



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



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

Program Freeze Point

PRCB Presentation

S115134



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

Baseline the STS-134 Mission Specific Requirements and Flow Plans. This CR and the associated Data Package were reviewed at the 11-30-09 FRWG.

Flight Operation & Integration*

MO3/USA-PI

Orbiter Engineering*

Requesting Approval

USA-OE

Payload/Cargo Engineering*

USA-PI

Status in Back Up

KSC Integration*

MK-SIO

Flight Software

USA-FSW

Orbiter GFE

MV5

EVA

XA

SSME

Status at LSFR

MP21

***Backup material included**



SPACE SHUTTLE PROGRAM
Space Shuttle Flight Operations and Integration Office
NASA Johnson Space Center, Houston, Texas



STS-134/ULF6

Launch Site Requirements Review (LSRR)

Flight Requirements Status

PRCB December 3, 2009

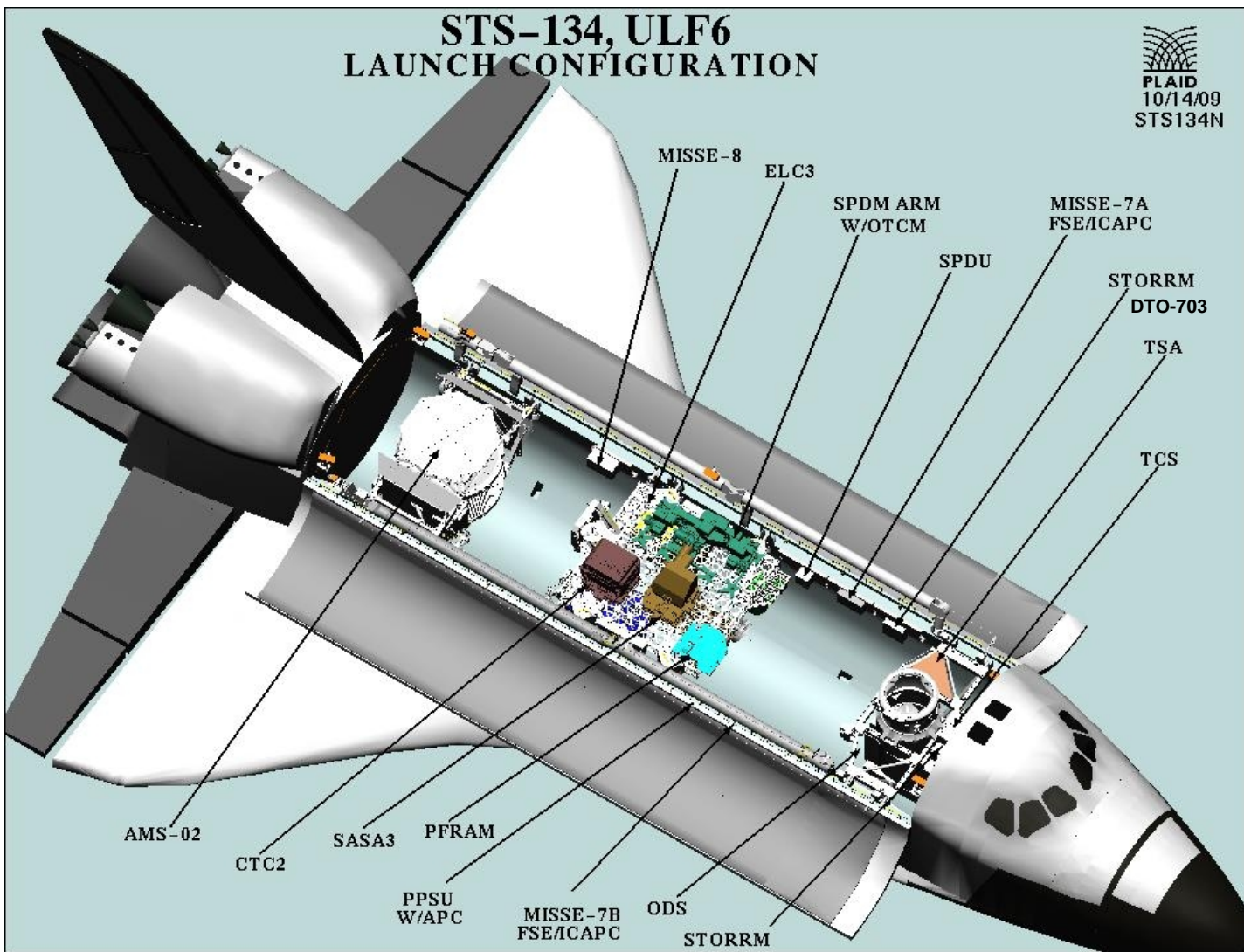
Shelby Lawson, STS-134 MIM

Frank Richmond, USA Flight Mgr.

Adam Richards/Boeing Mass Properties



STS-134 LAUNCH SITE REQUIREMENTS REVIEW		Presenter Shelby Lawson/MO3
Date 12/03/09	Page 2	



PLAID
 10/14/09
 STS134N

- Acronyms & Abbreviations:*
- Payload Bay*
 - AMS-02 – Alpha Magnetic Spectrometer -02
 - APC – Adaptive Payload Carrier
 - ELC3 – ExPRESS Logistics Carrier 3
 - ExPRESS – Expedite the Processing of Experiments to Space Station
 - ICAPC – Increased Capacity APC
 - MISSE – Materials on ISS
 - ODS – Orbiter Docking System
 - PPCU – Payload Power Switching Unit
 - SPDU – Station Power Distribution Unit
 - TCS – Trajectory Control System
 - TSA – Tool Stowage Assembly
 - Middeck*
 - GLACIER – General Laboratory Active Cryogenic on ISS Experiment Refrigeration
 - Payload of Opportunity*
 - MAUI – Maui Analysis of Upper Atmosphere Injections
 - RAMBO-2 – Ram Burn Observations-2
 - SEITE – Shuttle Exhaust Ion Turbulence Experiment
 - SIMPLEX – Shuttle Ionspheric Modification with Pulsed Local Exhaust
 - Development Test Objective (DTO)*
 - DTO 805 – Crosswind Landing Performance
 - DTO 703 – Sensor Test for Orion Relative-Navigation Risk Mitigation (STORM)



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LAUNCH

07/29/10
 39A/ MLP 3
 CREW SIZE: 6UP/6DN

ORBIT

51.6 DEG
 122 NM
 DIRECT INSERTION (200 NM altitude)
 DURATION: 12 + 1 + 2 DAYS (3 EVAs)

CONFIGURATION

OV-105 (25)
 LP03;RP04
 ET-137
 BI-144
 RSRM-112
 (1) TBD (2) TBD (3) TBD
 OI-34
 SRMS, OBSS^(a), ODS, SSPTS

CONSUMABLES

CRYO TANK SETS 5 (500# offload)
 GN2 TANKS 5 (FULL)
 FWD RCS 2175# (MIDPOINT)
 AFT RCS 4970# (FULL)
 OMS 22760# (STANDARD)

PAYLOAD

ISS-ULF6
 AMS-02
 ELC3
 MISSE 8
 MISSE 7a & 7b ^(b)
 STORM DTO-703

ISS-ULF6
 GLACIER (2)
 MAUI ^(c)
 RAMBO-2 ^(c)
 SEITE ^(c)
 SIMPLEX ^(c)

LANDING

SITE
 TAL
 ALT. TAL
 SCA

KSC
 ZARAGOZA
 MORON & ISTRES
 911

- Rescue Flight for STS-132
- (a) OBSS remains on ISS
- (b) MISSE 7a & 7b return only
- (c) Payload of Opportunity – no hardware



STS-134 LAUNCH SITE REQUIREMENTS REVIEW	Presenter Shelby Lawson/MO3	
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PERFORMANCE MARGIN

- **SIMULATION MARGIN (CIRAF134) +2569**

- **WEIGHT CHANGES SINCE SIMULATION**
 - **PAYLOAD +1281**
 - **OPERATOR -192**
 - **ORBITER +9**
 - **NPC -66**
 - **TOTAL WEIGHT CHANGES +1032 -1032**

- **OTHER PERFORMANCE PROJECTIONS**
 - **RENDEZVOUS ALT OF 200 NM +580**
 - **PROTECTION FOR DOL DISPERSIONS -700**
 - **SRB – M.P. UPDATES - 1**
 - **SRB – BR / 0.33 MIL LOWER THAN 0.3705 AVG -108**
 - **PROJ TO 5 MIN WINDOW FROM INPLANE -600**
 - **PERFORMANCE CHANGES ADJUSTMENT +72**

- **CURRENT BASELINED APM (12/01/09) +780**

VOLUME III: ASCENT PERFORMANCE MANAGER'S RESERVE GUIDELINE AT FPSR/CIR IS 800 LBS



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FLIGHT MASS PROPERTIES

<u>CASE</u>	<u>TOUCHDOWN WEIGHT pounds (LIMIT)</u>	<u>MACH 3.5 X C.G. inches (LIMIT)</u>
NOMINAL	202327 (233000)	1081.5 (1075.7)
RTLS	237605 (245000)	1081.7 (1077.2)
TAL	236164 (244000)	1082.1 (1077.2)
AOA	232203 (242000)	1080.2 (1075.7)
CONT RTRN**	233370 (233000)	1081.9 (1075.7)

****CONT RTRN CASE EXCEEDS 233K NEOM WEIGHT LIMIT (SEE VOL. X BK. 1 SEC. 3.3.1.1.9)**

**NOTE: RTLS INCLUDES 185 SEC ARCS & 25 SEC FRCS DUMPS
TAL INCLUDES 120 SEC ARCS & 65 SEC FRCS DUMPS**

ESTIMATES BASED ON CIRAF134 AND MODIFIED FOR WEIGHT CHANGES THRU 12/01/09.

