



**SPACE SHUTTLE PROGRAM**  
Space Shuttle KSC Integration Office  
NASA Kennedy Space Center, Florida



# **STS-129 Delta Launch Site Flow Review**

Presenter **Kenneth Nowak**

Date **06-25-09**

## **Program Freeze Point**

## **PRCB Presentation**

## **S115129C**



# STS-129 Delta Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **06-25-09**

Baseline the STS-129 Mission Specific Requirements and Flow Plans.

The STS-129 Integrated Launch Site Requirements were established by PRCBD S115129AR1 dated 04-16-09. This CR and the Associated Data Package were reviewed at the 06-22-09 FRWG.

**Flight Operation & Integration\***

**Orbiter Engineering\***

**Requesting Approval**

**MO3/USA-PI**

**USA-OE**

**Payload/Cargo Engineering\***

**USA-PI**

**SSME**

**Requesting Approval**

**MP21**

**KSC ISS and Payload Processing**

**UB-R3**

**Launch Vehicle Processing\***

**PH-A**

**Status in BackUp**

**KSC Integration**

**MK-SIO**

**Flight Software**

**USA-FSW**

**Orbiter GFE**

**MV5**

**EVA**

**XA**



# **STS-129 Delta LSFR**

## **PRCB**

# **Mass Properties and Flight Requirements Status**

**Michael Darnell, Lead MIM**  
**Robert Reynolds, USA Flight Manager**  
**June 25, 2009**

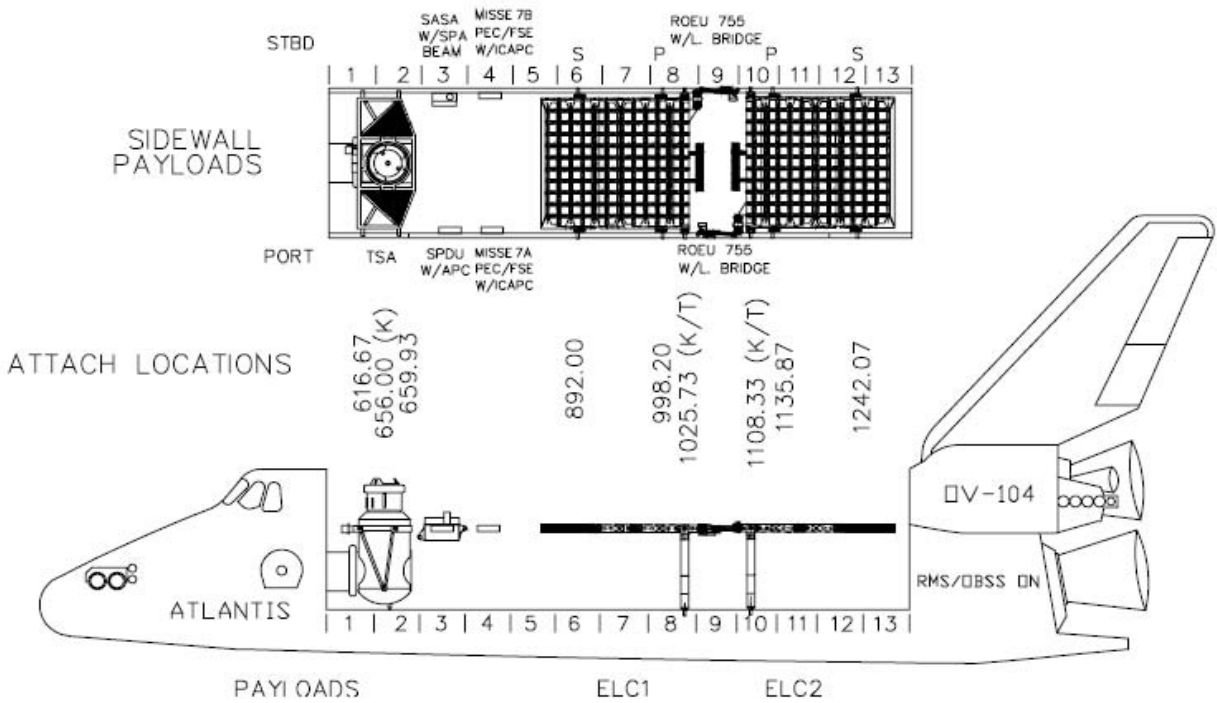


# STS-129 DELTA LAUNCH SITE FLOW REVIEW

Presenter  
**Michael Darnell**

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Date  
**JUNE 25, 2009**



Note: ORU's are not shown on ELC1 and ELC2

## ULF 3 Cargo Bay Layout



**STS-129 DELTA LAUNCH SITE FLOW REVIEW**

Presenter <b>Michael Darnell</b>
Date <b>JUNE 25, 2009</b>

**LAUNCH**

11/12/09  
 39A/ MLP 3  
 CREW SIZE: 6UP/7DN

**CONFIGURATION**

OV-104(31)  
 LP04;RP01  
 ET-133  
 BI-140  
 RSRM-108  
*PROPOSED: (1) 2048 (2) 2044 (3) 2058*  
 OI-34  
 SRMS,ODS,OBSS

**PAYLOAD**

ISS-ULF3 (ELC1, ELC2, SASA, MISSE 7A, MISSE 7B)	ISS-ULF3 MAUI SEITE SIMPLEX RAMBO-2
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**ORBIT**

51.6 DEG  
 122 NM  
 DIRECT INSERTION  
 DURATION: 11 + 1 + 2 DAYS

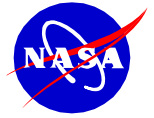
**CONSUMABLES**

CRYO TANK SETS	5 (FULL)
GN2 TANKS	5 (FULL)
FWD RCS	2175# (MIDPOINT)
AFT RCS	4970# (FULL)
OMS	22760# (FULL)

**LANDING**

SITE	KSC
TAL	ZARAGOZA
ALT. TAL	MORON & ISTRES
SCA	911

***FDRD UPDATE REQUIRED TO MANIFEST SSME'S***



# STS-129 DELTA LAUNCH SITE FLOW REVIEW

Presenter	<b>Michael Darnell</b>
Date	<b>JUNE 25, 2009</b>

## PERFORMANCE MARGIN

• SIMULATION MARGIN (OCFAF129)		<b>+2184</b>
• WEIGHT CHANGES SINCE SIMULATION		
• PAYLOAD	<b>- 182</b>	
• OPERATOR	<b>+274</b>	
• CREW COMPARTMENT	<b>- 4</b>	
• RCS	<b>+263</b>	
• MPS PROP	<b>+260</b>	
• RECONSTR ASCENT PERF COLLECTOR	<b><u>- 94</u></b>	
TOTAL WEIGHT CHANGES	<b>+517</b>	<b>- 517</b>
• OTHER PERFORMANCE PROJECTIONS		
• PROTECTION FOR DOL DISPERSIONS		<b>- 700</b>
• USABLE IMPULSE FOR MPS BGT GEN0901S		<b>- 17</b>
• SRB – M.P. UPDATES		<b>- 184</b>
• SRB – BR / 2.40 MIL HIGHER THAN 0.3705 AVG		<b>+480</b>
• ISP/THRUST FOR GENERIC BLOCK 2 @ 104.5%		<b>+6</b>
• PROJ TO 5 MIN WINDOW FROM INPLANE		<b>- 600</b>
• PERFORMANCE CHANGES ADJUSTMENT		<b><u>+36</u></b>
• CURRENT BASELINED APM (06/16/09)		<b>+ 688</b>
• ISP/THRUST FOR SSME 2048, 2044,2058		<b><u>- 63</u></b>
• PROJECTED APM		<b>+ 625</b>

VOLUME III: ASCENT PERFORMANCE MANAGER'S RESERVE GUIDELINE AT LSFR IS 400 LBS

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# **STS-129 DLSFR OV-104 FLIGHT 31 CONFIGURATION UPDATES PRCB**

Joe Rodriguez  
USA / VM

Elena Seastrom  
Boeing / VPE

June 25, 2009



6-25-09



# STS-129 OV-104 Flight 31 – DLSFR Updates

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## Program Authorization Is Requested For The Following:

- Partial Modification Deferral
- MECSLSI Updates
- Mission Equipment Changes

## Information Only:

- Potential Modification
- Summary of Previously Authorized Modifications
- Wing Leading Edge (WLE) Spar Inspection Status
- Chits
- TPS Priorities List / Current Status

## Back-up:

- Modification Records and MECSLSI Updates Summary
- Engineering, Hardware and Certification Status
- Description of Previously Authorized Modifications
- TPS Allocation Breakdown



# STS-129 OV-104 Flight 31 – Partial Modification Deferral

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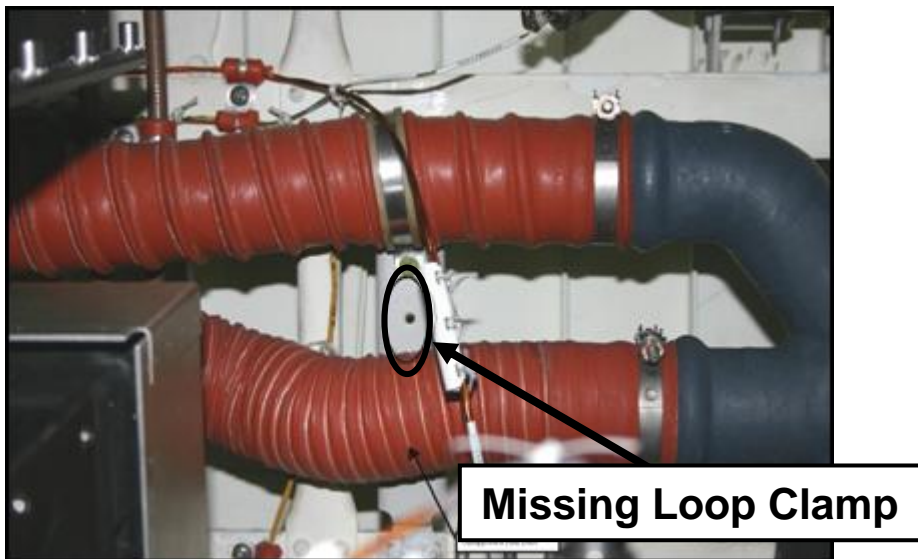
## MCR 19393 – Air Duct Clamp and Cushion Modification Deferral

- Program approval is requested to partially defer baselined modification record until access is available for implementation
  - Mod record VK70-613604-001,0104,0 for avionics bay 3A duct orifice modification baselined at the LSRR includes three configuration changes in bays 1 and 2 for which access is not planned during the flight 31 flow
    - 1) Clamp missing from flex duct
    - 2) Two cushions installed but not shown on the drawing
    - 3) Two cushions installed per drawing, but installation documentation not located
  - Items 1 & 2 were noted during flight 27 flow routine inspection and PR EOTF ECL-4-27-1354 was written to correct the engineering discrepancies
    - Deferral to next available access approved per MR ECL-4-A0093
  - Item 3 was noted during flight 31 flow engineering evaluation and will be documented on PR ECL-4-A0093
    - Current access does not allow part number verification; MR acceptance rationale is in work

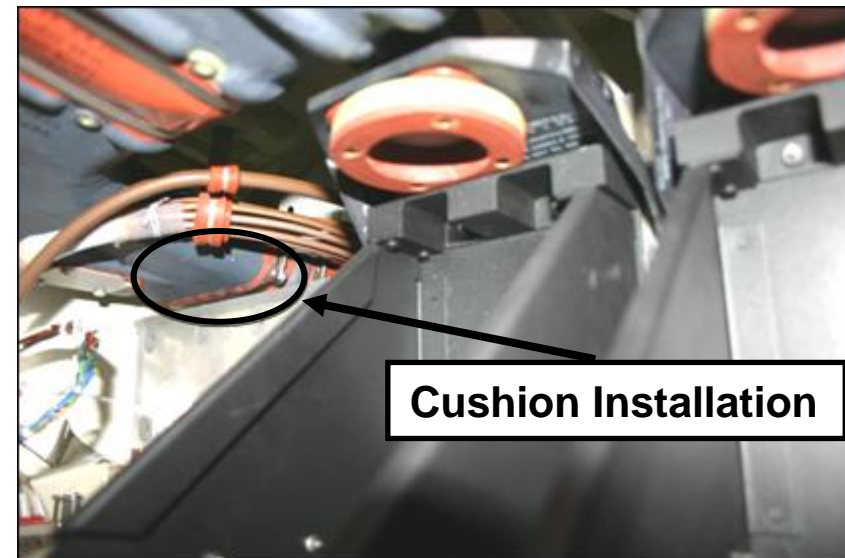
# STS-129 OV-104 Flight 31 – Partial Modification Deferral

## MCR 19393 – Air Duct Clamp and Cushion Modification Deferral (Cont.)

- Items 1 & 2:
  - During flight 27 flow routine inspection, it was found that a clamp was missing from a flex duct, and that two cushions were installed but not shown in the drawings
  - Engineering evaluation determined that the system will perform properly in this configuration, and the missing clamp and cushion installations were accepted by MR and deferred to the next OMDP or TACAN and MSBLS decoder removal



Avionics Bay 1 Ducting

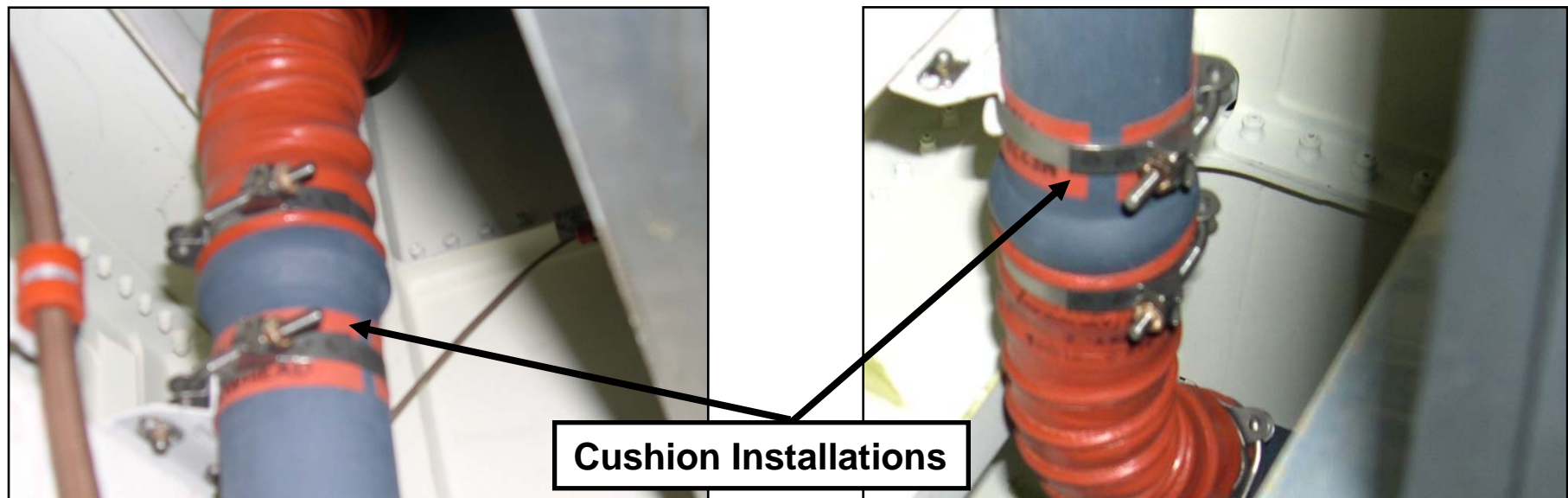


Avionics Bay 2 Ducting

# STS-129 OV-104 Flight 31 – Partial Modification Deferral

## MCR 19393 – Air Duct Clamp and Cushion Modification Deferral (Cont.)

- Item 3:
  - During flight 31 flow engineering evaluation for the avionics bay 3A modification, two cushions in bays 1 and 2 were noted, for which installation documentation could not be located
    - Current access does not allow part number verification
    - PR/TPS generation and MR acceptance rationale in work



Avionics Bay 1 Ducting

Avionics Bay 2 Ducting

# STS-129 OV-104 Flight 31 – MECSLSI Updates

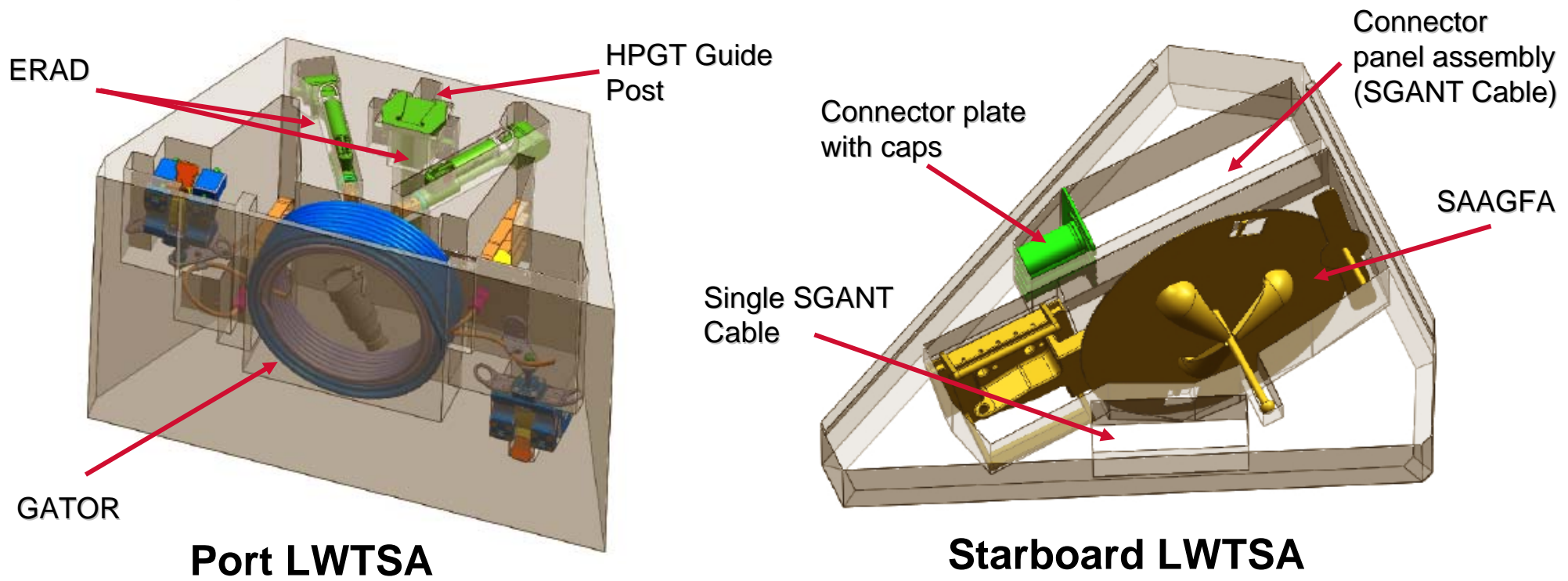
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- **Update the V072-200209 MECSLSI with the following tech order changes:**
  - **GN2 Purge Line Installation**
    - Add M072-634545-002 (Mission Kit MV0727A)
      - Originally required for STS-125 HST mission to provide GN2 purge line to the Super Lightweight Interchangeable Carrier (SLIC) and the Orbital Replacement Unit Carrier (ORUC); Remains installed on the vehicle after HST service missions because the installation is below the payload bay liner
  - **Beam, Harness Routing, ODS Bay 2**
    - Remove M072-340175-001 (Mission Kit MV0828A)
      - Associated with the Station to Shuttle Power Transfer System (SSPTS) modification which was not implemented on OV-104 (paper only)

# STS-129 OV-104 Flight 31 – Mission Equipment Changes

## TAD 30010 - Starboard and Port Lightweight TSA Cushions

- Provides new cushions for the port and starboard Lightweight Tool Stowage Assembly (LWTSA) to accommodate additional tools that will remain on ISS
  - M072-660853-008 LW Port TSA tool stowage cushion and M072-660857-001 LW Starboard TSA have been incorporated into the MECSLSI
  - Requires authorization of the TSA modification record 030010,0104,5





# STS-129 OV-104 Flight 31 – Mission Equipment Changes

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- The following tech order change has been incorporated into the MECSLSI – tech order change is for information only:
  - **RMS End Effector Configuration Change**
    - Requires authorization of RMS End Effector configuration change MRCS record TCTIM0017222REF, 0006, 4
    - Tech Order M072-544502-036 Remote Manipulator Arm Installation

# STS-129 OV-104 Flight 31 – Potential Modification

## TAD 30260 – FRCS Rain Cover Redesign In-Throat Concept

- Develops a new Tyvek Rain Cover for the FRCS thruster positions F3D and F4D to prevent tearing/partial cover release during launch
  - Partial release of the FRCS thruster cover occurred on several Shuttle missions
    - During STS-119, the remnant was estimated from imagery to be 6-10 grams which was larger than remnants from previous flights
  - New cover concept, Rain Cover Plug (RCP), will replace the existing thruster covers at the positions F3D and F4D with smaller covers installed deeper in the thruster



- OCCB recommendation was to evaluate modifications to the current design vs. the RCP concept, and recommend the option which will best mitigate the risk for STS-129; Plan to return to OPO early June 26th

# STS-129 OV-104 Flight 31 – Previously Approved Modification

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The following modifications have been previously baselined

- **TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements**
  - Installs resized orifice in the ducting to middeck avionics bay 3A to provide sufficient airflow to cool the ISS payload
- **TAD 30231 – Rudder Speed Brake Inconel Thermal Barrier Redesign**
  - Installs redesigned Rudder Speed Brake inconel thermal barrier tabs to improve strength of the tab attachment
- **TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification**
  - Modifies Orbiter electrical configuration for the O2 crossover valves to provide valve position indication
- **TAD 30099 – Relocation of D-Hatch Actuator Handle Position Decal**
  - Relocates actuator handle position decal on the external airlock upper hatch to the correct location
- **TAD 30099 – External Airlock Ducting Configuration Change**
  - Connects the Orbiter Docking System booster fan outlet duct prior to launch to have the airlock fan active from post-insertion through de-orbit preparation



# STS-129 OV-104 Flight 31 – Previously Approved Modification

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The following modifications have been previously baselined (Cont.)

