.
 - A crew member will monitor the Payload Bay during FCS Checkout while the APUs are operating.
 - Any FOD identified leaving the Payload Bay will be photographed and downlinked.



Ascent/Entry Topics (cont.)



- Unidentified Noise from ET during Stacking Operations in VAB
 - When rotating the ET to the vertical position in the VAB, several operators reported a metallic clang emanating from the ET.
 - KSC performed extensive NDE inspections of the ET but could not identify the source of the noise.
 - The IPR was closed as an UA with the most likely cause being FOD within a stringer or VAB GSE causing the noise.
 - No changes are required to current Flight Rules or procedures.
- Advanced Health Management System (AHMS) Downlink
 - STS-126/ULF2 is first flight with new SSME controller software capability to downlink AHMS main engine controller data while on-orbit
 - » Must be performed prior to removing power from main engine controller
 - » Backup capability to post-landing MADS data retrieval
 - Ascent Checklist update approved
 - » Delay main engine controller power down until 25 minutes MET
 - » Acceptable AC inverter loading for extended period of time
- Air Data Transducer Assembly (ADTA) Contamination
 - Spare Sensor Circuit Cards were inspected and observed to have contamination.
 - If the contamination is exposed to moisture, there is a failure mode that could result in a short circuit of the sensor card potentially failing an ADTA.
 - » Flight Rule A8-111 addresses actions to take if 3 or more ADTAs are failed.
 - » FCS Checkout performs self test of each ADTA
 - No changes are required to current Flight Rules or procedures



Spaceflight Meteorology Group (SMG)



- All NWS/SMG software used to create mission critical products or required for mission support is ready for STS-126.
- All SMG forecasters required to support STS-126 meet currency requirements listed in SMG Training & Certification plan.
- Some Spanish radar products remain unavailable during the Spanish Weather Service radar network modernization.
 - Composite reflectivity products remain unavailable in MIDDS and AWIPS
 - SMG coordinating with Spanish Weather Service (AEMET) for estimate of data availability
 - US Navy's Rota radar data also cover the Moron area and are viewable with web browser
- The French weather service has provided SMG access to a web site with radar, lightning and other data products that cover Istres.
 - This web site will be used to replace French radar images that were removed from the Spanish weather data server prior to STS-124.

The undersigned certifies that the Spaceflight Meteorology Group is ready to support the STS-126 flight.

/s/ Frank C. Brody

Frank C. Brody

Chief, Spaceflight Meteorology Group

Mission Operations Directorate
Flight Director Office

New Operations: Docked Focused Inspection



- Nominal FD2 and Late Inspection plans
 - Returning to use of generic procedures used between STS-117/13A and STS-122/1E
- Focused Inspection constraints:
 - Limited capability to perform starboard wing Focused Inspection (FI) while docked
 - » SRMS/OBSS structural interference once MPLM installed at Node 2 Nadir
 - » See next chart for affected zones on starboard wing
 - » Alternate timeline developed for starboard wingtip FI. Back up plan is to delay MPLM and EVA activities by one day each (uses +1 day on FD4):
 - FD4 – Focused Inspection crew procedure review, Focused Inspection, middeck transfer
 - FD5 – MPLM install and Ingress
 - FD6 – EVA 1
 - OPO and DAT plan to prioritize starboard wing imagery during standard FD3 reviews
 - » Flight Control Team (FCT) will need a decision on Starboard Wing FI by start of crew sleep on FD3 (MET 002/05:00, ~23:30 CST Sunday for 11/14 launch)
 - » FCT will make a real-time call regarding MPLM Install Go/No-Go decision on FD4
 - Focused Inspection for areas other than area shadowed by MPLM on starboard wing will take place on FD6 (if required)
 - » Best effort will be made to perform only a single FI (on either FD4 or FD6)

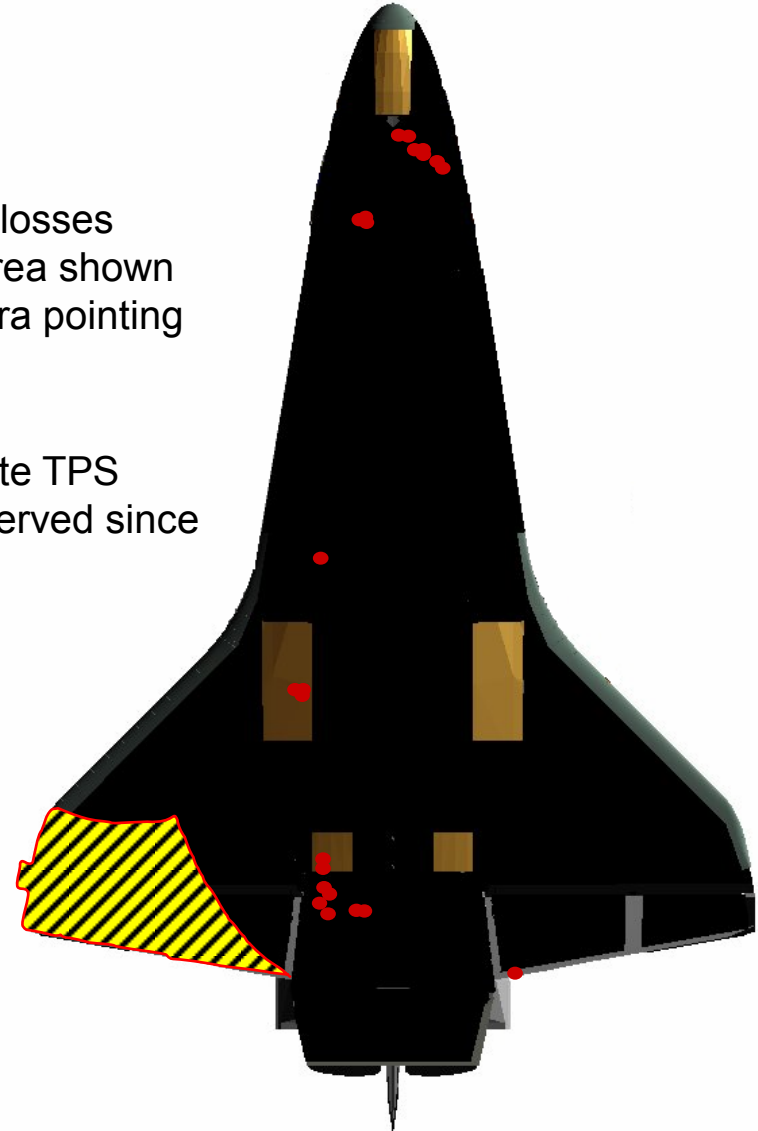
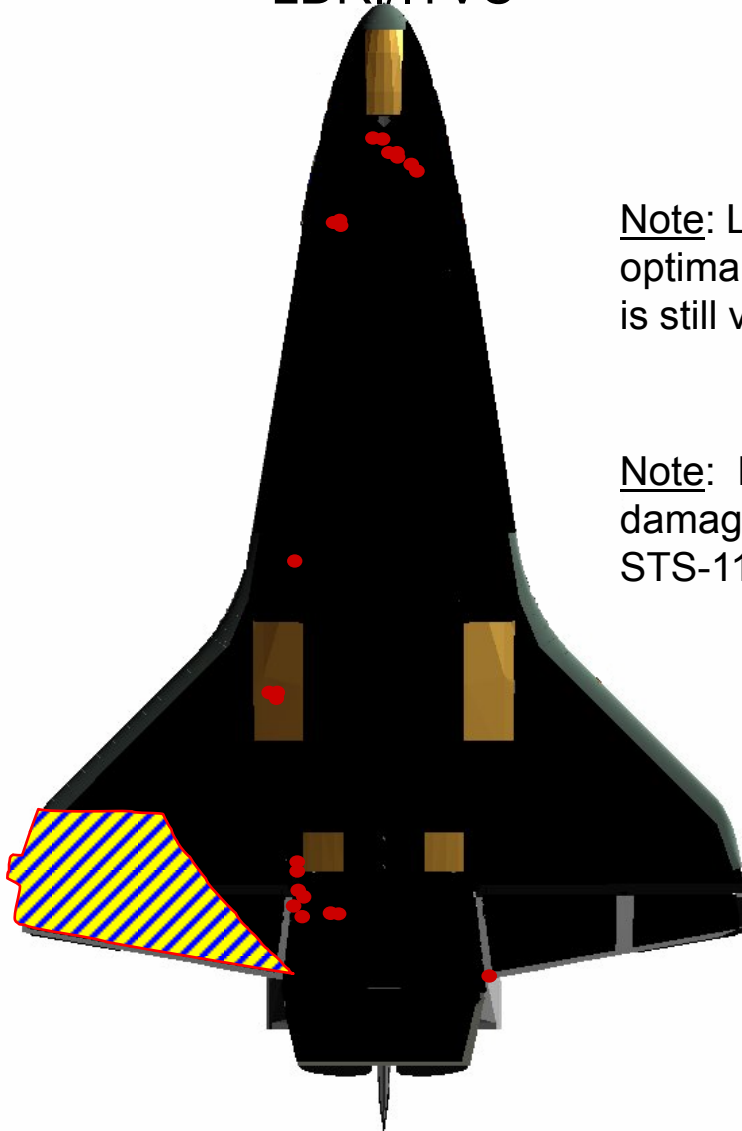


Docked Focused Inspection Lost With MPLM Installed



LDR1/ITVC

LCS/IDC



Note: LDR1/ITVC only loses optimal viewing, the area shown is still visible via camera pointing