STS-134 OV-105 Flight 25 LSRR Orbiter Element

Kim Guodace
Scott Copenhaver

USA / OE
Boeing / VMMO

December 3, 2009

STS-134 OV-105 Flight 25 LSRR Orbiter

Purpose:

- Obtain program authorization for baseline of modifications to be performed prior to STS-134, OV-105 Flight 25.
 - Mandatory Mods – 1
 - Fuel Cell CPM Dedicated Power Feed Circuit Fuse Mod
 - Mission Kit Mods – 3
 - IBA Boom Configuration Change for STS-134
 - STORRM (Sensor Test for the Orion ReINav Risk Mitigation)
 - Payload Cable Harness Mod for ROEU and AMS
 - Potential Mods – 1
 - Port LWTSA Cushion Mod to Return IBA EFGF
- Present summary of other requirements
 - RCNs / Chits

Back-up:

- Modifications Matrix
- Open Mod Certification
- BRI-18 priority status

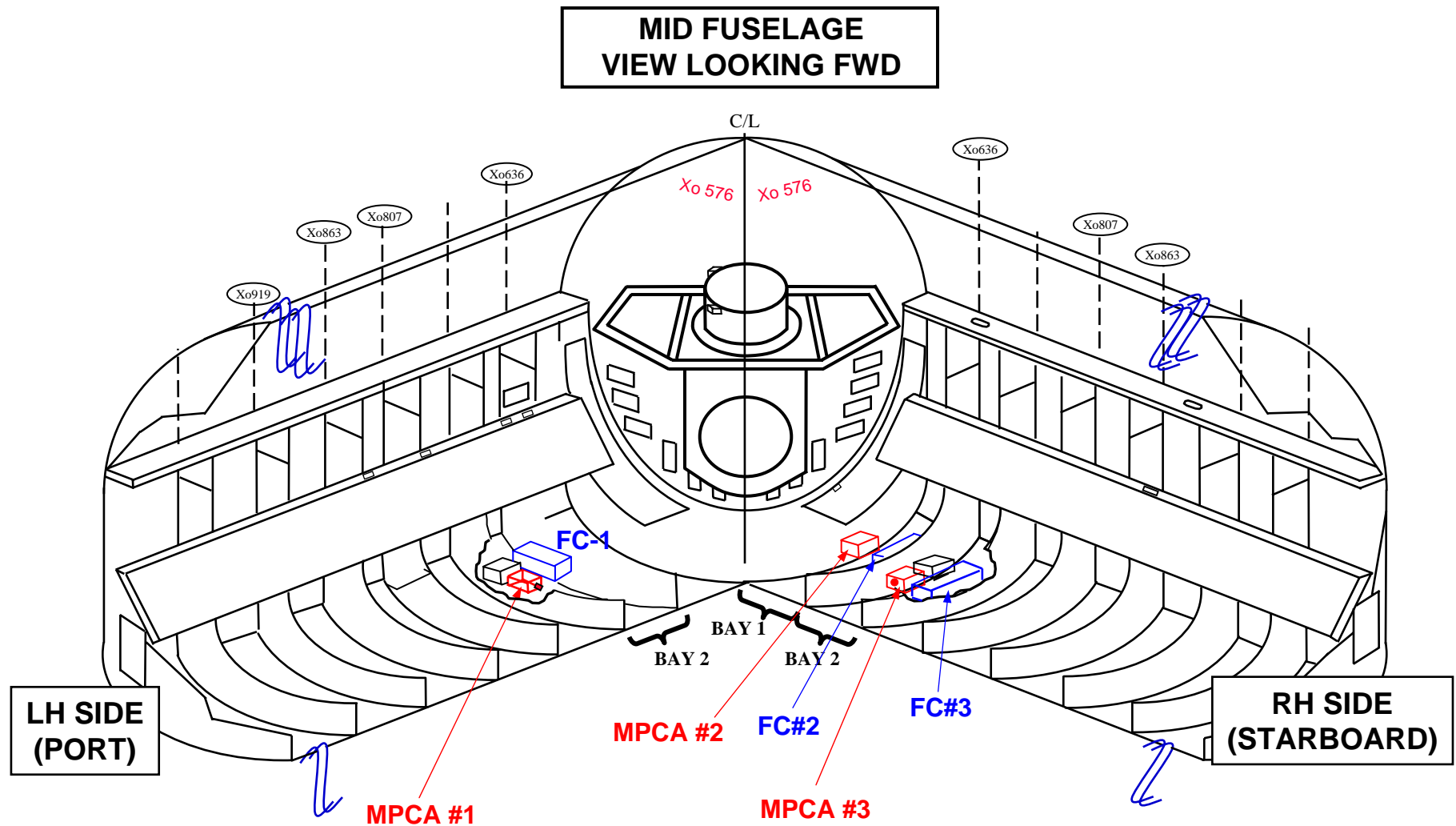
STS-134 OV-105 Flight 25 - LSRR Baseline

Request authorization to baseline the following mod

- **TAD 30274 – Fuel Cell CPM Dedicated Power Feed Circuit Fuse Mod**
 - Modifies Mid Power Cell Assemblies (MPCAs) 1 and 3 to utilize spare MPCA pin locations and 1-amp fuses to provide a dedicated power feed to the Cell Performance Monitor (CPM) separate from the Fuel Cell H2 flowmeter for all three Fuel Cells to protect against power loss of the CPM
 - Existing design has the Fuel Cell H2 flowmeter and the CPM receiving power from the same 1-amp fused circuit
 - Erratic flowmeter behavior has been observed on previous missions for all vehicles including STS-124 (OV-103) where a blown fuse resulted in loss of power to CPM
 - Corrective action has been to de-pin the #1 and #3 H2 flowmeters and fly them unpowered on subsequent missions of OV-103 (STS-128) and OV-105 (STS-127) per MR
 - Separation of H2 flowmeter and CPM power feed would eliminate impact to CPM
 - Loss of CPM during count results in Launch scrub (LCC-FCP03)
 - Loss of measurement in flight results in crew impact for alternate data collection to verify Fuel Cell health

STS-134 OV-105 Flight 25 - LSRR Baseline

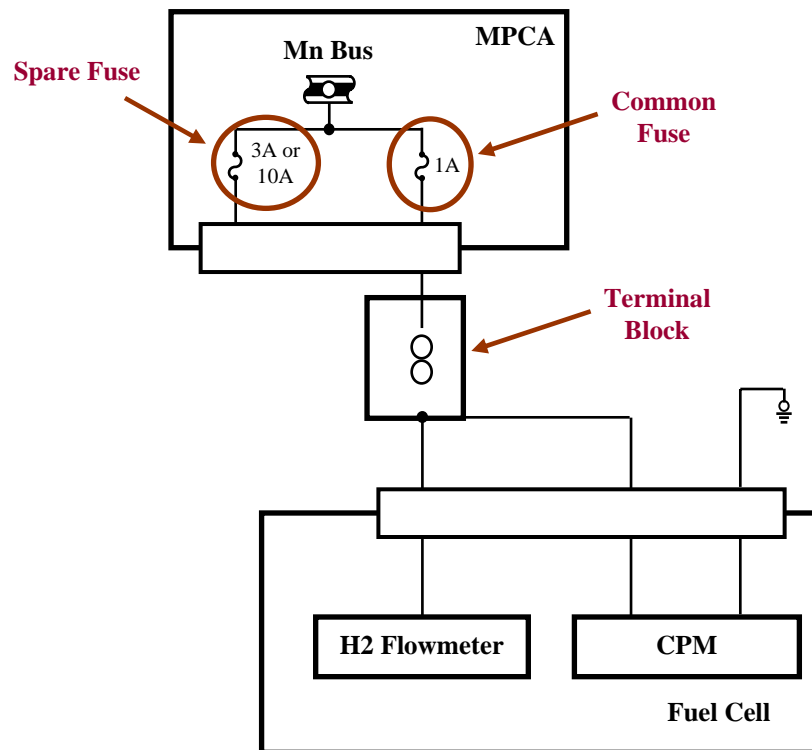
- Fuel Cell / MPCA Locations in Mid-Body