- **TAD 30186 - OMS Pod Micro-WIS Strain Recorder Removal**
  - Removes the recorder box from the left OMS Pod and stows the wires
- **TAD 23205 - Acreage Doublers Addition to Avionics Bays 4, 5 and 6**
  - Installs cold bonded protective doublers to the honeycomb facesheet on the aft avionics bay 4, 5 and 6 doors to provide additional resistance to impact loads and ensure life of honeycomb panels (Authorized as Non Flight Specific)

# STS-129 OV-104 Flight 31 – Information

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## Wing Leading Edge (WLE) Spar Inspection

- Structural inspections of the Wing Leading Edge spars are due prior to the last manifested flight of OV-104 (due date January 22, 2010)
  - Performance of these inspections is intrusive and classified as a significant flow impact. 16 panels per wing remaining to be inspected. PRT's position is full compliance with the requirement is required prior to 1/22/10
  - Last WLE spar full inspection on OV-104 was performed in July 2003; Prior OMDP inspections were performed in December 1997
  - Coating system refurbishment and re-performance of structural inspections was to be accomplished at the next OV-104 OMDP which was to occur prior to flight 29
- OPO recommended performing WLE spar inspection of 6 panels per wing during STS-129 flow
  - The current GO plan is to perform inspection of 4 panels per wing this flow
  - WLE Spar Inspection Requirement was briefed to the Launch Integration Manager on 4/8/09 and he concurred with the existing requirement to complete the full inspection prior to January 2010
  - Following the inspection this flow, OPO will review the results of all inspections performed to date on the OV-104 WLE spar in order to determine if an exception to the requirement is warranted. Plan is to report back to the Daily PRCB
- Exception and Program accepted risk would be required if inspections are not performed in full prior to January 22, 2010

# Chits

CHIT	TITLE
J6116	AMES GAP FILLER REMOVAL AND REPLACEMENT
J6275A	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION
J6327	WLE RCC JOGGLE INSPECTION
J6378	OV-104 BODY FLAP (BF) POWER DRIVE UNIT (PDU) GEARBOX FLUID LEVEL INSPECTION
J6380	EVA PDU TOOL INTERFACE VERIFICATION
J6389	CLOSE CLEARANCE MEASUREMENTS OF ORBITER HARDWARE FOR STS-125 (post flight)
J6399	0-GAUGE PROTECTION FOR OV-103 FLIGHT 32-35 AND OV-104 FLIGHT 27-35
J6402	MICRO INSPECTIONS OF CAPTIVE GAP FILLERS
J6407	CLOSE CLEARANCE MEASUREMENTS OF SRMS MPM AND OBSS
J6410	AFT STUB CRACKED TILE INSPECTION
J6414A	RUDDER SPEED BRAKE THERMAL TAB INSPECTION
J6447	STS-126 POST FLIGHT INSPECTION AND CONTAMINATION SAMPLING OF LASER CAMERA SYSTEM AND ORBITER LOCATIONS
J6466	OMS POD PILLOW GAP FILLER INSTALLATIONS
J6481	MIDDECK PAYLOAD COOLING TEST FOR OV-104
J6497	OV-104 PUTTY REPAIR RCC AND WINDOW DTA
<b>J6501</b>	<b>STS-129 CIH CLOSE CLEARANCE MEASUREMENTS</b>
<b>J6506</b>	<b>CAPTURE OV-104 OUTPUT WAVEFORMS TO ADDRESS IN3600 DIODE CONCERNS</b>

# Chits (Cont.)

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CHIT	TITLE
J6512	OV104 EVA SCU CHANGEOUT
J6513	X-RAY INSPECTION OF MPS HELIUM SUPPLY SYSTEM CHECK VALVE CV4 ON OV-103 (STS-128) AND OV-104 (STS-129)
J6516A	WLE JOGGLE REGION IR THERMOGRAPHY REQUEST FOR HIGH LINE SCAN WF PANELS
J6524	KU-BAND PL MAX MODULATION TESTING FOR OV-104
J6525	PERFORM LEAK CHECK OF MPS LO2 OVERBOARD BLEED VALVE (PV19) AND T-0 QD (PD13) ON OV-103 (STS-128) AND OV-104 (STS-129)
J6527	FRCS THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L (in review)
J6528	PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION (in review)
J6529	OV-104 OMS VAPOR ISOLATION VALVE CHECKOUT (in review)
J6530	OV-104 ORBITER WIRE/CABLE INSPECTION DURING FLOW 31 (in review)
J6533	PERFORM BORESCOPE INSPECTION OF MPS INBD RTLS DUMP VALVE (PV17) BALL SEAL ON OV-104 (STS-129) (in review)

# Potential Chit

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- **W2 and W5 Vespel window fastener preflight torque evaluation**
  - Pending post-flight measurement of prevailing torque on OV-105 multi-flight windows
    - W1 and W6 which were torqued at the pad prior to their first flight, and previously flown W3, W4, or W5
    - Adverse finding would raise new concern for OV-104's multi-flight mod locations and lead to request to retorque
    - OV-105 measurements expected in the August timeframe

# TPS Priorities List

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## Mandatory (everyflow expectation)

- Flight damage, OMRS Rqmts/Chits, LRU access, & deferred work
- Multi-flow Chits {
- Corrosion Sampling (10% of total tile allocation) *Chit J6275A*
  - Putty repairs in RCC & Window DTA Zones of influence (10 tiles)
  - Continue G/F R & R on a best effort basis - zones 2B subset
  - *Deferred work may be redeferred with acceptable inspection*

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## Prioritized Opportunity

- 1 - 5 1 thru 5 complete on all vehicles
- 6 BRI-18 Tile – STR side of ET Doors Inboard side – *AFT 4 Tiles (8 Tile)*
- 7 Inboard Elevon “Hub” Tile Modification – *104 only remaining (4 Tiles)*
- 8 I/B Elevon 9lb/90 SIP Upgrade to FRCI-12 – AFT to FWD, 34 Tiles (17/side)
- 9 O/B Elevon 9lb/90 SIP Upgrade to FRCI-12 – 6 Tiles (3/side)
- 10 MLGD – Outboard Middle 1/3 - (6 Door/6 STR)

# TPS Priorities List (Cont.)

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- 11 **ET Door - Remaining STR side of Door & leading edge on Door** - 40 tiles (24 STR/ 16 door)
- 12 **MLGD** - Outboard AFT 1/3 - 24 Tile (6 door/6 str)
- 13 **Nose Area 9lb/90 SIP Upgrade to FRCI-12** – 14\* Tiles (7/side) (\*103 16 tiles,thruster)
- 14 **Base Heat Shield 9lb/90 SIP Upgrade to FRCI-12** – 42 Tiles (32/stinger, 10/Box Attach point)
- ➔ **NEW Body Flap Stub "Piano Key" Upgrade to AETB-8** 42 Tile (Order will be provided)
- 15 **Gap fillers in Subset 2B** (Line across MLGD edge)
- 16 **Remaining BRI-18 Tile** – Remaining MLGD (top priority) / ET Door / LESS carrier panels/NLGD  
MLGD (Inboard, forward edge working to AFT door edge)  
ET Door  
LESS - panels 8, 9, 10, 7, 6, 5, 4, 3, 2, 1, 11, 12, 13 (in that order)  
NLGD (attrition – do leading edge first)
- 17 **Mod work** (WLE sneak flow, WLE Horsecollar Gap Fillers,)
- 18 **MADS Instrumentation Failures** (104 & 105 L/H OMS Pod)(place holder)
- 19 **Remaining Gap Fillers & Window BRI-18**  
Windows 2, 3, 4, & 5 Upper Carrier Panels (top priority)

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**STS-129**  
**ISS-ULF3 ELC 1, ELC2, MISSE 7A & 7B, SASA**  
**Delta Launch Site Flow Review**

**Payload Cargo Engineering Status**

**Yvette Carmona**

**281-212-6492**

**06/22/09**



# STS-129 DLSFR

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## Engineering Flight Product Status

<u>Drawing No</u>	<u>Title</u>	<u>Rev</u>	<u>EO</u>	<u>Released</u>
V072-200209	MECSLSI	A	A01	04/21/09A
VA72-200209	Cargo Arrangement	Basic	-	01/15/09A
VD72-200209	Avionics Diagram	A	A01	04/22/09A
VS72-200209	Integrated Schematic	A	A01	04/22/09A
VS70-540403	Retention Schematic	A	A02	04/24/09A

FRED Release was completed on 04/27/09

### Engineering Open Work

- ELC MGSE Design Incorporation

### Standardization

- Mission Configuration does comply with Orbiter/Payload Integration Standardization Document, NSTS 60523

# STS-129 DLSFR

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## OMRS Status

### Baselined Files

- P545 - ISS-ULF3
- P548 - MISSE 7

### Open Work

### ECD

- RCNs
  - FII, V2 Post Mate
    - PP17979R1 P545 – MDS Fit Check & GLACIER IVT 06/16/09
  - FII, V4 Pre-Mate
    - PS17981 S07 – RH/LH ROEU Test – Dual Configuration 06/23/09
    - PS17964 S07 – STS-129 F2/V4 Mission Unique List 07/07/09
    - PS17960 S07 – STS-129 FIII Mission Unique List 06/30/09
    - PS17971 S07 – STS-129 Adjacent Bent Pin Test 06/30/09
  - FII, V6 Shuttle Experiments
    - None

### Issues/Concerns

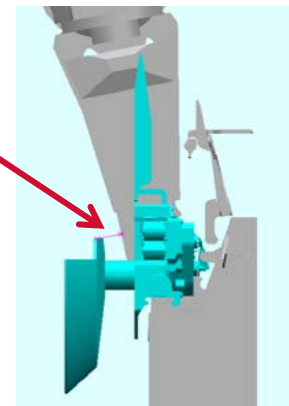
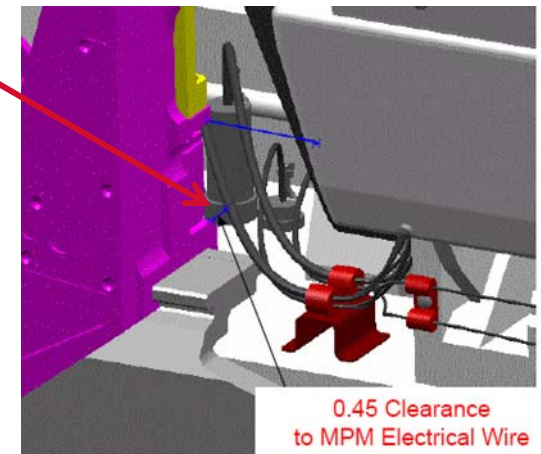
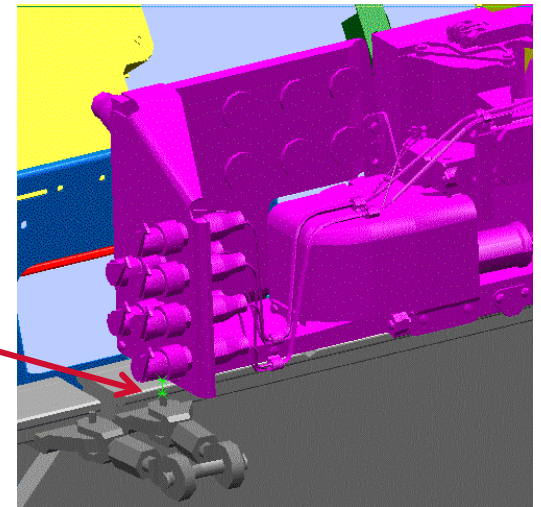
- None

# STS-129 DLSFR

## Cargo Close-Clearance Process

The following Close-Clearance areas have been identified:

- **Starboard ROEU-to-stabilizer link bolt**
  - 0.45” static, 0.26” dynamic
  - As-installed OPF measurements required
  - Chit J6501 approved 05/04/09
- **Latch at X<sub>o</sub> 892 and MPM wiring (port and starboard)**
  - 0.45” static (approx) when latch travels full aft
  - Measurement not required
  - Re-dress of MPM cabling may be required if potential for contact
- **Potential: MPM and scuff plate at X<sub>o</sub> 1242**
  - Less than 3” static, but currently >1” dynamic
  - As-installed measurement only required if VLA shows less than 1” dynamic (ECD: 08/03/09)



# STS-129 DLSFR

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## Cargo Integration Hardware Status

### Delivery Status

- **ROEU Cable Harnesses – (Re-Make)**
  - Cables returned to vendor for re-braiding
  - Hardware Delivery Date: 06/30/09
  - Certification Approval Date: N/A
  - KSC Need Date: 06/18/09
  
- **ELC Bond Straps and Attach Hardware**
  - Hardware Delivery Date: 07/01/09
  - Certification Approval Date: N/A
  - KSC Need Date: 08/20/09

# **Atlantis STS-129**

## **Delta Launch Site Flow Review**

### **Space Shuttle Main Engine**

**SSME - KSC**  
**Paul Brzeski**  
**(321) 861-4064**

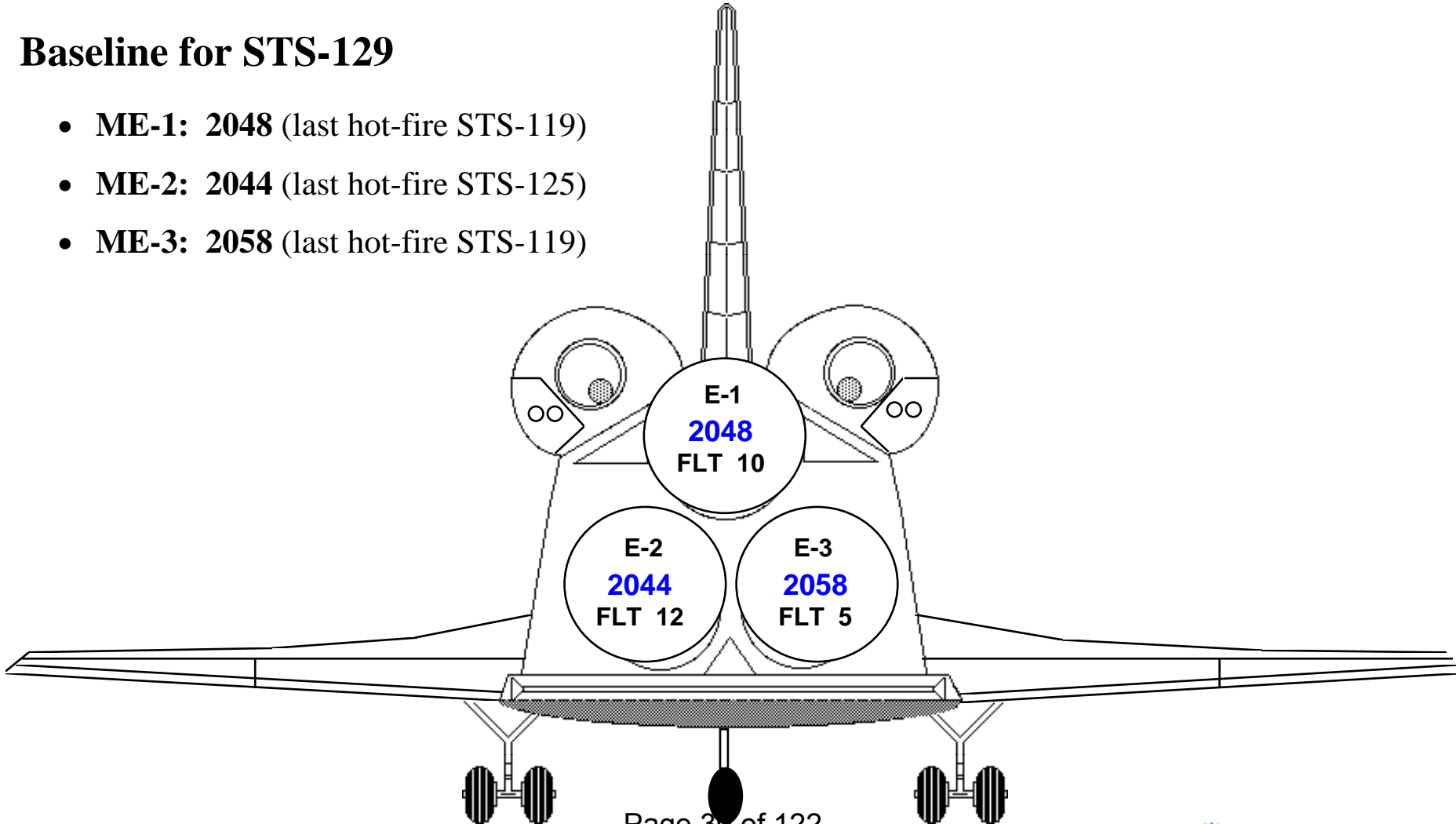


# STS-129 Delta Launch Site Flow Review

## *SSME Allocations / Locations*

### Baseline for STS-129

- **ME-1: 2048** (last hot-fire STS-119)
- **ME-2: 2044** (last hot-fire STS-125)
- **ME-3: 2058** (last hot-fire STS-119)





# STS-129 Delta Launch Site Flow Review

## *SSME Planned Modifications*

Mods authorized by Shuttle Project Action Request (SPAR) or Level II Change Request (CR)

ECP	Title	Engine(s)	Kit Drawing	Weight Impact	SPARs / CRs	Status
1543	Joint F3 (LPF Duct-to-HPFTP) Liquid Air Insulation Redesign.	2048	2R112834-010	+0.37 lbs	ME-0247 R01	Complete
		2044			ME-0251 B	In-Work
		2058			ME-0249 R01	Complete
1544	Joint F5 (HPF Duct-to-MFV) Liquid Air Insulation Redesign.	2058	2R112835-010	-0.15 lbs	ME-0249 R02	In-Work



# STS-129 Delta Launch Site Flow Review

## *Rocketdyne Action Requests (RAR)*

RAR	Title	Engine(s)	SPARs / CRs	Status
KLO-1636	Inspect HPFTP Inlet Housing.	2048 2058	ME-0247 B ME-0249 B	Complete.
KLO-1639	Inspect HPFTP Inlet Housing.	2044	ME-0251 B	In-work, part of postflight STS-125 processing.





## KSC International Space Station and Spacecraft Processing

**ISS-ULF3**

**ELC1**

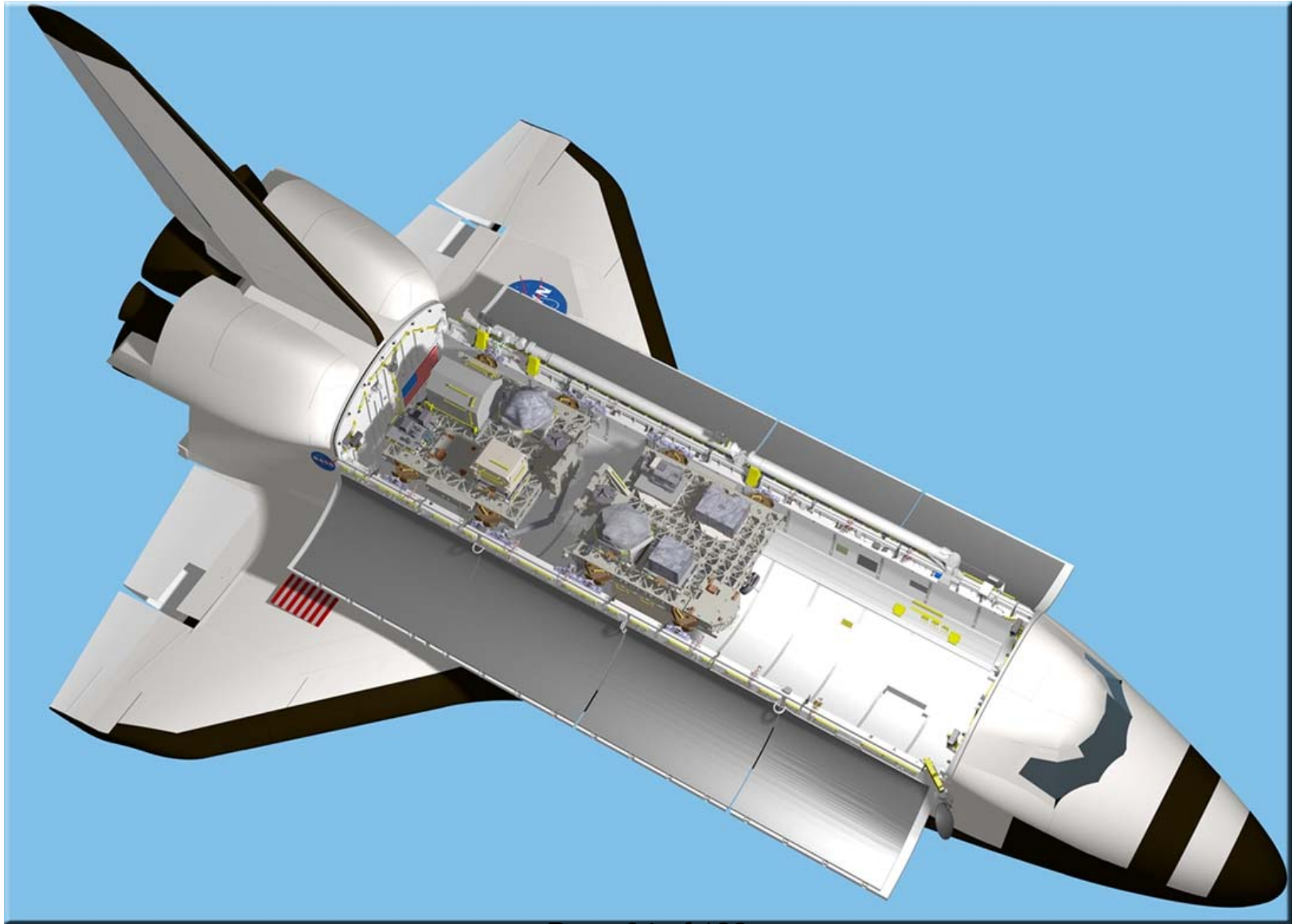
**ELC2**

**SASA**

**MISSE-7**

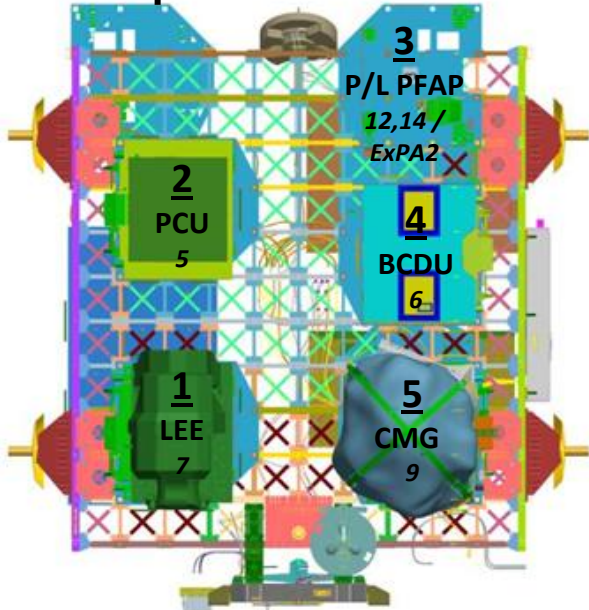
**Scott Higginbotham / UB-R**  
**ULF3 NASA-KSC Mission Manager**  
**June 25, 2009**

# ULF3 ELC1 / ELC2 Launch Configuration

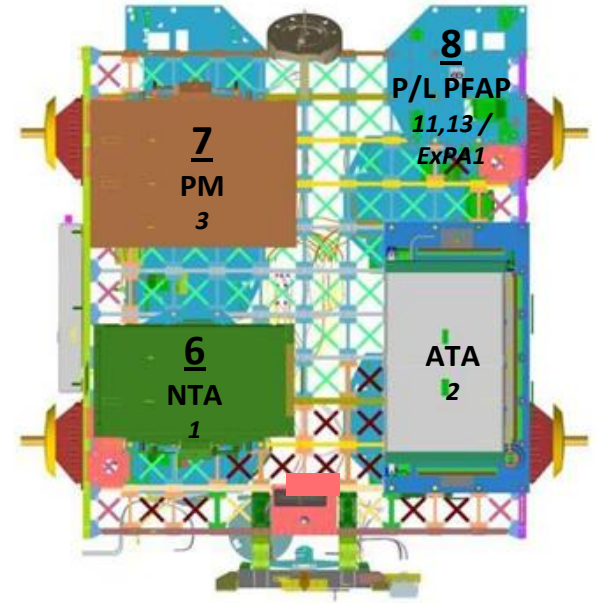


# ELC1 Configuration

Top Side/Port Face



Keel Side/Starboard Face

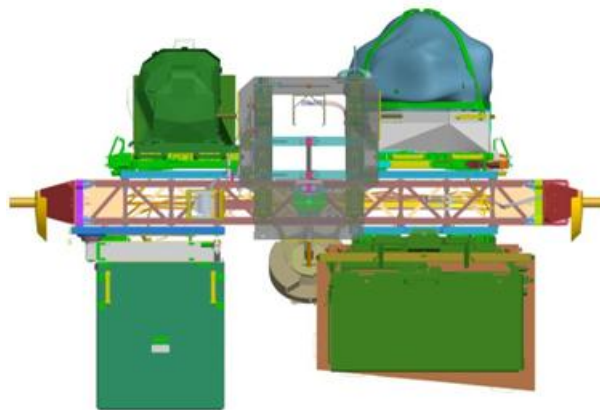


## Legend

**EVA Site #**

**Cargo Name**

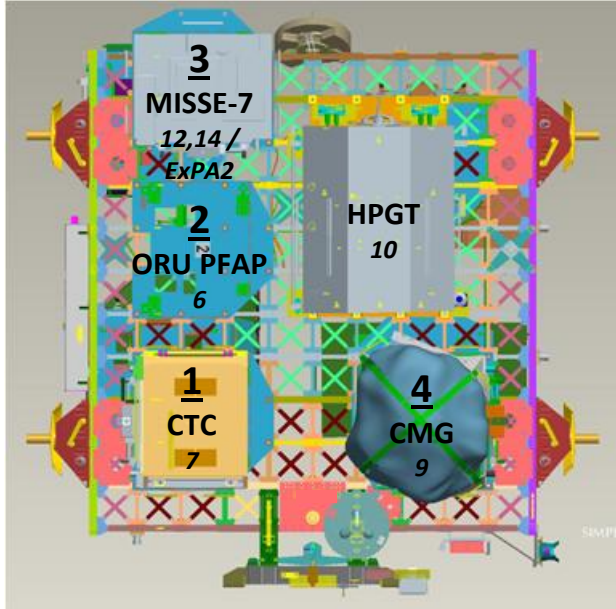
**Power Telemetry # / ExPA#**



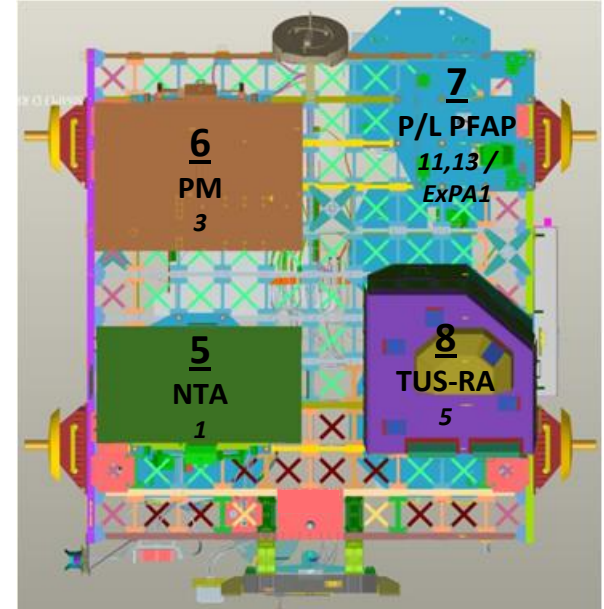


# ELC2 Configuration

Top Side/Port Face



Keel Side/Starboard Face

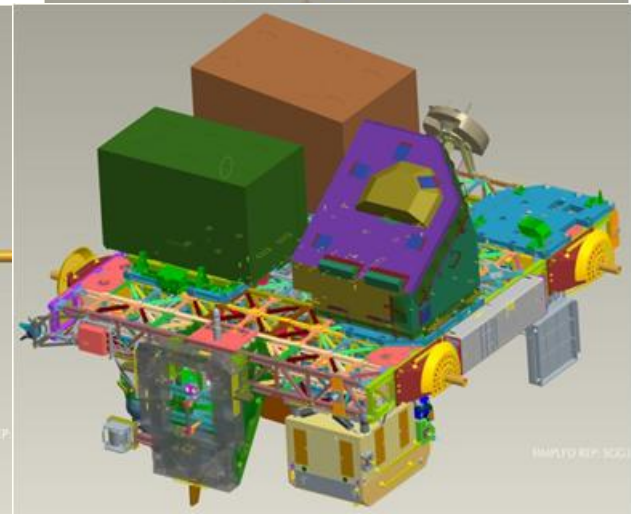
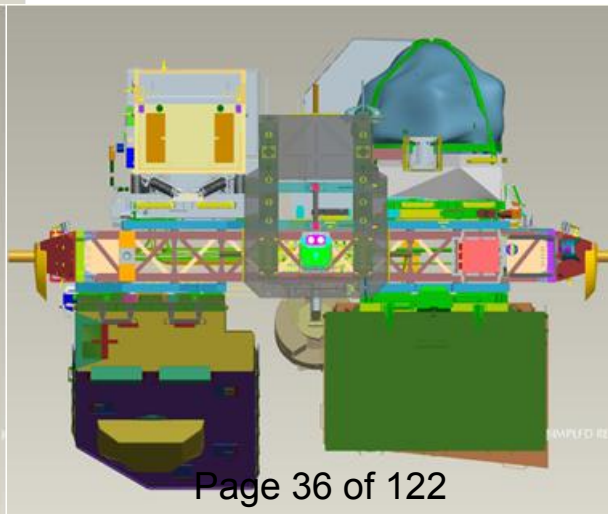
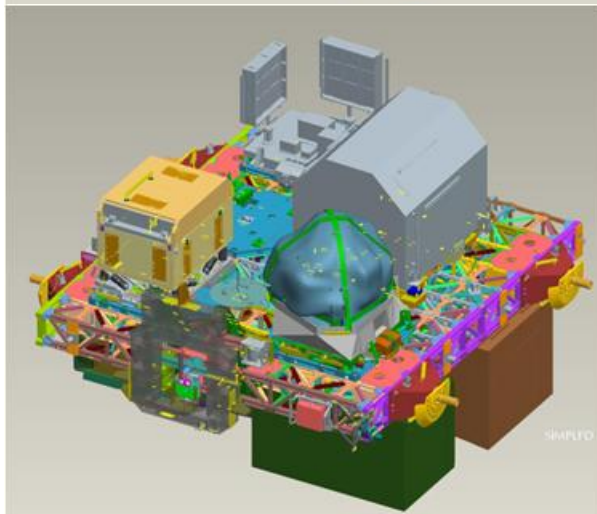


