



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



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

Program Freeze Point

PRCB Presentation

S115128C



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Re-baseline the STS-128 Mission Specific Requirements and Flow Plans. The STS-128 (OV-104) Launch Site Requirements were established by PRCBD S115128 dated 08-14-08. This CR and the Associated Data Package were reviewed at the 12-15-08 FRWG.

Flight Management*		MO3/USA-PI
<u>Orbiter Engineering*</u>	<u>Requesting Approval</u>	<u>USA-OE</u>
	<u>Status in BackUp</u>	
KSC Integration		MK-SIO
Flight Software		USA-FSW
Orbiter GFE		MV5
EVA		XA
Payload/Cargo Engineering		USA-PI
SSME	<u>Baseline at LSFR</u>	MP21



STS-128/17A

Delta Launch Site Requirements Review (DLSRR)

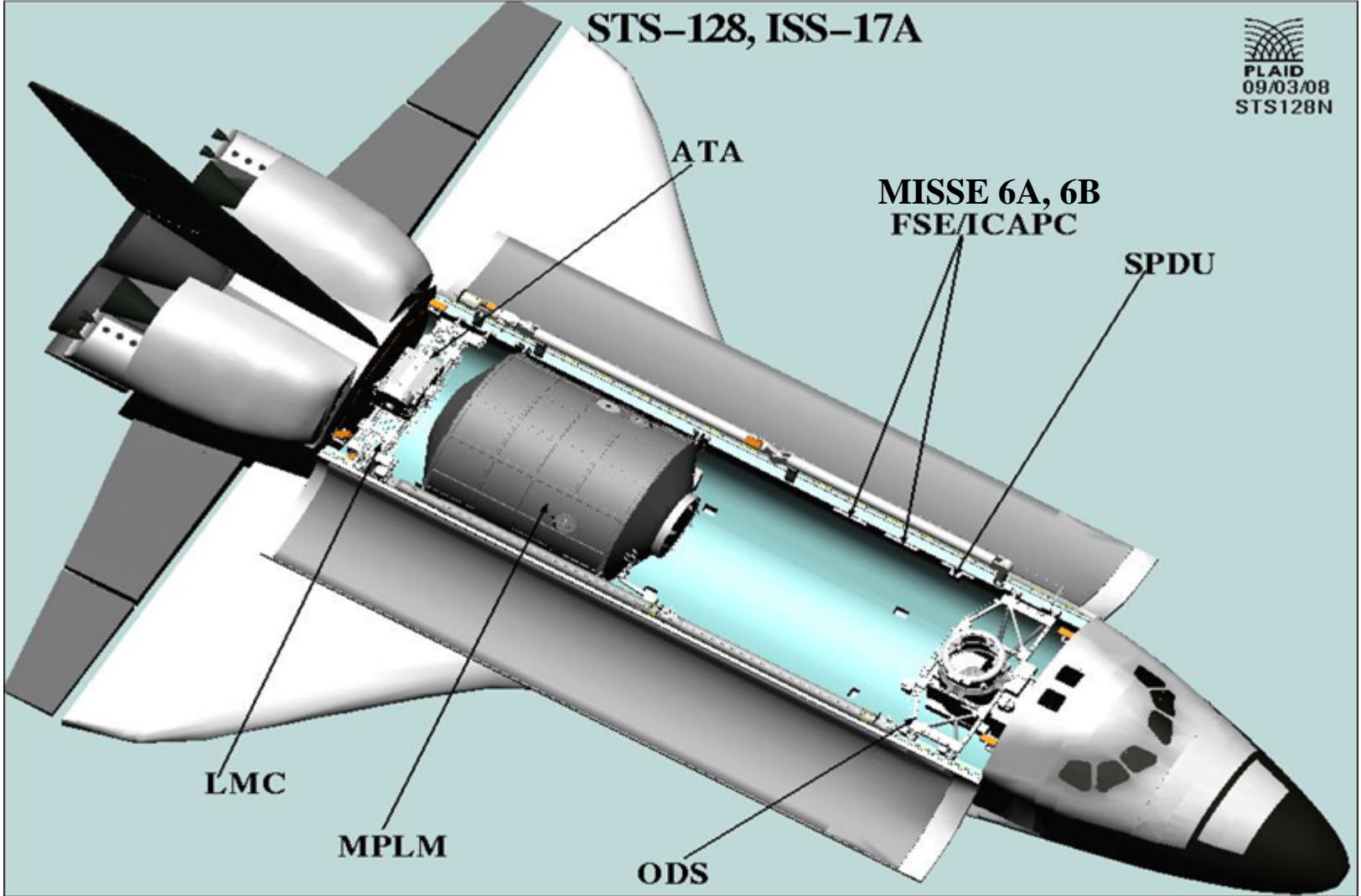
Flight Requirements Status

PRCB December 18, 2008

Shelby Lawson, STS-128 MIM
Frank Richmond, USA Flight Mgr.
Adam Richards/Boeing Mass Properties



STS-128 DELTA LAUNCH SITE REQUIREMENTS REVIEW		Presenter MO3/Shelby Lawson	
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LAUNCH

08/06/09
39A/ MLP 2
CREW SIZE: 7UP/7DN (One crew rotation)

ORBIT

51.6 DEG
122 NM
DIRECT INSERTION (190 NM altitude)
DURATION: 13 + 1 + 2 DAYS (3 EVAs)

CONFIGURATION

OV-103 (37)
LP01: RP03
ET-132
BI-139
RSRM-107
(1) TBD (2) TBD (3) TBD
OI-34
SRMS,OBSS, ODS, SSPTS

CONSUMABLES

CRYO TANK SETS 5 (450# O2 OFFLOAD)
GN2 TANKS 6 (FULL)
FWD RCS 1912# (OFFLOAD)
AFT RCS 4970# (FULL)
OMS 22760# (FULL) – COPV offload

PAYLOAD

ISS-17A (MPLM, LMC), MISSE 6,
TriDAR AR&D Sensor DTO-701A,
ISS-17A: MAUI, SEITE, SIMPLEX

LANDING

SITE KSC
TAL ZARAGOZA
ALT. TAL MORON & ISTRES
SCA 905

Notes:

- Rescue Flight for STS-127
- Items in italics were approved at the PRCB on 12/4/08 per S042013HQ.
- **SIMPLEX** per SO72128A (OSB), needs FDRD update.
- Unique flight requirements include possible MPLM late load at the pad.
- FRD CR in review to add DTO 854, Boundary Layer Transition due to OV-103 switch.



STS-128 DELTA LAUNCH SITE REQUIREMENTS REVIEW		Presenter MO3/Shelby Lawson
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PERFORMANCE MARGIN

• SIMULATION MARGIN (OCFAF128)			+1775
• WEIGHT CHANGES SINCE SIMULATION			
• PAYLOAD		- 15	
• OPERATOR		+128	
• ORBITER		+536	
• NPC		<u>+66</u>	
TOTAL WEIGHT CHANGES		<u>+715</u>	-715
• OTHER PERFORMANCE PROJECTIONS			
• PROTECTION FOR DOL DISPERSIONS			- 700
• 08/06/09 LAUNCH DATE (PMBT&ATMOS)			+143
• SRB – M.P. UPDATES			- 63
• SRB – BR / 1.55 MIL HIGHER THAN 0.3705 AVG			+310
• PROJ TO 5 MIN WINDOW FROM INPLANE			- 600
• PERFORMANCE CHANGES ADJUSTMENT			<u>+50</u>
• CURRENT BASELINED APM (12/16/08)			+197
• IPT PROJECTIONS			
• FLIGHT DURATION TO 13+1		+157	-146
• IPT CRYO OFFLOAD		- 450	+418
• IPT ADJUST OMS TIMER		+75	- 70
• IPT ADJUST MIDDECK PAYLOADS		+109	<u>-101</u>
• IPT PROJECTED APM (12/16/08)			+298



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FLIGHT MASS PROPERTIES
WEIGHTS AND CG'S ARE WITHIN ACCEPTABLE LIMITS

CASE	TOUCHDOWN	MACH 3.5
	<u>WEIGHT pounds (LIMIT)</u>	<u>X C.G. inches (LIMIT)</u>
NOMINAL	225591 (233000)	1087.9 (1075.7)
RTLS	239867 (245000)	1087.7 (1077.2)
TAL	238486 (244000)	1087.8 (1077.2)
AOA	234791 (242000)	1085.6 (1075.7)
CONT RTRN*	204783 (233000)	1084.5 (1075.7)

**CONT RTRN Case is No MPLM, LMC empty, Full Middeck, Fwd CG*

**NOTE: RTLS INCLUDES 185 SEC ARCS DUMP, 25 SEC FRCS DUMP
 TAL INCLUDES 120 SEC ARCS DUMP, 65 SEC FRCS DUMP
 102 LBS AFT BALLAST (BOXES ONLY)**

ESTIMATES BASED ON OCFAF128 AND MODIFIED FOR WEIGHT CHANGES THRU 12/16/08.