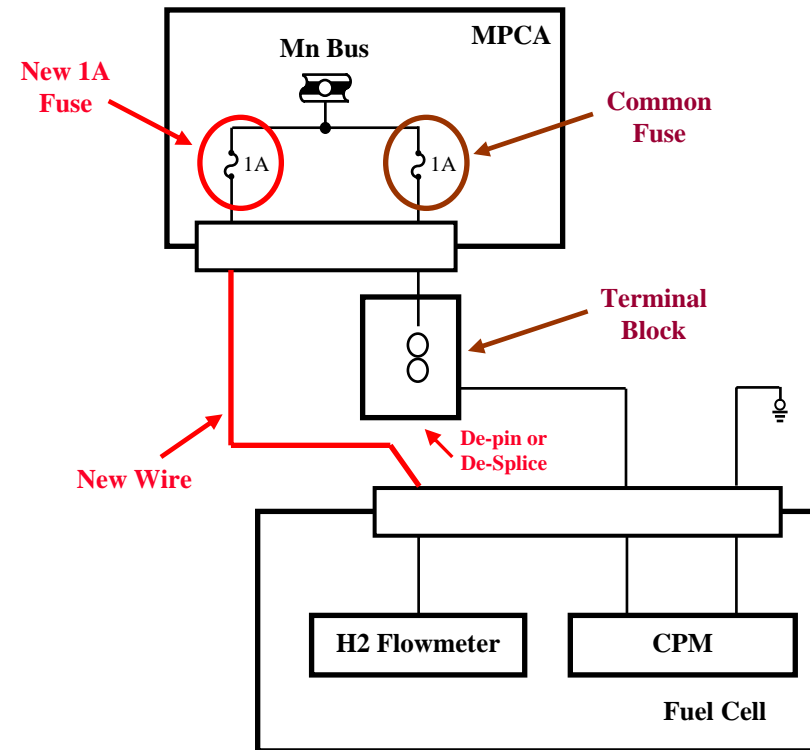
STS-134 OV-105 Flight 25 - LSRR Baseline

- Simplified schematic showing current and proposed configurations

(Current)



(Proposed)



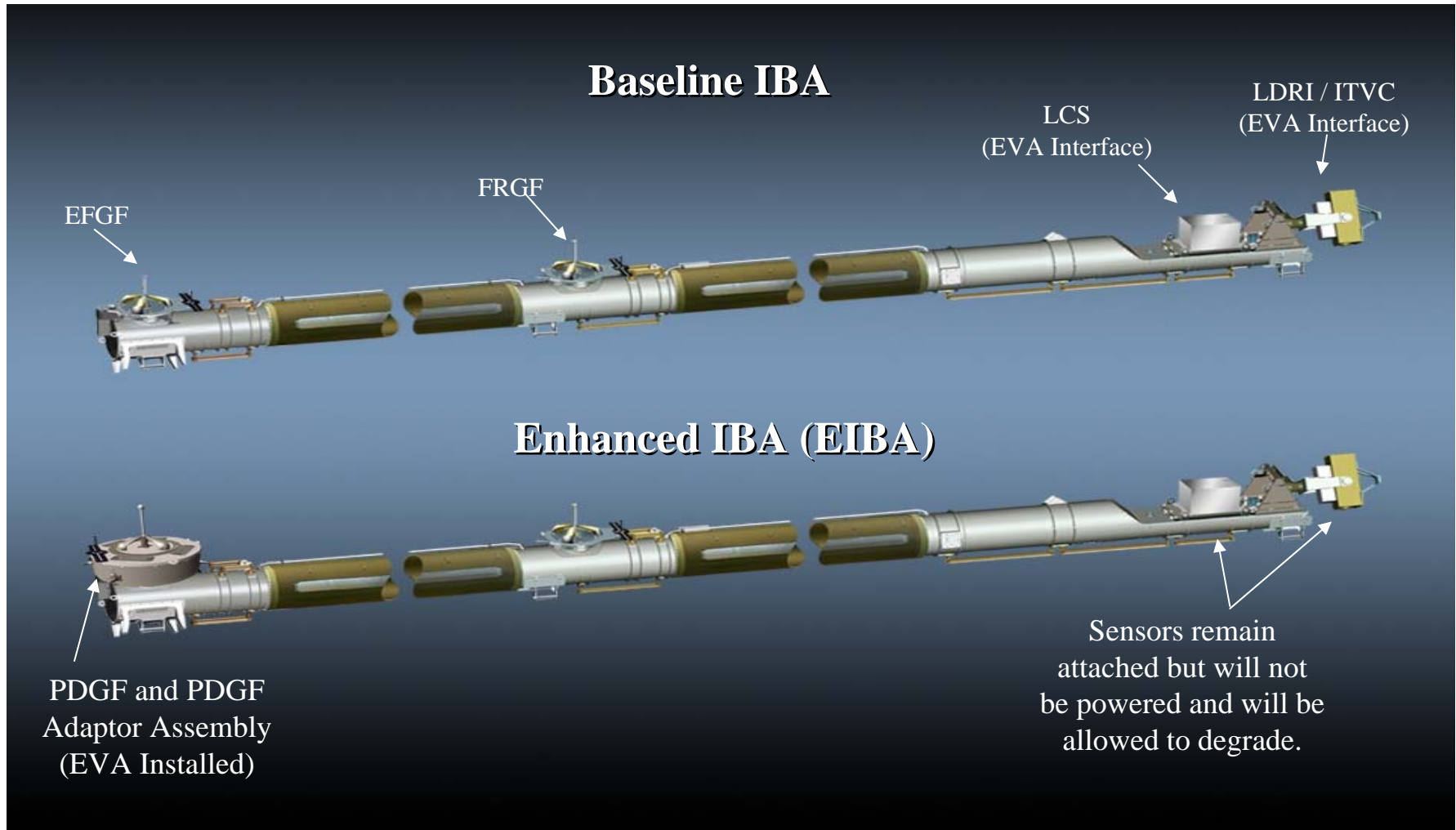
STS-134 OV-105 Flight 25 - LSRR Baseline

Request authorization to baseline the following mission kit mod

- **TAD 30180 – IBA (Integrated Boom Assembly) Boom Configuration Change for STS-134**
 - Boom is scheduled to be left on ISS (-5515)
 - IBA will be replaced with EIBA (Enhanced IBA)
 - EIBA is more compatible with ISS RMS
 - Modified grapple fixture interface
 - Several minor hardware modifications
 - MECSLSI reflects new boom and sensor pack 1 installation Tech Orders as well as Orbiter return without Boom

STS-134 OV-105 Flight 25 - LSRR Baseline

- IBA (Integrated Boom Assembly)

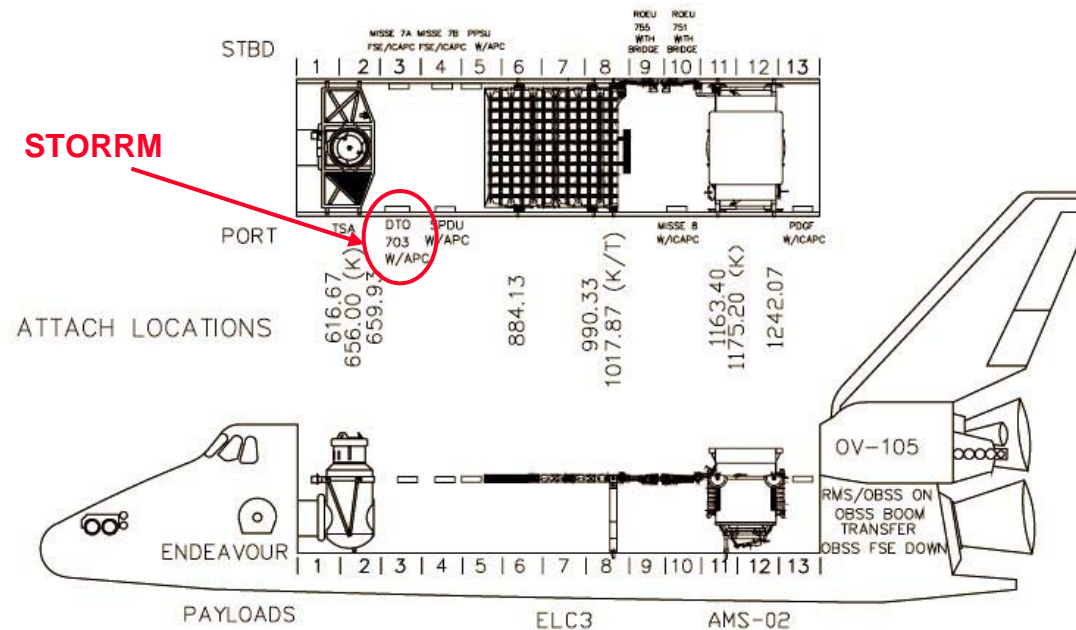


STS-134 OV-105 Flight 25 - LSRR Baseline

Request authorization to baseline the following mission kit mod

- **TAD 30191 – STORRM (Sensor Test for the Orion ReINav Risk Mitigation) DTO 703 Implementation**

- Will test the Vision Navigation Sensor (VNS) and Docking Camera planned for Orion both during dock and undock of Shuttle to ISS
- Revision to Tech Order blanket installation and MECSLSI planned



STS-134 OV-105 Flight 25 - LSRR Baseline

Request authorization to update MECSLSI for the following mission kit mod

- **TAD 30180 – Payload Cable Harness Mod for ROEU and AMS**

- STS-134 requires all 12 Payload Retention Stbd Sill location connections
 - Each ROEU Pwr/Ctrl requires 6 cables for 3 Sill connector locations
- STS-134 is the first Flight manifested with 2 ROEU's on the same side (Stbd)
 - ELC3 and AMS-02 each require 2 Stbd Sill Latch connection locations
 - ELC3 ROEU Pwr/Control cable lengths are short for 2 available Stbd Sill connector locations
- This mod will lengthen the ELC3 ROEU Pwr/Control CIH cables and will mate the ELC3 Sill Latch cables further fwd to allow for the ELC ROEU Pwr/Control cable connections on the stbd sill