## Legend

**EVA Site #**

**Cargo Name**

**Power Telemetry # / ExPA#**





# Hardware Processing Status Summary



## ExPRESS Logistics Carrier 1 (ELC1)

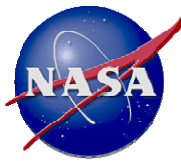
- Assembly operations are continuing
  - Top side kinematic mount match drilling/PFAP installations are complete
  - Keel side kinematic mount match drilling/PFAP installations to begin in late June
  - Harness routing/securing is underway
- PCAS/ACAS test and “risk mitigation” avionics testing planned for late July
- Flight ExPRESS Carrier Avionics (ExPCA) delivery has been significantly delayed – Not expected to arrive at KSC until mid-August

## ExPRESS Logistics Carrier 2 (ELC2)

- Assembly operations are continuing
  - Keel side ORU Integrated Assemblies (TUS-RA, PMA, NTA) have been installed
  - PVGF installation is underway
  - Top side ORU Integrated Assembly installation to begin in early July
  - PCAS/ACAS test scheduled for late June
- Flight ExPRESS Carrier Avionics (ExPCA) delivery has been significantly delayed – Not expected to arrive at KSC until mid-August
- Final integrated testing will occur following ExPCA arrival/installation



# Hardware Processing Status Summary



## Orbital Replacement Unit (ORU) Integrated Assemblies (IA)

- Seven of fourteen ORU IAs have been completed thus far (NTA s/n 03\*, LEE, ATA s/n 05, PMA s/n 05\*, BCDU, TUS-RA\*, CTC) [\* installed on ELC]
- The seven remaining ORU IAs are in various stages of build-up
  - CMG s/n 102 ORU to FSE integration is nearly complete
  - HPGT ORU oxygen servicing is in work at KSC; FSE integration onto ELC2 is in work
  - NTA s/n 02 ORU nitrogen servicing is scheduled for July; FSE integration is complete
  - PCU ORU xenon servicing preps are underway in California; FSE build-up is in work
  - PMA s/n 07 ORU to FSE integration is in work
  - CMG s/n 104 ORU to FSE integration is in work
  - SASA ORU rework is underway; FSE integration is underway

## Materials on International Space Station Experiment-7 (MISSE-7)

- Hardware arrived at KSC on 6/22 – Standalone assembly/test is underway



# ULF-3 Processing Milestones



## ELC1 / ELC2

- ELC1 / ELC2 keels on dock KSC 26 June 2009
- ELC2 ExPCA on dock KSC mid-August 2009 (U/R)
- ELC1 ExPCA on dock KSC mid-August 2009 (U/R)
- ELC deck to keel attachment MGSE on dock KSC 22 August 2009
- ELC1 / ELC2 CEIT TBD
- ELC1 / ELC2 closeouts complete / Start of Shuttle Integration TBD
- ICD Walkdown TBD
- ELC1 / ELC2 weight and c.g. measurements TBD
- ELC1 / ELC2 canister installation TBD
- ELC1 / ELC2 canister rotation to vertical TBD

Late ExPCA deliveries seriously threaten the planned 10/11/09 delivery of ELC1/2 to Pad A



# ULF3 Processing Milestones



## Sidewall Payload/ORU

- MISSE-7 SWC/PEC transfer to OPF / installation into Orbiter 25-26 August 2009
- SASA/FSE transfer to OPF / installation into Orbiter 27 August 2009
- SASA/FSE to Orbiter IVT 28 August 2009
- Orbiter CEIT 11-12 September 2009

## Integrated Operations

- ELC1 / ELC2 transfer to Pad A 11 October 2009
- SSV transfer to Pad A 14 October 2009
- ELC1 / ELC2 transfer into Orbiter 15 October 2009
- ELC1 / ELC2 MGSE removal / ROEU mate / Bond strap instl 16 October 2009
- ELC1 / ELC2 to Orbiter IVTs 17 October 2009
- Flight Crew walkdown / Interim payload closeouts 20 October 2009
- Interim payload bay door closure 20 October 2009
- PCU valve closure (NET L-100 hours) 9 November 2009
- Delta payload closeouts / Final payload bay door closure 9 November 2009
- Middeck experiment late stow / Orbiter IVTs 11 November 2009
- Launch 12 November 2009



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# **STS-129**

# **Delta Launch Site Flow Review**

**June 25, 2009**

# Agenda

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- **Assessment/Multi Flow**                      **A. Brewer/NASA**
- **Milestone Interface Chart**                      **A. Brewer/NASA**
- **Flight Element Processing**                      **R. Propst/USA**

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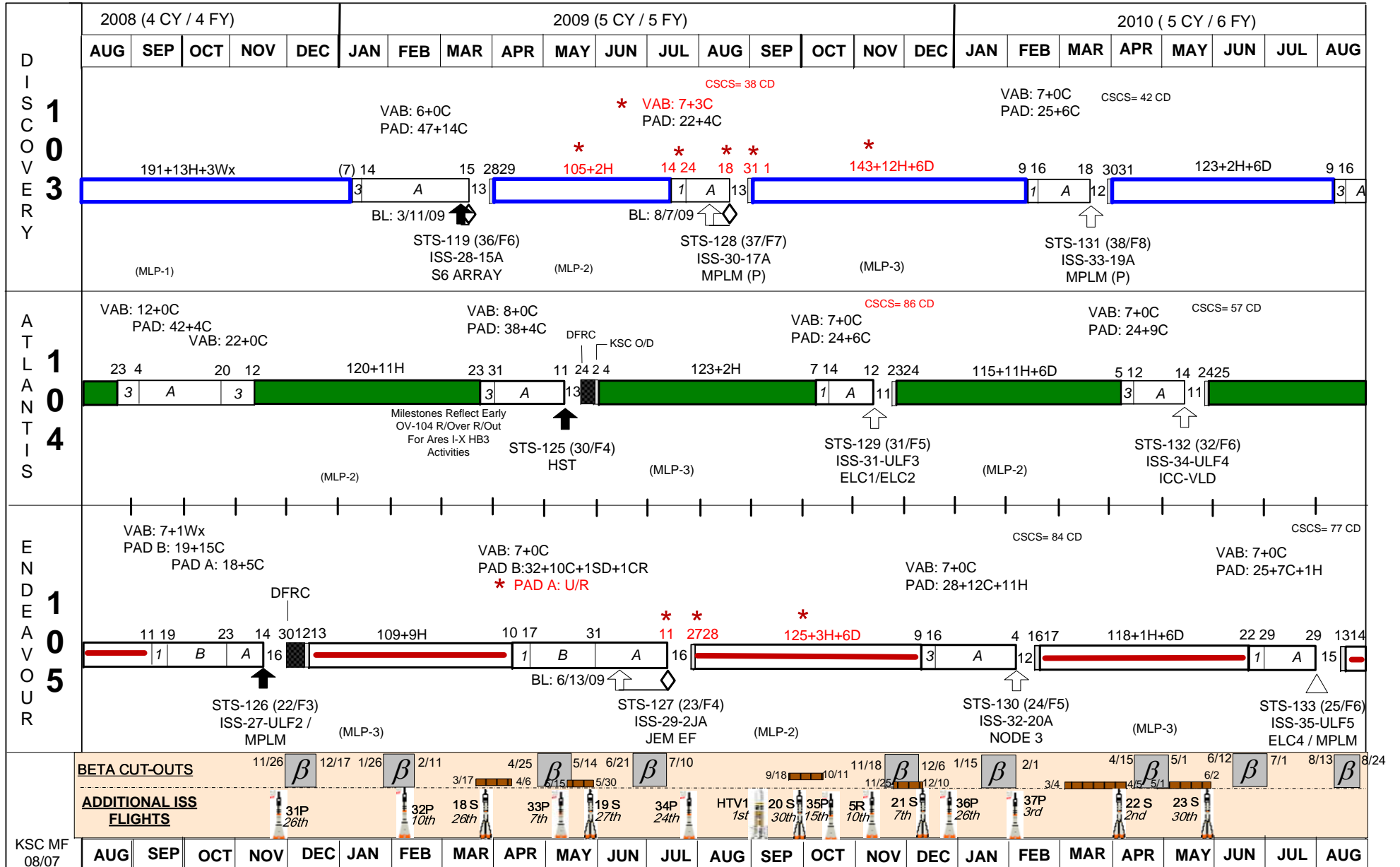
# Multi Flow A. Brewer

# KSC ASSESSMENT / ORB MULTI-FLOW

## SSP APPROVED MANIFEST

### MANIFEST REF. 09B-1

1000 EDT, 19 JUN 2009



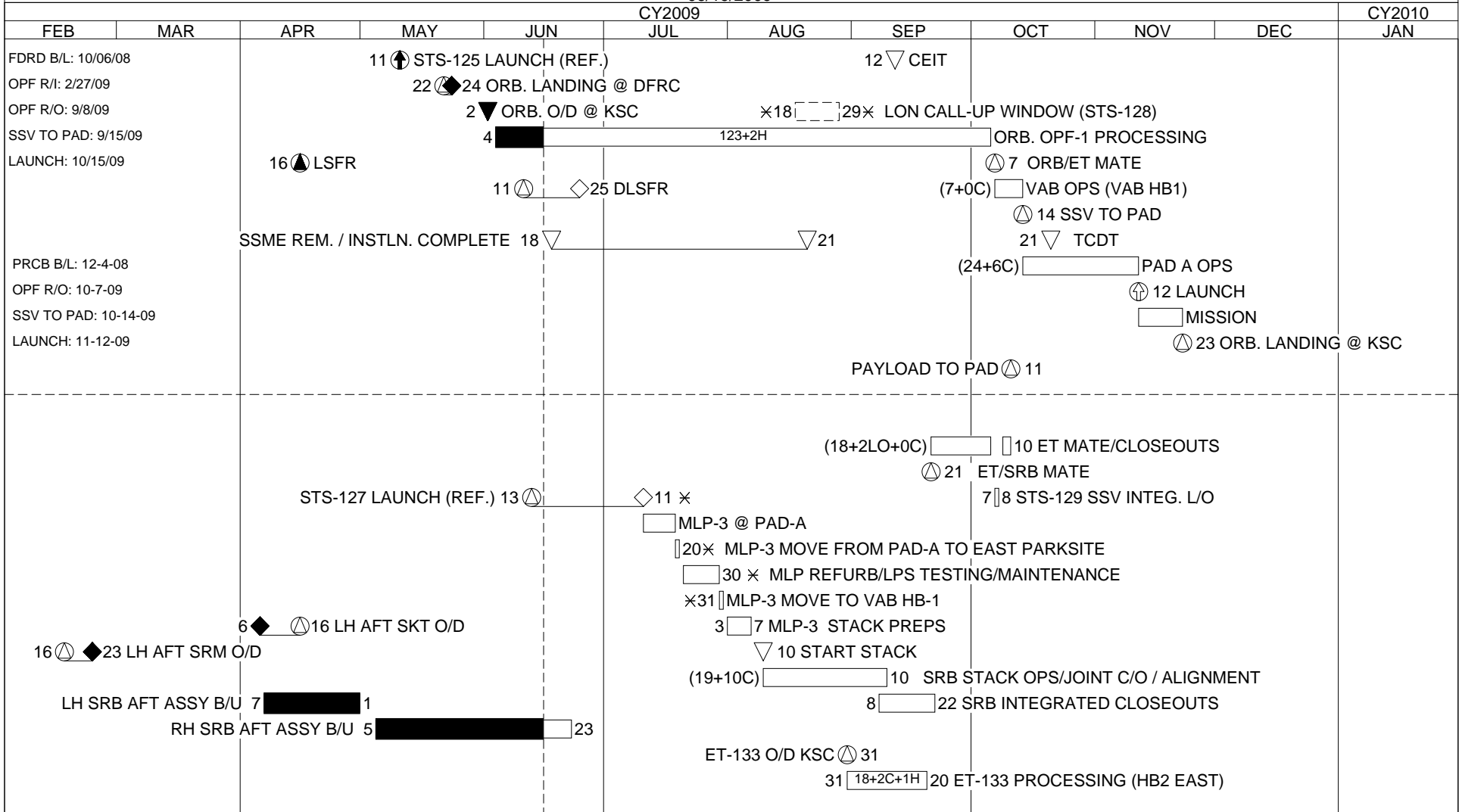
**LEGEND**  
 H = HOLIDAY    D = DRYDEN RESERVE    C = PAD CONTINGENCY    Wx = WEATHER OUTAGE    OPF-1    OPF-2    OPF-3    Vehicle out of service    S = SOYUZ    P = PROGRESS  
 CR = CREW REST DAY    DFRC OPS    1/3 VAB OPS    A/B PAD OPS    MILESTONE    LAUNCH    MLP TO VAB START STACK / ET - SRB MATE / ET - MATE CLOSEOUTS COMPLETE    SOYUZ Cutout

# STS-129 KSC Milestone Interface Chart

OPR: USA - R. GILLETTE, INTEG. OPS.  
NASA - A. BREWER, PH-A

OV-104 / 31 / ISS-31-ULF3 / ELC1 / ELC2  
CREW / DURATION: 6 UP - 7 DOWN / 11  
ET-133 / BI-140 / RSRM 108 / MLP-3 / PAD-A / VAB HB1

SSP APPROVED PRCB 12-4-08 (REF. CR #S042013HQ)  
Status as of:  
06/19/2009



THREATS: 1. MIDBODY CRITICAL PATH, ODS INSTALL / RCC INSPECTION

NOTES: 1. THIRTY-FIRST ISS/SSP FLIGHT

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# Flight Element Processing

## Ray Propst

# Flight Element Processing Overview

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- **Milestone Summary** **To Be Presented**
- **Significant Processing Deltas** **To Be Presented**
- **TPS Status** **To Be Presented**
- **Issues and Concerns** **To Be Presented**
- **Integrated Assessment** **To Be Presented**

STATUS

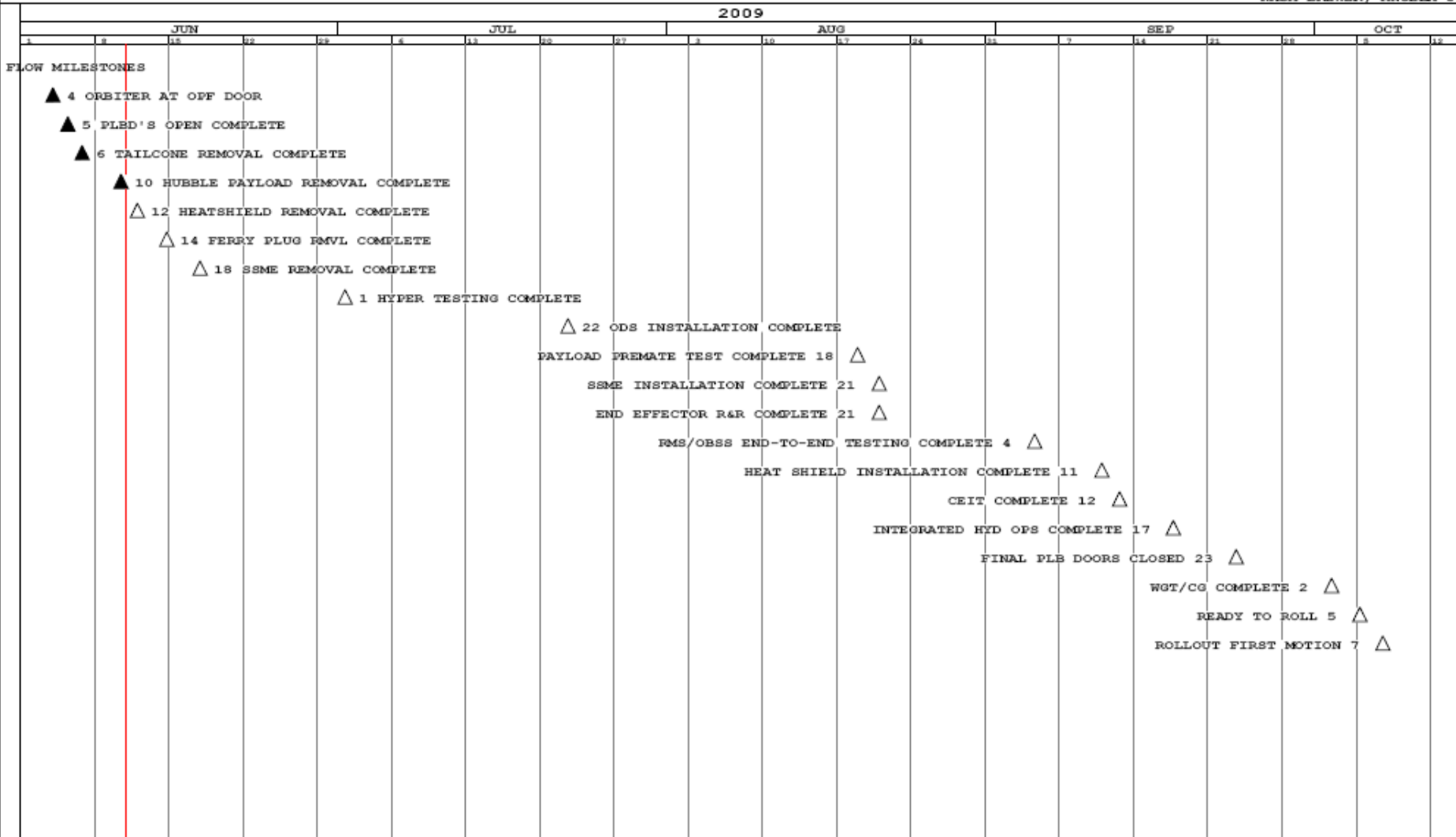
USA	NASA
C	C
Orbiters	EMUS-orbiters

STS-129/OV-104 OPF FLOW MILESTONES

'DOWN PAYLOAD: HST / UP PAYLOAD: ISS-31-ULF3

Creation Date: 21-JAN-2009  
 Revision Date: 11-JUN-2009  
 Revision : F

OPR: USA-PROPST, RAYMOND D  
 NASA-BREWER, ANGELA J



△ PLAN/BASELINE    ◇ DEVIATION FROM BASELINE    ▲ ◆ ACTIVITY COMPLETED    △ ACTIVITY CANCELED    △-△ ACTIVITY DURATION \*\*\*\* SCHEDULE CHANGE



# Significant Processing Deltas

---

## Major Components Removal / Replacements

- Windows 1 & 7
- Thruster R5R
- Fuel Cell #1
- ODS Reinstallation
- ASA #1 R&R
- WLE Corrosion Inspection – RCC 13 – 16 L&R
- Elevon Cove Seal Leak Check (Flt 32 Get Ahead)

## MODS

- Av Bay 3A Cooling Mod
- Complete WLE Sneak Flow Path Mod
- RSB Thermal Tabs
- O2 Crossover Valve Talkback Mod

# TPS Work Content

## TPS Removals

<u>Priority</u>	<u>Description</u>	<u>LSFR</u>	<u>DLSFR</u>
Mand	Deferred Tile/ Fib For 1 Flight (Minimum)	3	4
Mand	In-flight Tile/Blanket Damage (Estimate)	25	40
15	-Piano Key (Upper Body-Flap-14 Flight Tile)		
Mand	Estimated Putty Removals (Grindouts)	14	14
Mand	Operational Damage (Estimate)	20	20
Mand	Putty Repairs in RCC and Window DTA Zones	10	10
Mand	I/B Elevon 9lb/90 SIP Tile Upgrade (14 To Go)	14	14
Mand	Instrumentation	2	2
13	Nose Area 9lb/90 SIP Tile Upgrade	14	14
BRI Replacement:			
6	ET Inboard Structure Side	7	7
<b>Projected TPS Removals TOTAL (Estimate)</b>		<b>*109</b>	<b>*125</b>

**\* Final TPS Work Content Will Be Baselined At The Delta LSFR**

# TPS Work Content (Additional Work)

---

## Planned Work:

- LESS access panels
  - Restricted work 17R/22R - (1) panel
  - Complete Priority 17 Sneak Flow Mod on 2L/4R - (2) panels
  - LH/RH RCC 13-16 R&R - (24) panel removals
  - Chit J6327 T-Seals on 14/15R, 17/18R, 11/12L - (4) panels
  - Post-flight discrepancies (Torque, Horsecollar, Etc) - (5) panels
    - **Total LESS panel removals to date= (36)**  
**(24 Lower/12 Upper)**

## Potential Work:

- RH S-Band (Potential 25-30 Tiles)
- AMES R&R – Zone 29 of 2A (fwd of LH MLGD)
- Elevon cove access panel removals (Pending Elevon Cove leak checks)

# Issues and Concerns

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- Radiator Freon Control Valve
- S-Band Lower Right Antenna (Potential 25-30 Tile)
- Right OMS Nozzle
- TPS Work Volume
- ROEU Late Delivery
- Inner Window #5

**STATUS**

OPR: USA - J. Taylor, INTEG FM (1-7420)  
NASA - A. Brewer, PH-A (1-9104)

**STS-129 / OV-104**

**Integrated Operations Assessment Summary**

Payloads: ISS-31-ULF3 ECL1 / ECL2 (VERT)