STS-128 LSRR
OV-103 FLIGHT 37

Belinda Soublet
USA Orbiter Element

December 18, 2008



STS-128 OV-103 Flight 37 – Orbiter LSRR Baseline

Modifications To Be Baselined at LSRR for OV-103 Flight 37

- 1 mandatory mod to be baselined

Mission Kit Tech Order Changes

- 3 tech order related changes

Potential modifications (info only)

Additional Requirements being tracked:

- STR/TPS Priorities
- Chits
- Time & Cycle / Deferred WADs (info only)

Authorization Requested for MECSLSI and CCD Updates for STS-128 (OV-103 Flight 37) Orbiter Mods

- Incorporate updates to SGD32104451 CCD and V072-200208 MECSLSI

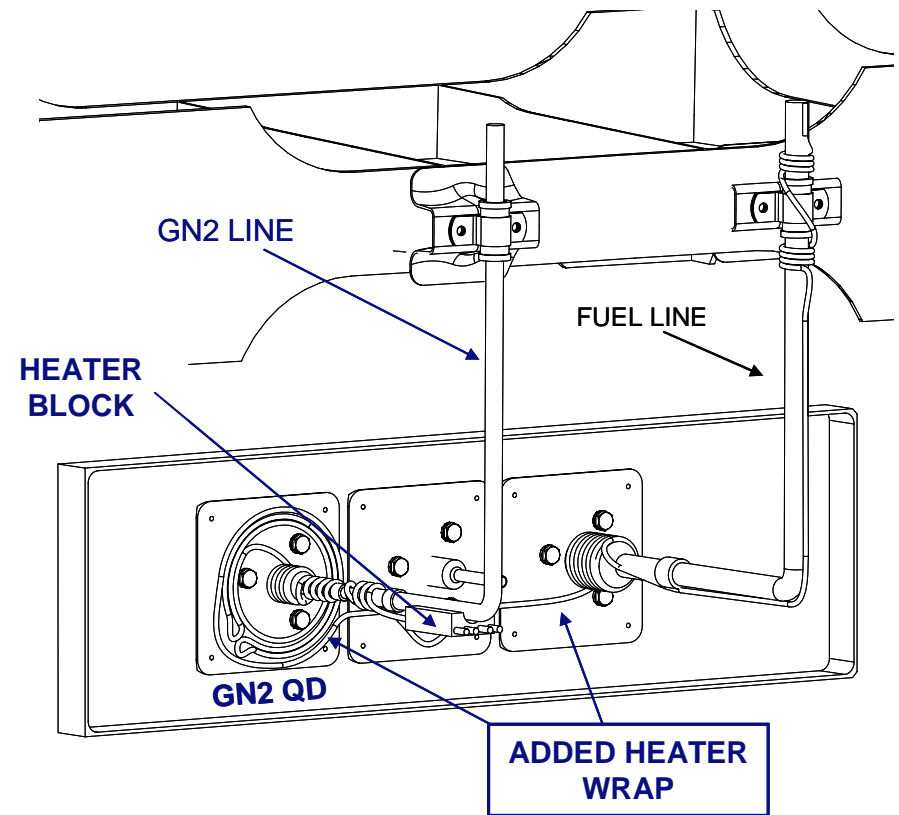
Backup

- Modification Information Backup
- Engineering, Hardware and Certification Status for Proposed Mods
- OV-103 Current Gapfiller Replacement and BRI-18 Installation Status

STS-128 LSRR Mandatory Mod To Be Baselined for OV-103 Flight 37

• TAD 30189 APU GN2 QD Heater Mod

- Completion of mod which adds heaters to APU GN2 QDs to mitigate the most likely cause of GN2 system pressure decay observed on previous flights
 - Increasing the temperature of the GN2 QD expected to mitigate leak potential
 - Heaters added to systems 1 and 2 QDs for STS-119 OV-103 Flt 36
- Heater mod will be installed on system 3 QD during the Flt 37 flow pending no performance issues during STS-119
 - Existing system 3 fuel fill line will be replaced with a longer heater and the extra length will be used to heat the system 3 GN2 QD
- Engineering is released
- Hardware required is in stock in logistics inventory



HEATER LAYOUT SYSTEM 3

TEST LINE NOT SHOWN FOR CLARITY

STS-128 LSRR Mission Kit Tech Order Changes for OV-103 Flight 37

• TAD 30164 – TriDAR (GFE) Installation in Support of DTO-701A

- The TriDAR sensor will be installed on the Orbiter to demonstrate technology for autonomous rendezvous and docking in low earth orbit
 - TriDAR will be mounted on the external airlock truss adjacent to Trajectory Control Sensor (TCS) 2 in the TCS 1 location, which is no longer flown
 - Similar mechanical and electrical interface arrangement to TCS
 - Hardware furnished by GFE and installed by Boeing TCS tech order which will be updated to establish a unique TriDAR installation configuration
- Tech order engineering is released – minor engineering cleanup required to transfer to OV-103 end item (originally issued for OV-104 STS-128 installation)
- MECSLSI update required for the following associated tech order changes
 - (Add) M072-730021-021 (TCS & TriDAR Instl)
 - (Remove) M072-730021-019
 - (Add) M072-363838-003 (External Airlock TCS Blanket Instl – TCS & TriDAR)
 - (Remove) M072-363838-001
 - Model MV0828A
- GFE hardware delivery and certification will be addressed in GFE section

STS-128 LSRR Mission Kit Tech Order Changes for OV-103 Flight 37

TAD 30164 – TriDAR (GFE) Unit and Installation Concept



**TriDAR Installation
Location on Aft
Airlock Truss**

**Trajectory Control
Sensor 2**

STS-128 LSRR Mission Kit Tech Order Changes for OV-103 Flight 37

- The following tech order related changes have been incorporated into the MECSLSI – tech order changes are for information only:
 - **RMS End Effector Configuration Change**
 - Incorporates GFE hardware upgrade
 - Requires authorization of MRCS Record 017222,0103,6 - RMS End Effector Mod
 - M072-544502-036 Mech Instl Remote Manipulator Instl (Model MV0082A)
 - **Demanifest Port Tool Stowage Assembly**
 - STS-128 FRD requirement (weight reduction)
 - M072-660855-001 HW Port TSA Tool Stowage Cushion and M072-660849-005 HW Port TSA Container (Model MV0849A) have been demanifested

Potential Mods (Info Only)

The following are mods that are in development stages in Orbiter and may be brought forward at a future freeze point review:

- 30091 Boundary Layer Transition (BLT) DTO
 - Flight 2 - Increased protuberance height
 - Catalytic coating DTO for 2 thermocouple locations
 - Pending assessment of STS-119 (flight 36) data with 0.25” protuberance
- 30245 ET Door Teflon Seal Design Change
- 30231 Rudder Speed Brake Thermal Clip Redesign
- TBD Tyvek Cover Design Enhancement

The following mods are partially completed but not baselined for STS-128. These will be requested to be baselined OSB if opportunity / priority arises:

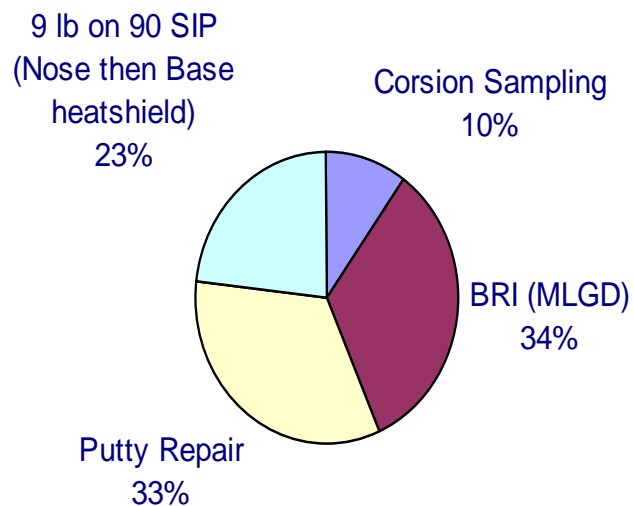
- 19735 WLE Spar “Sneak Flow” Protection (RH & LH panels 2-4)
- 19763 Lower WLE CP Horse Collar Gap Filler Redesign (RH & LH panels 2-4)
- 23227 Connector Saver (ME414-0630) Redesign (LH OMS Pod, Ku Band)

LON Requirements, if necessary

- 19798 LON Crew Rescue Recumbent Pallet System
- 19760 Recumbent Seat Kit (Seat 8) Rail Assembly

Breakdown of STS-128 Risk Reduction Work ~ Percentages Shown

TPS Priorities



- Orbiter's expectations for the work areas are shown on the pie chart for STS-128
- Exact numbers are determined by the KSC Team based on vehicle configuration, access, and flow duration
 - Distribution provides data/risk reduction in all areas of the list
 - °Does not allocate all the resources in one area