STS-134 OV-105 Flight 25 - LSRR Baseline

Potential mission kit modification

- **Port LWTSA Cushion Mod to Return IBA EFGF**
 - IBA EFGF (Electrical Flight Grapple Fixture) will be removed from the IBA as part of the EIBA mod and the EFGF is to be returned in the Port LWTSA
 - Fit check planned for January 2010

RCNs/Chits

The following are presented for information only

Pending RCNs No.	Title/Description	Notes
None		

Chit No.	Title	Description
J6275A	Orbiter Structure IML Surface Corrosion Sampling Inspection	Approved
J6527	FRCS Thruster Canister Stud Inspections – F5R and F5L	Approved
J6543	ET Ferry Flight Door Attach Fitting Inspection	Approved – Ferry flight only
J6559	Upper Aft Stub Tile Inspection for In-Plane Cracks	Approved
J6577	Ames Gap Filler Removal and Replacement	In Draft
J6580	Capture OV-105 Output Waveforms to Address 1N3600 Diode Concerns	In Draft

STS-134
ISS – ULF6 – AMS STORRM MISSE 7&8
Launch Site Requirements Review

Payload Cargo Engineering Status

Michael Barido

281.212.6072

12-03-2009

STS-134 LSRR

Engineering Flight Product Status

<u>Drawing</u>	<u>Title</u>	<u>Rev</u>	<u>EO</u>	<u>Released</u>
V072-200214	MECSLSI	Basic	-	10/01/09
VA72-200214	Cargo Arrangement	Basic	-	10/01/09
VD72-200214	Avionics Diagram	Basic	-	10/01/09
VS72-200214	Integrated Schematic	Basic	-	10/01/09
VS70-540375	Retention Schematic	Basic	-	09/28/09

Engineering Open Work

- FRED 01-08-10

Standardization

- Mission Configuration complies with Orbiter/Payload Integration Standardization Document NSTS 60523 except as defined in PRCB CR S070046 STS-134 Mission Unique Waiver (currently being processed OSB):
 - Non- standard cabling installed in aft flight deck and payload bay
 - Addition of T-0 110 VAC & 120 VDC services and T-0 monitoring of RTD signal
 - Unique FSW monitoring (1553 interface to OIU, one MDM PF-01 DOL, two MDM PF-2 AIDs)

STS-134 LSRR

Cargo Integration Hardware Status

Delivery Status

- New Cargo Integration Harnesses (Qty 10) 02/23/10

Issues/Concerns

- None

Cargo Close Clearance Process

- The following Close Clearance areas have been identified:
 - None



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Backup Material

FRWG Presentation (With Minor Changes)



	Presenter	Shelby Lawson/MO3	
	Date	12/03/09	Page 6

Flight Operations and Integration (FO&I)

Flight Requirements:

MIP & PIPs

FDRD

FRD

Backup Charts



STS-134/ULF6		Presenter Shelby Lawson/MO3
Mission Requirements Status		Date 12/03/09 Page 7

Documentation

ECD/Date

MIP – NSTS 21507, Basic, Chg 1-3 (10/15/09)

CR-006: Post CIR Updates for Table 5-1, 6-1, ELC3 & STORRM

12/02/09 (A)

CR-007: STS-134 TBR Closures for AMS-02

12/02/09 (A)

FDRD:

None pending

PIP – MAUI, NSTS 21530, Basic, Chg 1-2 (5/5/08)

None pending

PIP – RAMBO-2, NSTS 21530, Basic, Chg 1 (05/06/02)

None pending

PIP – SEITE, NSTS 21542, Basic , Chg 1-2 (10/19/09)

None pending

PIP – MISSE 7a and 7b, NSTS 21548, Basic (07/14/08)

None pending

PIP – MISSE 8, NSTS 21557, Basic (06/26/09)

None pending

IP-DTO-703 Orion Relative Navigation Sensors Experiment (STORRM),

NSTS 21551, Basic, Chg 1 (09/15/09)

CR-003: Update DTO-703 Integration Plan

12/14/09



STS-134/ULF6 FRD Status		Presenter Frank Richmond/USA
Date 12/03/09	Page 8	

- **STS-134 Latest FRD Revision**
 - Rev 2: Dated, October 26, 2009 (<http://sspweb.jsc.nasa.gov/efrd>)
- **Open CRs**
 - FRD 17462-134-013 - Add PGSC's to STS-134 FRD
 - CR evaluations due 12/01/09; to be incorporated in Revision 003.
 - FRD 17462-134-014 - Add DTO 900 to STS-134 FRD
 - CR evaluations due 12/14/09; to be incorporated in Revision 004.
- **Closed CRs**
 - FRD 17462-134-010 - Add Lockers Above Volume D
 - Approved 11/20/09; to be incorporated in Revision 003.
 - FRD 17462-134-012 - Update Photo TV Configuration Table
 - Approved 11/20/09; to be incorporated in Revision 003.
- **Pending CRs**
 - None

Orbiter Element Back-up

Modifications Matrix

MCR NO.	MCR TITLE	KIT/ MOD RECORD & DESCRIPTION	TECH ORDER IMPACT	REMARKS
Mandatory Modifications to be Baselined at LSRR				
30274	Fuel Cell CPM Dedicated Power Feed Circuit Fuse Mod Modifies Fuel Cell Mid Power Cell Assemblies (MPCAs) to provide a dedicated power feed to the Cell Performance Monitor (CPM) separate from the Fuel Cell H2 flowmeter.	TCTIV7030274REF, 0105, 0 - Utilizes spare MPCA pin locations and 1-amp fuses to provide CPM with a dedicated power feed	No Tech Order Impact	No MECSLSI Impact
30274	Mid Power Control Assy (MPCA) Interchangeability Allows interchangeability of different dash number MPCAs between Orbiters.	INT-EO-30274, 0105, 0 - Allows MPCA dash number interchangeability between Orbiters	N/A	For Information Only
Mission Kit Modifications to be Baselined at Delta LSRR				
30180	IBA Boom Configuration Change for STS-134 IBA (Integrated Boom Assembly) Boom is being reconfigured into the Enhanced IBA (EIBA) to be delivered to and left on the ISS during STS-134.	TCTIM0030180REF, 0003, 0 - Updates configuration of the Orbiter Boom Sensor System IBA to the EIBA for delivery to the ISS on STS-134	Model MV0092A M072-544506-007 was -009 (for Launch config only)	MECSLSI Impact
30180	Payload Cable Harness Mod for ROEU and AMS Lengthens ECL3 ROEU Pwr/Control cables to reach available starboard sill locations	None Required	Model MV0073A Add M072-794085-019	MECSLSI Impact
30191	Rel Nav (STORRM) Impl. DTO-703 Performs an early flight test of the Vision Navigation Sensor (VNS) and docking camera planned for Orion. Rel Nav will be mounted on the ODS truss next to the Trajectory Control System (TCS).	030191, 0105, 0 - Test of the Vision Navigation Sensor for Orion.	Model MV0828A M072-363838-003 was -001	MECSLSI Impact
Potential Mission Kit Mods				
	Port LWTSA Cushion Mod to Return IBA EFGF IBA EFGF (Electrical Flight Grapple Fixture) will be removed from the IBA as part of the EIBA mod on-orbit and the EFGF is to be returned in the Port LWTSA.	TBD	Mode MV0849A M072-660853 (Launch) M072-660853 (Return)	MECSLSI Impact Final dash number configuration to be determined post fit check

Open Mod Certification

STS-134 Open Mod Certification (as of 11/24/09)

- 8 open CRs/CARs

Document #	Part Name	CR	CAR	QSA	Subm Date	Aprvl Date	Comments/Description of Change
25-849-660516-001S	Starboard LWTSA Tool Tray Mod	X			12/07/09P		Mod to forward tool tray to install the handle on opposite end of the tray to facilitate use in the starboard TSA.
19-25-849-660516-001S			X				
04-09-000002-002Q	Orbiter TCS (APU QD Heaters)		X		11/23/09A	1/22/10P	Permanent certification of line heaters added to APU GN2 fill QD's. QSA approved through STS-130.
21-764430-001K	Mid Power Control Assembly (MPCA)	X			1/21/10P		Modification to MPCA's for Fuel Cell Performance Monitors (CPMs) Dedicated Power Feed. Ref. TAD 30274.
08-21-764430-001K			X				
16-201-0001-0400AN	Auxiliary Power Unit	X			11/02/09A	11/10/09A	Certification for the extension of the APU wetted time to six years. Ref. TAD 30264.
24-16-201-0001-0400AN				X	3/15/10P		
04-341002J	Airlock/Truss Structure Assy	X			1/27/10P		Certification for Rel Nav Sensor Installation on External Airlock Truss Structure. Ref. TAD 30191.
120-04-341002J				X			

Open STS-131 Certs (affecting subs) = 5 (4 still to be submitted)

Open STS-132 Certs (affecting subs) = 1 (Still to be submitted)

Open STS-134 Certs = 2 (Still to be submitted)