USA NASA

C C

**CONCUR**

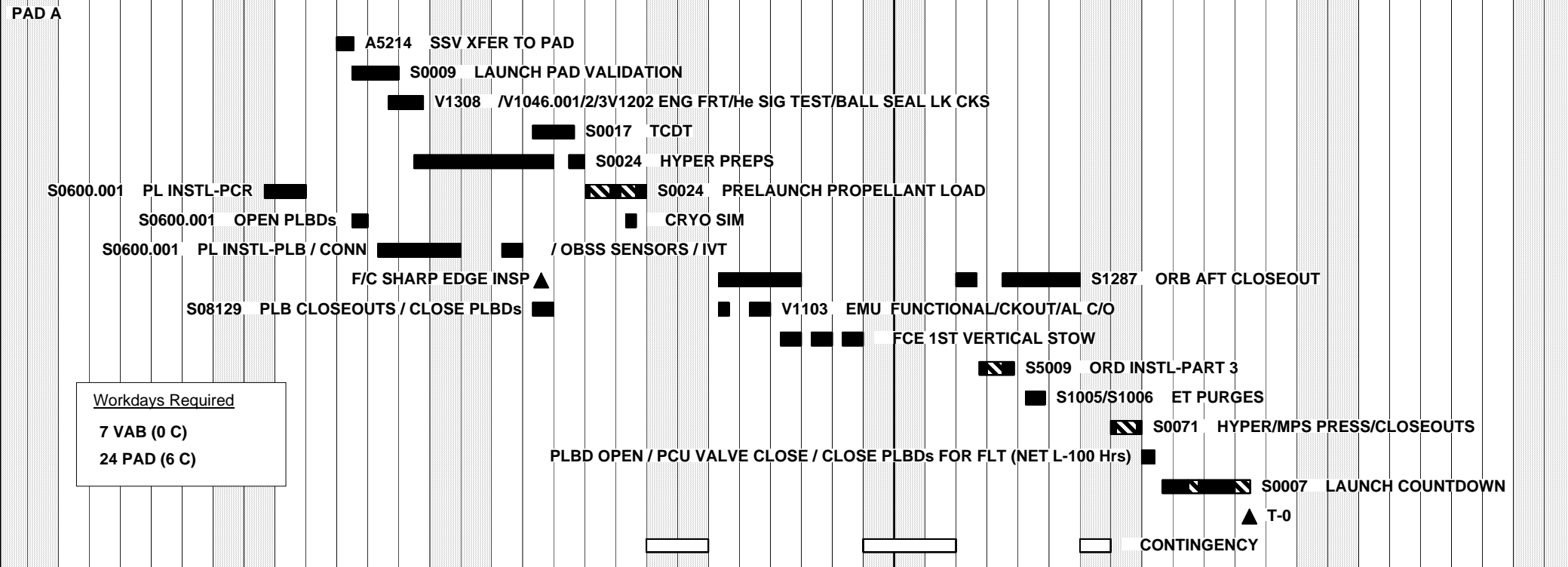
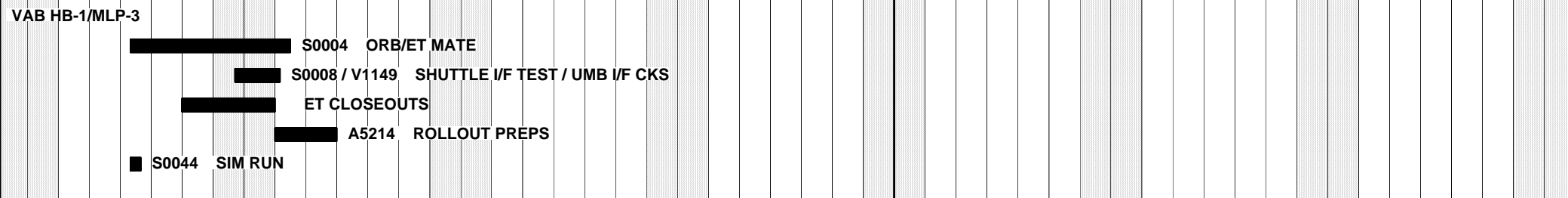
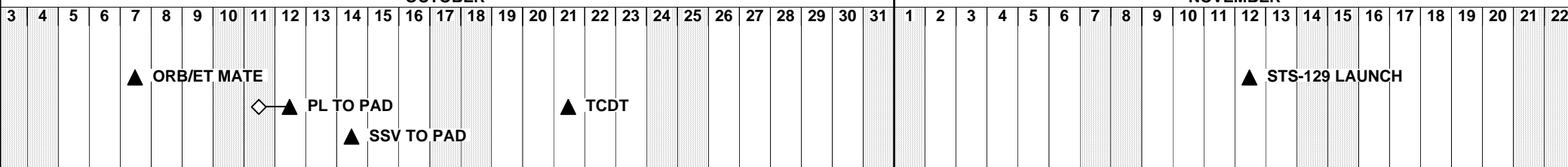
Creation Date: 08 JAN 09  
Revision Date: 23 MAR 09  
Revision: NEW - 1

C=Concur NC=Non-Concur

2009

OCTOBER

NOVEMBER



Workdays Required  
 7 VAB (0 C)  
 24 PAD (6 C)

PLBD OPEN / PCU VALVE CLOSE / CLOSE PLBDs FOR FLT (NET L-100 Hrs)

CONTINGENCY



# **STS-129 Delta Launch Site Flow Review**

Presenter **Kenneth Nowak**

Date **06-25-09**

## **Backup Material**

### **FRWG Presentation (With Minor Changes)**



# STS-129 DELTA LAUNCH SITE FLOW REVIEW

Presenter
<b>Michael Darnell</b>
Date
<b>JUNE 25, 2009</b>

## Backup Charts



## STS-129 DELTA LAUNCH SITE FLOW REVIEW

Presenter
<b>Michael Darnell</b>
Date
<b>JUNE 25, 2009</b>

### MISSION INTEGRATION PLAN (MIP) REQUIREMENTS STATUS

#### OPEN CR's

- PRCB CR's

  - None

- NSTS 21545 MIP CR's

  - MIP CR#0011 – Remove O2 Transfer Requirement and Add CGBA Middeck payload to ULF3 (ECD 6/24/09)
  - MIP CR#0012 – Add CERISE Middeck Payload to ULF3 (ECD 6/24/09)

- NSTS 21530 MAUI PIP CR's

  - None

- NSTS 21542 SEITE PIP CR's

  - None

- NSTS 21327 SIMPLEX PIP CR's

  - None

- NSTS21556 RAMBO-2 PIP CR's

  - None

- Issues and Concerns

  - None





## **STS-129 DELTA LAUNCH SITE FLOW REVIEW**

Presenter

**Michael Darnell**

Date

**JUNE 25, 2009**

### **STS-129 FRD Status**

- **STS-129 FRD Latest Revision: 005, dated May 29, 2009**
  - **Open CR's**
    - **None**

## Back-up

- **Modification Record and MECSLSI Updates Summary**
- **Engineering, Hardware and Certification Status**
- **Description of Previously Authorized Modifications**
- **TPS Allocation Breakdown**

# Modification Records and MECSLSI Update Summary

MCR/ TAD NO.	TITLE	KIT / MOD RECORD & DESCRIPTION	TECH ORDER IMPACT	REMARKS
<b>Mission Equipment Records To Be Baselined</b>				
30010	<b>Starboard and Port Lightweight TSA Cushions</b> Provides new cushions for the port and starboard Lightweight Tool Stowage Assembly (LW TSA) to accommodate additional tools that will remain on ISS.	<a href="#">030010_0104_5</a> - End Item Kit record	<b>Port LW TSA Tool Stowage</b> M072-660853-008 (is) M072-660853-004 (was) <b>Starboard LW TSA Tool Stowage</b> M072-660857-001 (is) M072-660854-001 (was) MV0849A	Tech Order changes are incorporated into MECSLSI
17222	<b>RMS End Effector Configuration Change*</b> Incorporates design modification during the End Effector refurbishment.	<a href="#">TCTIM0017222REF_0006_4</a> - End Item Kit record	<b>Mech Instl - Remote Manipulator Arm Instl</b> M072-544502-036 (is) M072-544502-033 (was) MV0082A	Tech Order changes are incorporated into MECSLSI
<b>Potential Modification</b>				
30260	<b>FRCS Rain Cover Redesign In-Throat Concept</b> Develops a new Tyvek Rain Cover for the FRCS thruster positions F3D and F4D to prevent tearing/partial cover release during the launch.	<a href="#">TBD</a>	No Tech Order Impact	No MECSLSI Impact
<b>Modification Previously Baselined</b>				
30186	<b>OMS Pod Micro-WIS Strain Recorder Removal</b> Removes the recorder box from the left OMS Pod and stows the wires.	<a href="#">TCTIM0030186REF_0003_0</a> - Stows the remaining wire	<b>Micro-WIS SGU on OMS Pod Installation</b> M072-755111-002 (is) M072-755111-001 (was) MV0886A	Tech Order changes are incorporated into MECSLSI
23205	<b>Acreage Doublers Addition to Avionics Bays 4, 5 and 6</b> Installs cold bonded protective doublers to the honeycomb facesheet on the aft avionics bay 4, 5 and 6 doors to provide additional resistance to impact loads and ensure life of honeycomb panels.	<a href="#">VK70-356734-001_0104_0</a> - Provides hardware for acreage doublers on honeycomb door panels	No Tech Order Impact	No MECSLSI Impact
30240/ 19393	<b>Middeck ISS Payload Cooling Requirements</b> Installs resized orifice in the existing ducting to the middeck avionics bay 3 to provide sufficient airflow balance to cool the ISS payload.	<a href="#">VK70-613604-001_0104_0</a> - Installs resized orifice in 3 locations <a href="#">VK70-613604-002_0104_0</a> - Installs a new bracket to support installation of a new orifice <a href="#">K609-613004-001_0002_0</a> - Provides caps for the duct	<b>Middeck Bay 3A Cooling Installation</b> M072-613800-005 (CCCD) <b>Avionics HX &amp; Fan Installation</b> M072-613999-002 (MECSLSI) MV0609A	Tech Order changes are incorporated into CCCD and MECSLSI
30231	<b>Rudder Speed Brake Inconel Thermal Barrier Redesign</b> Installs redesigned the Rudder Speed Brake inconel thermal barrier tabs to improve strength of the tab attachment.	<a href="#">TCTIV2930231REF_0104_0</a> - Installs redesigned RSB inconel thermal barrier tabs	No Tech Order Impact	No MECSLSI Impact
30250	<b>Oxygen Crossover Valve Signal Talkback Modification</b> Modifies Orbiter electrical configuration for the O2 crossover valves to provide valve position indication.	<a href="#">TCTIV7930250REF_0104_0</a> - Repins the connector at the N2/O2 control panel and reworks the MDM and signal conditioners in the avionics bay	No Tech Order Impact	No MECSLSI Impact
30099	<b>Relocation of D-Hatch Actuator Handle Position Decal</b> Relocates actuator handle position decal on the external airlock upper hatch / blanket to the correct location.	<a href="#">TCTIM3330099REF_0001_0</a> - Relocates "Latched / Unlatched" decals on the airlock upper hatch <a href="#">TCTIM0030099REF_0001_0</a> - Relocates decal on the blanket	<b>D-Hatch</b> M072-593828-005 MV0828A <b>Blanket</b> M072-364828-004 MV0828A	Tech Order changes are incorporated into MECSLSI
30099	<b>External Airlock Ducting Configuration Change</b> Connects the Orbiter Docking System booster fan outlet duct to the booster fan outlet prior to launch.	<a href="#">N/A</a>	<b>ISS Fan &amp; Ducting</b> M072-643402-011 MV0828A	Tech Order changes are incorporated into MECSLSI



# Engineering, Hardware and Certification Status

MCR/ TAD NO.	TITLE	Est. Engr Release (MM/DD/YY)	G.O. Engr Need (MM/DD/YY)	Est. Hdwe Delivery (MM/DD/YY)	G.O. Hdwe Need (MM/DD/YY)	MOD/CERT GO / NO-GO	CERT SUBMITTAL DATE	CERT APPROVAL DATE	CERTIFICATION CR / CAR (BOEING)	REMARKS
<b>Mission Equipment Records To Be Baselined</b>										
30010	<b>Starboard and Port Lightweight TSA Cushions</b> Provides new cushions for the port and starboard Lightweight Tool Stowage Assembly (LWTSA) to accommodate additional tools that will remain on ISS.	8/25/09	8/25/09	8/25/09	8/25/09	GO	Submitted	6/30/09	25-849-660516-001P 16-25-849-660516-001P	OCR/D S165421
17222	<b>RMS End Effector Configuration Change*</b> Incorporates design modification during the End Effector refurbishment.	N/A	N/A	N/A	N/A	GO	N/A	N/A	N/A	*NASA GFE
<b>Potential Modifications</b>										
30260	<b>FRCS Rain Cover Redesign In-Throat Concept</b> Develops a new Tyvek Rain Cover for the FRCS thruster positions F3D and F4D to prevent tearing/partial cover release during the launch.	9/24/09	9/24/09	10/15/09	10/15/09	TBD	TBD	TBD	TBD	
<b>Modifications Previously Baselined</b>										
30186	<b>OMS Pod Micro-WIS Strain Recorder Removal</b> Removes the recorder box from the left OMS Pod and stows the wires.	Released	N/A	N/A	N/A	GO	N/A	N/A	N/A	OCR/D S164130N Baselined at STS-128 LSRR
23205	<b>Acreege Doublers Addition to Avionics Bays 4, 5 and 6</b> Installs Cold bonded protective doublers to the honeycomb facesheet on the aft avionics bay 4, 5 and 6 doors to provide additional resistance to impact loads and ensure life of honeycomb panels.	Released	N/A	Delivered	N/A	GO	N/A	N/A	N/A	Baselined as NFS at STS-128 LSRR Engineered for flight 30
30240 / 19393	<b>Middeck ISS Payload Cooling Requirements</b> Installs resized orifice in the existing ducting to the middeck avionics bay 3A to provide sufficient airflow balance to cool the ISS payload.	Released	N/A	Delivered	N/A	GO	Submitted	Approved Approved	22-613400-001N 14-22-613400-001N	OCCE approved 10/28/08 (S165384A) OCR/D S165384A
30231	<b>Rudder Speed Brake Inconel Thermal Barrier Redesign</b> Installs redesigned the Rudder Speed Brake inconel thermal barrier tabs to improve strength of the tab attachment.	Released	N/A	Delivered	N/A	GO	Submitted	7/14/09	07-290101-001S 18-07-290101-001S	OCCE approved 1/27/09 OCR/D S165399
30250	<b>Oxygen Crossover Valve Signal Talkback Modification</b> Modifies Orbiter electrical configuration for the O2 crossover valves to provide valve position indication.	Released	N/A	N/A	N/A	GO	N/A	N/A	N/A	OCCE approved 2/24/09 OCR/D S165404
30099	<b>Relocation of D-Hatch Actuator Handle Position Decal</b> Relocates actuator handle position decal on the external airlock upper hatch / blanket to the correct location.	Released	N/A	N/A	N/A	GO	Submitted Submitted	Approved Approved	Hatch Actuator CR# 28-593201-001T CAR# 12-28-593201-001T Hatch Blanket CR# 09-362000-001CJ CAR# 71-09-362000-001CJ	OCR/D S165361 approved
30099	<b>External Airlock Ducting Configuration Change</b> Connects the Orbiter Docking System booster fan outlet duct to the booster fan outlet prior to launch.	Released	N/A	N/A	N/A	GO	Submitted	Approved Approved	CR# 35-643500-002W CAR# 20-35-643500-002W	OCR/D S165375 approved



# STS-129 OV-104 Flight 31 – Previously Approved Modification

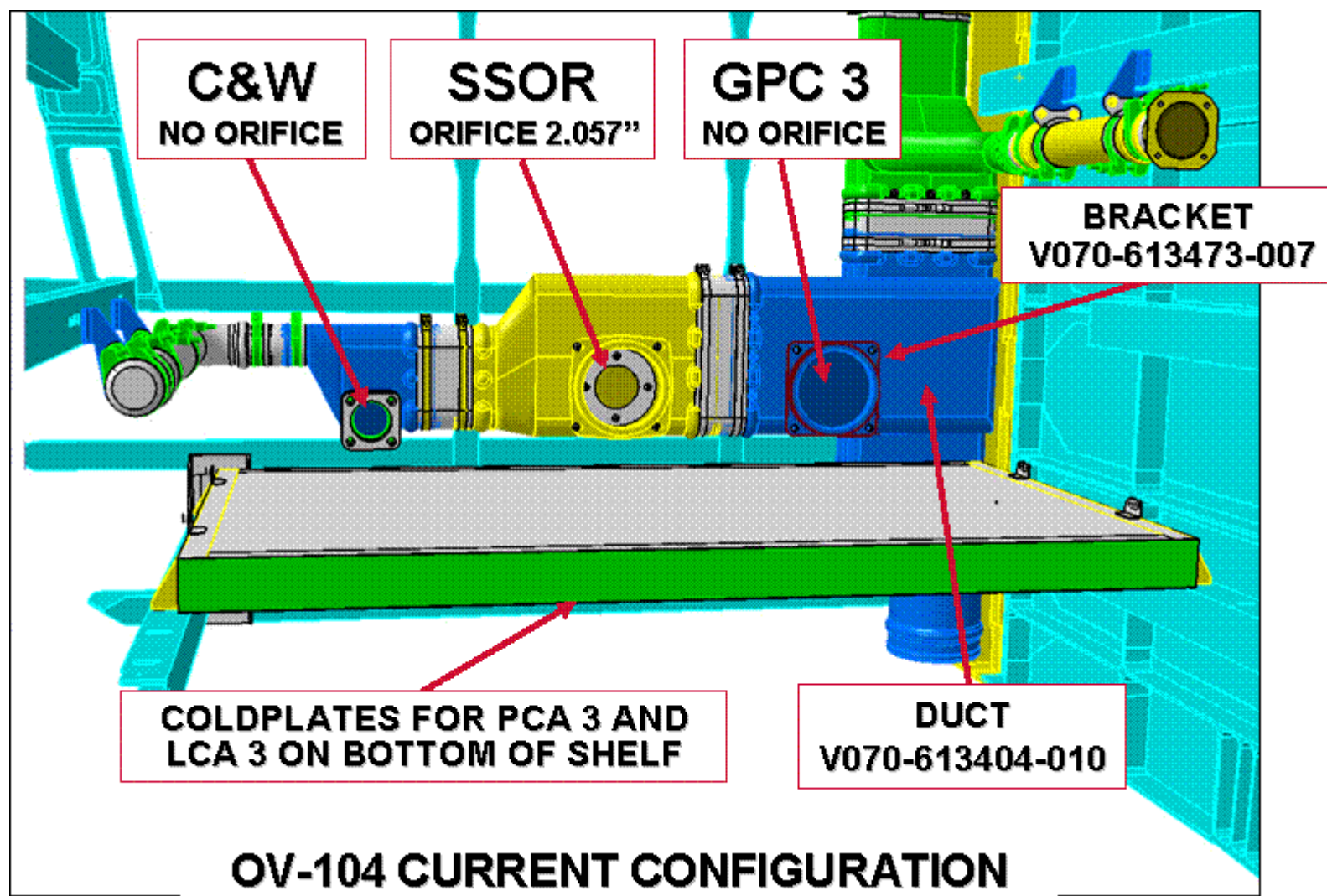
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## TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements

- Installs resized orifice in the ducting to middeck avionics bay 3A to provide sufficient airflow to cool the ISS payload
  - The ISS payload, Mice Drawer System (MDS), is currently planned to be installed in middeck avionics bay 3A
  - The current Orbiter configuration does not provide sufficient airflow to accommodate rear breathing payload in the middeck avionics bay 3A
  - Modification, increases the airflow to this location, providing the capability for avionics cooling in support of the MDS
    - Bay 3A requires installation of a bracket in the duct to allow the installation of an upgraded orifice at GPC 3 location, and installation of an upgraded orifice at SSOR and C&W locations
  - OCCB approved the implementation of the modification for bay 3A for flight 31 on 10/28/08

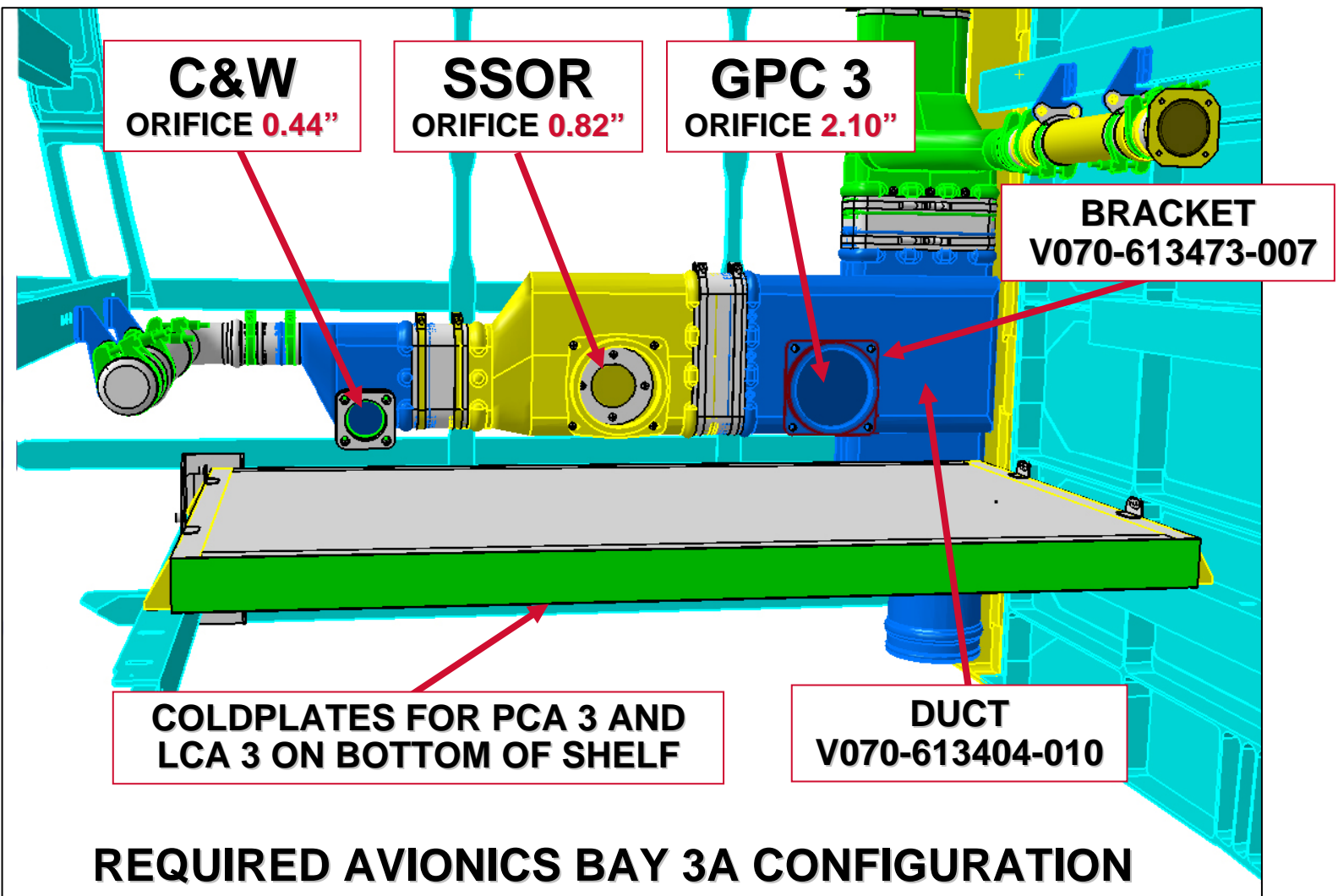
# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements (Cont.)



# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements (Cont.)

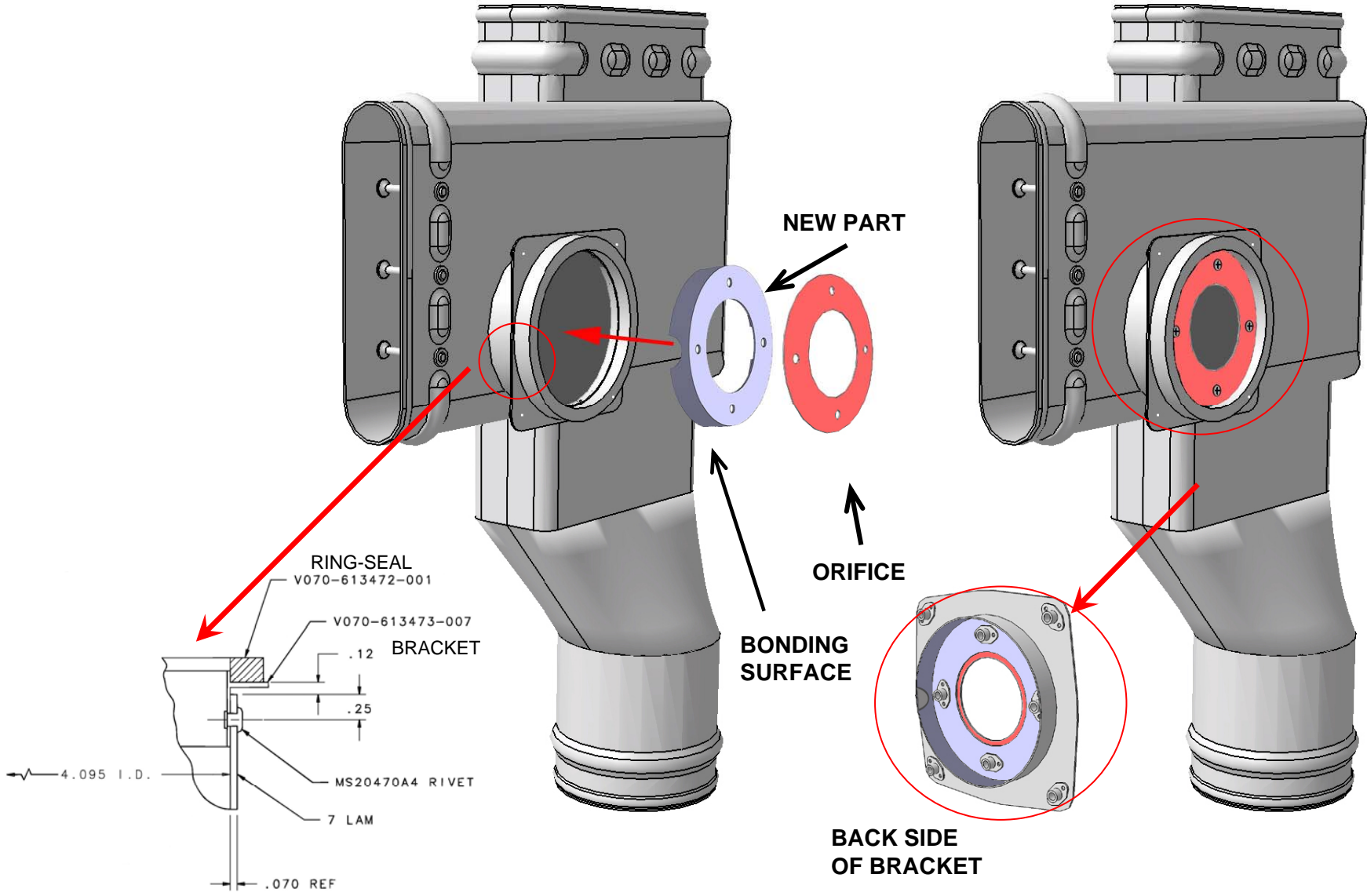


**REQUIRED AVIONICS BAY 3A CONFIGURATION**



# STS-129 OV-104 Flight 31 – Previously Approved Modification

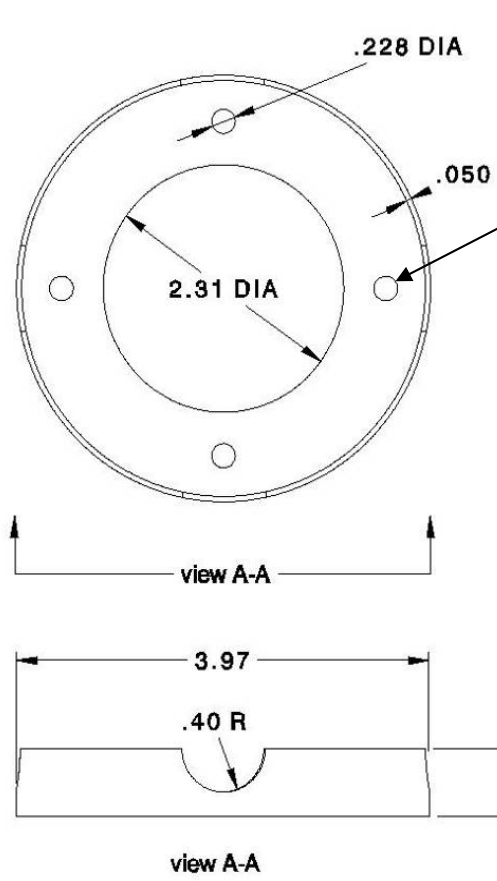
## TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements (Cont.)