Note: Red dots indicate TPS damage locations observed since STS-114/RTF



New Ops: Orbiter Contamination Mitigation



- Orbiter hardware contamination mitigation is necessary during Starboard SARJ cleaning EVA operations. Ops actions are:
 - OBSS sensor Field of View (FOV) to be pointed more than 90 degrees from view of starboard SARJ during EVA cleaning ops
 - » A dedicated SRMS maneuver is planned to impose the orbiter body on SRMS/OBSS (see back-up slide)
 - » Starboard SARJ cleaning planned for portions of EVAs 1, 2, and 3
 - » No constraints during EVA 4 (Port SARJ Lube EVA ops)
 - » OBSS will be on SRMS from FD3 (post-dock) until Late Inspection (post undock)
 - Robotic Sideview Camera (RSC) FOV to be pointed more than 90 degrees from view of starboard SARJ (also protected via dedicated SRMS maneuver)
 - -Z star tracker door will be closed (already blocked by ISS structure)
 - Payload Bay cameras not being used to support Starboard SARJ cleaning ops will be pointed more than 90 degrees from FOV of Starboard SARJ
 - » Cameras B and C are planned to be used and are allowed to be pointed at Starboard SARJ during cleaning ops



New Operations: Orbit Operations



- Picosat deployment requires increased separation delta-v at undock
 - Undock & Fly-around on FD14, followed by 3 separation burns of 1.5 fps, 5.6 fps, and 5.6 fps respectively to set up safe relative distance to ISS
 - OBSS is on SRMS in undock position during this timeframe
 - Picosat Deploy occurs on FD15 (spring ejected)
 - Picosat has ability to adjust its own orbit and will do so at end of primary mission
 - » Burn is no earlier than 30 days after deploy
- O2 Cross-over Valve hardware modification:
 - O2 System 2 Cross Over Valve bypassed due to erratic performance, temporarily using MO10W valve
 - Two nominal procedures affected by hardware modification
 - » PCS reconfig actions in Post Insertion timeframe and Deorbit Prep C/L
 - Single failure deep procedures will be flown (OPCL, MAL, etc)
 - Two+ failure deep procedures will be uplinked in real time following first failure
 - » Procedures have been developed and are ready for uplink as required
- Main Landing Gear (MLG) heater DTO to validate thermal models
 - Engineering may request MOD to turn MLG heaters on for several days (4-5 days docked)
 - Cryo margins can support request and still support 15+1+2 mission duration
 - » Pad hold capability would be reduced to 125 hours
 - Ideally would gather data that may allow flying high betas without requiring PTC at EOM



New Operations: EMU Glove Plan



- The EV crew's prime gloves will be the modified TMG gloves
 - Incorporate new RTV Silicone on palm/fingers
 - Add new protective material layer on index finger and thumb
- The EV crew's backup gloves are modified EMU gloves that have TurtleSkin™ patches sewn onto the thumb and index fingers in the region of interest (same as prime gloves used on STS-124/1J)
- The same criteria applies to either type of glove
 - No requirement to wear overgloves
 - Any RTV loss will not be reason to don overgloves
 - Periodic glove inspections will occur and post-EVA glove photos will be taken and downlinked for assessment
 - EVA will be terminated for a visible cut or hole



New Operations: 6-Person Crew Hardware



- STS-126/ULF2 will bring the following 6-person crew hardware to ISS
 - Water Recovery System (WRS) Rack #1
 - WRS #2
 - Waste and Hygiene Compartment (WHC)
 - Galley (Express Rack #6)
 - Advanced Resistive Exercise Device (ARED)
 - Crew Quarters (2)
 - Total Organic Carbon Analyzer (TOCA)
 - Food Warmers
- The WRS and WHC racks will be outfitted with loose hardware also launched on STS-126/ULF2
- The Water Processor Assembly (WPA) and the Urine Processor Assembly (UPA) will be activated during the docked mission to process urine from a Russian water container (ЕДВ), return that sample for ground processing, and process an onboard sample using the TOCA



New Operations: EVA Operations



- Over the course of EVAs 1, 2, and 3, the crew will clean and lubricate the race ring, and change out 11 Trundle Bearing Assemblies (TBAs) on the Starboard SARJ
- The Port SARJ will be cleaned and lubricated as a preemptive measure to mitigate the potential for the friction-induced issues seen on the Starboard SARJ. Lubrication will be applied to 50% of the surface, relying on SARJ rotation to spread to the remaining surface.
- The positioning of both the Starboard and Port SARJs is critical to the success of the EVA choreography and cover removal plan on all EVAs and is defined in ULF2_B2-XX
 - Starboard SARJ to be at a position of 105 degrees for EVA 1 and then 60 degrees for EVAs 2 and 3. This allows for clean race ring to be rotated under the Drive Latch Assemblies (DLAs), which are not being removed for cleaning.
 - EVA 4 must start off with the Port SARJ at either 30 or 210 degrees for both applications of lubrication
- SSRMS LEE A will be lubricated to address the presence of S-curves in the snare wire and which could impede the ability to perform free-flyer captures (i.e. HTV)
- First EVA use of Nikon D2X Cameras

New Operations: Robotics & Transfer Ops



- EVA 1 ORU (NTA/FHRC) Transfer w/ ESP-3 on MCAS:
 - To maximize the amount of EVA time available for SARJ tasks, ESP-3 (with the return NTA) will be relocated to the MT (MCAS) shortly before the STS-126/ULF2 docked mission.
- MPLM Installation
 - The SSRMS will be used to perform the first installation of MPLM to Node 2 (Nadir)
 - » Should an issue arise with a Node 2 Nadir Installation, the backup installation site will be Node 2 Zenith. Ops products will be available to support, but a standdown in MPLM install operations will be required to revise analyses.
- Transfer Operations Summary
 - MPLM Transfer is highly choreographed, including some rack transfers that are planned to occur prior to ULF2
 - » Currently carrying 85 hours of generic MPLM Transfer plus an additional 33 hours for rack and ORU transfer
 - All items required for the execution of EVA 1 have been stowed in the Middeck (ex. 4 TBAs, SARJ tools, wipes, etc.)



New Operations: MCC



- Shuttle support workstations transitioned to the Linux workstations/software
 - Workstation Install Complete:
 - » BFCR (HST Customer) - 2/27/08
 - » WMPSR – 7/22/08
 - » WFCR – 6/27/08
 - STS-126/ULF2 Linux Cert Mode Lockdown scheduled for 10/10/08
- ISS Operations have been running on Linux since 4/11/08
- Two Linux issues have been uncovered
 - User data can go stale with no alert to the user that data is not updating (SSP & ISS)
 - » Multiple Information Sharing Protocol (ISP) Servers are taking a greater than expected amount of time to complete job of publishing data to user displays/comps/plots
 - » ISP Server data will intermittently become stale for up to 10 seconds and the user has no indications that this data is not being updated (i.e. no “s”, color change, etc)
 - Frequency of occurrence varies but has been noted during A/E simulations
 - » The ISP Server recovers on its own and data flow will continue nominally
 - » Root Cause identified as a sluggish LDAP (Light Weight Directory Access Protocol) domain controller
 - Used to manage MCC and IPS account info
 - After reboot of LDAP (9/5) no problems have occurred
 - » Fix
 - Reboot of LDAPdomain controller prior to mission support (good for 1 month +)
 - MCC Global Reboot Procedure developed
 - Data is continuously monitored for reoccurrence
 - A fix will be delivered for testing in Dec, 08 and available for step up in Mar, 09
 - JMEWS (used as a strip chart replacement) has been inconsistent in plotting real-time data
 - » MMACS will retain one Unix workstation to run strip chart recorders until this issue is resolved.



STS-124/1J IFA Closure – JEM Unberth



- Y-axis oscillations observed during STS-124/1J JEM payload unberth
 - IFA written as constraint to STS-126/ULF2 MPLM unberth ops
 - FOICB (on 8/25/08) agreed to close IFA with the following rationale from MOD & SE&I:
 - » JEM payload and scuff plate design had known ICD violations that allowed reduced clearance
 - STS-126/ULF2 has no such issues
 - » Mass and diameter of MPLM is less than JEM
 - JEM had a larger moment at grapple fixture to induce cross coupling effects
 - » STS-124/1J JEM unberth command rate was much faster than previous flights unberthing heavy payloads
 - STS-126/ULF2 and future crews re-sensitized to importance of slow unberth rate command input
 - Crew robotics training modified to provide plotted performance data regarding unberth tasks, rather than previous verbal instructor feedback
 - » Unberth arm rates are limited to 0.11 fps, which is scuff plate design limit
 - No changes were made to STS-126/ULF2 MPLM unberth operations



Safety Issues



- Insufficient controls related to pretreated urine (PTU - Tox 2) QDs for WRS and associated interfaces becoming sticky and failing open
 - Current design dictates only one PTU source (WHC or EDV) into the WRS, with nominal mate/demates originally planned to switch between them
 - » CR in development for Y-hose fabrication, but one year away
 - Installation of Y-hose still requires mate/demate cycle of PTU QDs
 - Plan to proceed with ULF2 ops with no demate of this interface
 - Demate plan (short-term):
 - » Bag QD, demate & check for leakage, can unbag only if no leakage (ULF2 NCR)
 - » Boeing/MSFC Safety to provide NCR (ECD in work)
 - » Need decision on short term plan acceptability (ULF2 NCR) by ~E18 arrival
 - » DX4/OSO to verify feasibility of QD bagging technique and procedures in support of NCR (ECD in work)
 - Program Risk if leakage detected
 - Analysis to be initiated to demonstrate QD functionality in expected environment
 - » Positive results could provide sufficient rationale for long-term NCR (1FT to eye damage)
 - » OB/M.B. Edeen and MSFC Engineering to provide analysis (ECD in work)
 - » Boeing/MSFC Safety to provide NCR (ECD in work)
 - » Need decision on long term plan (with analysis) acceptability (NCR) by ~early Dec to support checkout prior to 6-person crew



Safety Issues



- Acceptability of free hygiene water in Lab from WHC and/or TeSS
 - Potential for common cause failure resulting in loss of redundant critical equipment
 - Hygiene Working Group and Boeing Safety assessing
 - Stage issue – not a concern for ULF2
 - » No hygiene in WHC/TeSS until resolved
 - » Potential impact to Go/No-Go for 6-person crew operations
 - Need resolution by March '09
- Remaining open OCADs due to open Hazard Reports/NCRs considered Standard Open Work