OV-103 STR/TPS Priorities

Mandatory

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

Prioritized Opportunity

- 1. BRI-18 Tile - MLGD (28 Tile) - Complete**
1st subset – FWD and O/B corner – 14/door
- 2. BRI-18 Tile - MLGD FWD Edge (22 Tile) - Complete**
2nd subset – fwd & O/B sides – 11/door
- 3. BRI-18 Tile - MLGD O/B Side (18 Tile) - Complete**
3rd subset – O/B sides – 9/door outboard side
- 4. BRI-18 Tile - STR side of ET Doors (20 Tile) - Complete**
4th subset – ET Doors – 10/door
- 5. BRI-18 Tile – LESS Carrier Panels 8-10 (24 Tile) – Complete**
5th Subset – LESS Hot Panels – 12/side

OV-103 STR/TPS Priorities (cont)

6. BRI-18 Tile – STR side of ET Doors Inboard side – AFT 4 Tiles (8 Tile) – **Complete**
7. Inboard Elevon “Hub” Tile Modification – (both sides) – 4 Tiles – **Complete**
8. I/B Elevon 9lb/90 SIP Upgrade to FRCI-12 – 34 Tiles (17/side) – **Complete**
9. O/B Elevon 9lb/90 SIP Upgrade to FRCI-12 – 6 Tiles (3/side) – **Complete**
10. MLGD – Outboard Middle 1/3 - (6 Door/6 STR) – **None completed**
11. MLGD – Outboard Aft (1/3 left) 6/door/6 STR)- 24 Tile – **None completed**
12. Nose Area 9lb/90 SIP Upgrade to FRCI-12 – 14 Tiles (7/side) – (103* 16 tiles, thruster) – **15 remaining**
13. Base Heat Shield Stinger 9lb/90 SIP Upgrade to FRCI-12 – 42 Tiles (32/stinger, 10/Box Attach point) – **34 remaining**

OV-103 STR/TPS Priorities (cont)

14. Gap fillers in Subset 2B (Line across MLGD edge) – **3 zones remaining**
15. BRI-18 Tile – Remaining MLGD (Top Priority)/LESS carrier panels/NLGD
 1. MLGD (Inboard forward edge working to AFT door edge) – **None Completed**
 2. LESS - panels 8, 9, 10, 7, 6, 5, 4, 3, 2, 1, 11, 12, 13 (in that order) – **59 tiles remaining**
 3. NLGD (attrition – do leading edge first) – **111 tiles remaining**
16. Mod work LESS internal (WLE sneak flow, WLE Horsecollar Gap Fillers) – **6 locations remaining**
17. MADS Instrumentation Failures (placeholder)
18. Remaining Gap Fillers & Window BRI-18 - **122 remaining**
Windows 2, 3, 4, & 5 Upper Carrier Panels (top priority)

STR/TPS Priorities Current Vehicle 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 9Ib/90 SIP	34	complete	5	complete
9. O/B Elevon 9Ib/90 SIP	6	complete	3	complete
10. MLGD – Outboard Middle 1/3	24	0	0	3
11. MLGD - Outboard AFT 1/3	24	0	1	1
12. Nose Area 9Ib/90 SIP	14 (16 ^{OV103})	1	0	0
13. Base Heat Shield 9Ib/90 SIP	42	8	24	33
14. Gap fillers in Subset 2B	5 Zones	2	1	0
15. BRI-18 Tile – Remaining MLGD (Top Priority) / LESS carrier panels/NLGD	MLGD 100 NLGD 123 LESS 66	MLGD 0 NLGD 12 LESS 7	MLGD 1 NLGD 19 LESS 5	MLGD 0 NLGD 26 LESS 12
16. Mod work LESS internal	44 locations	38	39	complete
18. Remaining Gap Fillers & Window BRI-18	124	2	2	18



STS-128 Chits

Chit #	Title	Status
J6116A	Ames Gap Filler R&R	Approved
J6275A	Orbiter Structure IML Surface Corrosion Sampling Insp	Approved
J6341A	Evaluation of OMS Pod LI-900 Tile Installed on 0.90" SIP	Approved
J6384	BLT Tempilabel Assessment	Approved
J6392	Pre and Post Flight Optigo Scan of Protuberance Tile (Port Wing) to support the BLT Flight Experiment	Approved
J6402	Micro Inspection of Captive Gap Fillers	Approved
J6410	Aft Stub Cracked Tile Inspection	Approved
J6414A	Rudder Speed Brake thermal tab Inspection	Pending
J6434	OV-103 Putty Repair	Approved
J6443	Z-Scan of BLT Protuberance Tile	Approved
J6447	STS 126 Post Flight Inspection and Contamination Sampling of Laser Camera System & Orbiter Locations	Pending
J6455	APU QD Tempilabel Assessment	Pending
J6XXX	GPS MAGR Link-008 Software Update	Potential
J6XXX	PLBD C/L Actuator R&R	Potential
J6XXX	ET Door PDU R & R	Potential
J6XXX	Primary Thruster PC Tube Flush	Potential

STS-128 Chits cont'd

Chit #	Title	Status
J6XXX	BLT Protuberance Tile Removal	Potential
J6XXX	MDM FA1/EIU R&R	Potential
J6XXX	LMC Close Clearance Measurements	Potential
J6XXX	MPLM Close Clearance Measurements	Potential
J6XXX	TriDAR optics and retest requirements	Potential

OV-103 Significant Time/Cycle & Deferred WAD Items (Info Only)

- **Time and Cycle**
 - Fuel Cell 3 R&R end of life

- **Deferred WADs**
 - RP03 Attach Point 2 retorque
 - Requires Pod removal



Delta STS-128 Integrated Launch Site Requirements Review

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Date **12-18-08**

Backup Material

FRWG Presentation (With Minor Changes)



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Flight Operations and Integration (FO&I)

Flight Requirements:
MIP, PIPs, CIP
FDRD
FRD

Backup Charts



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Mission Requirements Status		Date 12/18/08 Page 6

Documentation

ECD/Status

<u>MIP – ISS 17A – NSTS 21546, Rev B, Chg 1-2 (9/25/08)</u>	None pending
<u>CIP- LMC, NSTS 21494, Rev B, Chg 1-12 (8/14/08) STS-128 Addendum</u>	None pending
<u>PIP – MPLM, NSTS 21499, Rev B, Chg 1-2 (12/7/07)</u>	None pending
<u>PIP – MAUI, NSTS 21530, Basic, Chg 1-2 (5/5/08)</u>	None pending
<u>PIP – SEITE, NSTS 21542, Basic (11/19/07)</u>	None pending
<u>PIP – MISSE 6a and 6b, NSTS 21537, Basic, Chg 1-3 (01/24/08)</u>	None pending
<u>IP-DTO-701A TriDAR AR&D Sensor, NSTS 21547, Basic (06/05/08)</u>	None pending
<u>IP– RMS Sideview Camera (RCS), NSTS 21418, Chg 1-3 (06/28/05)</u>	None pending
<u>FDRD – PRCB S042013HQ Interim Launch Dates</u>	12/10/08 (A)



STS-128/17A FRD Status		Presenter USA/Frank Richmond
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- **STS-128 Latest FRD Revision**
 - Revision 003: Dated, December 11, 2008 (<https://sspweb.jsc.nasa.gov/efrd>)
- **Approved CRs to be incorporated into next FRD Revision**
 - None
- **Open/Pending CRs**
 - **FRD17462-128-011 – Add DTO 854 (Boundary Layer Transition Flight Experiment)**
 - **ECD: 01/14/09**
 - **FRD17462-128-012 – Update LiOH Requirements**
 - **ECD: 01/14/09**

STS-128 Flight Requirements Document (FRD) DLSRR Status

Frank D. Richmond

FRWG 12/15/08

PRCB 12/18/08

STS-128 FRD Status

- **STS-128 Latest FRD Revision**

- **Revision 002: Dated, November 11, 2008** (<https://sspweb.jsc.nasa.gov/efrd>)