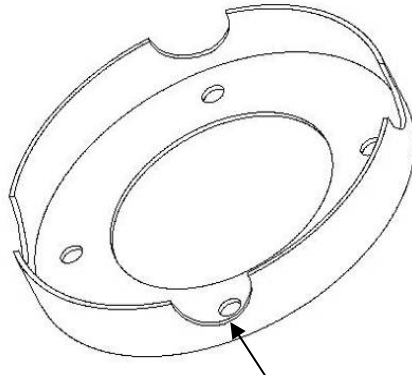


# STS-129 OV-104 Flight 31 – Modifications To Be Baselined

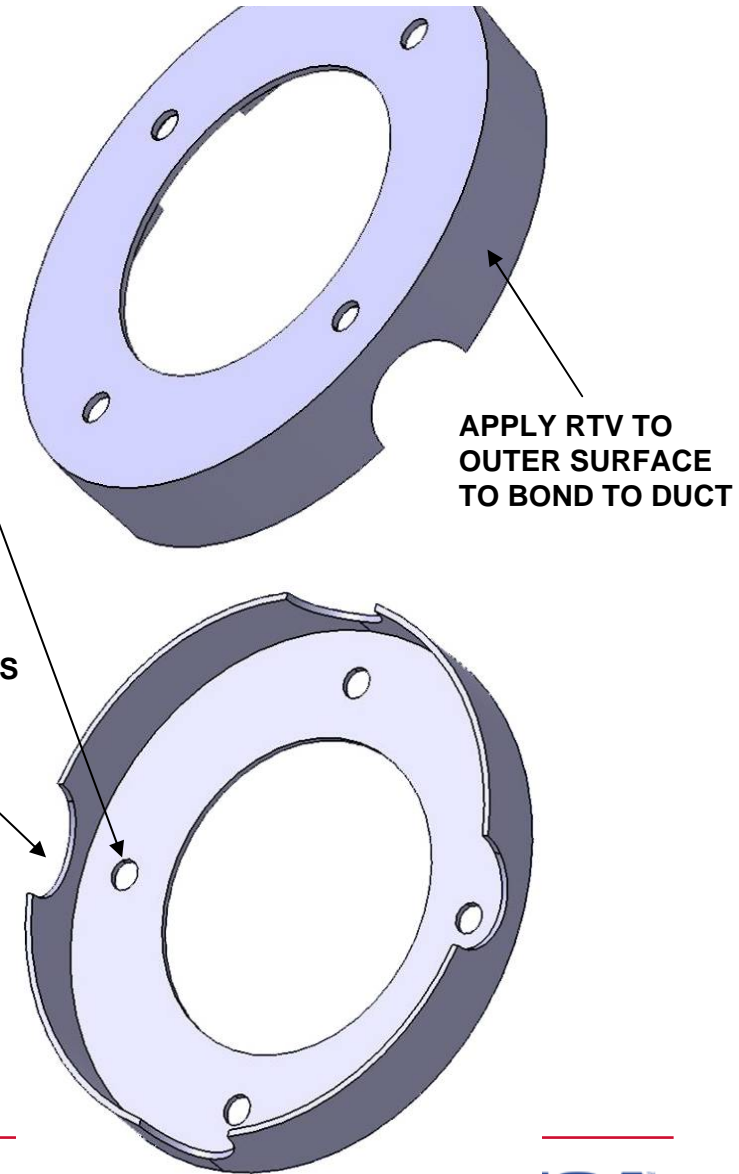
## TAD 30240 / MCR 19393 – Middeck ISS Payload Cooling Requirements (Cont.)



MD114-5005-0301 NUTPLATE 4 REQD  
MD121-0001-03 RIVET 8 REQD



NOTCHED TO SLIDE OVER THE RIVETS  
IN THE V070-613404-010 DUCT



APPLY RTV TO  
OUTER SURFACE  
TO BOND TO DUCT

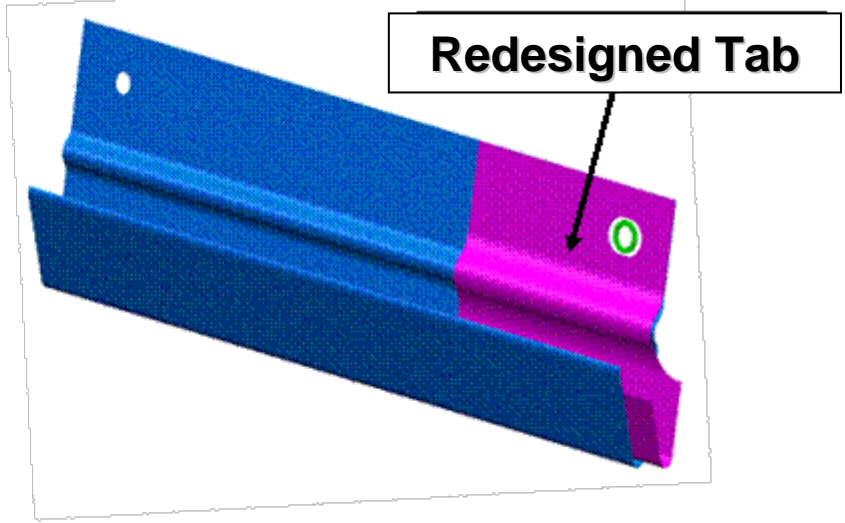
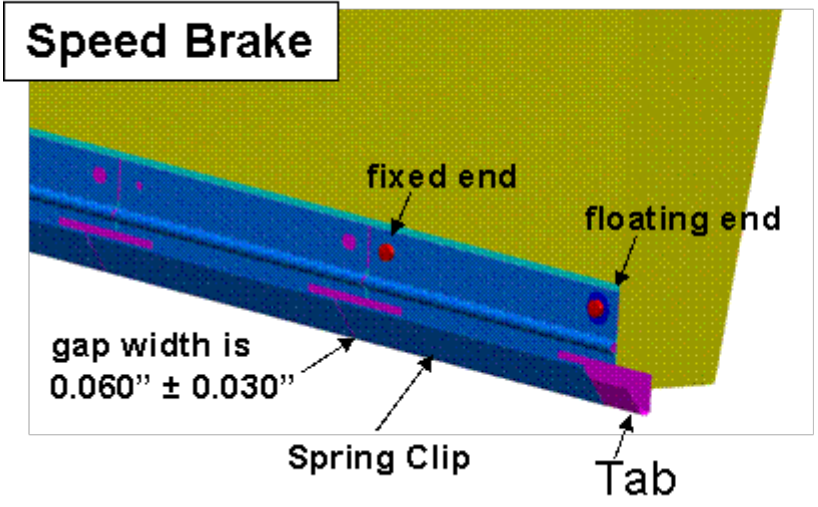
### INITIAL CONCEPT FOR BOND IN-PLACE ORIFICE



# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30231 – Rudder Speed Brake Inconel Thermal Barrier Redesign

- Installs redesigned Rudder Speed Brake inconel thermal barrier tabs to improve strength of the tab attachment
  - During STS-124 an inconel tab was seen floating away from the vehicle while on orbit
  - STS-126 post-flight inspection found 7 inconel tabs were missing, even though improved pre-flight ground inspection procedures were used
- The redesign effort will reduce the moment arm and stress to the spot welds, and will provide a secondary mechanical attachment
  - Redesign lengthens tab to reach screw, slides tab into spring by .70" (.30" overhang), includes more spot welds and changes the spot weld from Class "C" to Class "B" (additional quality control to ensure weld conformance)



# STS-129 OV-104 Flight 31 – Previously Approved Modification

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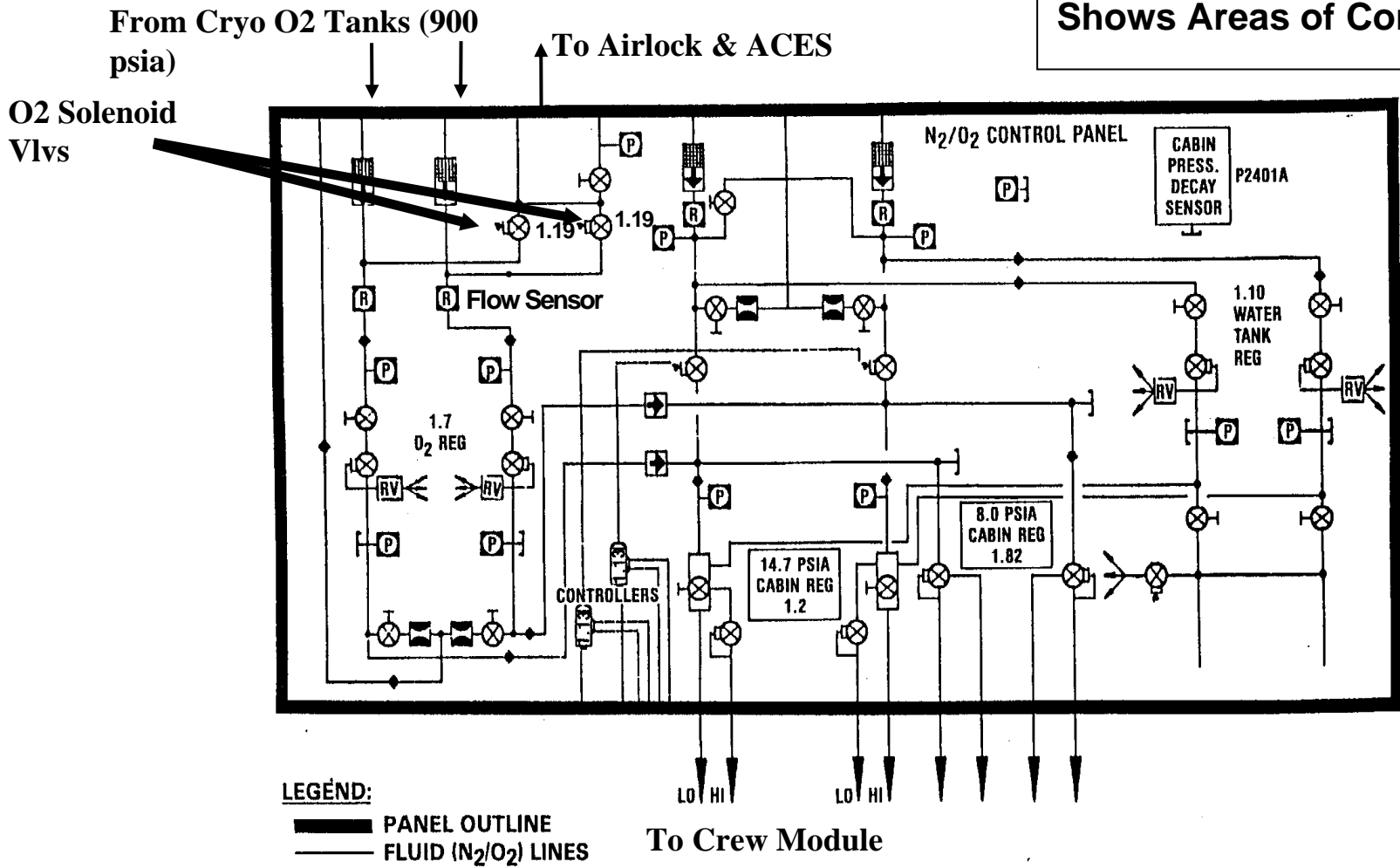
## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification

- Modifies Orbiter electrical configuration for the O2 crossover valves to provide valve position indication
  - The N2/O2 control panel supports O2 and N2 flow to the crew cabin and provides O2 to the crew Launch Escape Suits (LES) and airlock
  - The O2 crossover valves are required to be open to support crew breathing on the Advanced Crew Escape Suit (ACES)
    - Current Orbiter configuration provides only switch scan instrumentation which verifies power applied to valve but not position indication
    - O2 crossover valve failure closed could result in the loss of oxygen to LES
  - The O2 crossover valve position indication is provided at the N2/O2 control panel electrical connector
    - Connecting to the available N2/O2 valve position will provide a reliable method for verifying that the O2 crossover valve is open
  - Electrical modification requires repinning the connector at the N2/O2 control panel and reworking the MDM and signal conditioners in the avionics bay
    - Utilizes two existing spare MSIDs for valve position indication
  - The first implementation of the modification is planned for STS-128, OV-103
    - Implementation on STS-129, OV-104 is contingent upon sufficient slack in harness to allow repinning of connectors without removal of MO10W panel

# STS-129 OV-104 Flight 31 – Previously Approved Modification

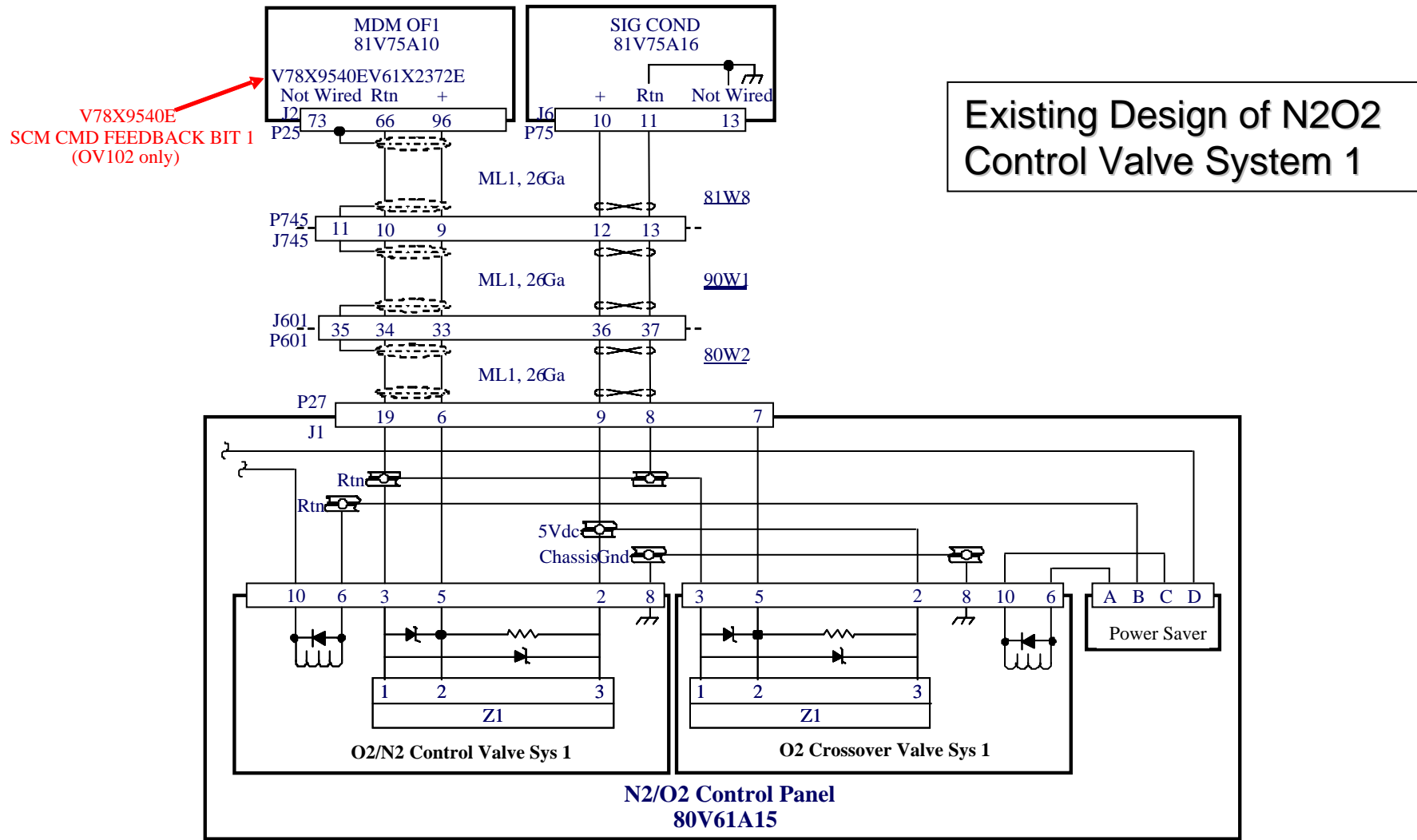
## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification

N2O2 Panel Schematic Shows Areas of Concern



# STS-129 OV-104 Flight 31 – Previously Approved Modification

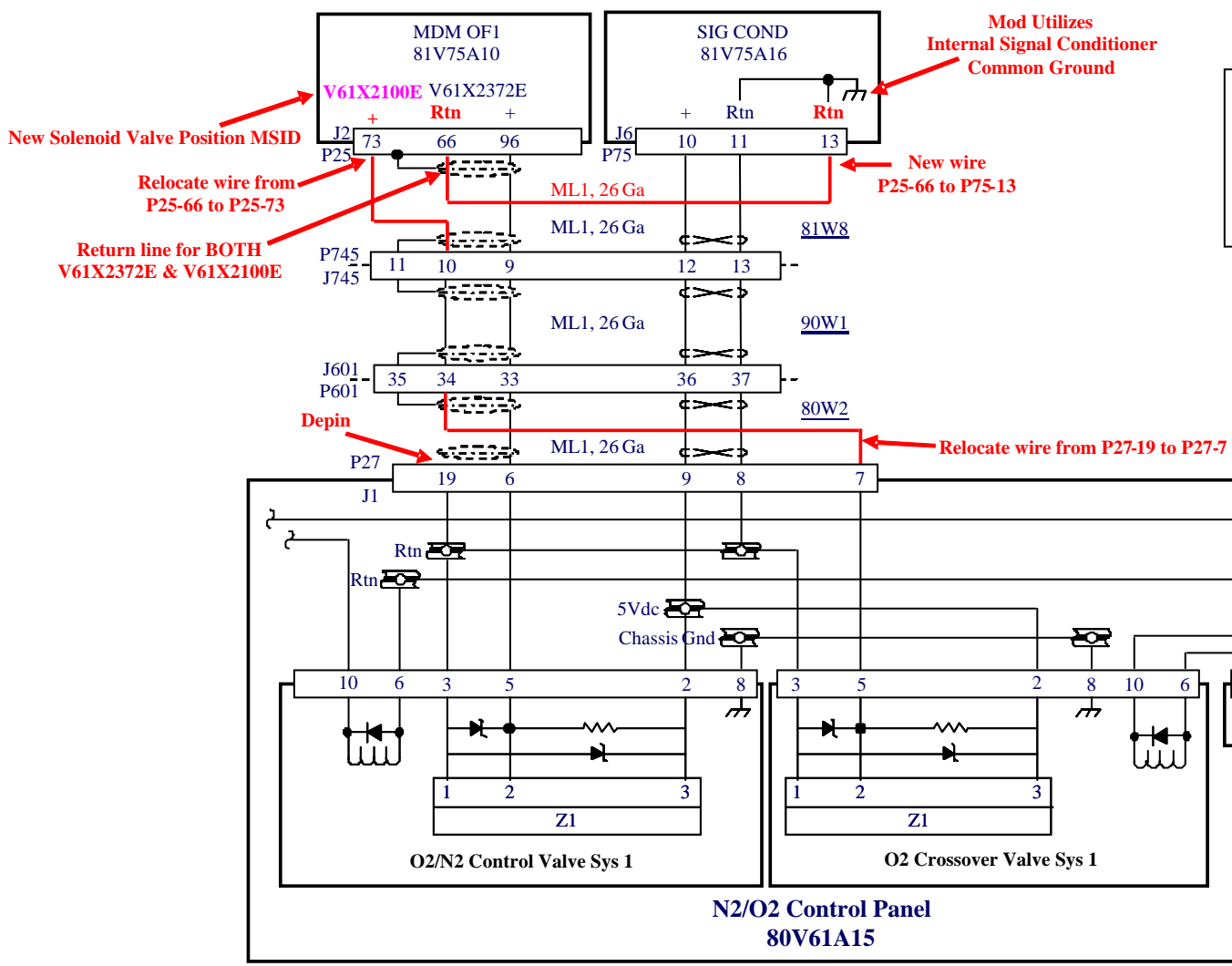
## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification (Cont.)



Existing Design of N2O2 Control Valve System 1

# STS-129 OV-104 Flight 31 – Previously Approved Modification

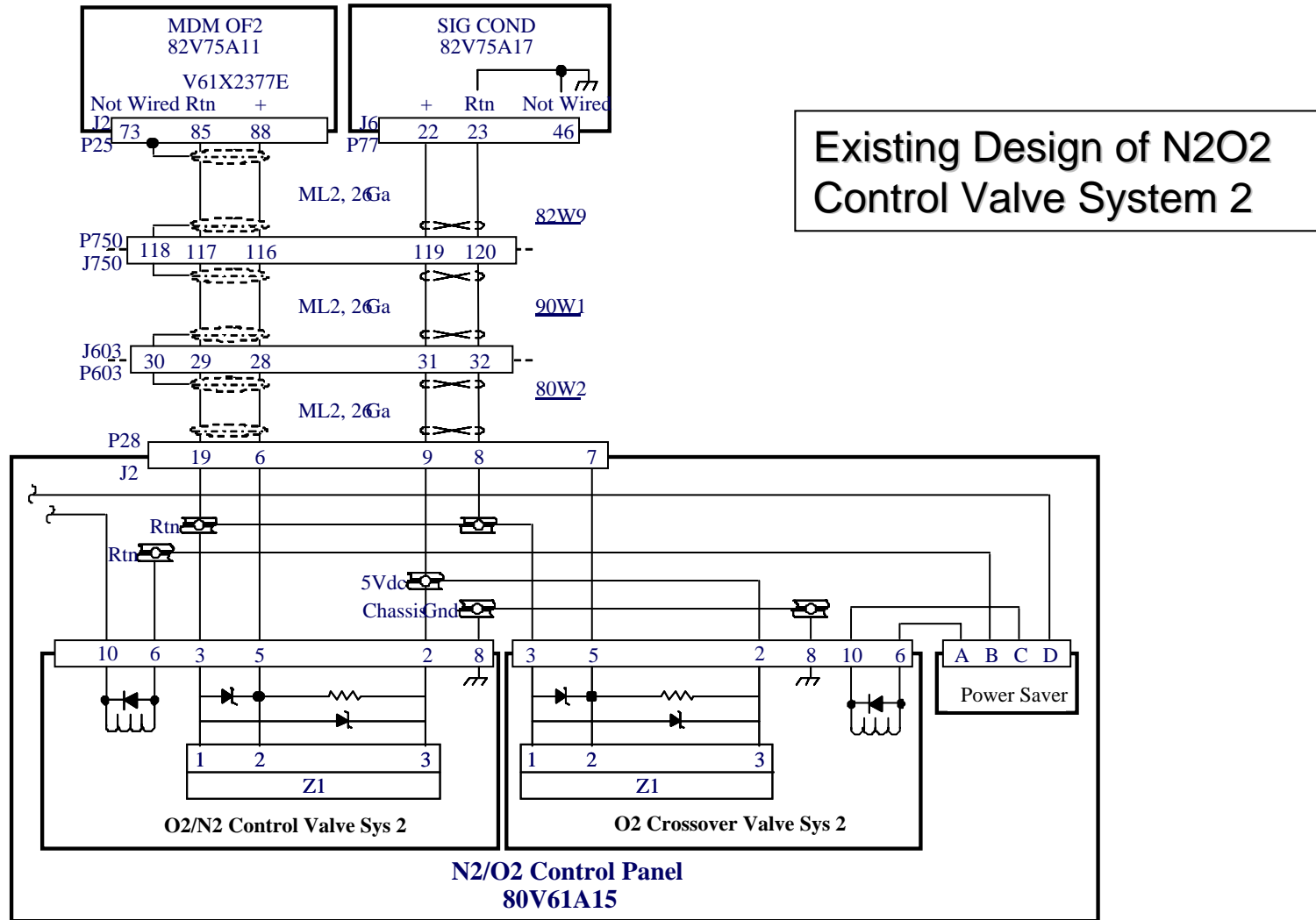
## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification (Cont.)