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-126/ULF2
 - Volume A (STS), Final, PCN-9 dated 1/22/08
 - Volume B (ISS), Final, dated 9/2/08
 - Volume C (Joint), Final, PCN-4 dated 5/5/08
 - Volume D (Soyuz/Progress), Final, PCN-5, dated 9/10/08
- STS-126/ULF2 flight rules annex
 - Final, expected approval at JPRCB on 10/6/08
 - PCN-1 targeted for JPRCB approval on 10/31/08



FDF/ODF/SODF



- DA8 has participated in FDF/ODF/SODF processes and procedure reviews as required
- FDF/ODF will be ready to support STS-126/ULF2
- New US procedures are primarily for:
 - MPLM/Node 2 Nadir vestibule outfitting, activation, ingress
 - Regen ECLSS system set-up and activation for baseline sample return and commissioning to support go for 6-person crew operations



Flight Director Mission Staffing



- All STS-126/ULF2 Flight Directors are certified per Flight Director Certification Guide (DA8-00010), Final, dated June 2, 2008
- Additional certified Flight Directors are available to support Team 4, EMCC, and STS-119/LON flight, as required
- MOD Work Guidelines are met: Due to the expected mission duration, Shuttle Orbit 2 and Planning Teams are augmented
- Flight-specific certifications are expected to be complete by October 30, 2008

Shuttle Flight Directors		ISS Flight Directors	
Mike Sarafin	Lead/Orbit 1	Ginger Kerrick	Lead/Orbit 2
Tony Ceccacci /Paul Dye	Orbit 2	Holly Ridings	Orbit 1
Paul Dye/ Kwatsi Alibaruho	Planning	Brian Smith	Orbit 3
Bryan Lunney	Ascent/Entry	Courtenay McMillan	Orbit 4



EMCC/BCC



- No changes to EMCC procedures since STS-124/1J
 - Personnel are identified to support EMCC, if required
- BCC procedures were just updated to include lessons learned since 1J/STS-124 (from Hurricanes Gustav and Ike)
 - Personnel and Facilities are ready to support
 - » MSFC/HOSC certified availability



Non-Standard Open Work



- Level II (Program) Actions - 126/ULF2 Flight Effectivity/Constraint
 - There are no open Space Shuttle Program Open Actions that have an STS-126/ULF2 Flight Effectivity assigned for MOD
 - There are no open Space Station Program Open Actions that have a ULF2 Flight Effectivity assigned to MOD for STS-126/ULF2
- Potential threats
 - Progress (30P) undocking during STS-126/ULF2 mission
 - » Discussion with FPWG Chair and RSC-E on 10/6
 - Progress (31P) docking during STS-126/ULF2 mission
 - » Low likelihood, but possibility
 - X2R7 software anomaly
 - » STS-126/ULF2 cannot fly on CCS R6
 - » Decision date to begin testing for CCS R7/GNC R6 hybrid config to meet an 11/1 Uplink date is 10/10
 - 3 weeks are required for ORT testing, PV, and 4 Box testing (ECD 10/31)
 - S1 Radiator face sheet damage (IR camera imagery)
 - » Imagery team is assessing requirements for close-up views (i.e. crew on SSRMS)
 - Request for digital still imagery of potential Zenith TUS cable damage



Non-Standard Open Work



- Safety
 - Pretreated urine (PTU) QD demate “bagging” procedure development in support of NCR feasibility (ECD in 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-126/ULF2 mission and ULF2 stage
- All standard/non-standard open work will be closed out or have a closure plan prior to ISSP SORR (10/24/08) and SSP FRR (10/21/08) with no exceptions





Backup



Remaining STS-126/ULF2 Integrated Sims



- Orbit
 - 10/8: FD3/FD4 Long Sim (make-up from JSC closure for Hurricane Ike)
- Ascent/Entry
 - 10/23: SOO44 w/KSC
 - 10/24: FDO/BSE
 - 10/29: TCDT
 - 11/4: Ascent #3
 - 11/7: Entry #3
 - 11/10: Ascent #4

Standard Open Work



- STS-126/ULF2 Flight Rules Annex
 - PCN-1 targeting JPRCB approximately October 31, 2008
- FDF/SODF
 - Final crew review November 3, 2008
 - Final errata, L-2 days
- Training
 - Complete STS-126/UFL2 Ascent/Entry simulations (L-7 days)
 - Complete Flight Director flight specific certifications (ECD 10/20/08)
- Pressure profile
 - Complete coordination of pressure management plan with MCC-M (ECD L-1wk)
- Finalize solar array constraints and power profile plan for docked mission
 - Initial analysis shows objectives are supportable by limiting loads and adjusting power share ratios.
 - Powerdowns may be needed
 - SACM (L-30 days)
 - Power Analysis (ECD L-1 wk)



Standard Open Work (cont.)



- Complete “Road To” Items and Prepack
 - MSS Prelaunch checkout (ECD 10/6/08)
 - X2R7 Readiness
 - » ECD 10/10/08, if fly current X2R7 configuration
 - » ECD 11/1/08, if required to fly hybrid config
 - EVA preparations (ECD L-1 week)
 - ACBM checkout (ECD L-3 weeks)



Standard Open Work: Safety



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



Ascent/Entry Flight Techniques Panel (A/E FTP)



- Six Ascent/Entry Flight Techniques Panel (A/E FTPs) were held with topics supporting STS-126/ULF2
 - A/E FTP #231, #235, #236, and #238
 - » Edwards Temporary Runway Issues
 - A/E FTP #239
 - » OI-33 Review
 - A/E FTP #240
 - » SSME LCC Update
 - A/E FTP #242
 - » SSME LCC Update
 - » 3 String GPS Ramp Up Summary
 - A/E FTP #243
 - » DOLILU Wind Change Redline
 - » I/O Reset Considerations
 - » OI-32 Automatic 2% Throttle-down Issues – discussed previously
 - » Operational Impacts for Low Mixture Ratios – discussed previously



A/E FTP #231, #235, #236 & #238 Summary



- After extensive review of the current brake energy Flight Rule and procedure rationale, VMS test procedures for the proposed changes, brake energy reconstruction process and history, A/E FTP agreed to the following changes:
 - Generic braking procedure update for STS-124 and subs
 - » Braking procedure only considers 2 cues
 - Brake initiation at 5,000 ft rollout remaining or 120 knots groundspeed
 - » Clarifies when maximum braking is required
 - Max brakes required only if groundspeed is greater than 140 knots at 5,000 ft remaining
 - Edwards temporary runway changes
 - » Brake Energy limits increased from 42M ft-lbs to 52M ft-lbs (with NWS)
 - » For heavy-weight orbiter landings, nominal braking initiation at 4,000 ft rollout remaining or 120 knots groundspeed, whichever comes first.



A/E FTP #239, #240 & #242 Summary



- OI-33 Review
 - Joint FTP with Orbit
 - Reviewed OI33 content and identified required updates to operational products.
 - Also identified topics for further discussion at FTPs
 - Significant A/E OI-33 CRs include:
 - » RTLS ET Separation Enhancements
 - » GNC Spec 54 Crew Bearing Display for additional crew horizontal situational awareness
 - » Automatic Single Engine Roll Control for 3 SSMEs out in Major Mode 102
 - » ECAL Energy Compensation – provides better energy state estimates during phugoids
 - » BFS GPS Auto Update frequency changed to be same as PASS
- SSME LCC Update
 - Proposed additional pre-launch monitoring for main engine shutdown pushbuttons
 - » OI-32 introduced new downlink parameters so pushbutton contact dilemmas can be detected in OPS-9
 - » Instead of a one-time check, the launch team will constantly monitor pushbutton contacts down to T-31 sec for 2 of 2 pushbutton contacts failed 'on'
 - LCC for Limit switch contact failures still in work
- 3 String GPS Ramp Up Summary
 - GPS performance has been very good on the 6 ramp-up flights
 - Nominal procedure will continue to be taking GPS in both PASS and BFS in OPS 301 prior to the deorbit burn and after high-speed C-band tracking confirms the navigation state



A/E FTP #243 Summary



- DOLILU Wind Change Redline
 - Wind pair redline updated for generic use
 - » Current limits did not account for SRB performance and liftoff weight.
 - » Limits used to determine if non-assessed winds late in the launch count are acceptable for flight.
- I/O Reset Considerations
 - Current procedures allow crew to execute an I/O Reset for a bypassed LRU
 - If a non-universal I/O error caused the bypass, executing a GNC I/O RESET could cause a redundant set split as recently witnessed during troubleshooting of the MDM FA2 anomaly prior to STS-124.
 - In order to mitigate the possibility of the set split during dynamic flight, crew procedures have been updated to have the crew check with MCC prior to executing the I/O RESET.
 - » MCC has more insight to the bypassed LRU and can quickly determine if a non-universal I/O error is present.
 - » If no comm is available with the ground, per established protocol, the crew may execute the I/O RESET if required.
 - » GNC I/O RESETs imbedded in nominal procedures do not require the MCC check.



STS-126/ULF2 JOP Topics



- ESP-3 on MCAS Option for EVA 1
 - Reviewed 3 different methods for performing ORU transfers on EVA1. Selected the option of relocating ESP-3 to the MCAS on the MT prior to the mission in an effort to minimize the amount of EVA time required for ORU transfer, allowing more time for SARJ activities
- Docked Focused Inspection
 - Identified structural interference between MPLM and SRMS/OBSS once MPLM is installed at Node 2 Nadir location affecting ability to perform FI on starboard wingtip
 - Alternate timeline developed through JOP and Long Sim to manage a scenario where focused inspection is required on starboard wingtip
- Picosat deploy operations
 - Identified need for larger separation between ISS and orbiter prior to picosat deploy, the need for additional loads analysis to allow sequence with SRMS/OBSS in undock position (uncradled)
- Contingency YVV Attitude Hold
 - Updated generic contingency power management flight rule to incorporate additional option of flying YVV within a limited beta range to provide additional power margin
- LOAC Recovery Plan for EVA 4
 - Defined a plan for recovery of ISS attitude control during EVA 4, if required
- Regen ECLSS Requirements and Operations Plan
 - Defined a subset of the overall Regen ECLSS and 6-person crew requirements that could be accomplished during the docked ULF2 mission



JOP Splinter Topics



- Docked Mission Ducting Configuration (10/6)
 - The ISS Program is interested in determining exactly what aspects of the ducting configuration on STS-124/1J was the main contributor to the improvement in flow and resulting elimination of CO2-related issues
- EFBM C/O Criteria (10/16)
 - EFBM C/O is scheduled for FD8. Pending the outcome of that checkout, JAXA may request time on EVA 4. The go/no-go criteria for the checkout and for proposing any deltas to the EVA 4 timeline will be discussed.