- **Open CRs**

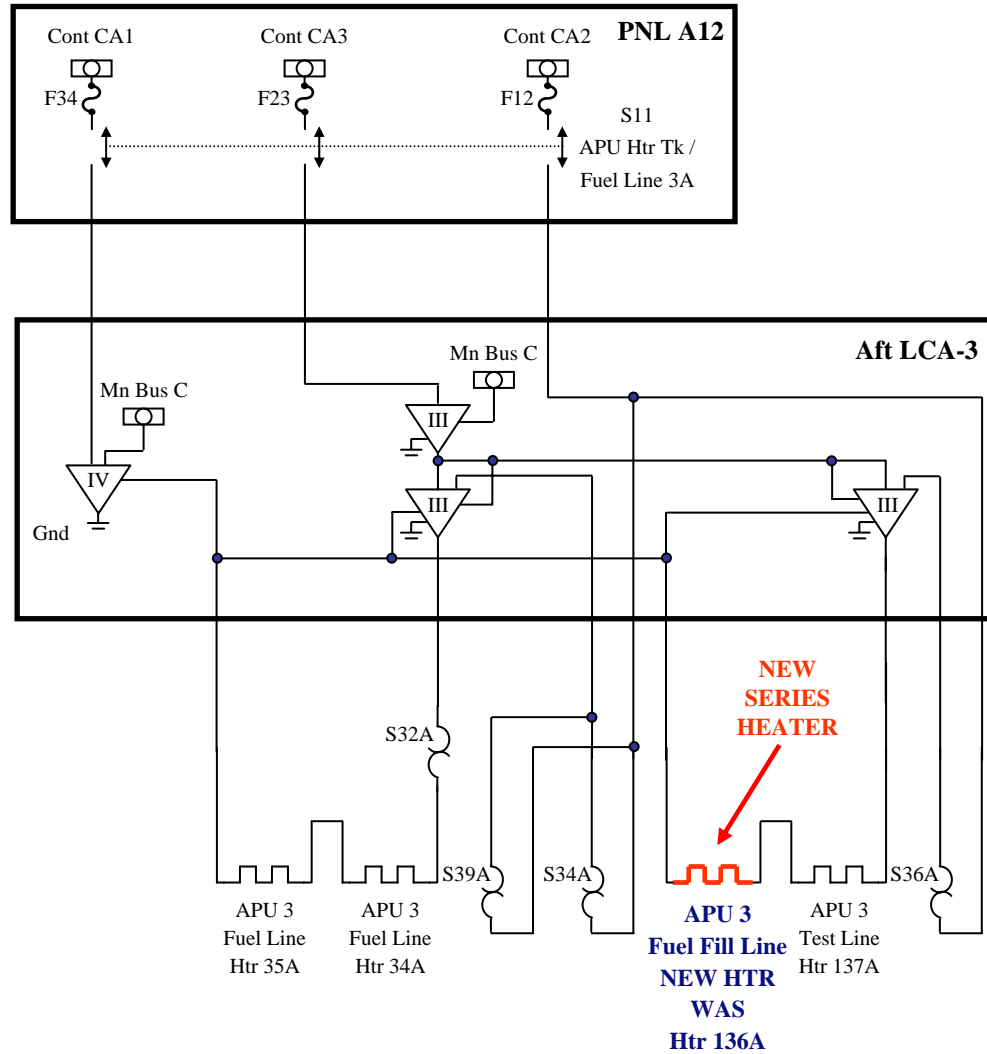
- **FRD 17462-128-008 - Add DTO 900 to STS-128 Flight Requirements Document**
ECD: Approved 11/19/08
- **FRD17462-128-010 - STS-128 Vehicle Swap**
ECD: 12/10/08

STS-128 LSRR BACKUP

- **Modification Information Backup**
- **Engineering, Hardware and Certification Status**
- **Mod Record and MECSLSI Updates**
- **Current Gap Filler Status**
- **Current Bri-18 Status**

TAD 30189 APU QD Heater Modification

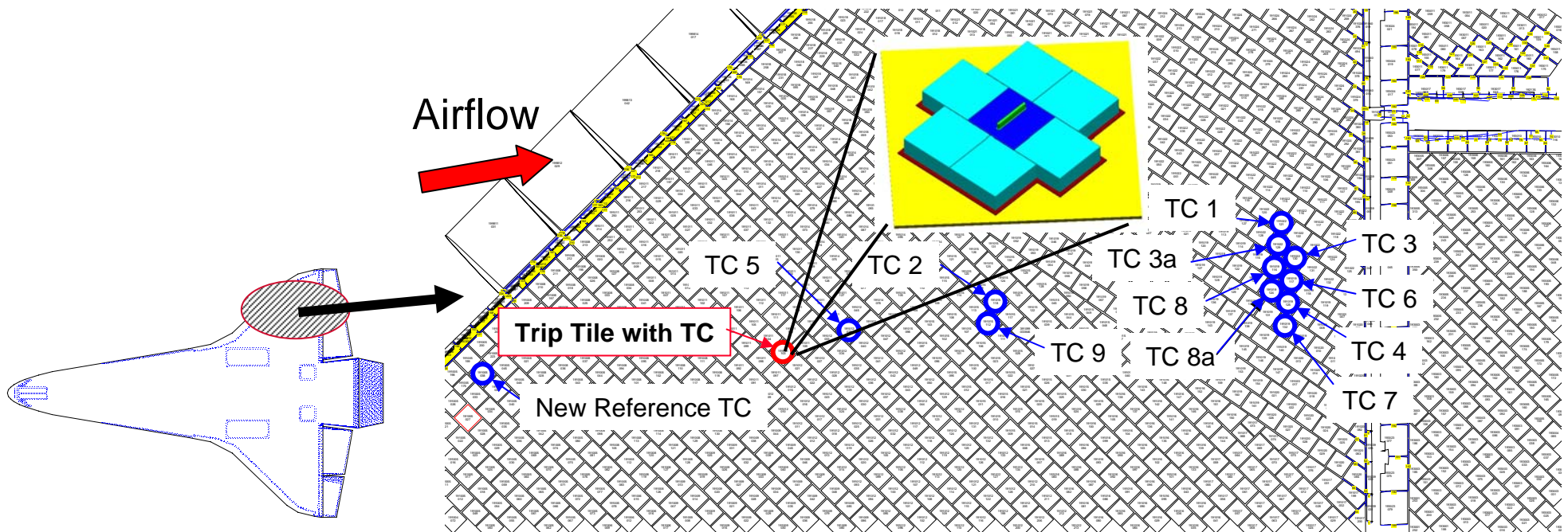
APU GN2 QD System 3 Mod Schematic



OV-103 Flight 37 Potential Mods

• 30091 Boundary Layer Transition (BLT) DTO – Flight 2

- Mod / flight experiment involves integrated TPS and MADS instrumentation design to fly with a fixed protuberance tile
 - STS-119 will fly with a protuberance height of 0.25” to initiate BLT at ~Mach 15
- A total of thirteen thermocouples were installed in TPS tiles: eleven will be in the affected wing area downstream of the transitional cone of influence, one in the protuberance tile, and one as a reference upstream of the protuberance.
 - Ten temperature measurements of the thirteen will be selected and recorded each flight on the MADS instrumentation system
- Based on STS-119 performance, arc jet testing and analysis, a protuberance height for STS-128 will be selected, potentially in the 0.35 to 0.45 range



Engineering, Hardware and Certification Status – Baselined Mods

MCR NO.	MCR 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 (ESTIMATE)	CERTIFICATION CR / CAR (BOEING)	REMARKS
Mods For Baseline at STS-128 LSRR										
30189 Antonios	<p>APU QD Heater Modification</p> <p>APU system 1 experienced pressure decay on-orbit during STS-121 (OV-103) and STS-123 (OV-105) - pressure decay was not evident on the ground prior to launch. The GN2 QD was isolated as the most likely source for the leak. Tests of the two QDs which exhibited on-orbit leakage indicated that leakage occurred as a result of the effects of contamination (including hydrazine) on the QD poppet sealing surface and the cold environment of space. Replacement of the poppet and seal assembly following STS-121 resulted in no leakage during the 3 subsequent flights of OV-103. Testing has demonstrated that cold temperatures must be present for a leak to occur, therefore, increasing the temperature of the GN2 QD expected to eliminate the leak condition.</p> <p>Mod parially implemented during flight 36 flow - heaters added to system 1 and 2 GN2 QDs for STS-119. System 3 will be modified during the flight 37 flow (assuming no issues with STS-119 performance). Heaters will be electrically connected in parallel to the existing System 3 line heaters and will be installed on the line and routed to the QD with an appropriate wrap factor. Over-temperature thermostats (system A & B) will be installed on the parallel leg.</p>	Released (a)	TBD	N/A (b)	N/A	Go (c)	12/23/08 P	2/11/09 P	CAR 01-09-000002-002Q	<p>(a) APU and Wiring engineering is 100% released.</p> <p>(b) Parts available on site</p> <p>(c) No technical issues - pending successful performance of systems 1 and 2 during STS-119</p>