Proposed Modification of N2O2 Control Valve System 1 Design

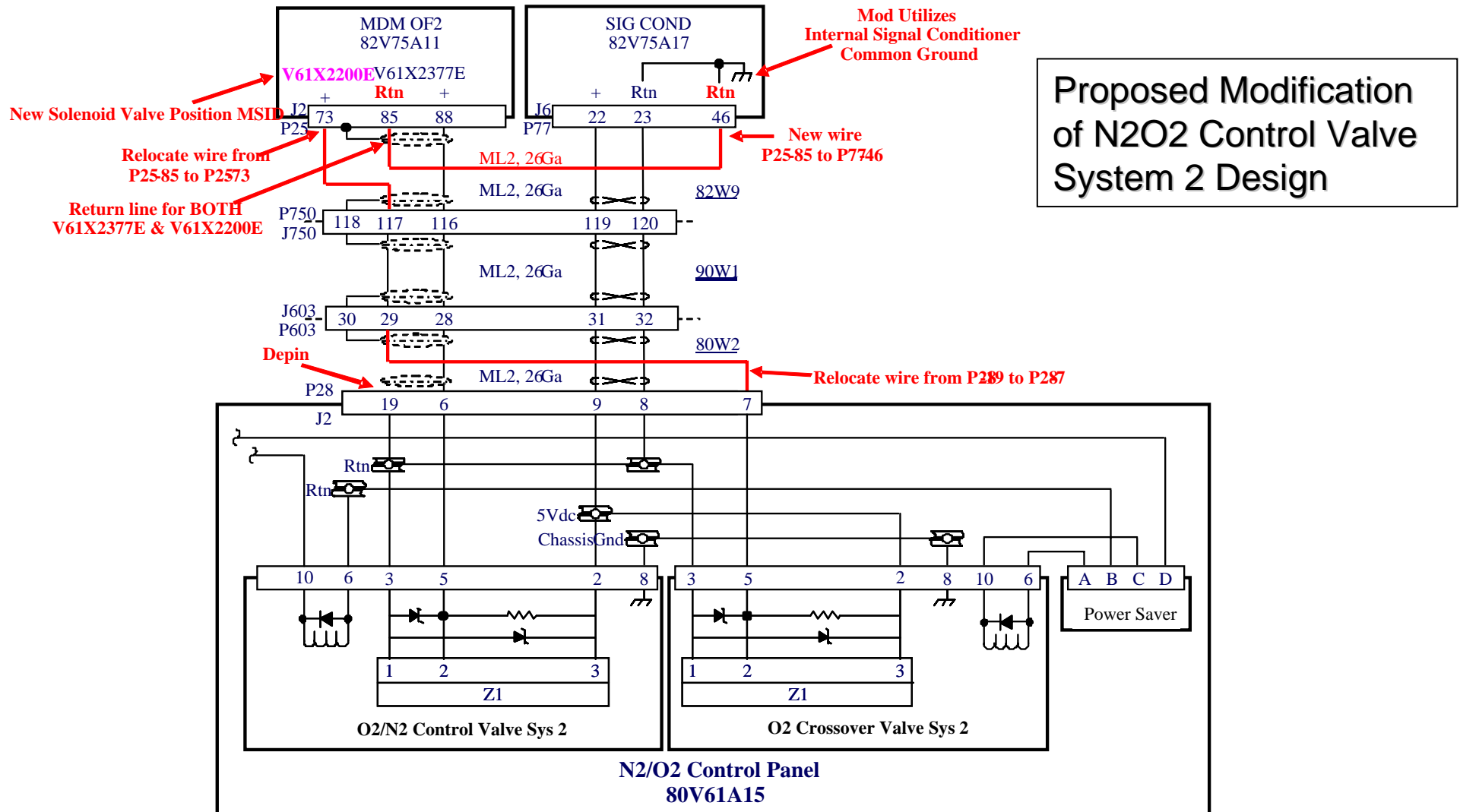
# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification (Cont.)



# STS-129 OV-104 Flight 31 – Previously Approved Modification

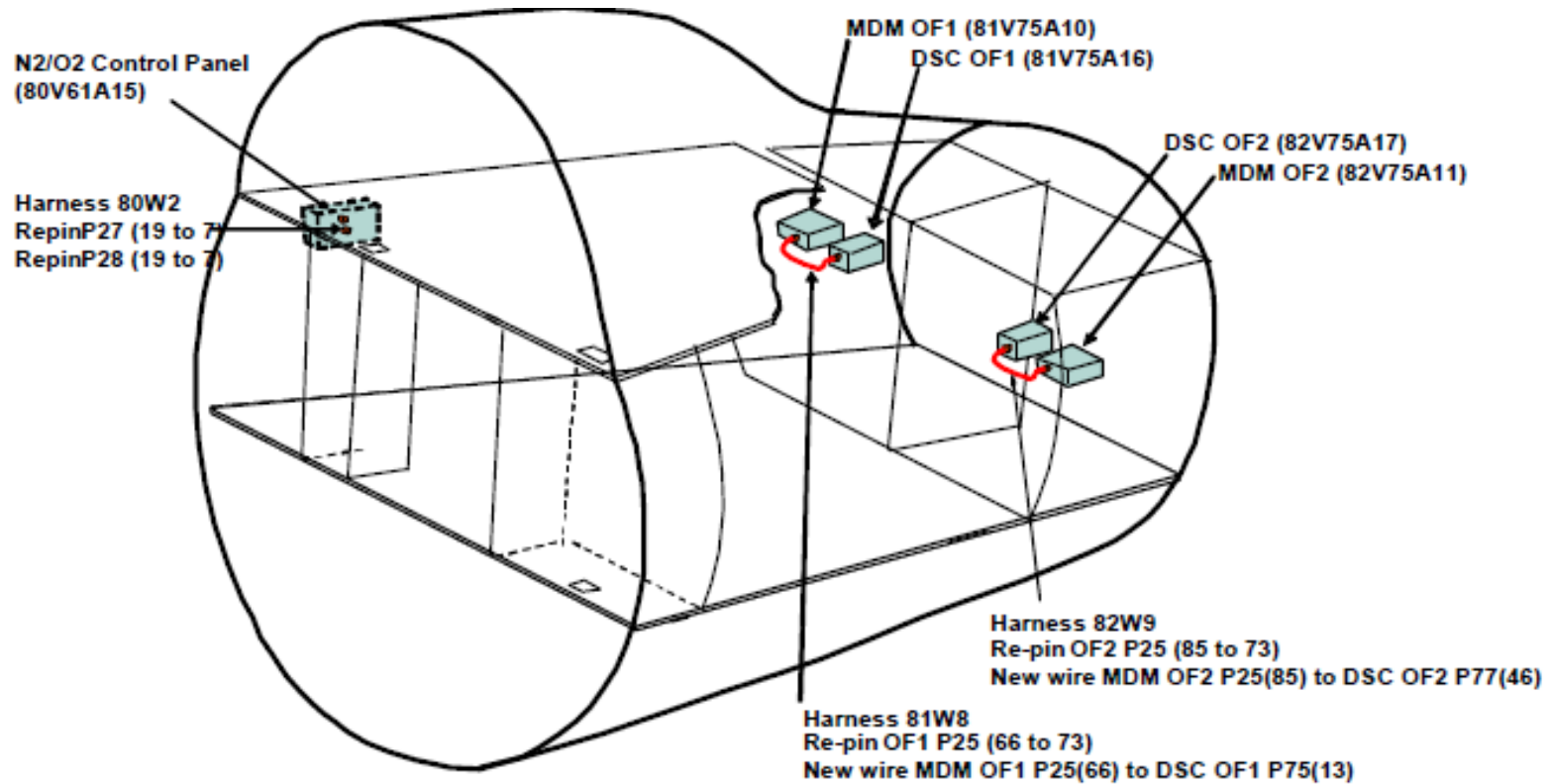
## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification (Cont.)





# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30250 – Oxygen Crossover Valve Signal Talkback Modification (Cont.)

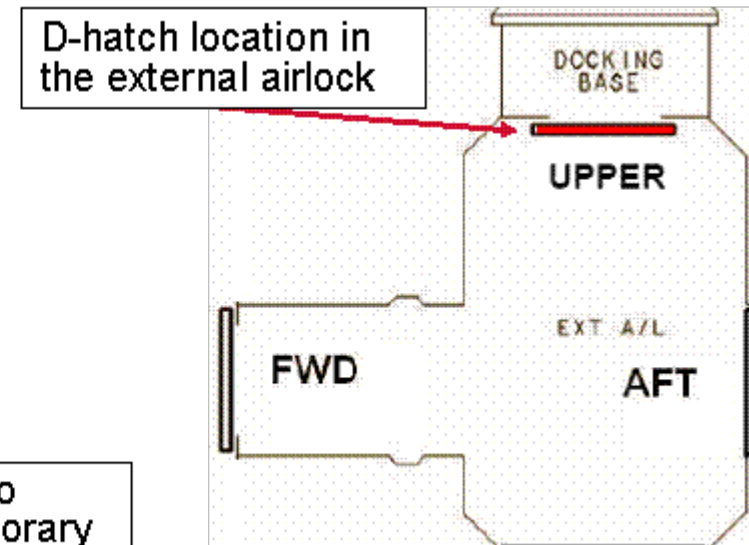
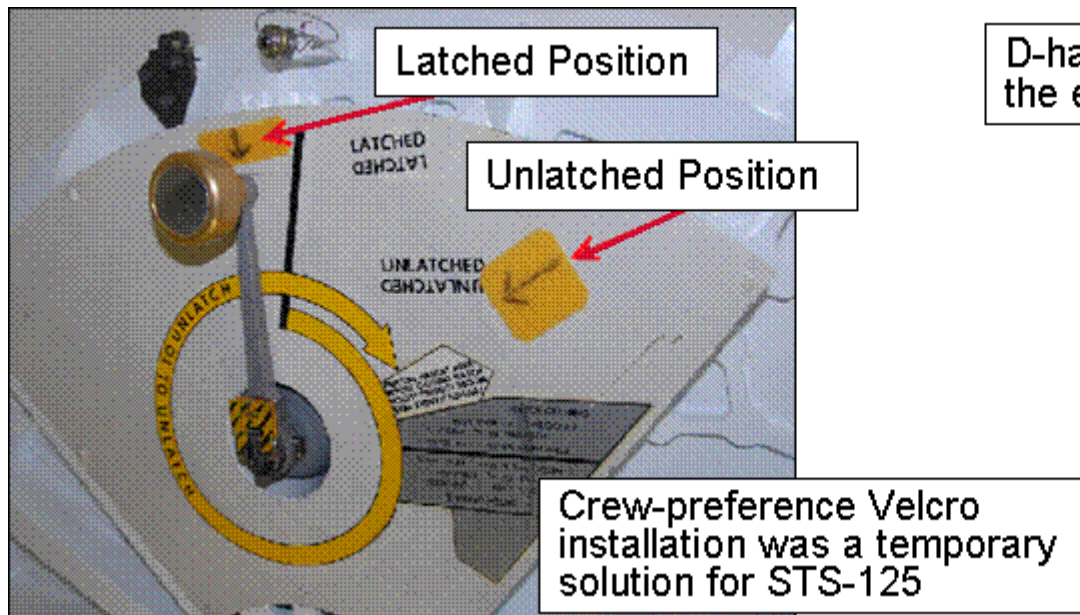


### Overview of N2/O2 Control Panel and MDM/DSC's Wire Modifications

# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30099 – Relocation of D-Hatch Actuator Handle Position Decal

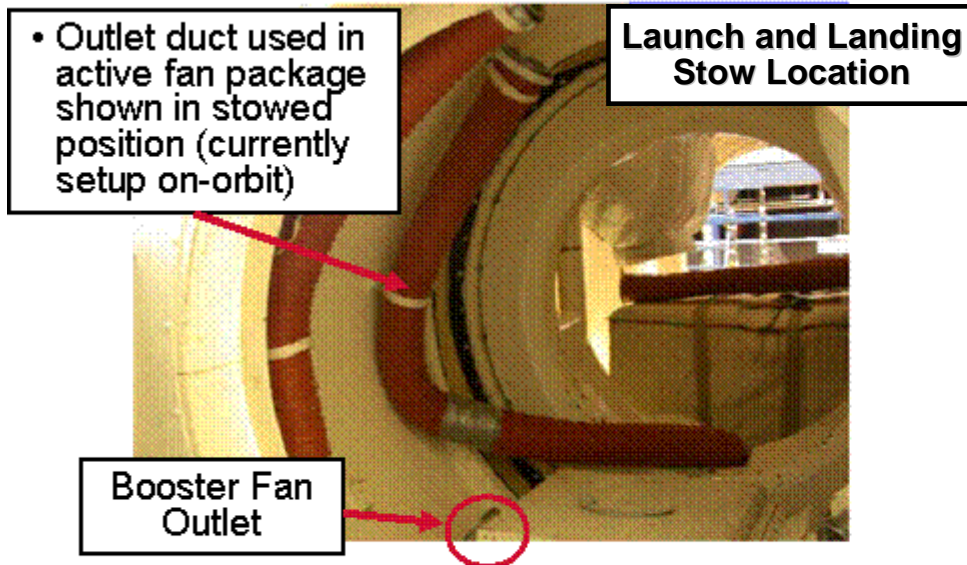
- Relocates actuator handle position decal on the external airlock upper hatch to the correct location
  - The crew reported difficulty closing and latching the external airlock upper hatch during STS-124 (OV-103)
    - Attempts to position the actuator handle over the decal that indicated the correct “pre-closing” position were unsuccessful, as a hard stop was encountered prior to reaching that position (Ref. PR MEQ-3-36-1710)
    - When D-hatch was designed in 1982, the decal was inadvertently located in original A/B-hatch position (20 degrees from fully unlatched)
  - The D-hatch installation drawings are updated to reflect the correct decal locations



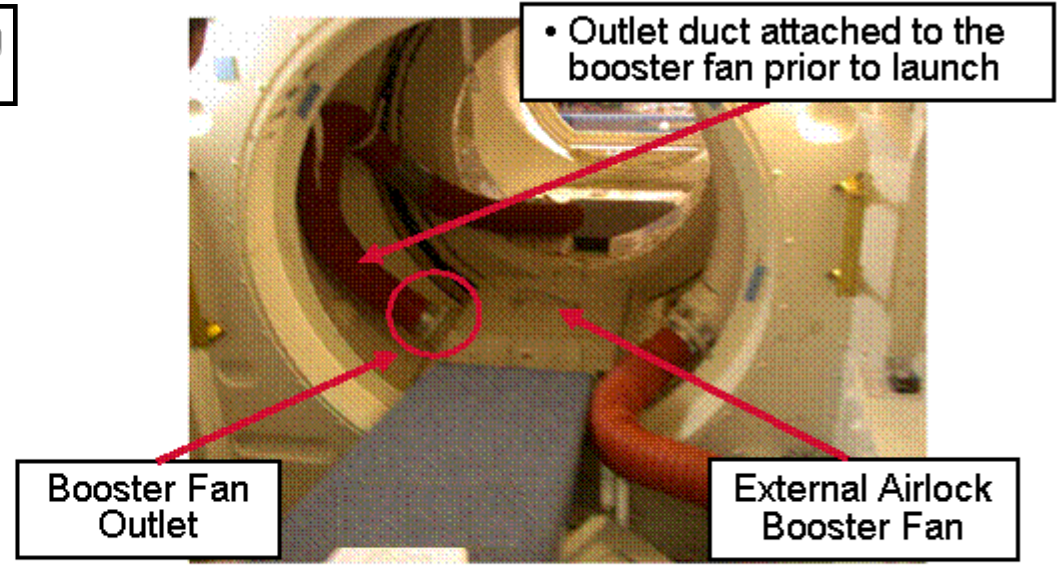
# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30099 – External Airlock Ducting Configuration Change

- Connects the Orbiter Docking System booster fan outlet duct prior to launch to have the airlock fan active from post-insertion through de-orbit preparation
  - MOD has indicated that future missions will not require the cryo savings associated with use of the booster fan bypass duct
  - The new duct configuration will reduce crew setup activity associated with booster fan operations
    - The mylar tape will not be required around the forward middeck floor diffuser; eliminating a crew procedure to remove the tape seal which can be misplaced during the mission
    - The option to fly the booster fan bypass duct will still be available



Airlock Booster Fan and Ducting Stowed for Launch (Current Configuration)

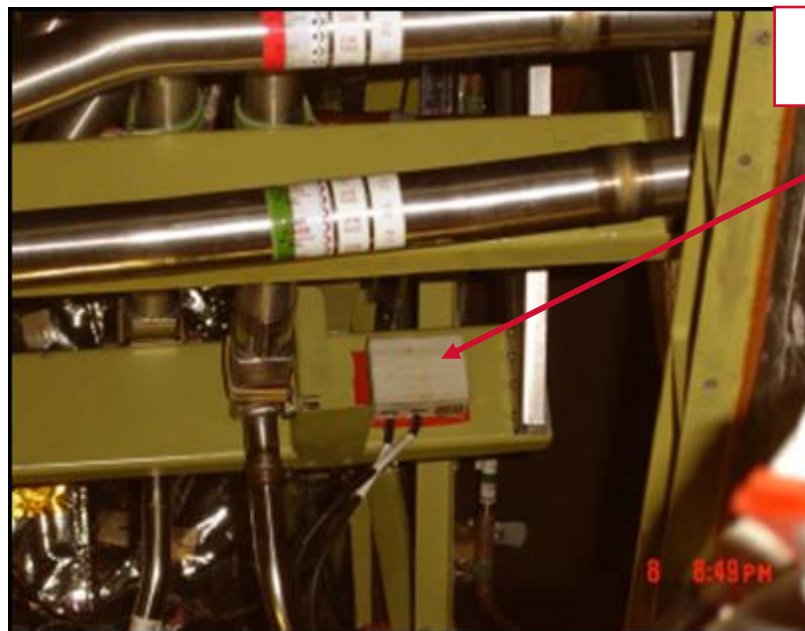


Airlock Booster Fan and Ducting in Active Booster Fan Arrangement for Launch (Proposed Configuration)

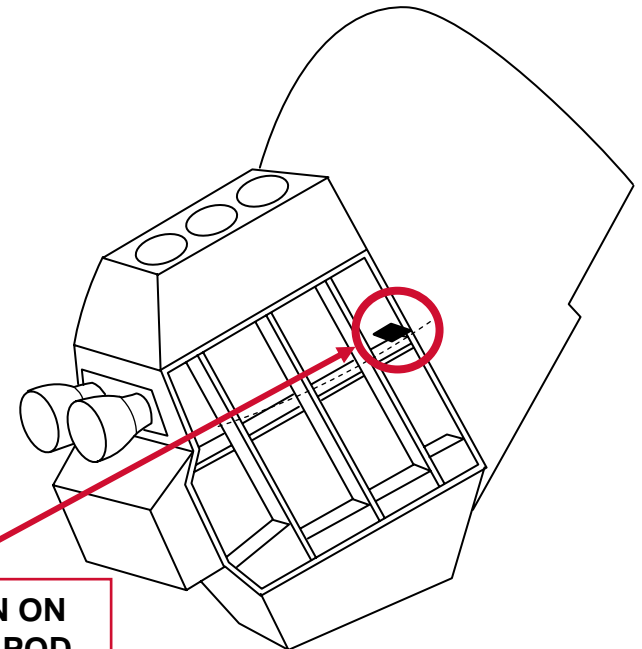
# STS-129 OV-104 Flight 31 – Previously Approved Modification

## TAD 30186 - OMS Pod Micro-WIS Strain Recorder Removal

- Removes the Micro-WIS Strain Gage Unit (SGU) from the left OMS Pod due to the expired certification
  - The Strain Gauge Unit was installed to obtain environment data for analysis of harmonics observed on STS-100 (OV-105) launch video and was certified for four flights
- Tech order M072-755111 was updated to -002 and added to the MECSLSI



**MICRO SGU  
RECORDER BOX**



**BOX LOCATION ON  
THE LEFT OMS POD**



# STS-129 OV-104 Flight 31 – Previously Approved Modification

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## MCR 23205 - Acreage Doublers Addition to Avionics Bays 4, 5 and 6

- Installs cold bonded protective doublers to the honeycomb facesheet on the aft avionics bay 4, 5 and 6 doors to provide additional resistance to impact loads and ensure life of honeycomb panels
  - Numerous dents and damages to the avionics bay 4, 5 and 6 doors occur during routine ground processing
  - Large PRACA history on honeycomb dents requiring MR doubler installation
- Protective doublers over the entire acreage will prevent future damage and work stoppage during damage assessment and repair effort

# TPS Priorities / Current Status

Priority Number	Total	OV-103	OV-104	OV-105
1. BRI-18 Tile - MLGD FWD O/B Corner	28	complete	complete	complete
2. BRI-18 Tile - MLGD FWD Edge	22	complete	complete	complete
3. BRI-18 Tile - MLGD O/B Side	18	complete	complete	complete
4. BRI-18 Tile - STR side of ET Doors	20	complete	complete	complete
5. BRI-18 Tile – LESS Carrier Panels 8-10 (103 & 104)	24	complete	complete	n/a
6. BRI-18 Tile – STR side of ET Doors I/B	8	complete	1	complete
7. Inboard Elevon “Hub” Tile Mod	4	complete	2	complete
8. I/B Elevon 9lb/90 SIP	34	complete	20	complete
9. O/B Elevon 9lb/90 SIP	6	complete	complete	complete
10. MLGD – Outboard Middle 1/3	24	0	0	3
11. ET Door remaining STR side	40	1	7	0
12. MLGD - Outboard AFT 1/3	24	0	0	1
13. Nose Area 9lb/90 SIP	14 (16 <sup>OV103</sup> )	2	0	0
14. Base Heat Shield 9lb/90 SIP	42	8	complete	complete
15. Gap fillers in Subset 2B	5 Zones	2	1	0
16. Remaining BRI-18 - MLGD (top priority) / ET / LESS carrier panels / NLGD	MLGD 100	MLGD 0	MLGD 1	MLGD 0
	NLGD 123	NLGD 12	NLGD 19	NLGD 47
	LESS 68 (92 <sup>OV-105</sup> )	LESS 7	LESS 5	LESS 19
	ET Door 28	ET Door 5	ET Door 0	ET Door 1
17. Mod work LESS internal	44 locations	40	complete	complete
19. Remaining Gap Fillers & Window BRI-18	124	2	2	19



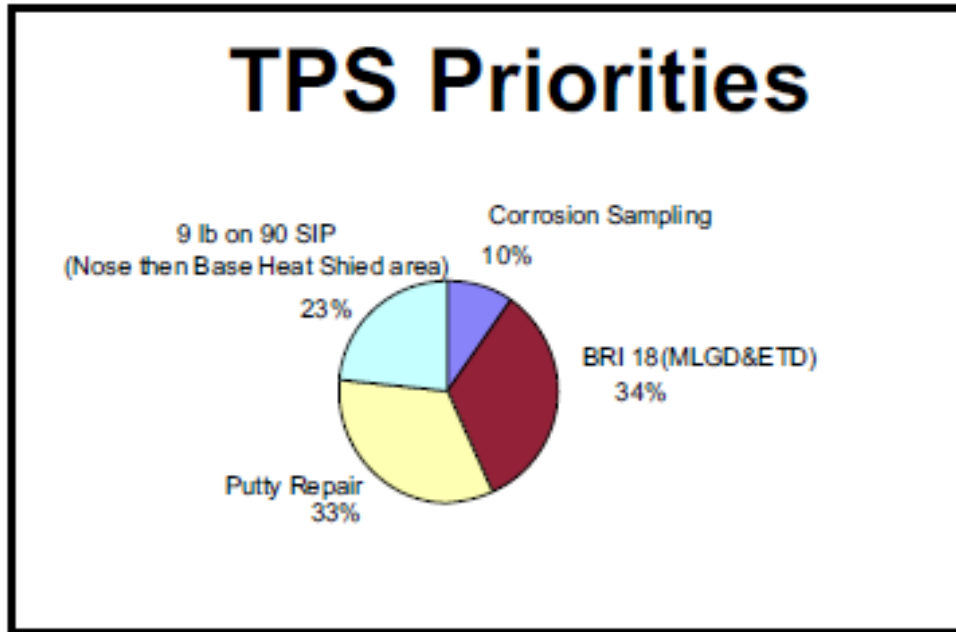
# TPS Priorities / Top Five Complete

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## These items have been completed on all Vehicles

1. **BRI-18 Tile - MLGD (28 tile)**
  - 1<sup>st</sup> subset – fwd & o/b corner – 14/door
2. **BRI-18 Tile - MLGD FWD Edge (22 tile)**
  - 2<sup>nd</sup> subset – fwd & o/b sides – 11/door
3. **BRI-18 Tile - MLGD O/B Side (18 tile)**
  - 3<sup>rd</sup> subset – O/B side – 9/door outboard side
4. **BRI-18 Tile - STR side of ET Doors (20 tile)**
  - 4<sup>th</sup> subset - ET doors - 10/door
5. **BRI-18 Tile - LESS Carrier Panels 8-10 (24 tile)**
  - 5<sup>th</sup> subset - LESS hot panels - 12/side
  - OV-103 & OV-104 only

# TPS Priorities / Allocation Breakdown



Example	60 tile Allocation at DLSF
Corrosion Sampling	6
BRI-18 MLGD&ETD	20
Putty Repairs	20
9lb on 90 SIP	14

- Orbiter's expectations for the work areas are shown on the pie chart
  - The above table is for reference only – exact #'s are determined by the KSC Team
    - Access/configuration/length of flow
  - Distribution provides data/risk reduction in all areas of the list
    - Does not allocate all the resources in one area
  - OV-104 to utilize this break down upon completion of priority numbers 6 & 8