RJOP Topics



- STS-126/ULF2 Briefings to Russian Teams
 - In work and expected to be completed by launch minus 1 week



ULF2 Stage Additions / Threats



- None

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



SPAN Staffing (cont.)



- MOD standard SPAN manning plan as established prior to STS-120/10A
 - Standard Target for manning completion is L-2 weeks
- Personnel will be provided by the Organizations to properly staff all SPAN positions without violating Work Guidelines



ISS Open Hazard Reports



- COL-1002
- ECL-0205
- ECL-0404
- EPS-0309
- IVA-0204
- IVA-0208
- MCH-0109
- WRS-004
- WHC-013

* Pre-verified



Mission Operations Directorate
Flight Director Office

GFE Open Hazard Reports



• EVA

- NEXT GENERATION DIGITAL CAMERA: ECD 10/3/08
- PHASE VI GLOVE TMG ASSY: ECD TBD
- MMWS TOOLSTOWAGE CADDY : ECD TBD
- SARJ LARGE AREA CLEANING WIPE : ECD TBD
- SOLAR ALPHA ROTARY JOINT (SARJ) SCRAPER DEBRIS CONTAINER : ECD TBD
- SARJ TRUNDLE BEARING ASSEMBLY (TBA) AND DRIVE LOCK ASSEMBLY (DLA) BAG: ECD TBD
- EVA WIPE: ECD TBD
- WIPE CADDY: ECD TBD
- SARJ TOOL: ECD TBD

• STS

- ACTEX: ECD 10/24/08
- WIRELESS ACCESS POINT : ECD 9/20 – ECD 10/3/08
- DIGITAL EXTERNAL TANK THERMAL PROTECTION SYSTEM CAMERA FLASH ASSY: ECD 10/3/08
- DET TPS CAMERA ASSEMBLY : Explosion-proof testing is planned for late August. RAESR and GCAR updates will follow. – ECD 10/3/08

GFE Open Hazard Reports



- **ISS**

- TOTAL ORGANIC CARBON ANALYZER: Due to daily hardware failures during testing, project may have difficulty meeting their delivery schedule. – ECD 10/9/08
- ISS POTABLE WATER DISPENSER– ECD TBD
- ISS CREW QUARTERS (CQ) - ECD 10/10/08
- ISS WORK LIGHT – ECD TBD
- WEIGHT BAR – ECD TBD
- NEXT GENERATION DIGITAL CAMERA - ECD 10/3/08



Payload Open Hazard Reports



- **ISS**

- Smoke Point In Co-flow Experiment: US Payload Organization to update hazard report with crew procedures and flight rule corresponding to hazard level as determined by toxicological assessment of combustion by-products. – ECD 9/30/08
- Fly Wheel Exercise Device: ESA to work with the Payload Developer and NASA to document Keep Out Zone for adjacent IVA crewmembers during operations. – ECD TBD

- **Shuttle**

- None



ISS Open NCRs



- NCR-WHC-001 Inability of crew to hear C&W during WHC operation
- NCR-ISS-5A-22 (update) Integrated Acoustic Non-compliance



Open NASA OCADs



- OSO (11)
 - WRS maintenance constraints
 - CQ setup constraints
 - CQ jammed door response
 - WHC installation constraints *
- EVA (4)
 - Post-EF berthing constraint
 - Translate using Node2 fluid line constraint
 - PROX RF EVA constraint
 - Heads-first positioning constraints
 - JEM SIGI Antenna bolt torque *
 - JEM SIGI power off constraint *
- ECLSS (7)
 - Preclude WRS to CWC overfill
 - Potable water sampling
 - CQ “on-duty” crew constraint
 - WHC leak check constraints *
 - MPLM air cycling pre-ingress to mitigate drilled-in-place endcone cargo bracket FOD *
- Crew Systems (3)
 - WRS usage constraint
 - REFH usage constraints
- ROBO (1)
 - MPLM unberth constraint
- PHAL (13)
 - Mate/demate constraints
- CIO (1)
 - S2 Rack-face stowage constraint driven by WHC *

* OCAD not yet submitted



Non-Critical Processors/Applications



- All DA8 Non-Critical Applications certified
- One Flight Director applications changed since STS-124/1J
 - MIDS Weather Application for the Flight Director Console was updated to reflect new capability.



Command Procedures



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



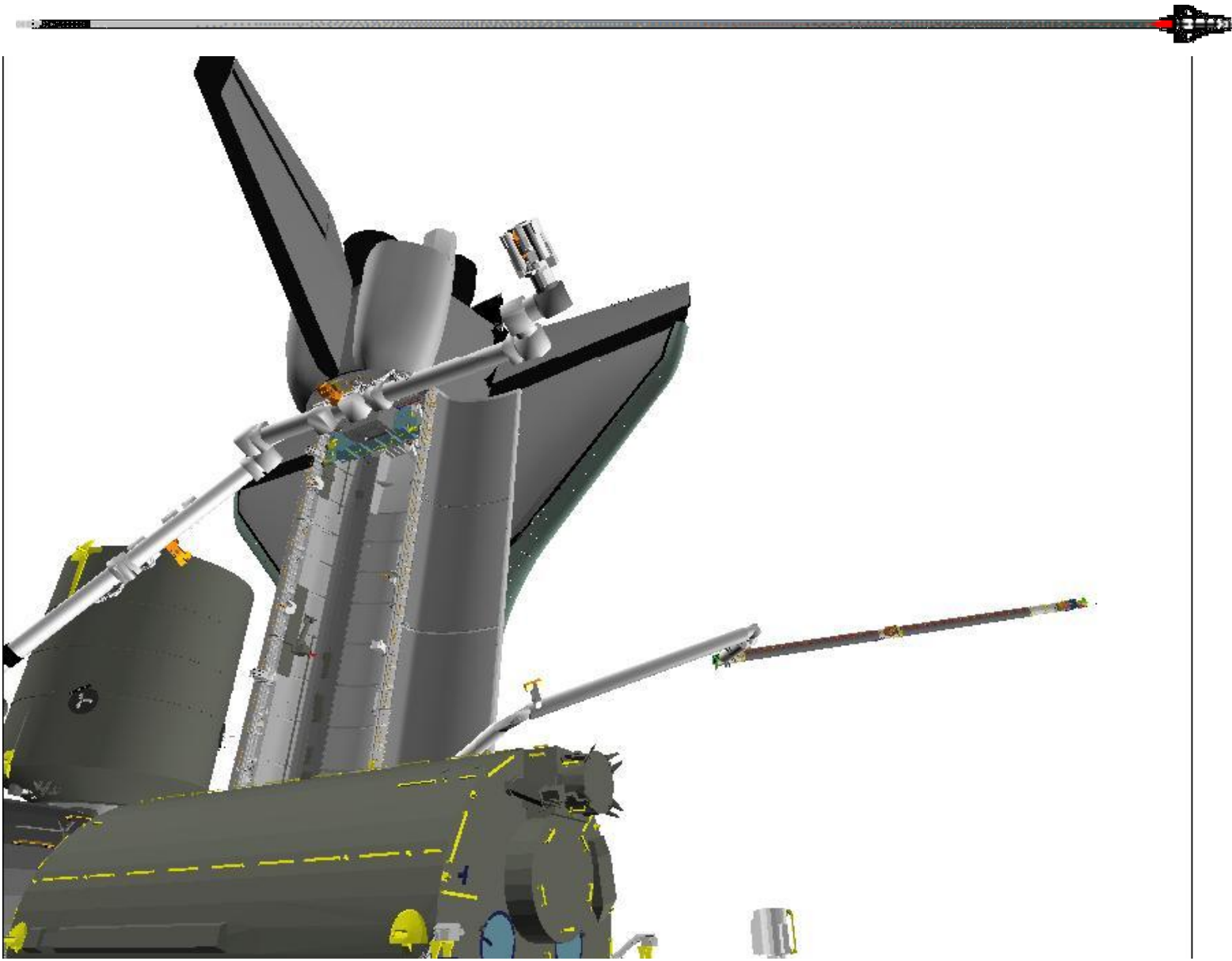
Contingency Shuttle Crew Support/STS-119/LON



- 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-126 Ascent/Entry Team will support STS-119/LON mission
- Personnel are available to support Orbit Operations as required