Engineering, Hardware and Certification Status – Mission Kit Mods

MCR NO.	MCR 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 (ESTIMATE)	CERTIFICATION CR / CAR (BOEING)	REMARKS
Mission Kit Changes For STS-128										
30164 Antonios	TriDAR (DTO-701A) Installation The autonomous rendezvous and docking sensor (TriDAR) will be integrated into the Orbiter system to demonstrate technology for autonomous rendezvous and docking in Low Earth Orbit. The sensor will be mounted on the airlock truss next to the Trajectory Control Sensor (TCS) 2 in the TCS 1 location which is no longer used. Hardware furnished by GFE and installed by Boeing TCS tech order which will be updated to establish a unique TriDAR installation configuration	Released (d)	N/A	N/A (GFE) (e)	TBD	Go (f) TBD (GFE) (e)	1/15/09 P 1/15/09 P	2/26/09 P 2/26/09 P	CR 04-341002J CAR 120-04-341002J	(d) Tech order installation engineering is released – minor engineering cleanup required to transfer to OV-103 end item (originally issued for OV-104 installation) (e) Hardware delivery and LRU certification is GFE responsibility (f) Boeing certification for LRU installation Ref OCRD S165322
17222 Kadri	RMS End Effector Change In response to an End Effector on-orbit anomaly (back up release stalled) on STS-103, two design mods are being incorporated during planned End Effector refurbishment. 1) The Spring Return Assembly was altered to improve the output torque drive efficiency and reliability. Background: The Back-up release mechanism does not deliver enough torque to overcome minor anomalies, such as debris in some gear passes. Gear ratios were modified on two gears to provide additional torque (2X) and material changes (nitride coating) were made to decrease wear due to mission vibration loads. 2) The Energy Absorber shaft material and processing were changed to reduce chipping of the nitride coating. Background: The Energy absorbers are deteriorating faster than expected, exacerbating wear of some gears. Energy absorber changed to a stronger material (AerMet 100) and coated with ion nitride. Boeing update to the Remote Manipulator Arm Tech Order Installation drawing (M072-544502) implemented to reflect this new -13 EE replacing the -11 EE configuration.	Released	N/A	N/A (g)	N/A (g)	N/A (g)	N/A	N/A	N/A	Ref M072-544502 C01 V082-000002 end item EO not released (g) Hardware delivery and certification is NASA GFE responsibility. Boeing certification not affected. Ref OCRD S165341
N/A	Demanifest Heavyweight Port TSA for STS-128 STS-128 unique FRD requirement for performance improvement.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	



Mod Record / MECSLSI Updates for Baseline Mods

MCR NO.	MCR TITLE	KIT-MOD RECORD / TECH ORDER IMPACT DESCRIPTION
<u>Mods For Baseline at STS-128 LSRR</u>		
30189 Antonios	<u>APU QD Heater Modification</u>	<u>Placeholder Record 030189,0103,1</u> - APU QD Heater Mod System 3 No Tech Order / MECSLSI Impact

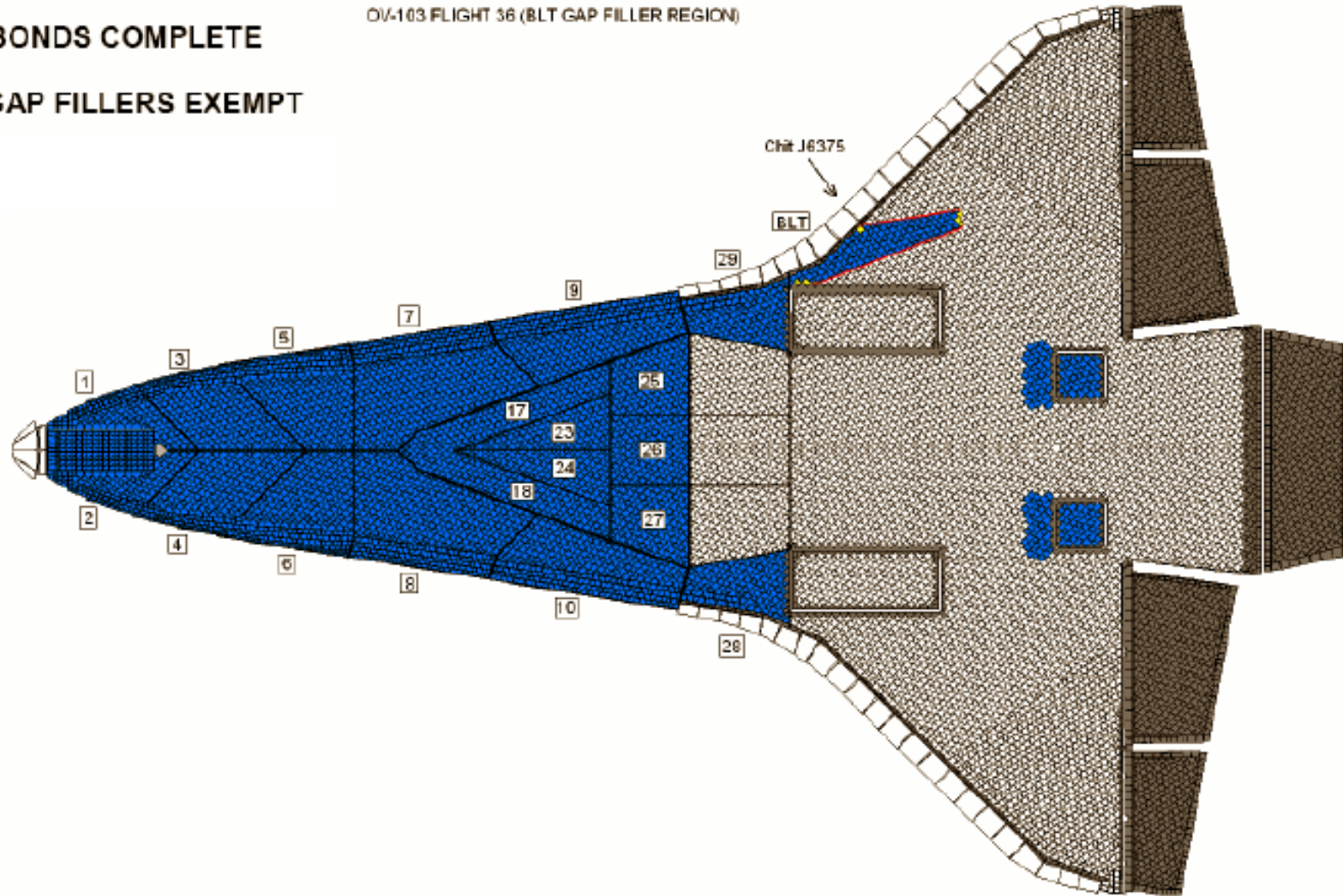
Mod Record / MECSLSI Updates for Mission Kit Mods

MCR NO.	MCR TITLE	KIT-MOD RECORD / TECH ORDER IMPACT DESCRIPTION
Mission Kit Changes for STS-128 (Info Only)		
30164 Antonios	<u>TriDAR (DTO-701A) Installation</u>	<p>The following records to be authorized at LSRR:</p> <p>Placeholder Record 030164,0103,0 - TriDAR DTO Instl Mission Kit End Item Update</p> <p>Tech Order and MECSLSI Impact:</p> <p>(Add) M072-730021-021 TCS & TriDAR Instl (Remove) M072-730021-019 (Add) M072-363838-003 (External Airlock TCS Blanket Instl - TCS & TriDAR (Remove) M072-363838-001</p> <p>Model MV0828A</p>
17222 Kadri	<u>RMS End Effector Change</u>	<p>Placeholder Record 017222,0103,6 - End item updated for end effector mod (To be authorized at LSRR)</p> <p>Tech Order and MECSLSI Impact (Info only for LSRR)</p> <p>(IS) M072-544502-036 (WAS) M072-544502-033 Remote Manipulator Arm Mechanical Instl Model MV0082A</p>
Mission Kit Changes for STS-128 (Info Only)		
N/A	<u>Demanifest Heavyweight Port TSA for STS-128</u>	<p>Tech Order and MECSLSI Impact (Info Only for LSRR)</p> <p>(Delete) M072-660855-001 HW Port TSA Tool Stowage Cushion (Delete) M072-660849-005 HW Port TSA Container Model MV0849A</p>