## Backup Charts

# STS-129 DLSFR

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## Annex 1

### Baselined Files

- ISS-ULF3 MIP Annex 1
- MISSE 7 PIP Annex 1

Baselined  
01/26/09A  
03/10/09A

### Open Work

- ISS-ULF3 A01 – NSTS 21545
  - Weight & Mass Properties Update
  - Part Number Update
  - Interim Update (includes: Mechanical & Electrical Drawings, ELC Keel Mass Properties, Grapple Fixture Data, Safety Critical Switch List)
  - L-4 Month Update
    - Customer input: ELC1 & 2 Functional Flow Diagram, ELC1 & 2 Electrical Schematic Diagram, ELC1 & 2 Safety-Critical Circuit Diagram
- Issues/Concerns
  - None

ECD  
04/09/09A  
04/27/09A  
  
06/30/09  
07/13/09  
  
06/22/09

## TGHR Status

- Customer Submittal
- Release For Review
- Baseline
- No Issues/Concerns

07/13/09  
08/12/09  
09/11/09

# STS-129 DLSFR

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## Payload ICDs/PIRNs

All Payload-Unique ICDs are baselined

### PIRNS that Impact Flight Products

<u>PIRN #</u>	<u>ICD/Payload</u>	<u>Title</u>	<u>ECD</u>
A05744	ICD-A-21545-ELC1	Update Sec 3.0 Figures and Section 20	08/26/09
A05679	ICD-A-21545-ELC2	Update Sec 3.0 Figures and Section 20	06/18/09
A05751	ICD-A-21545-ELC1	ELC1 Update section 7, Elec. power	06/29/09
A05752	ICD-A-21545-ELC2	ELC2 Update section 7, Elec. power	06/29/09

### Issues/Concerns

- None

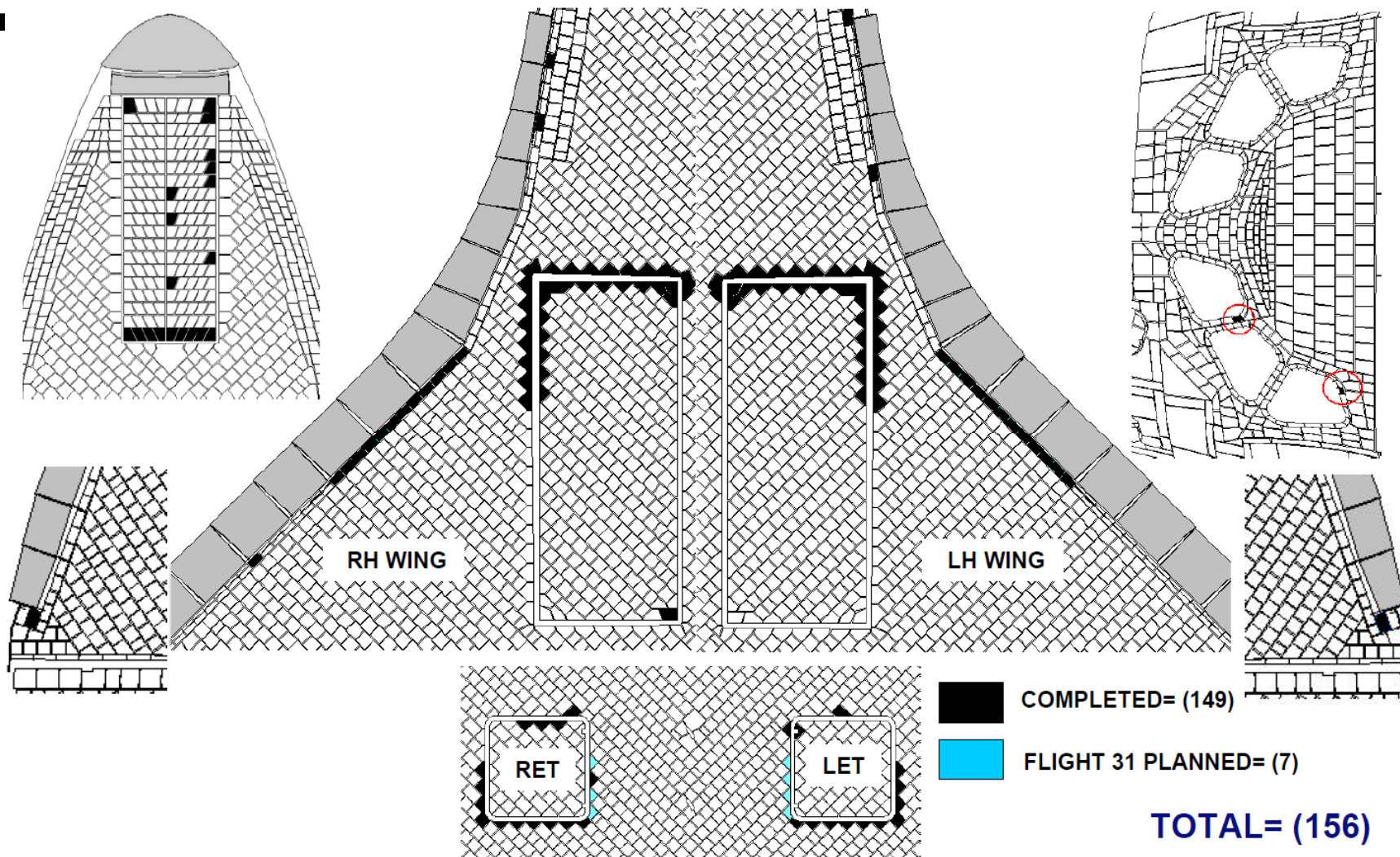
## Rescue Flight Status

STS-129 Reconfiguration Engineering Products will be developed by the Engineering Order To Follow (EOTF) process.

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# BACKUP

# TPS Work Content (BRI Locations)





# STS-129 Delta Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **06-25-09**

## Overview

- **SSP System Drawings** **No Issues\***
- **SSP Authorized Modifications/Non-Standard Work** **No Issues\***
- **SSP OMRS Changes (RCNs)** **To Be Presented**



<b>STS-129 Delta Launch Site Flow Review</b>	<b>Presenter</b> MK-SIO / A. Swift	
	<b>Date</b> 06-25-09	<b>Page</b> 1

**Mandatory RCNs:**

**KV17692      V05 – WCCS SIDE/OVERHEAD DUAL DESC MOD      6/26/09**

**Non-Mandatory Value Added RCNs:**

**OV17978      V74 – SENSOR PACKAGE 1 & 2 REQ DELETE      PRELIM**

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# **STS-129**

## **Delta Launch Site Flow Review**

### **Flight Software Overview**

**Judi Powell**

**USA FSW**

**FRWG 06/22/09**

**PRCB 06/25/09**



# STS-129 DLSFR (FSW)

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- **STS-129/OV-104 Flight Software (FSW) Versions**
  - Second scheduled flight of Operational Increment (OI) 34 Flight Software (SASCB SCR 98107A documents PASS and BFS OI-34 content)
  - Second scheduled flight of MEDS IDP VI 07.00/MDUF VI 06.00 (SASCB SCR 98113 documents content)
  - Third scheduled flight of MAGRS-3S Link 613-996-008 Software (Link-008) (SASCB SCR 98115 documents content)
- **STS-129/OV-104 Flight Software Payload/Vehicle Support:**
  - ISS ULF3
  - Orbiter Interface Unit (OIU)
  - Sequential Still Video (SSV)
  - Orbiter Docking System (ODS)
  - Trajectory Control System (TCS)
  - ISS Caution and Warning (ISSCW)
  - Assembly Power Converter Units (APCUs) & Station to Shuttle Power Transfer System (SSPTS) (generic support for both configurations)
- **Major New Flight Software Support Items:**
  - None

# STS-129 DLSFR (FSW)

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- **STS-129 Source Changes/Edits for Primary Flight Software (Base)**
  - SCR 93211A Update of SSMEC Vehicle Data Table (VDT) for Enhanced Accelerometer
  - SCR 93262A Film ET Camera
  - SCR 93267A Removal of the Set and Reset to False Cmds For the RCS Tank Iso Valves
  - DR 126366 SM GPC Failure to Send GCIL Commands
- **STS-129 Patch Implementation for Primary Flight Software**
  - None
- **STS-129 Patch/Edit Implementation for Backup Flight Software (Base) (included on delivered Mass Memory)**
  - None
- **STS-129 Patch Implementation for Backup Flight Software**
  - None

# STS-129 DLSFR (FSW)

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- **Products**

- **STS-129/OV-104 Base delivery schedule (available to field)**
  - FPSB**
  - **Shuttle Data Tape** **March 10, 2009A**
  - **Mass Memory Unit** **March 30, 2009A**
- **An STS-129/OV-104 ADTL SDT will be required to support the O2 Cross Over Valve (PRCB CR S070006)**
  - FPSB**
  - **Shuttle Data Tape** **August 06, 2009**
  - **The ADTL Mass Memory is not be required.**

- **Open Items**

- **Potential new requirements for an additional power safety inhibit to disconnect one or both of the Express Logistics Carrier (ELC)s from their associated Remotely Operated Electrical Umbilical (ROEU) (potentially implemented via a Payload Power Switching Unit (PPSU)).**
  - **Risk accepted by the Safety and FOICB boards so no change to the FSW is required**

- **Concerns/Issues**

- **No issues or concerns with STS-129 at this time**



<b>STS-129 Delta LSFR</b> <b>Flight Crew Equipment/GFE</b>	Presenter <b>MV6/Bill Lane</b>	
	Date June 25, 2009	Page <b>1</b>

# STS-129 DLSFR FCE/GFE Status



<b>STS-129 Delta LSFR</b> <b>Flight Crew Equipment/GFE</b>	Presenter <b>MV6/Bill Lane</b>	
	Date June 25, 2009	Page <b>2</b>

- **Except for RMS End Effector, need dates and delivery dates have been partnered. Delivery of modified RMS End-Effector is presently 5 weeks past KSC need date. Team actively working with MDA to refine delivery date.**
  
- **Tech orders and hardware list noted in backup charts, reference only**
  
- **Changes since STS-125:**
  - **Reconfigure from HST to ISS – reinstall ODS mechanism, TCS, WVS antennas**
    - **NOTE: WVS antennas at Xo 1126 location (bay 10) not installed due to interference with ELC2 primary latches**
  - **OMS pod SGUs removal (end of certified service life)**



**STS-129 Delta LSFR**  
**Flight Crew Equipment/GFE**

Presenter  
MV6/Bill Lane

Date  
June 25, 2009

Page 3

- **RMS End Effector (EE) Mod - MDA Upgrading from -11 to -13:**
  - Change the raybestos brakes/clutches to a ceramic material (since raybestos is no longer available)
  - Implement two design modifications to address issues that occurred on STS-103 (back-up release stall)
- **OV-105 RMS EE was upgraded during STS-126 flow**
- **OV-103 RMS EE will be upgraded during STS-128 flow (EE S/N 403)**
- **OV-104 RMS EE will be upgraded during STS-129 flow (EE S/N 402)**
  - EE S/N 402 will be upgraded following STS-119 and returned to KSC in August/September
- **Tech Order M072-544502-036 reflects the new -13 EE configuration**



**STS-129 Delta LSFR**  
**Flight Crew Equipment/GFE**

Presenter  
**MV6/Bill Lane**

Date  
June 25, 2009

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**BACKUP**



**STS-129 Delta LSFR**  
**Flight Crew Equipment/GFE**

Presenter <b>MV6/Bill Lane</b>	
Date June 25, 2009	Page <b>5</b>

Tech Order numbers are identified for reference only. Report generated Jun-11-2009

Hardware	Tech Order	KSC Eng Need	Eng(TO) Release	In MEC	Cert O/C	KSC Need	JSC Planned	Comments	JSC Contact
A (port forward)	M072-750025-076	7/3/09	1/17/07	4/22/09	C	8/3/09	8/3/09	Camera/PTU from STS-127.	Randall Moore
B (port aft)	M072-750025-077	7/3/09	1/17/07	4/22/09	C	8/3/09	8/3/09	Camera/PTU from STS-127.	Randall Moore
C (starboard aft)	M072-750025-078	7/3/09	1/17/07	4/22/09	C	8/3/09	8/3/09	Camera/PTU from STS-127.	Randall Moore
D (starboard forward)	M072-750025-079	7/3/09	1/17/07	4/22/09	C	8/3/09	8/3/09	Camera/PTU from STS-127.	Randall Moore
SRMS elbow camera	M072-544504-014	7/3/09		4/22/09	C	8/3/09	8/3/09	Camera/PTU from STS-127.	Randall Moore
SRMS wrist camera	M072-544504-008	7/3/09	1/17/07	4/22/09	C	8/3/09	8/3/09	Camera from STS-127.	Randall Moore
Centerline Airlock Camera (stowed)	M072-660828-002, plus CCCD stow		3/17/99	4/22/09	C			Units last flown STS-127	Randall Moore
Lefthand Umbilical Camera (aft)	M072-705001-016	8/30/09	10/28/04	1/15/09	C	9/30/09	9/30/09	OPF Roll out planned for 10/07/2009.	Randall Moore
Righthand Umbilical Camera	M072-705001-028 M072-705001-027	8/30/09	10/28/04 10/28/04	4/22/09	C	9/30/09	9/30/09	OPF Roll out planned for 10/07/2009.	Randall Moore
Digital Television (DTV)	M072-710570-007		11/15/07		C			Installed Hardware	Larry Schmidt
MCIU/RMS Situational Awareness Display (RSAD)	M072-710543-001		3/7/00	1/15/09	C			Installed Hardware	Larry Schmidt
Tools for Rendezvous and Docking (TRAD)	M072-730021-019	7/13/09	7/20/07	4/22/09	C	8/13/09	8/13/09		Larry Schmidt
Video Processing Unit (VPU)	M072-710338-007		3/2/08	4/22/09	C			Installed Hardware	Larry Schmidt





**SPACE SHUTTLE PROGRAM**  
**Space Shuttle Orbiter Project Office**  
 NASA Johnson Space Center, Houston, Texas



**STS-129 Delta LSFR**  
**Flight Crew Equipment/GFE**

Presenter <b>MV6/Bill Lane</b>	
Date June 25, 2009	Page <b>6</b>

Tech Order numbers are identified for reference only. Report generated Jun-11-2009

Hardware	Tech Order	KSC Eng Need	Eng(TO) Release	In MEC	Cert O/C	KSC Need	JSC Planned	Comments	JSC Contact
Wireless Video System (WVS)	M072-744007-001 UHF M072-344828-001 mount M072-744004-013 S-BAND M072-744004-012 S-BAND M072-744004-015 S-BAND M072-744004-017 S-BAND M072-744004-018 S-BAND		6/2/04	4/22/09	O			Installed Hardware	Randall Moore
Space to Space Orbiter Radio (SSOR)	M072-344828-002		9/24/04	4/22/09	C			Installed	Larry Schmidt
RMS Sideview Camera (RSC)	M072-710281-002 M072-000416-006 camera	9/14/09	11/24/04	4/22/09	C	10/14/09	10/14/09	Camera from STS-128 after repressurization. SSV to PAD A 10/14/2009	Randall Moore
Wing Leading Edge (WLE) Instrumentation - Left Wing	M072-756111-007		8/21/07	4/22/09	C			Insatilled Hardware	Micheal Wright
Wing Leading Edge (WLE) Instrumentation - Right Wing	M072-756111-008		8/21/07	4/22/09	C			Installed Hardware	Micheal Wright
OBSS Sensor Package 2 *** (OPF)	M072-710282-006	7/17/09	4/18/08	4/22/09	C	8/18/09	8/18/09		Larry Schmidt
OBSS SENSOR PACKAGE 1 ** (OPF)	M072-710282-008	7/17/09	4/18/08	4/22/09	C	8/18/09	8/18/09	Same configuration as STS-127. S/N 1007 will fly.	Russell Yates
RMS-13 End Effector	M072-544502-036	7/13/09		4/22/09	C	8/12/09	9/22/09	The current plan is to swap the End Effector on OV-103 post STS-119 and return that End Effector back to MDA for upgrade and eventual use on STS-129. RMS guys at KSC will need no more that a few days in their lab to perform their off line check out and then a day or two to install in the vehicle prior to performing their V1175 test. JSC reports that the end effector delivery will move approximately 4 to 6 weeks to the right from the original 8/14/09 planned delivery.	Kenneth Ruta

# **EVA Status STS-129/ULF3 Delta Launch Site Flow Review**

**Marc Ciupitu  
EVA Office  
Johnson Space Center  
June 22, 2009**

- **Forward Bulkhead PFR**
  - Portable Foot Restraint, SED33105308-307 installed on forward bulkhead.
  - Released Tech Order: M072-661568-029
  - Required to protect for contingency EVA TPS inspection
- **Lightweight Port TSA**
  - Port LWTSA installation – Tech Order: M072-660850-005
  - Port LWTSA Tools installation – Tech Order: M072-660853-002
  - Port LWTSA Tools installation (MSA) – Tech Order: M072-660853-008
- **Lightweight Starboard TSA**
  - Starboard LWTSA installation – Tech Order: M072-660850-006
  - Starboard LWTSA Tools installation – Tech Order: M072-660857-001
- **Winches**
  - Winch P/N SED33101570-327 on Forward Bulkhead
  - Winch P/N SED33101570-325 on Aft Bulkhead



# STS-129 Delta Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **06-25-09**

## Backup Material

- **SSP Systems Drawings** **Attachment 1**
- **SSP Authorized Modifications/Non-Standard Work** **Attachment 2**
- **SSP OMRS Waivers and Exceptions** **Attachment 3**
- **Launch Window** **Attachment 4**
- **Open Configuration Waivers** **Attachment 5**



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## SSP System Drawings

The Drawings Baseline Was Released By PRCB S115129 on 02-23-09

- V072-000001-282 (Rev. VY01) Space Shuttle System (Rel. 04-08-09)
  - V072-200209-001 (Rev. A01) Mission Equipment Cargo Support (Rel. 04-21-09)
  - SGD32104452-401 (Rev. B1) Crew Compartment Configuration (Rel. 05-27-09)
    - 402 Descent
  - V070-000001-004 Orbiter General Assembly
    - V070-410100-018 SSME Installation
  - 10100-0061-177 Integrated SRB General Assembly (BI-140)
  - 80901000000-530 External Tank Assembly (ET-133)
- STS-129 LSRR + 18 days Mission Configuration Product Plan (MCP) was last published on 04-06-09 and will be republished at ORR -14 days on TBD.



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## SSP System Drawings – (Continued)

### Ferry Configuration

- V072-000001-283 (Rev. VW01) Space Shuttle System Drawing (Rel.03-06-09)
  - V072-200209-002 (Rev. A01) Mission Equipment Cargo Support (Rel. 04-21-09)
  - SGD32104452-001 (Rev. B1) Crew Compartment Configuration (Rel. 05-27-09)
  - V072-300055-025 (Rev. BU) Ferry Flight Configuration (Rel. 05-11-09)

**SCA 911**

WV MAR  
8929-324

# MODULAR LOCKER LAYOUT ASCENT

CDR CHARLIE HOBAUGH  
 PLT BUTCH WILMORE  
 M/S #1 LELAND MELVIN  
 M/S #2 RANDY BRESNIK  
 M/S #3 MIKE FOREMAN  
 M/S #4 ROBERT SATCHER  
 M/S #5 (DN)

PANTRY FOOD 1622 -308	MF57A 1622 -308 PANTRY FOOD	PANTRY FOOD 1622 -302
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LEADER: CELESTE NITCH  
 DATE: 4-29-09  
 LAUNCH: 11-12-09  
 FLIGHT: STS-129/ULF3  
 VEHICLE: OV-104  
 CREW: 7 MAN 11 + 1 + 2 DAYS  
 RQMTS: SRMS, ERGOMETER,  
 SORG, NO RCRS,  
 SLEEPING BAGS

ML60B 6013 T-310  
 PRIME C/L CAM  
 GFE TV CONTROL  
 ML60E TBD -XXX  
 PGSC ACCESS/  
 PCS ACCESS  
 ML60M 6014 -312  
 B/U C/L CAM  
 LEAK DETECTOR

### MIDDECK FORWARD

MF14E 2760 -306 FRESH FOOD FRESH FOOD	MF28E 0644 -301 DOUBLE COLD BAG
MF14G 2761 -308 FRESH FOOD MENU FOOD	MF28G TBD CREW PREF (HCTB)   CREW CARE PKG (HCTB)
MF14H 2763 -304 MENU FOOD MENU FOOD	MF28H 5452 -328 IFM BREAKOUT BOX ALTIMETER
MF14K 2764 -306 MENU FOOD MENU FOOD	MF28K 6300 -345   6250 -353 IFM TOOLS
MF14M 2765 -304 MENU FOOD MENU FOOD	MF28M 2762 -307 MENU FOOD MENU FOOD
MF14O 2766 -305 MENU FOOD MENU FOOD	MF28O 2767 -304 MENU FOOD MENU FOOD

MF43C 1900 -309 M/S #2 CLOTHING	MF57C 1904 -307 PLT CLOTHING	MF71C 3005 -304 M/S #4 CLOTHING
MF43E 6697 -332 HH LIDAR W/ NIGHTSCOPE 2ND HHL (TRAD) SSV BPSMU	MF57E 6240 -311 ORBITER FDF SODF	MF71E TBD -XXX CGBA NLP/CCNS
MF43G 1900 -308 CDR CLOTHING	MF57G 1902 -308 M/S #1 CLOTHING	MF71G 1903 -305 M/S #3 CLOTHING
MF43H 6231 TBD POST INSERTION	MF57H 5473 -305 ORBITER FDF	MF71H TBD TBD FDF   ENTRY GMTS (HCTB)
MF43K TBD POST INSERTION M/S #5 DM CLOTHING	MF57K 6291 -311 SODF	MF71K TBD TBD DC VACUUM (CTB)
MF43M TBD TBD ISS PHOTO/TV RE-SUPPLY	MF57M 1908 -309 CREW SUPPORT	MF71M 8965 -311 CONDENSATE COLL SUPA(12) INGRESS HDWR O-RING/BRAYCOTE STS CSA-CP

### MIDDECK AFT

MA9D/F 9882 -309 TRAD SPARE DTV MUX SPARE DTV DSR SPARE DTV VIP	MA16D XXX TBD ISS RESERVE
MA9G 8737 -311 RCC COLD BAG ASSY	MA16F/G 7495 TBD GLACIER
MA9J 5962 -303   6269 -309 PRINTER TRAYS IODINE REMOVAL 6256-306	MA16J 8723 -302 PHOTO/TV STOW - N - GO
MA9L 6066 -334   8719 -309 COLOR PRINTER (CTB)	MA16L TBD TBD SOMS/RESUC
MA9N 7432-334 SOFT STWG BAGS PHK'S (6) 4980-309 CCK/LIGHT/MAK STICKS/COMM PHK 8071-321 RSTRNTS/FLUID LOAD FIBERSCOPE 8070-302	MA16N 9014 TBD MED KITS MAK (1)

VOL B (MA73J) 7426 TBD  
 VOL 3B (MA73J) 7425 -326  
 QUICK DON MASKS(2)/CABIN AIR CLEANER/AUD.DOS. BTA/D2XS CAM/ SPOTLIGHT/ 400MM LENS/ G1 CAMCDR/FLASH 12-24 MM LENS

A16 8706 -314  
CAM BAG PILOT

A17 7424 -304  
CORE CC SYS BAG  
DTV CAMERA BAG  
QUICK DON MASK (4)  
HATCH TOOL

VOLUME D (MD52C) TBD  
RCC TOOLS

SEAT 7 BAG 0657 -TBD  
IPT RESERVE (2)  
CHECS

VOLUME F (MD76M) 1403 -306  
WET TRASH

VOLUME G (MD80R) 1800 -346  
CONT UCD'S  
WASTE MGMT

VOLUME H (MD23R) 8068 -317  
EVA ACCESS (INBD)  
EVA ACCESS (OBD) 8065 -312

WMC 4575 -315 | 0914 -332 (MA82H)  
TOWELS AND RESUPPLY ITEMS  
WMC DISPENSER  
1st DAY CLOTH SUPA 1641-325

EXT AIRLOCK 5557 TBD (STBD) | 5555 TBD (PORT)  
2-EMUs  
EXT A/L FLOOR  
EVA TOOLS

MD CEIL (PORT 1) TBD  
RSK #6 ACES/G-SUIT HYGIENE

MD CEIL (PORT 2) TBD TBD  
ISS RESERVE

MD CEIL (STBD 1) 0275 -306  
RFTA NODE 3 HDW

MD CEIL (STBD 2) 6665 -343  
NODE 3 HDW

MD FLOOR (PORT 2) 0637 -TBD  
NODE 3 ANTIMICROBIAL APP (2)

MD FLOOR (PORT 1) TBD  
WATER TRANSFER  
RFTA

MD FLOOR (STBD 2) TBD  
EMU HDWR

MD FLOOR (STBD 1) 0657 -TBD  
EMU HDWR

31 LIQH- 29 + 1 ATCO IN LIQH BOX, 2 INSTLD (7435-320)  
6 G-SUITS

WINDOW SHADE BAG - WINDOW SHADES (5548-352)  
IFM CABLES & HOSES (4259-343)  
MONITOR SHIELDS

L10A1: AVIU (6686-337)  
L10A2: DTV MUX  
L10A3: DTV VTR/VIP  
L11: PDIP 2 OIU 1/2  
L12A1: SSP 1  
L12A2: SSP 2  
L12A3: PDIP 1  
R12A1: VPU  
R12A2: OBSS/OPP

\* NOT APPROVED  
 LATE LOAD  
 SWAP  
 TRANSFER TO ISS  
 CTB-CARGO TRANSFER BAG  
 HCTB-HALF CARGO TRANSFER BAG

C/D ISC TBD  
 P/D ISC TBD  
 C/D KSC TBD  
 P/D KSC TBD  
 CEIT KIT TBD  
 MDK LBL TBD  
 DWG NO. SGD32104452  
 /USR/DWGS/LOCKER/STS129  
 CMM: T. HUNT 483-3063