TPS Priorities - STS-134 LSRR

STATUS AS OF 10-14-2009				
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	complete	complete
7. Inboard Elevon "Hub" Tile Mod	4	complete	2	complete
8. I/B Elevon 9lb/90 SIP	34	complete	complete	complete
9. O/B Elevon 9lb/90 SIP	6	complete	complete	complete
10. MLGD – Outboard Middle 1/3	24	20	0	complete
11. ET Door remaining STR side	40	3	10	2
12. MLGD - Outboard AFT 1/3	24	0	0	9
13. Nose Area 9lb/90 SIP	14 (16 ^{OV-103})	3	complete	7
14. Base Heat Shield 9lb/90 SIP	42	10	complete	complete
15. Body Flap Stub "Piano Key" tiles	40	18	14	18
16. Gap fillers in Subset 2B	5 Zones	2	1	0
17. Remaining BRI-18 - MLGD (top priority) / ET / LESS carrier panels / NLGD	MLGD 100	MLGD 0	MLGD 1	MLGD 0
	NLGD 123	NLGD 15	NLGD 19	NLGD 52
	LESS 68 (92 ^{OV-105})	LESS 7	LESS 5	LESS 22
	ET Door 28	ET Door 5	ET Door 2	ET Door 1
18. Mod work LESS internal	44 locations	40	complete	complete
20. Remaining Gap Fillers & Window BRI-18	124	3	2	19

BACK-UP

STS-134 LSRR

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>
NONE			

Issues/Concerns

- None

STS-134 LSRR

Annex 1: ISS-ULF6 NSTS 21507-A01

Annex 1 Baseline*

- Customer Submittal
- Mass Properties Submittal
- CR Approval

ECD

08/28/09A
08/28/09A
10/28/09A

Post-CIR Update

- Customer Submittal
- CR approval

11/30/09
12/18/09

L-4 mo Update

- Customer Submittal
- CR approval

03/08/10
03/29/10

L-1 mo Update

- Customer Submittal
- CR Approval
- Final weight log

06/15/10
06/29/10
07/15/10

*Based on 7/29/2010 Launch Date

STS-134 LSRR

Annex 1: MISSE 8 NSTS 21557-A01

Annex 1 Baseline*

- Customer Submittal
- Mass Properties Submittal
- CR Approval

ECD

10/16/09A
09/15/09A
12/18/09

L-4 mo Update

- Customer Submittal
- CR approval

03/08/10
03/29/10

L-1 mo Update

- Customer Submittal
- CR Approval
- Final weight log

06/15/10
06/29/10
07/15/10

- *Based on 7/29/2010 Launch Date

STS-134 LSRR

Annex 1: RNS DTO-703 NSTS 21551-A01

Annex 1 Baseline*

	<u>ECD</u>
• Customer Submittal	12/04/09
• Mass Properties Submittal	12/04/09
• CR Approval	12/18/09

L-4 mo Update

• Customer Submittal	03/08/10
• CR approval	03/29/10

L-1 mo Update

• Customer Submittal	06/15/10
• CR Approval	06/29/10
• Final weight log	07/15/10

- *Based on 7/29/2010 Launch Date

STS-134 LSRR

Operations Maintenance and Requirement Specifications (OMRS)

File II, Vol. 2 Payload Post-Mate Testing

ECD

P507 ISS-ULF6

- Customer Submittal
- RCN baseline

08/19/09A
12/22/09

P557 MISSE 8

- Customer Submittal
- RCN baseline

10/08/09A
12/22/09

File II, Volume 4 Pre-Mate Testing

Requirement Baseline

- RCN Release
- RCN Baseline

01/22/10
02/09/10

File II, Vol. 6 Shuttle Experiments

- RNS DTO-703 Submittal
- RCN baseline

10/27/09A
12/22/09

Time-Critical Ground Handling Requirements (TGHR)

- Customer Submittal
- Baseline Approval

03/29/10
05/28/10



STS-134 Integrated Launch Site Requirements Review

Presenter	Kenneth Nowak	
Date	12-03-09	

Overview

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

* Backup material included

STS-134

Launch Site Requirements Review

Flight Software Overview

Gail Sanders

USA FSW

FRWG 11/30/2009

PRCB 12/03/2009

STS-134 LSRR (FSW)

- **STS-134/OV-105 Flight Software (FSW) Versions**
 - Sixth scheduled flight of Operational Increment (OI) 34 Flight Software (SASCB SCR 98107A documents PASS and BFS OI-34 content)
 - Fourth scheduled flight of MEDS IDP VI 07.01/Sixth scheduled flight of MDUF VI 06.00 (SASCB SCR 98113A documents content)
 - Seventh scheduled flight of MAGRS-3S Link 613-996-008 Software (Link-008) (SASCB SCR 98115 documents content)
- **STS-134/OV-105 Flight Software Payload Support:**
 - ISS ULF6
 - Orbiter Interface Unit (OIU)
 - Sequential Still Video (SSV)
 - Payload Power Switching Unit (PPSU)
 - 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)
 - Alpha Magnetic Spectrometer-02 (AMS-02)
- **Major New Flight Software Support Items:**
 - None

STS-134 LSRR (FSW)

- **STS-134 Source Changes/Edits for Primary Flight Software (Base)**
 - SCR 92882 Allow Three String GPS for STS-116 and Subsequent OV-105 Flights
 - SCR 93211A Update of SSMEC Vehicle Data Table (VDT) for Enhanced Accelerometer Operations
 - SCR 93262A Film ET Camera
 - SCR 93267A Removal of the Set and Reset to False Cmds For the RCS Tank Iso Valves
 - SCR 93284 Update PASS HUD Body Flap Warning Limit K-Load
 - DR 126366 SM GPC Failure to Send GCIL Commands
- **STS-134 Patch Implementation for Primary Flight Software**
 - None.
- **STS-134 Patch/Edit Implementation for Backup Flight Software (Base) (included on delivered Mass Memory)**
 - SCR 93282 Update PASS/BFS HUD Body Flap Warning Limit K-Loads
- **STS-134 Patch Implementation for Backup Flight**
 - None

STS-134 LSRR (FSW)

- Newly Approved PASS GMEMs
 - SCR 93293 - OMS GN2 Tank Pressure Limit Change GMEM
 - Approved on 11/19/2009 for STS-130 and all subsequent OI34 flights

STS-134 LSRR (FSW)

- **Products**
 - **STS-134/OV-105 Base delivery schedule (available to field)**
 - FPSB**
 - **Shuttle Data Tape** **January 14, 2010**
 - **Mass Memory Unit** **January 28, 2010**
- **An STS-134/OV105 ADTL SDT/Mass Memory may be required**
 - **Decision to generate these products will be made in February, 2010**
 - FPSB**
 - **ADTL Shuttle Data Tape** **April 21, 2010**
 - **ADTL Mass Memory Unit** **April 29, 2010**
- **Open Items**
 - **None**
- **Concerns/Issues**
 - **No issues or concerns with STS-134 at this time**



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE	Presenter Kenneth Brown	
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STS-134 LSRR FCE/GFE Status

Kenneth Brown
Manager, GFE & Flight Crew Equipment Office
Johnson Space Center



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



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE	Presenter Kenneth Brown	
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- Delivery dates partnered at STS-134 Cargo Integration Review
 - Delivery dates shown are already delivered h/w or transferred from STS-131



SPACE SHUTTLE PROGRAM

Orbiter Project Office

NASA Johnson Space Center, Houston, Texas



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE	Presenter Kenneth Brown	
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BACKUP



SPACE SHUTTLE PROGRAM

Orbiter Project Office

NASA Johnson Space Center, Houston, Texas



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE		Presenter Kenneth Brown	
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Hardware	Tech Order	Ce rt O/ C	KSC Need	JSC Planned	JSC Remarks	JSC Contact
A (port forward)	M072-750025-080	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
B (port aft)	M072-750025-081	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
C (starboard aft)	M072-750025-082	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
D (starboard forward)	M072-750025-083	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
SRMS elbow camera	M072-544504-015	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
SRMS wrist camera	M072-544504-010	O	5/3/10	5/3/10	H/W from STS-131.	Randall Moore
Centerline Airlock Camera (stowed)	M072-660828-002, CCCD	C			Installed h/w.	Randall Moore
Lefthand Umbilical Camera (aft)	M072-705001-016	C	6/11/10	6/11/10		Randall Moore



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Orbiter Project Office
 NASA Johnson Space Center, Houston, Texas



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE		Presenter Kenneth Brown	
		Date Dec 3, 2009	Page 5

Hardware	Tech Order	Cert O/C	KSC Need	JSC Planned	JSC Remarks	JSC Contact
Righthand Umbilical Camera	M072-705001-028	O	6/11/10	6/11/10		Randall Moore
Digital Television (DTV)	M072-710570-007	C			Installed hardware.	Randall Moore
MCIU/RMS Situational Awareness Display (RSAD)	M072-710543-001	O			Installed hardware.	Larry Schmidt
Portable Foot Restraint (PFR)	M072-661568-029	C	4/26/10	4/26/10		Sandy Peterson
Tools for Rendezvous and Docking (TRAD)	M072-730021-020	O			Installed hardware.	Larry Schmidt
Tool Stowage Assembly (TSA)	M072-660853-002 M072-660850-005	C	4/26/10	4/26/10		Sandy Peterson
Video Processing Unit (VPU)	M072-710338-007	C			Installed hardware.	Larry Schmidt
Winches	V070-650007-085	C			Installed hardware.	Sandy Peterson
OBSS Boom	M072-544506	O	3/15/10	3/15/10	Enhanced IBA. To be left on ISS	Ken Ruta