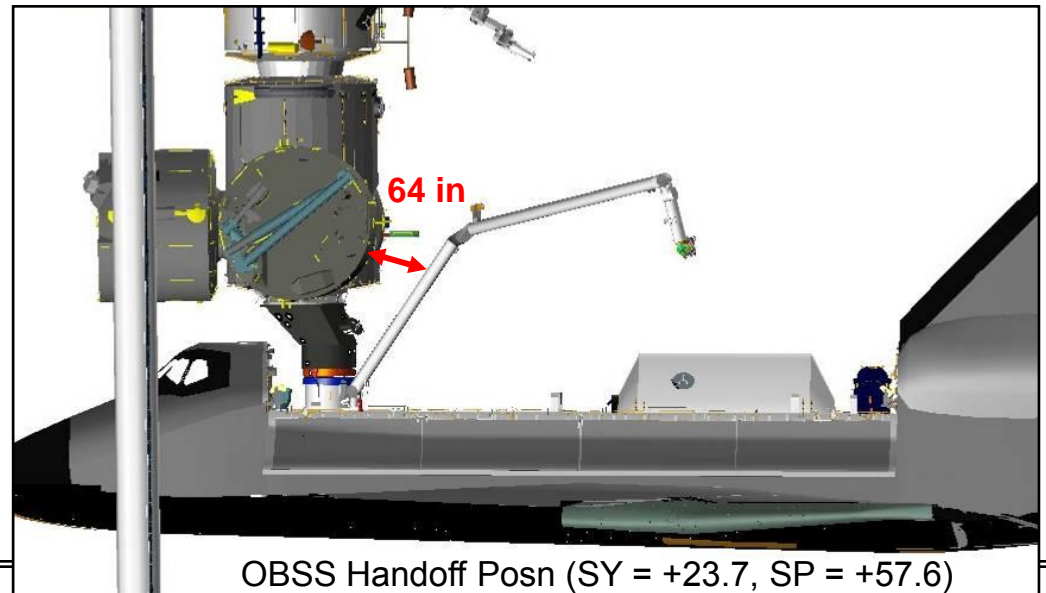
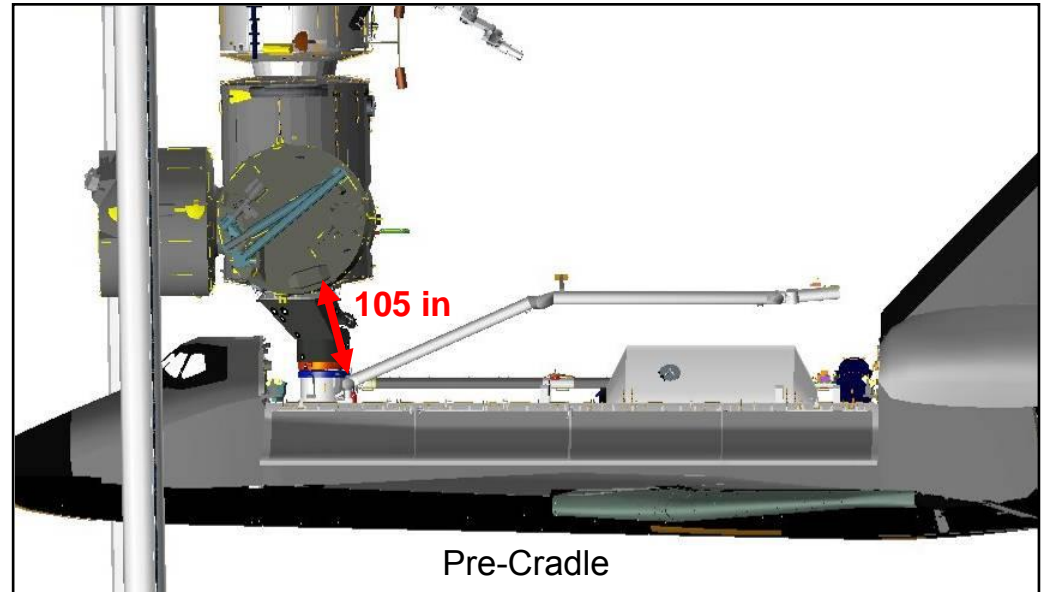
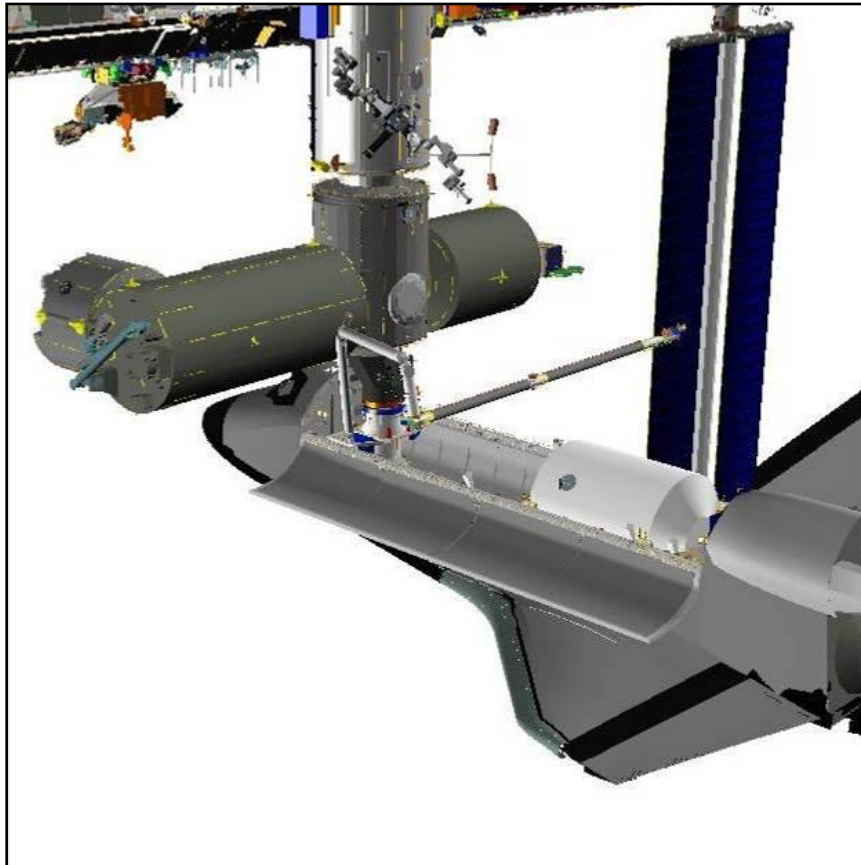


SRMS/OBSS Contamination Protection Position



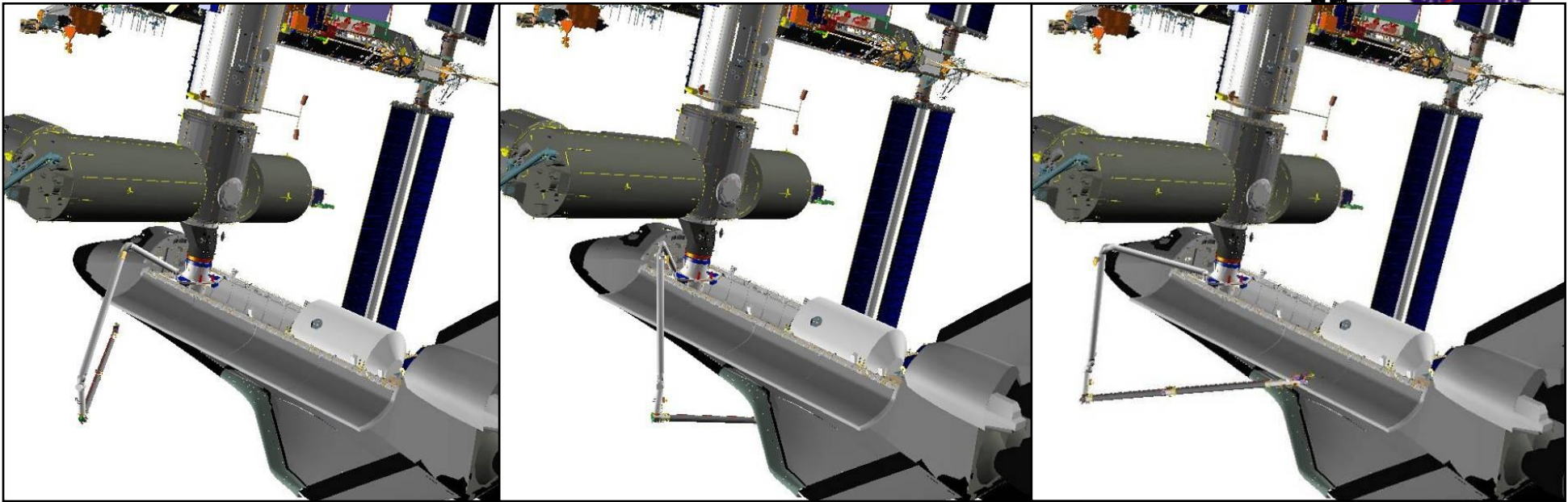
Mission Operations Directorate
Flight Director Office