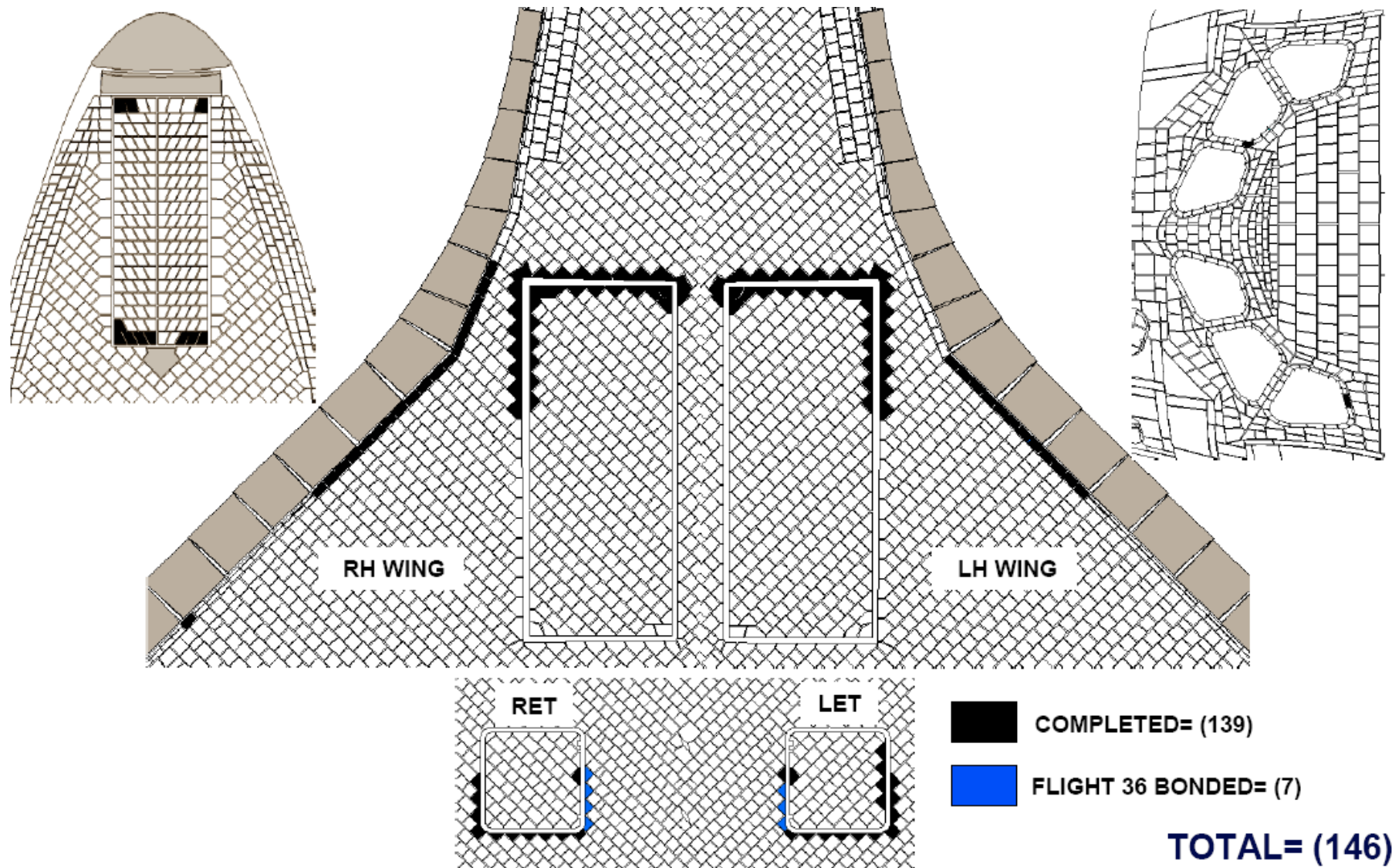
OV-103 Current Gapfiller Location

-  BONDS COMPLETE
-  GAP FILLERS EXEMPT

OV-103 FLIGHT 36 (BLT GAP FILLER REGION)



OV-103 Current Bri-18 Status



STS-128

Delta Launch Site Requirements Review

Flight Software Overview

Tom Stansel
USA FSW

PRCB 12/18/08

STS-128 DLSRR (FSWE)

- **STS-128/OV-103 is the First Scheduled Flight of Operational Increment (OI) 34 Flight Software (FSW)**
 - SASCB SCR 98107A documents PASS and BFS OI-34 content
- **STS-128/OV-103 Flight Software Payload Support:**
 - ISS 17A
 - Orbiter Interface Unit (OIU)
 - Sequential Still Video (SSV)
 - Orbiter Docking System (ODS)
 - Trajectory Control System (TCS)
 - Multi-Purpose Logistics Module (MPLM)
 - 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-128 DLSRR (FSWE)

- **STS-128 Source Changes/Edits for Primary Flight Software (Base)**
 - SCR 93211A Update of SSMEC Vehicle Data Table (VDT) for Enhanced Accelerometer
 - SCR 93267A Removal of the Set and Reset to False Cmds For the RCS Tank Iso Valves
 - SCR 93262 Film ET Camera
 - DR 126366 SM GPC Failure to Send GCIL Commands
- **STS-128 Patch Implementation for Primary Flight Software**
 - None
- **STS-128 Patch/Edit Implementation for Backup Flight Software (Base) (included on delivered Mass Memory)**
 - None
- **STS-128 Patch Implementation for Backup Flight Software**
 - None

STS-128 DLSRR (FSWE)

- **Products**

- **STS-128/OV-103 Base Cycle Product delivery schedule (available to field)**

FPSB

- **Shuttle Data Tape**
 - **Mass Memory Unit**

January 20, 2009

February 09, 2009

- **Open Items**

- **None**

- **Concerns/Issues**

- **No issues or concerns with STS-128 at this time**



	Presenter MV / Kenneth Brown	
	Date	Page 1

STS-128 LSRR

OV-103 FLIGHT 37

Kenneth Brown
Orbiter GFE

December 18th, 2008



End Effector Swap

Presenter
MV / Kenneth Brown

Date

Page 2

- **Modifications To Be Baselined at LSRR for OV-103 Flight 37**
 - **RMS End Effector Upgrade**

- MDA is in the process of completing the second End Effector (EE) upgrade on S/N 303:
 - 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)

- EE S/N 303 to be delivered to KSC in February
 - Plan to swap/return to MDA EE S/N 403 for upgrade



EVA Status

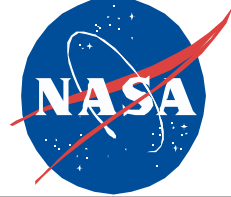
STS-128/Flight 17A

Delta Launch Site Readiness Review

XA/Maria Tullar

Johnson Space Center

December 18, 2008



- **Bulkhead PFR – SED33105308-307**
 - Bulkhead PFR installation – Tech Order: M072-661568-029

- **Winches**
 - Forward Winch, SED33101570-327
 - Aft Winch, SED33101570-325

- **No Port LWTSA Box**
 - EVA contingency tools stowed in the middeck

STS-128
ISS – 17A MPLM, LMC, MISSE 6
△ Launch Site Requirements Review

Payload Cargo Engineering Status

ABBAS ELSABAGH

281.212.6186

12-18-2008

STS-128 ΔLSRR

Engineering Flight Product Status

<u>Drawing No</u>	<u>Title</u>	<u>Released</u>
V072-200208	MECSLSI	10-03-08
VA72-200208	Cargo Arrangement	10-10-08
VD72-200208	Avionics Diagram	10-13-08
VS72-200208	Integrated Schematic	10-13-08
VS70-540355	Retention Schematic	10-13-08

- The above engineering released represent STS-128 CIR datapack on OV-104. An update to the engineering to reflect the vehicle change to OV-103 will be at FRED
 - FRED Release is planned for 02-23-09

Rescue Flight Status

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

Engineering Open Work

- FRED ECD: 02-23-08

Standardization

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

STS-128 ΔLSRR

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>
A05665	ICD-A-21494/LMC	Update Struct/Mech figures	05-Jan-09

Issues/Concerns

- None

STS-128 ΔLSRR

- OMRSD

- FII V2 (Post-Mate)

- Baselined Files

- P350 Multi-Purpose Logistics Module (MPLM)
- P430 SL/ORB Generic I/F Requirements (LMC)

- RCNs

		<u>Release</u>	<u>Baseline</u>
• PP17785	P546 – ISS-17A Baseline	09/25/08A	01/09/09
• TBD	P430 – LMC Update	12/16/08	01/09/09
• TBD	P1539 – MISSE 6 Baseline	12/16/08	01/09/09

- FII V4 (Pre-Mate)

- RCNs

		<u>Release</u>	<u>Baseline</u>
• DPS12739	Mission-Unique List	03/06/09	03/27/09
• DPS12741	FIII MUL	03/06/09	03/27/09
• TBD	Adjacent Pin Test	03/06/09	03/27/09

- FII V6 (Shuttle Experiments)

	<u>RCNs</u>	<u>Release</u>	<u>Baseline</u>
–	• TBD	12/16/08	01/09/09

- Issues / Concerns

- None

STS-128 ΔLSRR

- Annex 1 ECD
 - ISS-17A MIP Annex 1
 - ISS-17A Annex 1 Baseline 10/03/08A
 - Data needed: ATA drawings, Mass, Safety-Critical Circuit Figure, and center of gravity figures
 - LMC CIP Annex 1
 - 17A LMC Baseline 09/26/08A
 - Data needed: Safety-Critical Circuit Figure, payload axis system definition
 - MISSE 6 PIP Annex 1
 - MISSE 6 PIP Annex 1 Baseline 08/15/08A
 - Data Needed: None