SPACE SHUTTLE PROGRAM

Orbiter Project Office

NASA Johnson Space Center, Houston, Texas



STS-134 LSRR FLIGHT CREW EQUIPMENT/GFE

Presenter
Kenneth Brown

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Hardware	Tech Order	C e r t i f i c a t e d	KSC Need	JSC Planned	JSC Remarks	JSC Contact
Wireless Video System (WVS)	M072-744007-001 UHF M072-344828-001 mount M072-744004-012 S-BAND M072-744004-013 S-BAND M072-744004-014 S-BAND M072-744004-015 S-BAND M072-744004-016 S-BAND M072-744004-017 S-BAND M072-744004-018 S-BAND	C			Installed hardware.	Randall Moore
Space to Space Orbiter Radio (SSOR)	M072-344828-002 M072-740828-002 antenna	C			Installed hardware.	Larry Schmidt
RMS Sideview Camera (RSC)	M072-710281-002 M072-000416-006 camera	C	6/30/10	6/30/10		Randall Moore
Wing Leading Edge (WLE) Instrumentation - Left Wing**	M072-756111-007	O			Installed hardware.	Michael Wright
Wing Leading Edge (WLE) Instrumentation - Right Wing**	M072-756111-008	O			Installed hardware.	Michael Wright
SCU	M072-661606-012	C			Installed hardware.	Sandy Peterson
OBSS Sensor Package 1	M072-710282-009		4/26/10	4/26/10		
OBSS Sensor Package 2	M072-710282-009	O	4/26/10	4/26/10		Larry Schmidt
Airlock Adapter Plate	SJD32101440-302	O			Installed hardware.	Sandy Peterson



EVA Status STS-134/ULF6 Launch Site Readiness Review

**Maria Tullar
EVA Office
Johnson Space Center
December 3, 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-TBD
 - EFGF is planned for return in the MSA
- **Winches**
 - Winch P/N SED33101570-327 on Forward Bulkhead
 - Winch P/N SED33101570-325 on Aft Bulkhead



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

Backup Material

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



STS-134 Launch Site Requirements Review	Presenter MK-SIO / A. Swift	
	Date 12-3-09	Page 1

Mandatory RCNs:

NONE

Non-Mandatory Value Added RCNs:

NONE



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

SSP System Drawings

The Drawings Baseline Was Released By PRCB S072134 on 06-30-09

- **V072-000001-292 (Rev. TBD) Space Shuttle System (Rel. TBD)**
 - **V072-200214-001 (Rev. NEW) Mission Equipment Cargo Support (Rel. 10-01-09)**
 - **SGD32104456-501 (Rev. NEW) Crew Compartment Configuration (Rel. TBD)**
 - 502 Descent**
 - **V070-000001-005 Orbiter General Assembly**
 - **V070-410100-018 SSME Installation**
 - **10100-0061-TBD Integrated SRB General Assembly (BI-144)**
 - **80901000000-TBD External Tank Assembly (ET-137)**
- **STS-134 CIR + 70 days Mission Configuration Product Plan (MCP) will be published on 01-04-10 and will be published at LSRR +18 days on 12-21-09.**



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

SSP System Drawings – (Continued)

Ferry Configuration

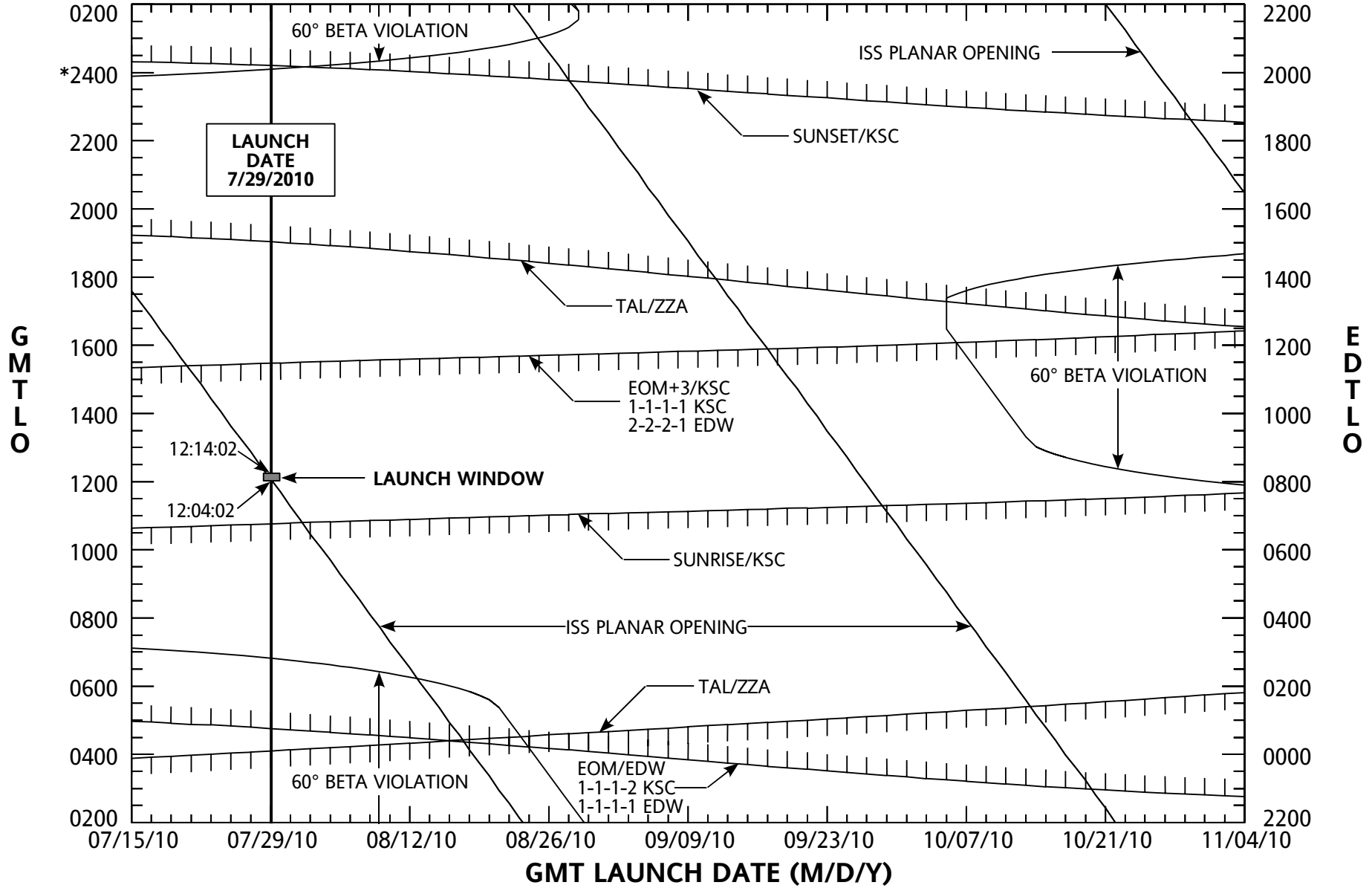
- **V072-000001-293** (Rev. TBD) Space Shuttle System Drawing (Rel. TBD)
 - **V072-200214-002** (Rev. NEW) Mission Equipment Cargo Support (Rel. 10-01-09)
 - **SGD321004456-001** (Rev. NEW) Crew Compartment Configuration (Rel. TBD)
 - **V072-300055-028** (Rev. BU) Ferry Flight Configuration (Rel. 05-11-09)

SCA 905

Mission Duration = 12+1+2
 Inclination = 51.6°
 OMS2 ha/hp = 124 x 85 nmi.
 Target ha/hp = 208 x 203 nmi.

STS-134 OCF LAUNCH WINDOW

N. Wortham/USH-483L
 P. Gentry/USH-483L
 September 9, 2009



Note: EOM lighting lines, based on an OMS2 phase angle of 251 deg, are representative only.
 The ISS beta angle ($|\beta| < 60^\circ$) for mated operation is beginning ~ 1/20:49:21 MET (FD3 Rendezvous) and ending ~ 10/15:01:00 MET.
 * Indicates the dateline. Launch times above this point are on subsequent days from the date indicated on the corresponding date axis



STS-134 Integrated Launch Site Requirements Review

Presenter **Kenneth Nowak**

Date **12-03-09**

Modification Impact Report

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



STS-134 Integrated Launch Site Requirements Review

Presenter Kenneth Nowak

Date 12-03-09

Modification Impact Report – (Continued)

- Possible impacts still under review 2
- MCR 30274 and 30180 are being reviewed for OMRSD, LCC, ICD, EMI, S/W, GSE impacts

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SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0134

ORB

ECP-MCR/KIT SEQUENCE

RUN TIME

09:24 DATE 11/24/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIO	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
ORB-0088B	AUTH	J6116	0105 004	AMES GAP FILLER REMOVAL AND REPLACEMENT
2006-08-16	MAND		SPAR	
	KSC			
	025			
S-J6275A	AUTH	J6275A	0105 003	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION
2008-02-26	MAND		SPAR	CORROSION SAMPLING CAPABILITIES WILL BE PROJECTED AT LSFR, AND FINALIZED AT DLSFR FOR EACH FLOW.
	KSC			
	025			
S-J6514A	AUTH	J6514A	0105 001	PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION
2009-05-22	MAND		SPAR	PUTTY REPAIR TPS REPLACEMENTS HAVE BEEN FACTORED INTO OPF PROCESSING PLANS FOR STS-130 & STS-131.
	KSC			
	025			
S-J6522	AUTH	J6522	0105 001	NODE 3 CLOSE CLEARANCE MEASUREMENTS OF ORBITER HARDWARE
2009-06-11	MAND		SPAR	
	KSC			
	025			
S-J6527	AUTH	J6527	0105 001	FRC5 THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L
2009-07-02	MAND		SPAR	OV-105 (FRC5) FLT 25
	KSC			
	025			
S-J6543	AUTH	J6543	0105 001	ET FERRY FLIGHT DOOR ATTACH FITTING INSPECTION
2009-09-17	MAND		SPAR	NDE OF FERRY FLT DOOR ATTACH FITTINGS WILL ONLY BE REQ'D
	KSC			
	025			

FOLLOWING A F/FLT BACK TO KSC. F/FLT ONLY.