Post STS-126/ULF2 Docking/Pre-MPLM Install



Mission Operations Directorate
Flight Director Office

TPS OBSS Access w/o MPLM



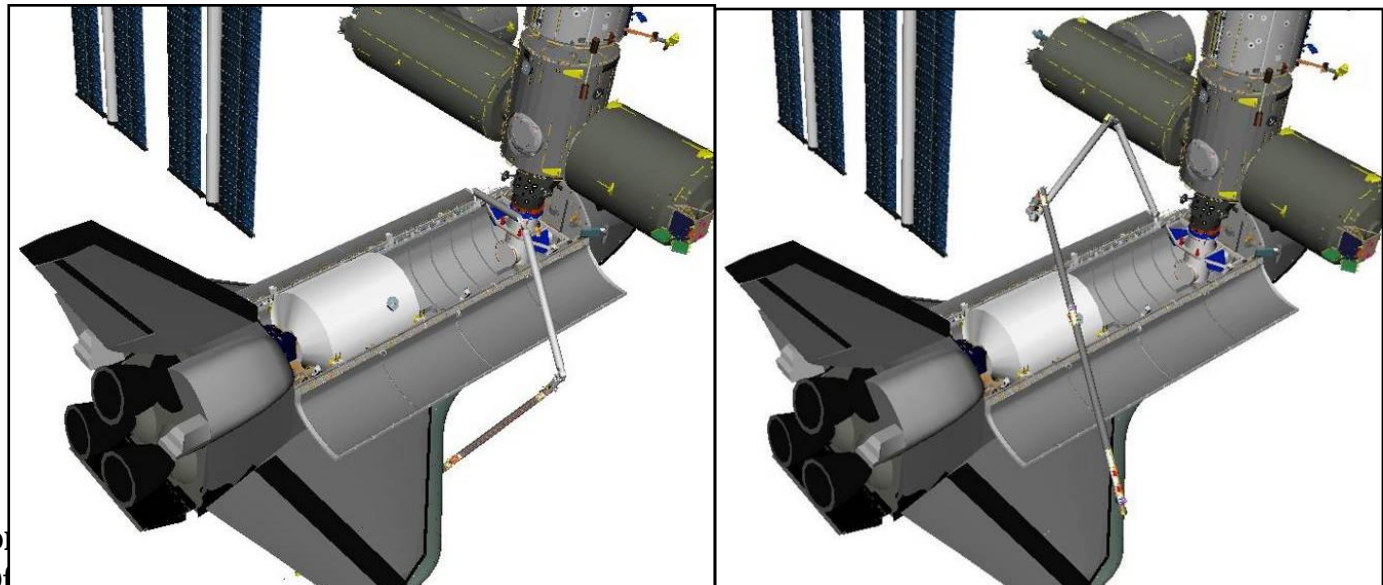
Fwd Belly/Nose

Aft Belly/Port Wing

Port RCC

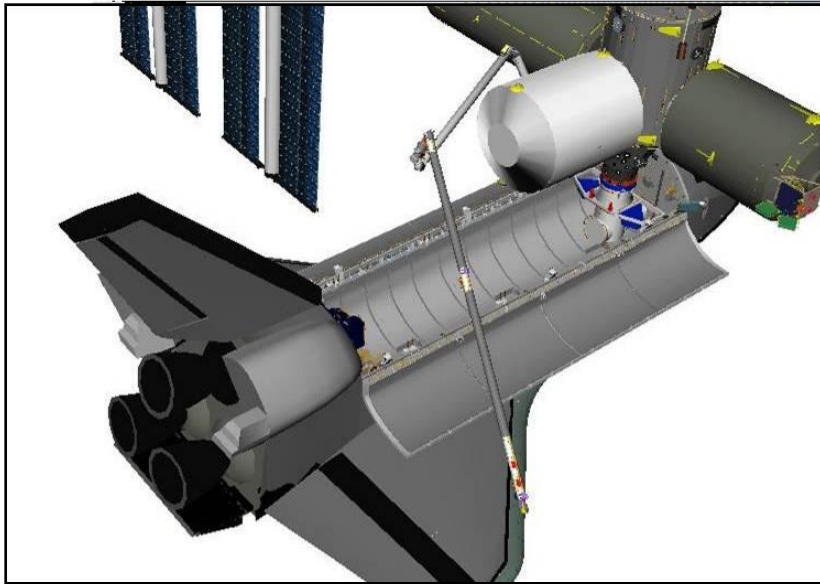
Top and bottom-middle views show FI configs w/ 60"+ clearance to structure.

Bottom-right shows config near allowable SP limit (30" to JEM).