Open Work

ECD

- None

Issues/Concerns

- None

STS-128 Δ LSRR

TGHR Status

Customer Submittal	04-06-09
Release For Review	05/15/09
Baseline	06-05-09

Issues/Concerns

- None

STS-128 Δ LSRR

Cargo Close Clearance Process

- The following Close Clearance areas have been identified:
 - MPLM aft port scuff plate to MPM*
 - MPLM to top centerline latches
 - ASI flag (MPLM) to sidewall
 - ATA to aft bulkhead EVA winch*
 - ATA to aft bulkhead WVS antenna*
- A Chit will be developed to take Close Clearance Measurements of Close Clearance Points listed above with *
 - Other points already measured or not accessible
- Chit measurements will be performed at the (PAD) after payload installation
 - ATA will be digitally measured before installation

STS-128 ΔLSRR

Cargo Integration Hardware Status

Delivery Status

ECD

- All available CIH has been delivered
- Unique CIH to support TRIDAR DTO
 - Cable Harness 46P77W983 (qty. 2)
 - Cable Harness 46P77W121 (qty. 1)
 - Cable Harness 46P77W349 (qty. 1)

02/20/09

Issues/Concerns

- None



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

Backup Material

- **SSP Systems Drawings** Attachment 1
- **SSP Authorized Modifications/Non-Standard Work** Attachment 2
- **SSP OMRS Waivers and Exceptions** Attachment 3
- **Launch Window** (Not Available)
- **Open Configuration Waivers** Attachment 4



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

SSP System Drawings

The Drawings Baseline Was Released By PRCB S0115128A on 09-29-2008

- **V072-000001-280** (Rev. VR) Space Shuttle System (Rel. 12-05-2008)
 - **V072-200208-003** (Rev. A) Mission Equipment Cargo Support (Rel. TBD)
 - **SGD32104451-301** (Rev. NEW) Crew Compartment Configuration (Rel. TBD)
 - 302** Descent
 - **V070-000001-003** Orbiter General Assembly
 - **V070-410100-017** SSME Installation
 - **10100-0061-176** Integrated SRB General Assembly (BI-139)
 - **80901000000-530** External Tank Assembly (ET-132)
- **STS-128 CIR + 70 days Mission Configuration Product Plan (MCP) will be published on 12-29-2008 and will be republished at LSRR +18 days on 01-05-2009.**



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

SSP System Drawings – (Continued)

Ferry Configuration

- **V072-000001-281** (Rev. VR) Space Shuttle System Drawing (Rel. 12-05-2008)
 - **V072-200208-004** (Rev. A) Mission Equipment Cargo Support (Rel. TBD)
 - **SGD321004451-001** (Rev. NEW) Crew Compartment Configuration (Rel. TBD)
 - **V072-300055-027** (Rev. BT) Ferry Flight Configuration (Rel. 12-11-2008)

SCA 905

LM MAR

ML60B 6013 -310
PRIME C/L CAMERA
GFE TV CNTRLR

ML60E 0646 -TBD

PGSCS (6)
STS1=OCA
STS2=WINDECOM
STS3=KFX
STS4=WORLDMAP
STS5=RPOP
STS7=WLES
ACCESS PT ACCESSORIES
WLE CABIN RELAYS
☒ PCS LAPTOP
☒ PWR SPLY
☒ CD-ROM

ML60M 6014 -312
B/U C/L CAM
ULTRASONIC LEAK DETECTION

CDR	FREDERICK STURCKOW
PLT	KEVIN A. FORD
M/S #1	PATRICK FORRESTER
M/S #2	JOSE M. HERNANDEZ
M/S #3	DANNY OLIVAS
M/S #4	CHRISTER FUGLESANG
M/S #5 (UP)	NICOLE STOTT
M/S #5 (DN)	TIM KOPRA

MODULAR LOCKER LAYOUT ASCENT

PANTRY FOOD	1622 -308	MF57A PANTRY FOOD	1622 -308	PANTRY FOOD	1622 -302
-------------	-----------	-------------------	-----------	-------------	-----------

MIDDECK FORWARD

5962 -303 MF14E 6269 -307 PRINTER TRAYS IODINE REMOVAL (GIRA) 6256-TBD	MF28E/G TBD -TBD MOUSE DRAWER SYSTEM (MDS) ☒ (36 CFM/REAR BREATHER)
MF14G TBD MDS SUPPORT EQUIPMENT CTB	MF28H 5454 -327 IFM BREAKOUT BOX TURNBUCKLES AIR BOTTLES WWD FILTER RMS KIT ALTIMETER/ION LOCKER DR
6300 -337 MF14H 6250 -345 IFM TOOLS 2163-302 2161-305 2162-307 MULTIMETER	MF28K 6231 -TBD POST INSERTION 1
MF14K 6231 -TBD POST INSERTION 2	MF28M 2763 -304 MENU FOOD
MF14M 6299 -TBD COAS/BTA WORK LTS/LT SHADES/D2X AUDIO DOSIMETER	MF28O 7521 -TBD SHUTTLE CSA-CP SUPA (13)/FMK CONDENSATE HOSE/CWC DOCKING KIT/O-RINGS BRAYCOTE
MF14O 8047 -TBD AC VACUUM CLEANER (CTB)	

MF43C 2764 -306 MENU FOOD MENU FOOD	MF57C 1900 -308 CDR CLOTHING	MF71C 2762 -307 MENU FOOD MENU FOOD
MF43E 6697 -TBD HH LIDAR W/NIGHTSCOPE 2ND HHL (TRAD)/SSV	MF57E 2760 -306 FRESH FOOD FRESH FOOD	MF71E TBD -TBD MENU FOOD MENU FOOD
MF43G 1908 -309 CREW SUPPORT	MF57G 6240 -311 ORBITER FDF SODF	MF71G TBD -TBD M/S #5 UP CLOTHING M/S #5 DN CLOTHING
MF43H 1904 -305 M/S #1 CLOTHING	MF57H 5473 -305 ORBITER FDF	MF71H 1903 -305 M/S #2 CLOTHING
MF43K 2765 -304 MENU FOOD MENU FOOD	MF57K TBD -TBD ISS RESERVE CTB	MF71K TBD -TBD SODF CTB
MF43M 1904 -307 M/S #3 CLOTHING	MF57M 1901 -305 PLT CLOTHING	MF71M 3005 -304 M/S #4 CLOTHING
MF43O TBD MENU FOOD MENU FOOD	MF57O TBD -TBD CREW PREF HCTB	MF71O TBD -TBD MENU FOOD MENU FOOD

LEADER: TBD
DATE: 11-13-2008
LAUNCH: 08-20-2009

FLIGHT: STS-128/17A (MPLM)
VEHICLE: OV-103
CREW: 7 CREW 13 + 1 + 2 DAYS

RQMTS:NO RCRS, SLEEPING
BAGS, EXT A/L, ERGOMETER, RMS,
LM MAR, NON-EDO VOL B, NO VOL D

MIDDECK AFT

MA9D/F 9882 -TBD TRAD SPARE DTV VIP MUX/TOOLS DTV DSR 25	MA16D TBD -TBD ISS SAMPLES ● DOUBLE COLD BAG
MA9G 8719 -307 COLOR PRINTER CTB	MA16F/G TBD -TBD GLACIER ● (36 CFM/REAR BREATHER)
MA9J 8737 -310 RCC COLD BAG (NOAX) ● DOUBLE COLD BAG	MA16J TBD -TBD SODF CREW CARE PKG HCTB
MA9L TBD STOW-N-GO CTB	MA16L TBD -TBD MED KITS MAK
MA9N 7432-315 SOFT STWG BAGS PHCS 4980-309 BRKTS/CK/RE-ENT LIGHT STICKS 8071-311 RSTRNTS/RE-ENT FIBERSCOPE 8070-302	MA16N TBD -TBD SOMS RESUSCITATOR/ODOR BACTERIA FILTER
WMC 4575 -309 (MA2H) 0914 -331 TOWELS AND RESUPPLY ITEMS WMC DISPENSER 1st DAY CLOTH SUPA (1) 1641-330	EXT AIRLOCK TBD -TBD 2-EMUs EXT A/L FLOOR -TBD -TBD TETHERS EMU BATTERY/DIDBs

VOL B (MA4D/J) TBD
HYGIENE

VOL 3B (MA73/J) 7425 -326
QUICK DON MASKS(3)
CABIN AIR CLEANER
SPOT (FLASHLIGHT)
G1 CAM/CDR/FLASH
D2X/400 MM LENS
12-24 MM LENS