S-J6559	AUTH J6559	0105 000	UPPER AFT STUB TILE INSPECTION FOR IN-PLANE CRACKS
	MAND		
	KSC	SPAR	
2009-10-01	025		
S052924CZ	AUTH K6561A	0105 001	GROUND LIGHTNING MONITORING SYSTEM (GLMS) INSTALLATION
	SCHD		
	KSC	NSW	
2009-10-13	025		
S052924DA	AUTH K6566	0105 001	SSME NOZZLE PURGE HOT WALL CORROSION PREVENTION
	SCHD		
	KSC	NSW	
2009-10-13	025		

TOTAL MODS = 9

1MRCR REPT. 4650-1
PAGE NO. 2

SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0134

PIH

ECP-MCR/KIT SEQUENCE

RUN TIME

09:24 DATE 11/24/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIOR	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
008852	APPD	K782-710004-001	0001 000	KIT - INTEG H/W, STS-133 & STS-134
NOT REQD	JSC			ADDED PER KIT EO NEW
025				
	APPD	K796-774002-001	0001 000	STS-134, CARGO INTEGRATION HARDWARE KIT
NOT REQD	KSC	NOT REQUIRED		ADDED BY EDS I/F & KIT EO NEW
025				
	APPD	K845-773015-001	0001 000	HARDWARE PROVISIONS FOR STS-133/134
NOT REQD	KSC			ADDED PER V845-773985 NEW
025				
	APPD	TCTIM0008852REF	0001 001	WIRE HARNESS ASSY AREA 38 MOD FOR STS-134
NOT REQD	KSC			ADDED PER V845-773796 B03
025				
TOTAL MODS =		4		

Approved STS-134 OMRS Waivers and Exceptions

WVR EXC	ELEMENT PROJECT	PRCBD NUMBER WAIVER# (STAT) (INITIAL STS)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS BEG END
E	ORB	S053299TQ EK10696 (A)	OMRSD EXCEPTION REQUEST - FUEL CELLPOWERPLANT 1 H2 FLOWMETER LOWE RLIMIT (EK10696)	105	023 027
W	ET	S053293FZ WK03850R1 (A) (STS-093)	L02/LH2 TANK PRESSURE MONITOR FOR MOVE	ET	099 999
	OMS	S053299HG WK10648R2 (A)	OMRSD WAIVER REQUEST - LEFT OMS PODHELIUM ISOLATION VALVE INTERNA L LEAK(WK10648R2)	0013	033 036
	ORB	S053296LJ WK10240 (A)	OMRSD WAIVER REQUEST - WSB 2 GN2 REG PRESS BELOW OMRSD (WK10240)	105	018 026
		S053298TA WK10538 (A)	OMRSD WAIVER REQUEST - MODULAR AUXILIARY DATA SYSTEM FREQUENCY DI VISIONMULTIPLEXER 1 FREQUENCY CALIBRATIONOV- 105 (WK10538)	105	020 026
		S053298TB WK10540 (A)	OMRSD WAIVER REQUEST - MODULAR AUXILIARY DATA SYSTEM FREQUENCY DI VISIONMULTIPLEXER 2 MUX CH. 1 DATA SHIFT OV-105 (WK10540)	105	020 026
		S053299DQ	OMRSD WAIVER REQUEST -	105	021 026

WK10614	(A)	MODULAR AUXILIARY DATA SYSTEM FREQUENCY DI VISIONMULTIPLEXER-M1A, NOISE RATIO/NOISE LEVEL (WK10614)		
S053299HE WK10639R1	(A)	OMRSD WAIVER REQUEST - AUXILIARY POWER UNIT 1 GAS GENERATOR CHAMB ERPRESSURE BIAS (WK10639R1)	105	022 025
S053299LM WK10655	(A)	OMRSD WAIVER REQUEST - FUEL CELL POWER PLANT CELL PERFORMANCE MON ITORSTACK DELTA VOLTAGE 1 AT 510 MILLIVOLTS (WK10655)	105	022 025

Approved STS-134 OMRS Waivers and Exceptions

WVR	ELEMENT	PRCBD NUMBER WAIVER# (STAT)	ABSTRACT RAS REQUIREMENTS	EISN PAYLOAD	STS BEG END	
+	W	ORB	S053299QE WK10684R1 (A)	OMRSD WAIVER REQUEST - FRCS FUEL CELL CHECK VALVE 101 ELEMENT #3 FAILEDLEAK CHECK (WK10684R1)	105	023 025
			S053299TT WK10697 (A)	OMRSD WAIVER REQUEST - AIRLOCK FWD HATCH PORT EQUALIZATION VALVE LOWTORQUE (WK10697)	105	023 025
			S053299ZD WK10733 (A)	OMRSD WAIVER REQUEST - FRCS CV101 ELEMENT 4 FAILED LEAK CHECK (WK 10733)	105	024 025
	RCS		S053296PV WK10275 (A)	OMRSD WAIVER REQUEST - RRCS FUEL A& B LEG REG LOCKUP PRESSURE(WK 10275)	0024	026 034
	SRB		S053293WA WK03886 (A) (STS-103)	LH FWD AND RH MID SRB JOINT TEMP SENSORS	BI	099 999

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+-----+
|           | Waivers | Except | Deviat | Cannib | Total |
+-----+-----+-----+-----+-----+
| Total Extracted | 13 | 1 | 0 | 0 | 14 |
+-----+-----+-----+-----+-----+

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-
-
-
-

ACTIVE WAIVERS FOR
OV-105

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	STAYS OPEN
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	STAYS OPEN
341	S063701	08/07/07	<p>The following requirement is waived to allow OV-105 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 bolt (NAS1003-8A) and 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 controlled) was noted missing from behind the starboard closeout panel. Without the nut plate, the bolt and washer cannot be installed. The area cannot be currently accessed to re-install the missing hardware. (NOTE: MRB in work on PR FCS-5-20-0476 to approve use of tape on the open hole. Lost and found PR LAF-5-20-0440 written to document lost nut plate.</p>	OV-105, Flight 20	

ACTIVE WAIVERS FOR
OV-105

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>	
345	S115123AR5	03/03/08	<p>The following requirement is waived to allow OV-105 to fly with the following out-of-configuration condition:</p> <p>Tech Order M072-544504-009, (CATIA) RMS elbow camera, fly with the RMS elbow camera/PTU assembly angle change from 10.6 degrees to 0 degrees for STS-123 launch.</p> <p>A dynamic clearance assessment for STS-123 identified an interference between the camera/PTU assembly and the Payload Bay Door radiators. A decision was made to change the tilt angle from 10.6 degrees to 0 degrees for launch.</p>	OV-105, Flight 21	

Prepared by: Jeff McRoberts
USA RV/DR
861-2505

11/23/2009

ACTIVE WAIVERS FOR
OV-105

Item #	Authority	Date	Waiver Description	Effectivity	Wad												
347	S115126AR5	08/22/2008	<p>The following requirement is waived to allow OV-105 (STS-400/LON) to fly with the following out-of-configuration condition:</p> <p>Active latches without extended guides in Bays 8 and 12 will replace the respective STS-126 requirements:</p> <table border="0"> <tr> <td>Bay 8 STBD</td> <td>M072-544201-203</td> </tr> <tr> <td>Bay 8 Port</td> <td>M072-544201-204</td> </tr> <tr> <td>BAY 12 STBD</td> <td>M072-544101-028</td> </tr> <tr> <td>Bay 12 Port</td> <td>M072-544101-027</td> </tr> </table> <p>Latches changed from secondary to primary:</p> <table border="0"> <tr> <td>Bay 12 STBD</td> <td>M072-002112-043 Partial in Lieu of M072-002212-045</td> </tr> <tr> <td>Bay 12 Port</td> <td>M072-002112-044 Partial in Lieu of M072-002212-046</td> </tr> </table> <p>The following Tech Orders will not be installed:</p> <p>M072-000423-001 M072-710801-001 M072-544001-008</p> <p>The following Tech Orders will be partially installed:</p> <p>M072-544752-003 ROEU installed but not mated and grease application not accomplished.</p> <p>M072-000442-004 Orbiter aft bulkhead handrails removed, but LMC installation not accomplished.</p> <p>M072-002113-003 and M072-002113-004 latch cap bolt MD111-4026-1635 torque to 20 +/- 5 ft-lbs.</p>	Bay 8 STBD	M072-544201-203	Bay 8 Port	M072-544201-204	BAY 12 STBD	M072-544101-028	Bay 12 Port	M072-544101-027	Bay 12 STBD	M072-002112-043 Partial in Lieu of M072-002212-045	Bay 12 Port	M072-002112-044 Partial in Lieu of M072-002212-046	STS-400/LON (OV-105, Flight 22)	
Bay 8 STBD	M072-544201-203																
Bay 8 Port	M072-544201-204																
BAY 12 STBD	M072-544101-028																
Bay 12 Port	M072-544101-027																
Bay 12 STBD	M072-002112-043 Partial in Lieu of M072-002212-045																
Bay 12 Port	M072-002112-044 Partial in Lieu of M072-002212-046																