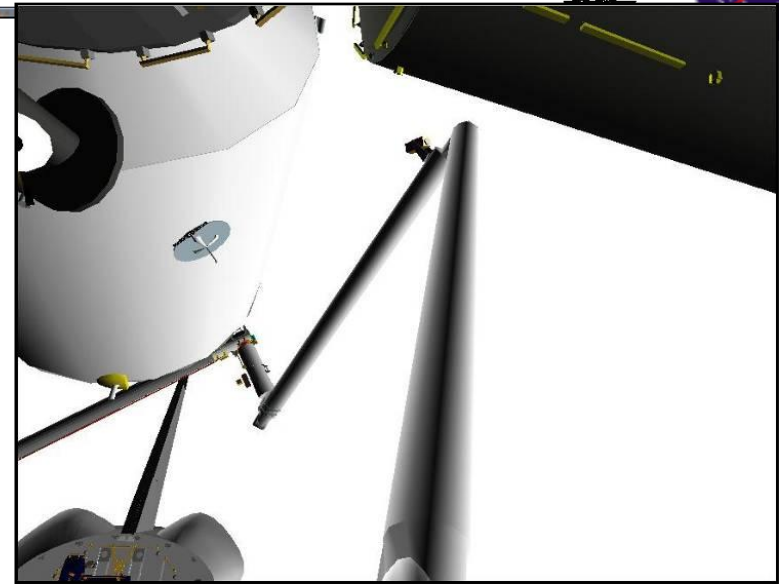


Mission Operations
Flight Director Office

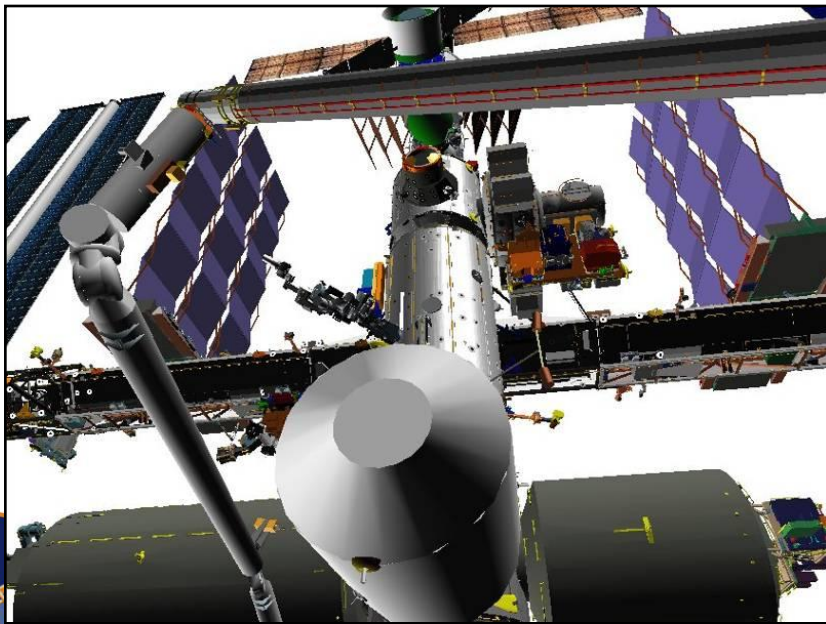
TPS OBSS Access W/ MPLM



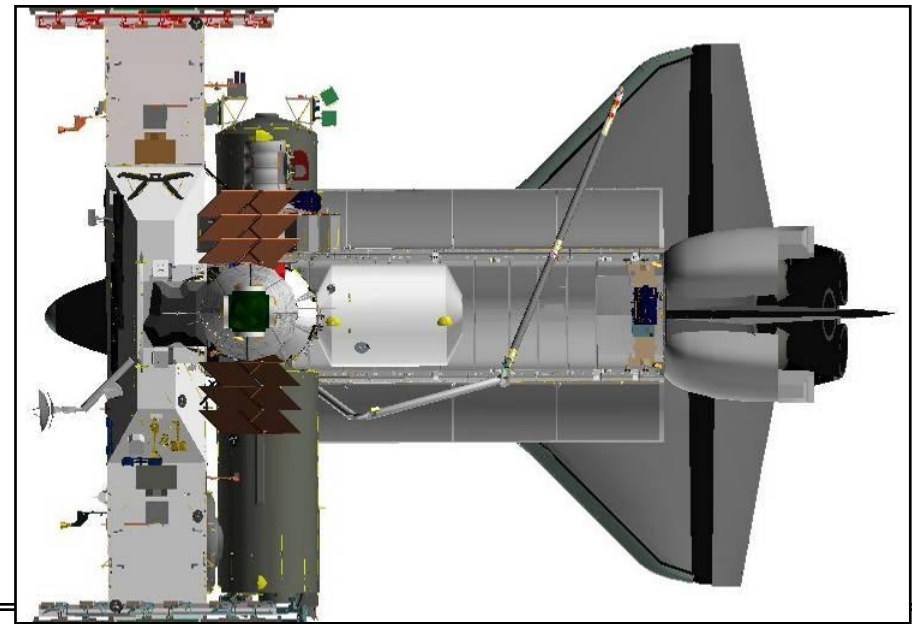
Bird's Eye



Camera A



Flight Director's Office Camera C



Top



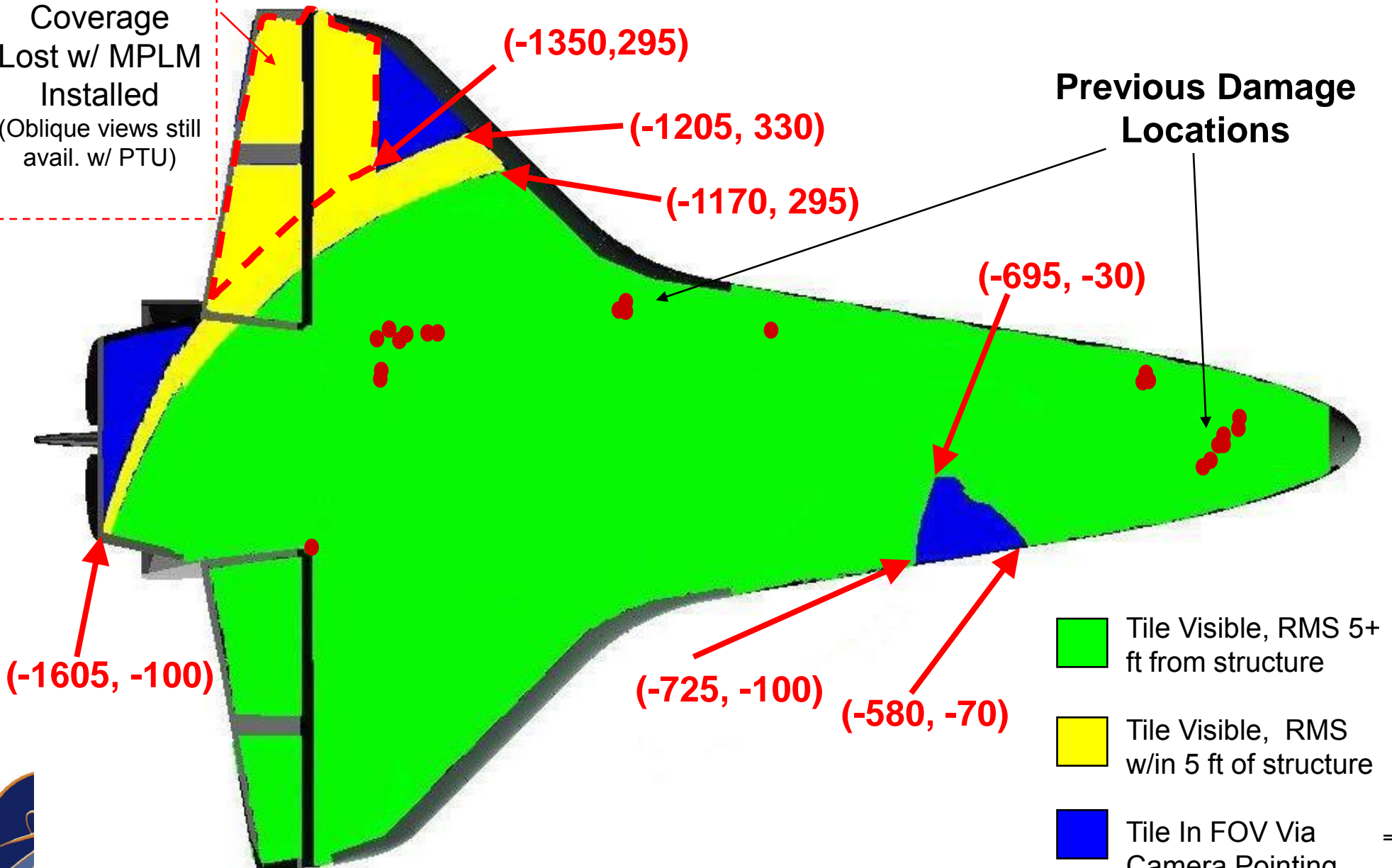


LDR1/ITVC Belly Reach

Optimal Scan (5 ft normal to surface $\pm 15^\circ$)

Coverage
Lost w/ MPLM
Installed
(Oblique views still
avail. w/ PTU)

Previous Damage
Locations



Tile Visible, RMS 5+ ft from structure

Tile Visible, RMS w/in 5 ft of structure

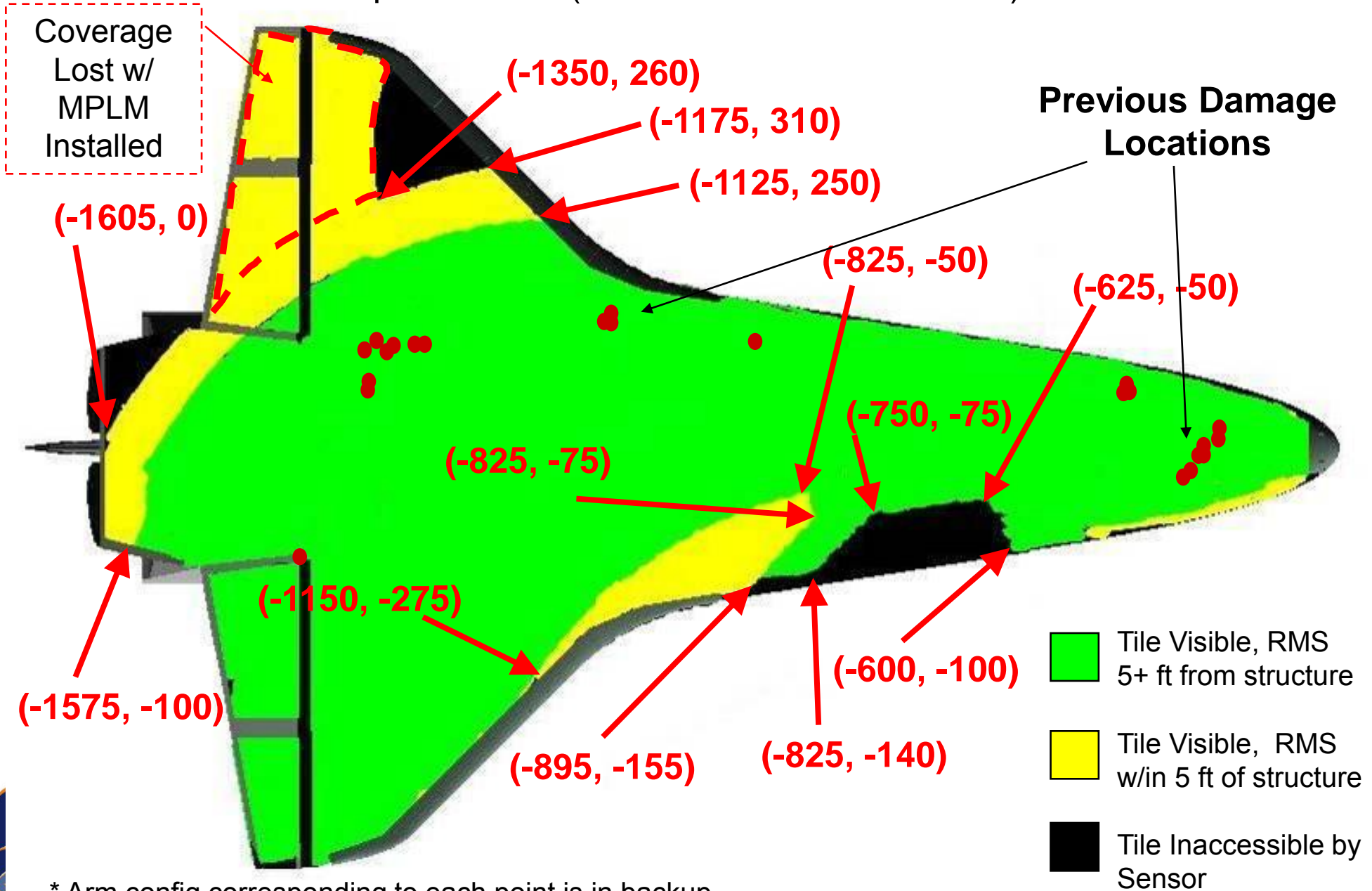
Tile In FOV Via Camera Pointing (oblique view)

* Arm config corresponding to each point is in backup



LCS/IDC Belly Reach

Optimal Scan (5 ft normal to surface $\pm 15^\circ$)



* Arm config corresponding to each point is in backup

Nose RCC

(With and Without MPLM)

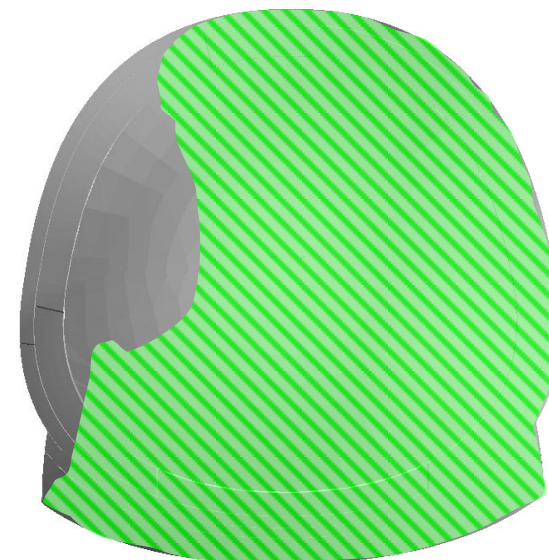
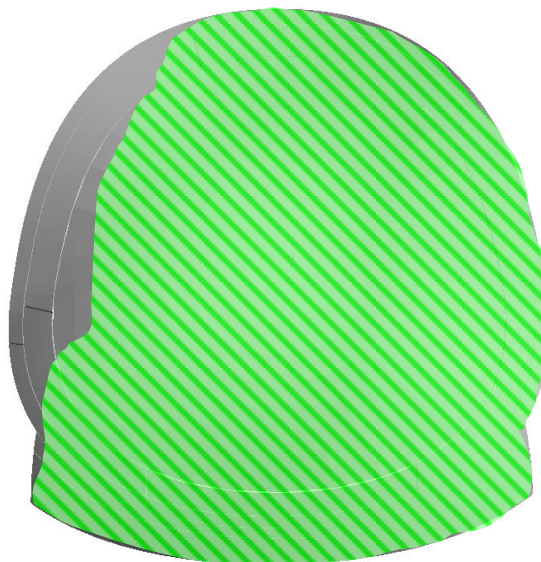
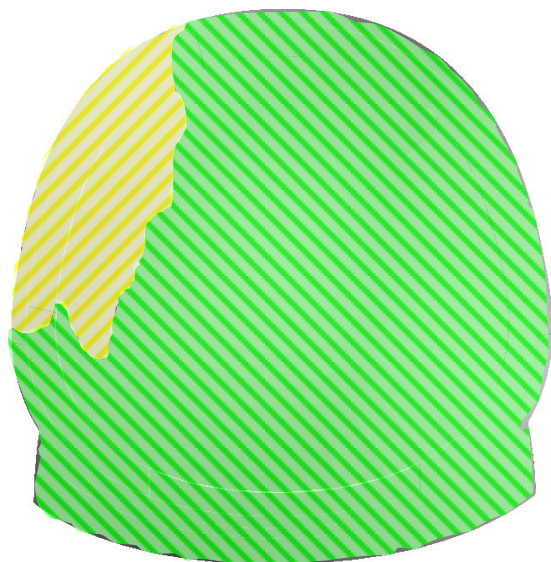