A16 8706 -TBD
35MM CAMERA BAG
PILOT HAND CNTRL

A17 7424 -TBD
DTV CAMCORDER BAG
CC SYSTEM BAG
4 QUICK DON MASKS
HATCH TOOL

VOL D (MD52C)
NOT INSTALLED

VOLUME F (MD76M) 1403 -306
WET TRASH

VOLUME G (MD80R) 1800 -TBD
CONT UCds
WASTE MGMT

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

MD CEIL (PORT 1) TBD LATE INSPECTION REPAIR
MD CEIL (PORT 2) 9895 -302 RSK-7 ACES G-SUITS
MD CEIL (STBD 1) 9022 -302 RCC REPAIR KIT GEL BRUSH KITS B/U EVA HDWR
MD CEIL (STBD 2) 8992 -301 RCC CRACK BAG 85 FT TETHERS
MD FLOOR (PORT 2) TBD ENTRY GARMENTS ☒ ISS ITEMS ☒ ISS PHOTO/TV (CTB) IPT RESERVE (2MLE)
MD FLOOR (PORT 1) TBD TSA TOOLS
MD FLOOR (STBD 2) TBD ISS RESERVE
MD FLOOR (STBD 1) TBD ☒ ISS ITEMS (TBD)

TOTAL LIOH (35)
LIOH BOX (7435-TBD):
29 LIOH IN LIOH BOX & 1 ATCO
2 INSTALLED
4 MPLM STOWED

KSC C/D: TBD-301
JSC C/D: TBD-301
KSC P/D: TBD-301
JSC P/D: TBD-301
CEIT KIT: TBD-301
ISS KIT: TBD

WINDOW SHADE BAG - (5548-TBD)
1. WINDOW SHADES
2. IFM CABLES & HOSES (4259-344)
3. FILM CHG BAG (4828-303)
4. PANEL COVERS

L10A1: V10/AVIU/TAPES(6686-327)
L10A2: DTV
L11A1: PDIP 2
L11A2:A3 OIU PANELS 1 & 2
L12A1: SSP 1
L12A2: SSP 2
L12A3: PDIP 1
R12A1: VPU
R12A2: OBSS/OPP/SPASP

* NOT APPROVED
● L-24 LATE LOAD
● TRANSFER HARDWARE
CTB CARGO TRANSFER BAG
☒ SWAP
HCTB HALF CARGO TRANSFER BAG

DWG NO. SGD32104451
CCMM: DELLA WYLIN
(281) 483-9790
/USR/DWGS/LOCKER/STS128

NOTE: LOCKER LAYOUTS ARE FOR REFERENCE ONLY & ARE NOT RELEASED DWGS. FOR RELEASED DRAWING, PLEASE REFER TO THE CREW COMPARTMENT CONFIGURATION DRAWING FOR THIS FLIGHT (SGD32104451)



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

Modification Impact Report

- **Mission Equipment Modifications and Orbiter Modifications analyzed for impacts to OMRSD, LCC, ICD, EMI, Software, and GSE.**
- **A total of 4 MCRs have been approved and/or pending mods**
- **Current MCR impact status:**
 - **No impacts for all six disciplines 2**
 - **One or more disciplines with impacts, documentation approved 0**
 and/or pending approval



Delta STS-128 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-18-08**

Modification Impact Report – (Continued)

- Possible impacts still under review 2
 - MCR's 30164 and 30189 are being reviewed for all impacts

MCR/ECP	STAT	ITEM/KIT NUMBER	SEQ	DESCRIPTION / GENERAL REMARKS	PRCB	PRIO
-----	SITE	TCTI NUMBER	EISN NO.	-----	AUTHDATE	FLT
	AUTH KSC	J6275A	0103 002	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION CORROSION SAMPLING CAPABILITIES WILL BE PROJECTED AT LSFR, AND FINALIZED AT DLSFR FOR EACH FLOW.	S-J6275A 2008-02-26	MAND 037
	AUTH KSC	J6341A	0103 001	EVALUATION OF OMS POD LI-900 TILE INSTALLED ON 0.090" SIP LI-900 TILE INSTLD ON .090 SIP WILL BE INSPD FOR DEFECTS PER CHIT ON NEAR TERM FLOWS UNTIL RCN IS	S-J6341A 2008-04-09	MAND 037
	AUTH KSC	J6384	0103 000	BLT TEMPILABEL ASSESSMENT BLT TEMPILABEL READINGS WILL BE RECORDED POST STS-119 NIB TO OPF PROCESSING.	S-J6384 2008-08-11	MAND 037
	AUTH KSC	J6392	0103 001	PRE & POST FLT OPTIGO SCAN OF PROTUBERANCE TILE (PORT WING) TO SUPPORT THE BOUNDARY LAYER TRANSITION (BLT) FLIGHT EXPERIMENT	S-J6392 2008-07-28	MAND 037
	AUTH KSC	J6402	0103 001	MICRO INSPECTION OF CAPTIVE GAP FILLERS CHIT DOCUMENTS MICRO INSPECTION OF SPECIFIC CAPTIV E GAP FILLERS DUE TO OBSERVED FLT DEGRADATION.	S-J6402 2008-08-08	MAND 037
	AUTH KSC	J6410	0103 001	AFT STUB CRACKED TILE INSPECTION	S-J6410 2008-09-18	MAND 037
	AUTH KSC	J6434	0103 001	OV-103 PUTTY REPAIR TPS REPLACEMENT WILL BE ON AN OPPORTUNITY BASIS FOR STS-119 WITH COMPLETION DURING STS-129.	S-J6434 2008-10-28	MAND 037
	AUTH KSC	J6443	0103 001	Z-SCAN OF BLT PROTUBERNANCE TILE	S-J6443 2008-11-19	MAND 037

TOTAL MODS = 8

MCR/ECP	STAT	ITEM/KIT NUMBER	SEQ	DESCRIPTION / GENERAL REMARKS	PRCB	PRIOR
-----	SITE	TCTI NUMBER	EISN NO.	-----	AUTHDATE	FLT
	AUTH	CR S063944A	B139 000	TCTI FOR IMPLEMENTATION OF THE IPT AT KSC	S063944A	
	KAS				2008-11-26	

TOTAL MODS = 1

Approved STS-128 OMRS Waivers and Exceptions

WVR EXC	ELEMENT PROJECT	PRCBD NUMBER WAIVER# (STAT) (INITIAL STS)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS BEG END
E	ORB	S053299DT EV10602-A (A)	OMRSD EXCEPTION REQUEST - WING LEADING EDGE SPAR STRUCTURAL SAMPL INGDEFERRAL (EV10602)	103	035 999
	RCS	S053296YK EK10327 (A)	OMRSD EXCEPTION REQUEST - RIGHT RC SOXIDIZER B-LEG PAD REGULATOR L OCKUPPRESSURE (EK10327)	0023	032 040
		S053297WA EK10452 (A)	OMRSD EXCEPTION REQUEST - RRCS FUEL GHE TANK P1 TRANSDUCER ACCURA CY (EK10452)	0023	032 039
W	ET	S053293FZ WK03850R1 (A) (STS-093)	L02/LH2 TANK PRESSURE MONITOR FOR MOVE	ET	099 999
	OMS	S053296UM WK10299 (A)	OMRSD WAIVER REQUEST - RP03 TK302 DYNATUBE LEAK RATE (WK10299)	0023	032 040
	ORB	S053297NZ WK10415 (A)	OMRSD WAIVER REQUEST - MADS FDM CALIBRATION MANUAL MODE (WK10415)	103	031 038
		S053298VM WK10557R1 (A)	OMRSD WAIVER REQUEST - FUEL CELL POWERPLANT 3 OXYGEN FLOWMETER LO WERLIMIT (WK10557R1)	103	033 042
		S053299BB WK10603 (A)	OMRSD WAIVER REQUEST - FORWARD OXYGEN REGULATOR	103	034 039

		LOCK UP PRESSURE(WK10603)		
	S053299JU	OMRSD WAIVER REQUEST -	103	035 040
	WK10653 (A)	WATER SPRAY BOILER #1 EXCEEDED 44 PSIA MAX IMUMLIMITATION (WK10653)		
	S053299MG	OMRSD WAIVER REQUEST -	103	035 038
	WK10656 (A)	FUEL CELL POWERPLANT 3 HYDROGEN FLOWMETERL OWER LIMIT (WK10656)		
RCS	S053298VTR1	OMRSD WAIVER REQUEST -	0023	035 043
	WK10559 (A)	RIGHT RCS OXIDIZER B-LEG SECONDARY REGULAT ORLOCK UP HIGH (WK10559R1)		

Approved STS-128 OMRS Waivers and Exceptions

WVR	ELEMENT	PRCBD NUMBER WAIVER# (STAT)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS	BEG	END
EXC	PROJECT	(INITIAL STS)					
+	W	SRB	S053293WA	LH FWD AND RH MID SRB	BI	099	999
			WK03886 (A)	JOINT TEMP SENSORS			
			(STS-103)				

+-----+-----+-----+-----+-----+-----+-----+-----+							
	Waivers	Except	Deviat	Cannib	Total		
+-----+-----+-----+-----+-----+-----+-----+-----+							
o							
o							
o	Total Extracted	9	3	0	0	12	
+-----+-----+-----+-----+-----+-----+-----+-----+							