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Date **06-25-09**

## Modification Impact Report

- **Mission Equipment Modifications and Orbiter Modifications analyzed for impacts to OMRSD, LCC, ICD, EMI, Software, and GSE.**
- **A total of 10 MCRs have been approved and/or pending mods**
- **Current MCR impact status:**
  - **No impacts for all six disciplines** **8**
  - **One or more disciplines with impacts, documentation approved and/or pending approval** **2**
    - **MCRs 19271 and 30250**





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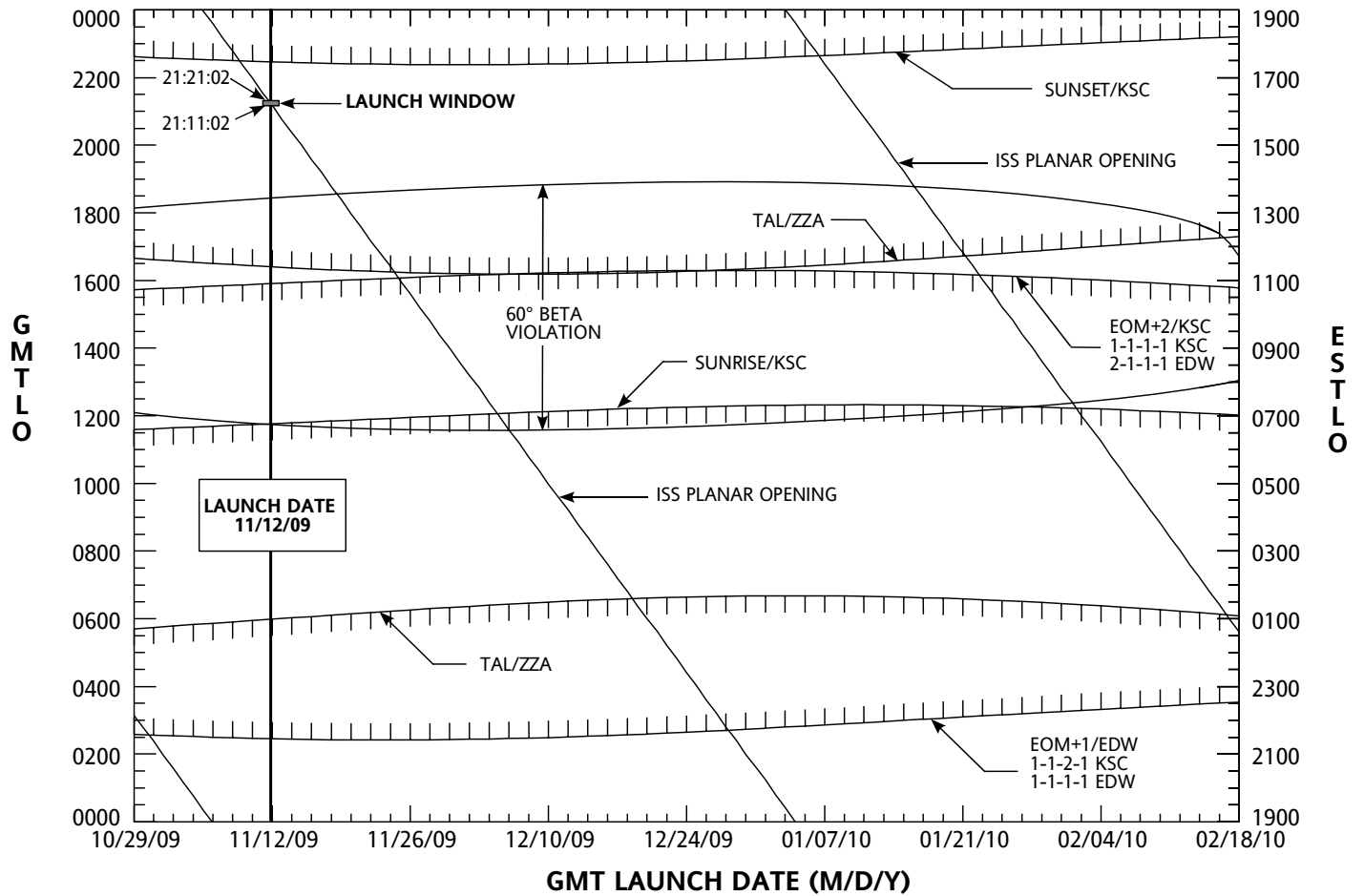
## Modification Impact Report – (Continued)

- Possible impacts still under review 1
- MCR 30250 is being reviewed for LCC impacts  
*underlined MCRs have impacts in other disciplines*

Mission Duration = 11+1+2  
 Inclination = 51.6°  
 OMS2 ha/hp = 124 x 85 nmi.  
 Target ha/hp = 202 x 187 nmi.

### STS-129 OCF LAUNCH WINDOW

C. Osgood/USH-483L  
 M. Jamroz/USH-483L  
 April 08, 2009



Note: EOM lighting lines, based on an OMS2 phase angle of 288 deg, are representative only.  
 The ISS beta angle ( $|\beta| < 60^\circ$ ) for mated operation is beginning ~ 1/21:29:26 MET (FD3 Rendezvous) and ending ~ 9/14:11:00 MET.

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

MEQ

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
019393	AUTH	K609-613004-001	0002 000	AVIONICS HEAT EXCHNR INSTLN, ORIFICE RESIZE-BAY 3, ECLSS
S115129A	MAND			
	KSC	NOT REQUIRED		ADDED BY EDS I/F & K609-613004 NEW
2009-03-31	031			
030099	PLND	TCTIM0030099REF	0001 000	D-HATCH DECALS RELOCATION ON UPPER HATCH BLANKET
S115129A	MAND			
	KSC			ADDED PER V828-000002 F18 & V828-390179 A02 MVD TO STS-
129		031		FRM STS-128 PER REMANIF/S042013HQ
	AUTH	TCTIM3330099REF	0001 000	RELOCATE ACTUATOR HATCH HANDLE POSITION DECAL, MV0828A
S115129A	MAND			
	KSC			ADDED PER V519-331035 A08 & V519-331051 A16
2009-03-31	031			
030186	AUTH	TCTIM0030186REF	0003 000	OMS POD MICRO-WIS STRAIN RECORDER REMOVAL
S115128	MAND			
	KSC			ADDED PER V886-000002 A14, REPLACES 030186,0014,0 MOVED
TO		031		STS-129 FROM STS-128 PER REMANIFEST

TOTAL MODS = 4

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

ORB

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
ORB-0085B	AUTH	J6116	0104 003	AMES GAP FILLER REMOVAL AND REPLACEMENT
2006-08-16	MAND			
	KSC		SPAR	
	031			
ORB-0085R01	COMP	J6198	0104 002	OV-104 MID FUSELAGE LOCK BOLT OPPORTUNITY SAMPLING AND
2007-03-12	MAND			
	KSC		SPAR	FASTENER REPLACEMENT
	031			
INSPECTION	AUTH	J6275A	0104 001	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING
LSFR,	S-J6275A	MAND		
2008-02-26	KSC		SPAR	CORROSION SAMPLING CAPABILITIES WILL BE PROJECTED AT
	031			AND FINALIZED AT DLSFR FOR EACH FLOW.
S-J6327	AUTH	J6327	0104 001	WLE RCC JOGGLE INSPECTION
2008-02-14	MAND			
	KSC		SPAR	
	031			
S-J6329	COMP	J6329	0104 000	ASA #2 & #4 AND ATVC #3 & #4 R&R FOR OV-104, FLT 31
2008-05-15	MAND			
	KSC		SPAR	PER USA PE:JEFF SCHIECK, TO PERF ON FLT 30, NOT 31
	031			

S-J6341A	COMP MAND KSC 031	J6341A	0104 000	EVALUATION OF OMS POD LI-900 TILE INSTALLED ON 0.090" SIP
2008-04-09			SPAR	TILES WERE REMOVED AND REPLACED DURING FLT 30 PROCESSING
INSPECTION	COMP S-J6351 KSC 031	J6351 MAND	0104 000	OV-104 RUDDER/SPEEDBRAKE (RSB) ACTUATOR EXTERIOR
2008-05-15			SPAR	PER USA PE, JEFF SCHEICK TO PERF ON FLT 30, NOT 31
S-J6378	AUTH MAND KSC 031	J6378	0104 000	OV-104 BODY FLAP PDU GEARBOX FLUID LEVEL INSPECTION
2008-07-18			SPAR	
S-J6380	AUTH MAND KSC 031	J6380	0104 000	EVA PDU TOOL INTERFACE VERIFICATION
2008-07-07			SPAR	
S-J6387	COMP MAND KSC 031	J6387	0104 000	PASSIVE DOCKING TEST ON OV-104
2008-08-15			SPAR	WORKED ON FLT 30 DUE TO ROLLBACK
S-J6389	AUTH MAND KSC 031	J6389	0104 001	CLOSE CLEARANCE MEASUREMENTS OF ORBITER HARDWARE
2008-07-10			SPAR	
S-J6399	AUTH MAND KSC 031	J6399	0104 000	0-GAUGE PROTECTION FOR OV-104, FLIGHTS 31-35
2008-10-03			SPAR	
S-J6402	AUTH MAND	J6402	0104 001	MICRO INSPECTION OF CAPTIVE GAP FILLERS

FILLERS	2008-08-08	KSC 031	SPAR	DOCUMENTS MICRO INSPECTION OF SPECIFIC CAPTIVE GAP DUE TO OBSERVED FLT DEGRADATION.
S-J6407	2008-09-02	AUTH J6407 MAND KSC 031	0104 001 SPAR	STS-125 CLOSE CLEARANCE MEASUREMENTS OF SRMS MPM AND OBSS VEH/EFF:OV-104 FLTS 30, 31.
S-J6410	2008-09-18	AUTH J6410 MAND KSC 031	0104 000 SPAR	AFT STUB CRACKED TILE INSPECTION
S-J6414A	2008-12-19	AUTH J6414A MAND KSC 031	0104 000 SPAR	RUDDER SPEED BRAKE THERMAL TAB INSPECTION
S-J6430	2008-10-14	COMP J6430 MAND KSC 031	0104 000 SPAR	MIDDECK PARTITION INSPECTION WILL BE WORKED DURING FLT 30 PROCESSING DUE TO ORB

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

ORB

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
S-J6441	COMP	J6441	0104 001	OV-104 LARGE PUTTY REPAIRS
2008-11-20	MAND			
	KSC		SPAR	TPS REPLACEMNT WILL BE PARALLEL TO PLANNED OPF PRO CESSG.
	031			TILE REPLCMT FOR OV104-F30:OPPORTUNITY BASIS
S-J6447	AUTH	J6447	0104 000	STS-126 POST FLT INSP AND CONTAMINATION SAMPLING
2008-12-19	MAND			
	KSC		SPAR	
	031			
S-J6466	AUTH	J6466	0104 001	OMS POD PILLOW GAP FILLER INSTALLATIONS
2009-02-09	MAND			
	KSC		SPAR	
	031			
S-J6481	AUTH	J6481	0104 000	MIDDECK PAYLOAD COOLING TEST FOR OV-104
2009-04-03	MAND			
	KSC		SPAR	
	031			
S-J6497	AUTH	J6497	0104 000	OV-104 LARGE PUTTY REPAIR REMOVAL
2009-04-28	MAND			
	KSC		SPAR	REQ'D TPS REPLACEMENTS HAVE BEEN REVIEWED AT THE STS-129
	031			LSFR & INTEGRATED INTO GRND PROCESS'G PLAN

S-J6501	AUTH	J6501	0104 000	STS-129 CIH CLOSE CLEARANCE MEASUREMENTS
2009-04-28	MAND		SPAR	CLOSE CLEARANCE MSRMNTS WILL BE PERF'D IN PARALLEL W/ P/L
	KSC			UP MISSION PROCESS'G & POST FLT DWNLD RECON
	031			
S-J6506	AUTH	J6506	0104 000	CAPTURE OV-104 OUTPUT WAVEFORMS TO ADDRESS 1N3600 DIODE
2009-05-12	MAND		SPAR	CONCERNS
	KSC			
	031			
(OV- S-J6509	PLND	J6509	0104 000	REMVL OF MPS GH2 FLOW CONTROL VALVES FOLLOWING STS-125
2009-05-12	MAND		SPAR	104), STS-127 (OV-105), AND STS-128 (OV-103)
	KSC			
	031			
S-J6512	AUTH	J6512	0104 000	OV104 EVA SCU CHANGEOUT
OK'D 2009-05-18	MAND		SPAR	DOCMNT RQMT TO R&R SCU'S DUE TO AGE-LIFE ITEMS. RQMT
	KSC	031		AT LSFR. WITHIN 129 OPF PROCESS'G PERIOD
	031			
103 S-J6513	AUTH	J6513	0104 000	X-RAY INSPN OF MPS HELIUM SUPPLY SYS CHK VLV CV4 ON OV-
2009-05-12	MAND		SPAR	(STS-128) AND OV-104 (STS-129)
	KSC			
	031			
SCAN S-J6516A	AUTH	J6516A	0104 000	WLE JOGGLE REGION IR THERMOGRAPHY REQUEST FOR HIGH LINE
2009-06-16	MAND		SPAR	WF PANELS
	KSC			
	031			
QD S-J6525	AUTH	J6525	0104 000	PERFORM LEAK CK OF MPS LO2 OVERBD BLEED VALVE (PV19)& T-0
2009-06-10	MAND		SPAR	(PD13) ON OV-103 (STS-128) & OV-104 (STS-129)
	KSC			
	031			



S062831	PLND	S062831	0104 001	REMOVAL OF TEMP SENSING LABELS ON APU GN2 QD'S
	MAND			
2009-04-15	KSC		NASA	
	031			
019393	AUTH	VK70-613604-001	0104 000	AV BAY 3A FAN MOD, OV104, W/W -002 KIT, (+ BAYS 1&2 EOTF)
S115129A	MAND			
2009-03-31	KSC	NOT REQUIRED		PAR'D FROM FLT 30 TO 31 PER KSC-1879 (TO BE WORKED UNDER
	031			TAD 30240), W/W-002 KIT, REF ECL-4-27-1354
S115129A	AUTH	VK70-613604-002	0104 000	KIT - AVIONICS BAY 3A FAN MOD, OV 104 (W/W -001 KIT)
	MAND			
31 2009-03-31	KSC	NOT REQUIRED		ADDED BY EDS I/F & VK70-613604 A02. PAR'D FROM FLT 30 TO
	031			PER KSC-1879
019735	AUTH	TCTIV1019735REF	0104 004	WLE FRONT SPAR PROTECTION FOR SNEAK FLOW - STRUCTURES
S115117CR4	MAND			
2006-11-21	KSC			TRANSFERRED TO GEU FROM GC5. PART DEF FROM OV-104/27. REF
	031			SEQ 1/STS-117, SEQ 2/STS-122, SEQ 3/125

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

ORB

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
019735	AUTH	TCTIV1919735REF	0104 004	FRONT SPAR PROTECTION FOR SNEAK FLOW (TPS/RCC)
S115117CR4	MAND			
	KSC			PART DEF'D FROM OV-104/27. SEE SEQ 1 FOR OV-104/28 WORK,
2006-11-21	031			SEQ 2 104/29, SEQ 3 104/30, SEQ 4 REMAINDER
019763	AUTH	TCTIV1919763REF	0104 004	WING LEADING EDGE (WLE) HORSE COLLAR REDESIGN
S115117CR4	MAND			
	KSC			PART DEF'D FROM OV-104/27. REF SEQ 1 FOR OV-104/28 WORK,
2006-11-21	031			SEQ 2 104/29, SEQ 3 104/30, SEQ 4 REMAINDER
030231	AUTH	TCTIV2930231REF	0104 000	RUDDER SPEED BREAK INCONEL THERMAL BARRIER REDESIGN STUDY
S115129A	MAND			
	KSC	NOT REQUIRED		ADDED BY EDS I/F & V070-298115 A07
2009-03-31	031			
030250	AUTH	TCTIV7930250REF	0104 000	O2 CROSSOVER VALVE SIGNAL TALKBACK MOD, REF ECN 25005
S115129A	MAND			
	KSC	NOT REQUIRED		ADDED BY EDS I/F & V070-778302 D05
2009-03-31	031			

TOTAL MODS = 37

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

PIH

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIO	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
008836	APPD	TCTIM0008836REF	0020 000	PROVISIONS TO SUPPORT EXPRESS LOGISTICS CARRIER (ELC) PDA
NOT REQD	KSC			ADDED PER V785-714912 E07 - MOVED TO STS-128 FROM STS-129
031				PER REMANIFEST PER S042013HQ
008850	APPD	K712-774041-001	0005 000	ADDITIONAL HARDWARE REQUIREMENT TO SUPPORT STS-129, CIH
KIT NOT REQD	KSC			ADDED PER KIT EO NEW
031				

TOTAL MODS = 2

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0129

SRB

ECP-MCR/KIT SEQUENCE

RUN

TIME 13:55 DATE 06/16/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR			
AUTHDATE	SITE	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
	FLT			
S084539LR3	AUTH	FEC A-10358B	B140 000	EDAS SENSOR INSTALLATION SUPPLEMENT FOR BI140 SRB'S
2009-03-10	KAS			
S084539LR3	AUTH	FEC A-10361B	B140 000	SUPPLEMENTAL EDAS INSTALLATION FOR BI140
2009-03-10	KAS			
S171478	PLND	FEC RSRM-120	B140 000	STIFFENER RING FOAM BONDLINE VERIF PULL-TEST LOC CHANGE
2009-04-22	KAS		NASA	
TOTAL MODS =		3		

Approved STS-129 OMRS Waivers and Exceptions

WVR EXC	ELEMENT PROJECT	PRCBD NUMBER WAIVER# (STAT) (INITIAL STS)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS BEG END
+	E	ORB	S053298ZC EK10572R1 (A)	OMRSD EXCEPTION REQUEST - MISSION LIFE ASSESSMENT OF WING LEADING EDGEINSULATORS (EK10572R1)	104 029 033
			S053298ZD EK10574R1 (A)	OMRSD EXCEPTION REQUEST - WING LEADING EDGE INSULATORS (EK10574R1 )	104 029 036
			S053298ZE EK10575R1 (A)	OMRSD EXCEPTION REQUEST - MISSION LIFE ASSESSMENT OF WING LEADING EDGEINSULATORS (EK10575R1)	104 029 031
			S053299AQ EK10592 (A)	OMRSD EXCEPTION REQUEST - DRAG CHUTE DEPLOY SYSTEM 2 LIGHT FAILU RE(EK10592)	104 029 032
			S053299AT EK10593 (A)	OMRSD EXCEPTION REQUEST - DRAG CHUTE DEPLOY SYSTEM 2 LIGHT FAILU RE(EK10593)	104 029 032
	W	ET	S053293FZ WK03850R1 (A) (STS-093)	L02/LH2 TANK PRESSURE MONITOR FOR MOVE	ET 099 999
		OMS	S053298NV WK10522 (A)	OMRSD WAIVER REQUEST - RIGHT OMS SECONDARY REGULATOR CREEP RATE(W K10522)	0021 035 043

ORB	S053296YT WK10332R2 (A)	OMRSD WAIVER REQUEST - PV6 PREVALVESCREEN PARTICLES (WK10332R2)	104	027 031
	S053298HY WK10502 (A)	OMRSD WAIVER REQUEST - BODY FLAP DRIVE RATE TEST (WK10502)	104	027 031
	S053299BLR1 WK10600R2 (A)	OMRSD WAIVER REQUEST - OXYGEN SYSTEM 1 RELIEF VALVE FAILED RESEA TLEAKAGE (WK10600R3)	104	029 032
RCS	S053296GY WK10188R1 (A)	OMRSD WAIVER REQUEST - LRCS OXIDIZER GHE ISOLATION VALVE LEAK(WK 10188R1)	0014	025 032

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Approved STS-129 OMRS Waivers and Exceptions

WVR EXC	ELEMENT PROJECT	PRCBD NUMBER WAIVER# (STAT) (INITIAL STS)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS BEG END
W	RCS	S053296YG WK10318R1 (A)	OMRSD WAIVER REQUEST - RIGHT RCS OXIDIZER GHE SYSTEM INTERNAL LEA KAGE(WK10318R1)	0021	034 042
		S053298JF WK10503 (A)	OMRSD WAIVER REQUEST - RRCS OX TANKOUTLET TRANSDUCER ACCURACY (WK 10503)	0021	034 042
		S053299GW WK10634 (A)	OMRSD WAIVER REQUEST - LEFT REACTION CONTROL SYSTEM FUEL GHE ISO LATIONVALVE LEAKAGE (WK10634)	0014	030 032
SRB		S053293WA WK03886 (A) (STS-103)	LH FWD AND RH MID SRB JOINT TEMP SENSORS	BI	099 999

	°	Waivers	°	Except	°	Deviat	°	Cannib	°	Total	°
° Total Extracted	°	10	°	5	°	0	°	0	°	15	°

ACTIVE WAIVERS FOR  
OV-104

Item #	Authority	Date	Waiver Description	Effectivity	Wad
53	S052428A	03/27/91	Allows specified flights to fly with interim TPS repair after each mission to minimize damage to surrounding tile during ferry flight	STS-37, STS-39, STS-40, STS-42 thru STS-999	<b>STAYS OPEN</b>
101	S076972	11/19/91	Permit the modified GPCs (AP101-S) Battery Back-up Unit to fly with annotated fastener improvements without rolling the LRU Part Number	STS-42, STS-44, STS-47 and STS-49 thru STS-999	<b>STAYS OPEN</b>
325	S061956	07/15/03	Blanket on the Control Moment Gyro (CMG) Orbital Replacement Unit (ORU) on the Lightweight MPESS Carrier (LMC) will <b>NOT</b> be re-installed on-orbit per configuration defined in ICD-A-21494. It will be secured around the FSE and attached to the aft bulkhead.	OV-104, Flight 27	
334	S115115JR1	07/19/06	The following requirement is waived to allow OV-104 to fly with the following out-of-configuration condition:  Tech Order M072-544501-067 (RMS, MPM over-center stop and MPM pedestal insulation cover fasteners) will be implemented in total, less the requirement to perform bench rigging per updated specification requirements for for OV-104, Flight 27 and subsequent OV-104 flights until such time that all MPMs can be removed and bench rigging can be performed.	OV-104, Flight 27 thru OV-104, Flight 999	<b>STAYS OPEN</b>
339	S063652	07/09/07	The following requirement is waived to allow OV-104 to ferry from DFRC to KSC with the following out-of-configuration condition:  Retain RH ET Camera installation for ferry flight MECSLSI V072-200197, reference flag note (3), removes (MV0456A) M072-705001-024 RH ET Sep Camera (Digital Camera with 35 mm lens) for ferry flight. The RH ET Camera needs to remain in flight configuration to support resolution of IFA STS-117-V07 Digital Umbilical Camera Image Corruption. Troubleshooting will be performed on the installed hardware after returning OV-104 to KSC.	OV-104, Flight 28	

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861-2505



ACTIVE WAIVERS FOR  
OV-104

Item #	Authority	Date	Waiver Description	Effectivity	Wad
340	S063652	07/09/07	<p>The following requirement is waived to allow OV-104, Flight 28 to ferry with the following out-of-configuration conditions:</p> <p>Remove LH OMS Pod LP04 (FIB) blankets prior to ferry flight thermal blanket V070-396376-241 on LOMS Pod lifted at forward leading corner and edges reported on orbit, IFA STS-117-V-02. Two blankets (V070-396376-241 and adjacent V070-396376-051) are removed. RTV ramp applied in cavity up to adjacent blankets per TLP04-28-2520 MRB approval.</p>	OV-104, Flight 28	
343	S115122GR4	12/07/2007	<p>The following requirement is waived to allow OV-104 to fly with the following out-of-configuration condition:</p> <p>Partial installation of Tech Order M072-660010-004, middeck air flow re-routing duct tech order, not to include one each bolt (NAS1003-8A) and one each washer (NAS620C10) in the lower aft corner of the vent housing cover assembly.</p> <p>During vertical stowage, the nut plate (not under USA Tech Order configuration control) was noted missing from behind the starboard closeout panel. Without the nutplate, the bolt and washer cannot be installed. The area cannot be currently accessed to reinstall the missing hardware.</p>	OV-104, Flight 29	ECL-4-A0118 (was ECL-4-29-1637)

ACTIVE WAIVERS FOR  
OV-104

Item #	Authority	Date	Waiver Description	Effectivity	Wad
344	S071024MP	12/20/07	<p>During maintenance of an Advanced Master Events Controller (AMEC) it was discovered that the module cards are able to translate upward, away from connectors. The cards are retained by friction applied by wedge-locks. An assessment determined a 0.070 upward card translation, would result in card disengagement from connectors. The wedge-lock system can not assure the cards will not translate upwards. The AMEC vendor (Boeing Autonetics) is no longer on contract supporting SSP. A design proposal is to provide a secondary connector retention using the AMEC covers. The new design new lids will limit the upward translation to 0.055. The new design will reduce the milled section of the cover and add silicone pads to provide shock absorption. Due to the absence of the original vendor and no current alternate drawings available for the AMEC the modification is being requested via a program directed Material Review (MR).</p> <p>P/N MC450-0016-0029</p> <p>S/N U6F0002, U6F0003, U6F0004, U6F0006, U6F0007, U6F0009, U6F0010 and U6F0011</p> <p>***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****</p>	<p>OV-103, Flight 35 OV-104, Flight 30 OV-105, Flight 21</p>	