5 ft scan, max incidence angle of 45°


**LDRI/
ITVC**


LCS

IDC



 Tile Visible, RMS
5+ ft from structure

 Tile Visible, RMS
w/in 5 ft of structure

 Tile Inaccessible by
Sensor

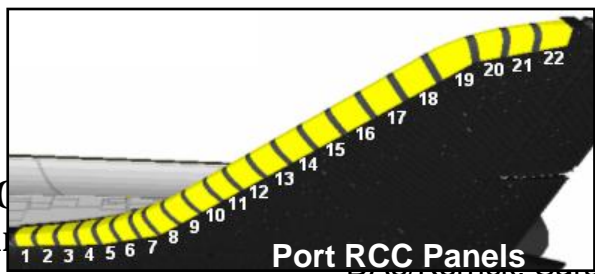
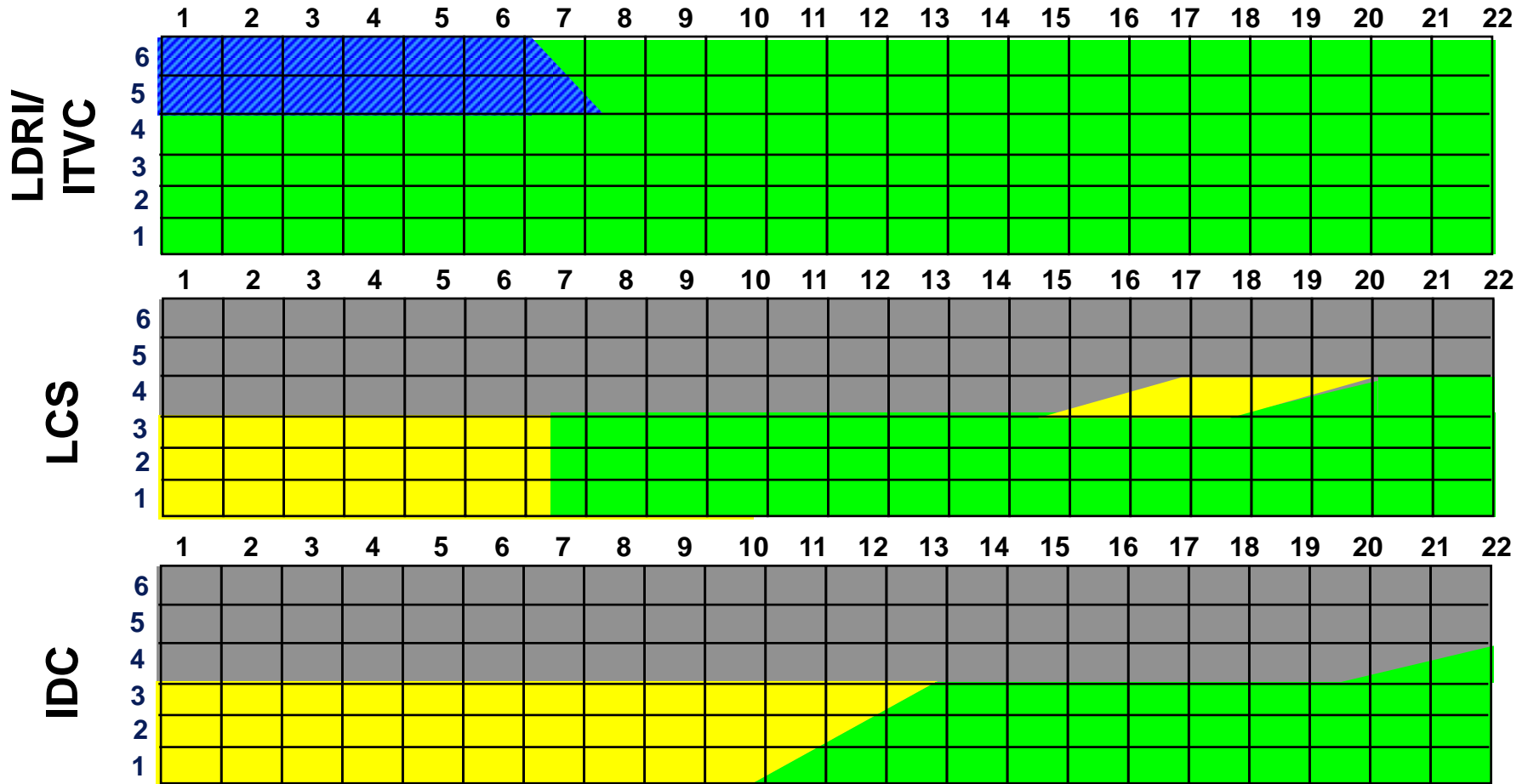


Port RCC

(With and Without MPLM)



5 ft scan, max incidence angle of 45°



	Tile Visible, RMS 5+ ft from structure		Tile In FOV Via Camera Pointing (oblique view)
	Tile Visible, RMS w/in 5 ft of structure		Tile Inaccessible by Sensor

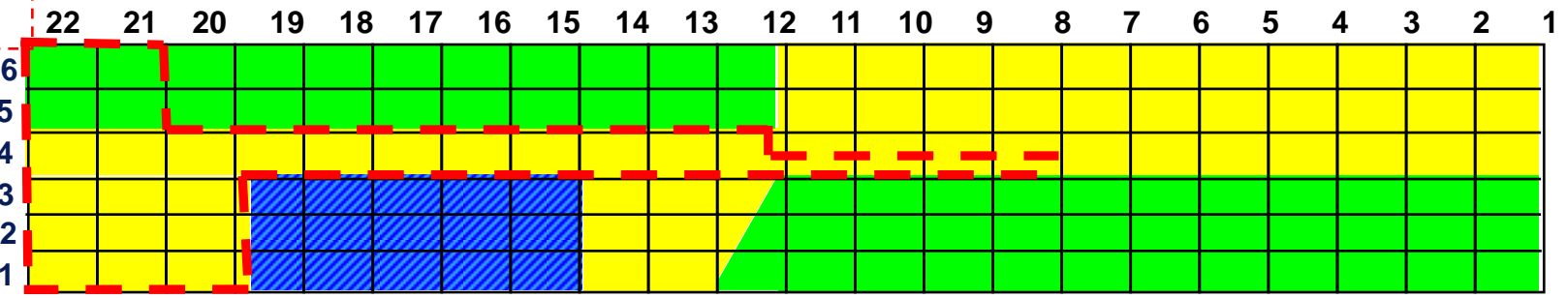
Starboard RCC (Without MPLM)



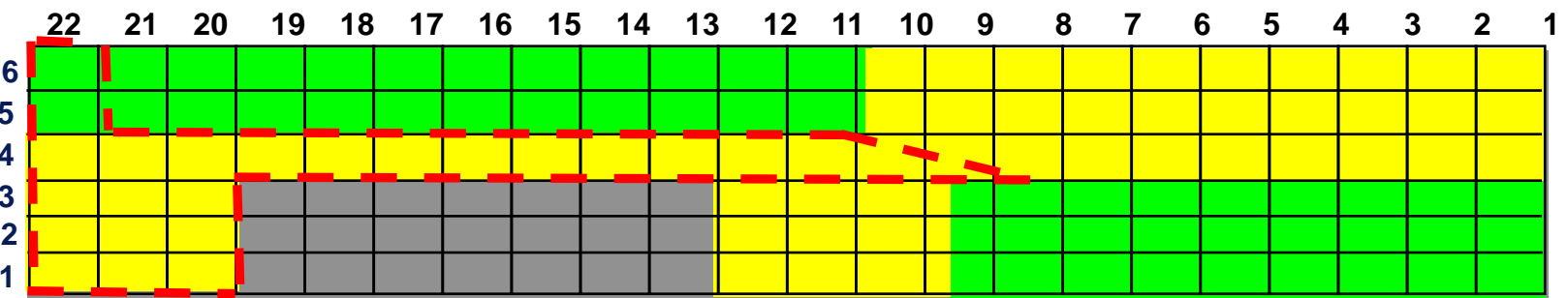
Coverage Lost w/
MPLM Installed

5 ft scan, max incidence angle of 45°

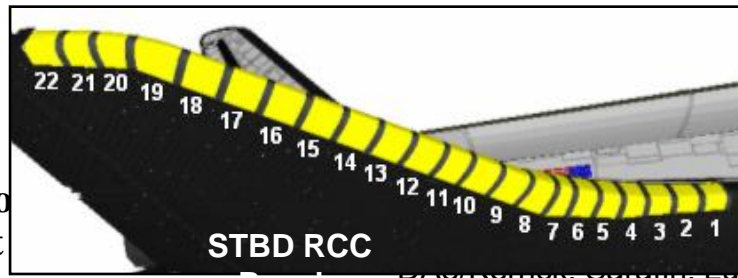
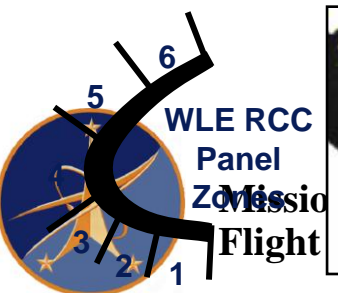
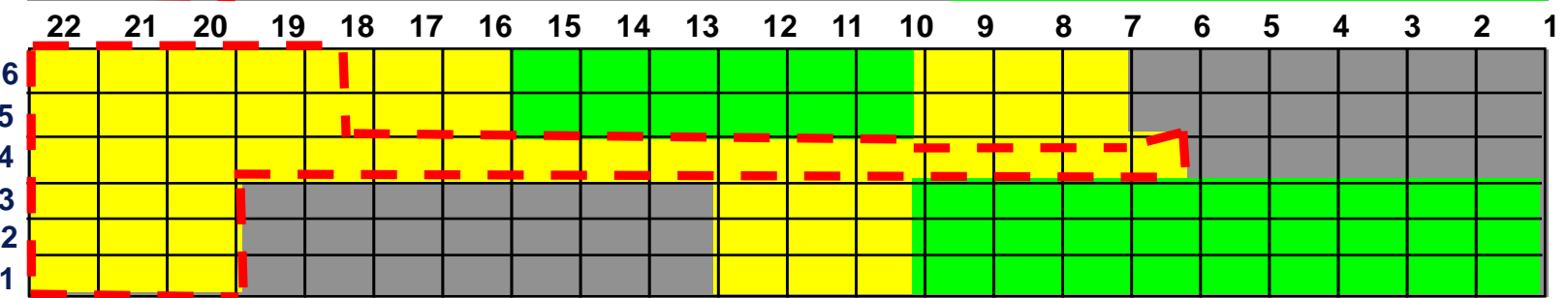
**LDRM/
ITVC**
(Oblique views
still avail. w/ PTU)



LCS



IDC



	Tile Visible, RMS 5+ ft from structure		Tile In FOV Via Camera Pointing (oblique view)
	Tile Visible, RMS w/in 5 ft of structure		Tile Inaccessible by Sensor



FIN