Prepared by: Jeff McRoberts
USA RV/DR
861-2505

11/23/2009

ACTIVE WAIVERS FOR
OV-105

Item #	Authority	Date	Waiver Description	Effectivity	Wad
348	S115126AR7	12/17/2008	<p>The following requirement, approved baseline return configuration, is waived to allow OV-105 to ferry from DFRC to KSC with out-of-configuration conditions for H2 and O2 supply line valves for fuel cell #2.</p> <p>During power operations, loss of power occurred on main B Bus. Fuel cell #2 coolant pump experienced a loss of power at this time due to the fact that Bus B provides AC2 power to fuel cell #2. Because of this loss of power, an overtemp condition may have occurred. During ferry, fuel cell #2 will be flown in a depressurized state. The addition of the jumper to the H2 and O2 lines is required to avoid potential damage to the fuel cell. This additional hardware is not part of the ferry flight configuration. Discharge water line from the fuel cell has been disconnected and secured in place. Reason being is this allows the removal of the water from the fuel cell and Orbiter line separately for freeze protection during ferry.</p> <p>***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****</p>	OV-105, Flight 22 (Ferry Flight)	
349	S115126AR7	12/17/2008	<p>The following requirement, approved baseline return configuration, is waived to allow OV-105 to ferry from DFRC to KSC with the following out-of configuration conditions:</p> <p>Discharge water line disconnected from fuel cell.</p> <p>TCS insulation blanket V070-362917-001 not installed.</p> <p>TCS blanket covers a frame and GSE disconnects. During ferry flight, temperatures will not be high enough or low enough to damage Orbiter hardware. TCS blanket V070-362917-001 was inadvertently left out of the midbody before Door 44 was installed for ferry flight. Discharge water line from the fuel cell has been disconnected and secured in place. Reason being is this allows the removal of the water from the fuel cell and Orbiter line separately for freeze protection during ferry.</p>	OV-105, Flight 22 (Ferry Flight)	

Prepared by: Jeff McRoberts
USA RV/DR
861-2505

11/23/2009

ACTIVE WAIVERS FOR
OV-105

Item #	Authority	Date	Waiver Description	Effectivity	Wad
350	S115127AR7	05/04/2009	<p>The following requirements are waived to allow OV-105 (STS-400/LON) to fly with the following out-of-configuration conditions:</p> <p>Active latches installations are partial without extended guides:</p> <p>M072-544101-059 M072-544101-060 M072-544201-309 M072-544201-310 M072-544201-349 M072-544201-350 M072-544201-351 M072-544201-352</p> <p>Payloads installation Technical Orders will not be installed:</p> <p>M072-000475-001 (JEM-EF) M072-000476-001 (JEM-ES) M072-000477-001 (ICC-VLD)</p> <p>The following Technical Orders will not be installed:</p> <p>EVA Cable Stowage Hardware (ECSH) Technical Order (Landing Configuration)</p> <p>M072-544001-008 Sill Wipers (Qty 3)</p> <p>The ROEU configuration will be changed:</p> <p>M072-544751-054 ROEU (stowed) Partial (no grease per A16 flag <15> Note 2)</p> <p>The TSA contents will be different for landing:</p> <p>M072-660853</p> <p>Payload to Orbiter Installation (wiring) is partial - payload connector caps only.</p>	STS-400/LON (OV-105, Flight 23)	

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NO.	SYS	REQT / PART DESC / PART NO	TOP / SEPAR	ANTICIPATED ACTION	CONSTR	ELE
1	PYRO	C00AA0.110.032 NASA STANDARD DET. SEB26100094-201	V5032.004 V5029.001	REMOVE/INSTALL	2	O
2	PYRO	C00AA0.110.033 CARTRIDGE SKD26100098-301	V5032.004 V5127	REMOVE/INSTALL	2	O
3	PYRO	C00AA0.110.034 AFT ATTACH BSTR CART. SKD26100099-401	V5032.004 V5029.001	REMOVE/INSTALL	4	O
4	PYRO	C00AA0.110.035 NLG THRUSTER CART. SKD26100100-301	V5032.004 V5127	REMOVE/INSTALL	2	O
5	PYRO	C00AA0.110.043 GAS PRESS CTG. SEB26100001-25X	V5056	INSTALL	4	O
6	PYRO	C00AA0.115.001 GAS SAMPLER BATTERY SED33101116-321	V5012.001 V5029.004	REMOVE/INSTALL	4	O
7	INS	C00AA0.140.004 MADS TAPE RECORDER ME435-0055-0003 THRU 0005	S0007 V1200 V1248	TEST	4	O
8	COM	C00AA0.160.001 GPS RECEIVER (GPS MAGR'S) MC478-0153-0001	V5A71 SEPAR-TBD	R/R BATTERIES EVERY 12 MONTHS	4	O
9	MEQLG	C00AB0.010.003 NLG TIRE MC194-0007-0006 (2)	V1165.003 V1165.004	REMOVE/INSTALL	2	O
10	MEQLG	C00AB0.010.004 MLG TIE BOLTS & NUTS MC621-0051-0038 (4 WHEELS)	V1165.001 V1165.002	REMOVE/INSTALL	2	O
11	MEQLG	C00AB0.010.005 MAIN WHEEL ASSEMBLY MC621-0051-0038 (4)	V1165.001 V1165.002	REMOVE/INSTALL	2	O

Constraints

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Elements

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12	MEQLG	C00AB0.010.006 NOSE WHEEL ASSEMBLY MC621-0050-0004 (2)	V1165.003 V1165.004	REMOVE/INSTALL	2	O
13	MEQLG	C00AB0.010.007 MLG CARBON BRAKE ASSEMBLY MC621-0075-0001	SEPAR TC09-066	REMOVE & REPLACE BRAKE ASSY	4	O
14	ODS	C00AB0.075.001 APDS OUTER ODS SEAL MC621-0087-6001	SEPAR TC09-074	REMOVE & REPLACE	4	O
15	PLM	C00AB0.160.020A VIDEOSPECTION CAMERA ASSY SED39125120-310	TPS-TBD	REMOVE/REFURB/INSTALL	4	M
16	TPS	C00AB0.170.001 RCC ARROWHEAD PLATE MC621-0007-7009	V5139.001 V5139.002	REMOVE/INSTALL	2	O
17	TPS	C00AB0.170.002 RCC ARROWHEAD PLATE MC621-0007-7010	V5139.001 V5139.002	REMOVE/INSTALL	2	O
18	TPS	C00AB0.170.018B THERMAL BARRIER V070-398816-014	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
19	TPS	C00AB0.170.023C THERMAL BARRIER V070-398817-022	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
20	TPS	C00AB0.170.023D THERMAL BARRIER V070-398817-023	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
21	TPS	C00AB0.170.027A THERMAL BARRIER V070-398818-012	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
22	TPS	C00AB0.170.027B THERMAL BARRIER V070-398818-013	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O

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23	TPS	C00AB0.170.035C THERMAL BARRIER V070-398819-028	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
24	TPS	C00AB0.170.035D THERMAL BARRIER V070-398819-029	V6051 SEPAR TC09-067	REMOVE & REPLACE	2	O
25	MEQ	C00AD0.025.001 ET PURGE CURTAIN NUT PLATES ME114-0035-0400	SEPAR TC09-078	REMOVE & REPLACE	2	O
26	PYRO	C00AD0.030.009 SPHERICAL BEARING ASSY V070-562036-002	V5032.004 V5127	REMOVE/INSTALL	2	O
27	PYRO	C00AD0.030.012 PYRO CENTERING MECHANISM SKD26100098-501	V5032.004 V5127	REMOVE/INSTALL	2	O
28	MPS	C00BA0.020.005A FLOW CONTROL VALVE MC280-0017-1301	TPS-TBD	REMOVE & REPLACE	2	O
29	PLM	JSC24937.30 PORTABLE FOOT RESTRAINT ASSY SED33105308-307	V5L44.001 V5L44.002 SEPAR-TBD	REMOVE/REFURBISH/INSTALL	2	M
30	FCS	JSC24937.56 EMER EGRESS SLIDE SYS MC623-0015-0023	TPS-TBD	REMOVE/INSTALL	4	M
31	ECLSS	V61AIL.010-C LIOH CANNISTER MC621-0008-0409	TPS-TBD	INSTALL AT PAD	4	O
32	ECLSS	V61AIL.015-C HYDRAZINE (CO RMVL CART.) MC621-0008-0060	TPS-TBD	INSTALL AT PAD	4	O
33	ECLSS	V61AIL.016-C ATCO CARTRIDGE MC250-0024-0001	TPS-TBD	INSTALL AT PAD	4	O

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34	ECLSS	V61AJ0.141 PPO2 SENSOR MC250-0002-3165	V1053.010	RECALIBRATE SENSORS AT PAD	4	O
35	FCS	V66AIL.060 POLE CREW ESCAPE SYS ASSY SED27101375-322	TPS-TBD	REMOVE/INSTALL	4	M
36	COM	V74AD0.130 MSBLS RF #1, 2 & 3 MC409-0017-0007	OMI-TBD SEPAR-TBD	PERFORM 15 MINUTE TEST	4	O

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