



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



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

Program Freeze Point

PRCB Presentation

S115132B



STS-132 Launch Site Flow Review

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Date **10-22-09**

Baseline the STS-132 Mission Specific Requirements and Flow Plans.

The STS-132 Integrated Launch Site Requirements were established by PRCBD S115132A dated 09-24-09 This CR and the Associated Data Package were reviewed at the 10-19-09 FRWG.

Flight Operation & Integration*

Orbiter Engineering*

Payload/Cargo Engineering*

Launch Vehicle Processing*

Requesting Approval

Status in BackUp

MO3/USA-PI

USA-OE

USA-PI

PH-A

KSC Integration*

Flight Software

Orbiter GFE

EVA

KSC ISS and Payload Processing

MK-SIO

USA-FSW

MV5

XA

UB-R3

SSME

Baseline at DLSFR

MP21

***Backup material included**



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



STS-132/ISS ULF4

Launch Site Flow Review (LSFR)

Flight Requirements Status

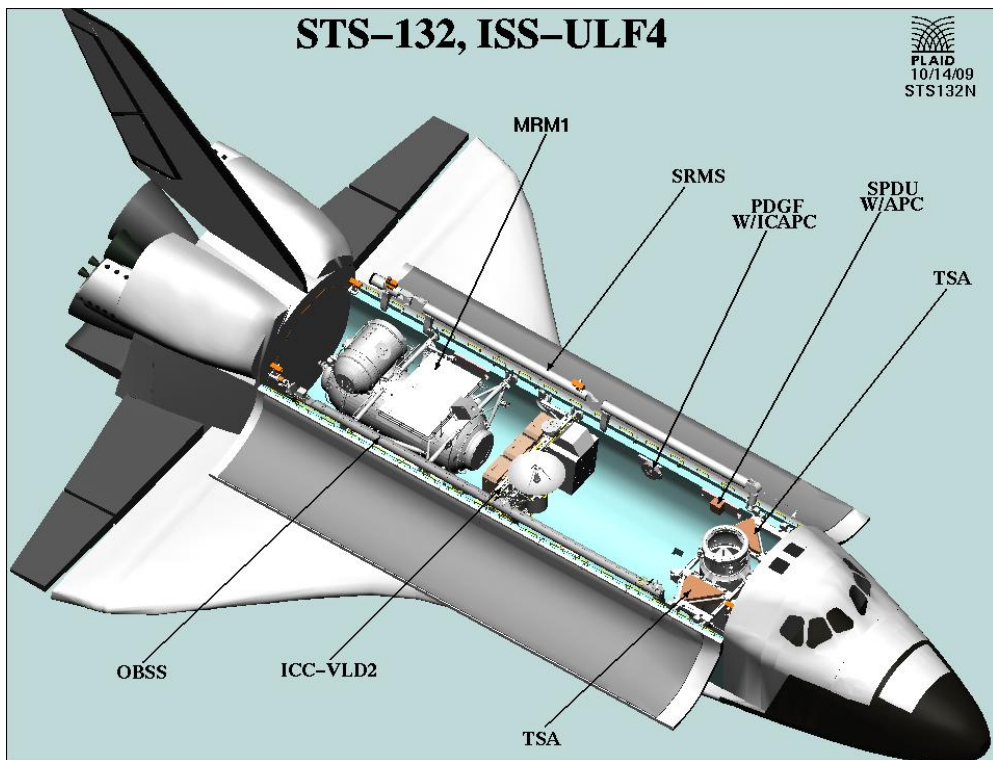
PRCB Oct 22, 2009

Phyllis Grounds, MO3 MIM
Robert Reynolds, USA Flight Mgr.

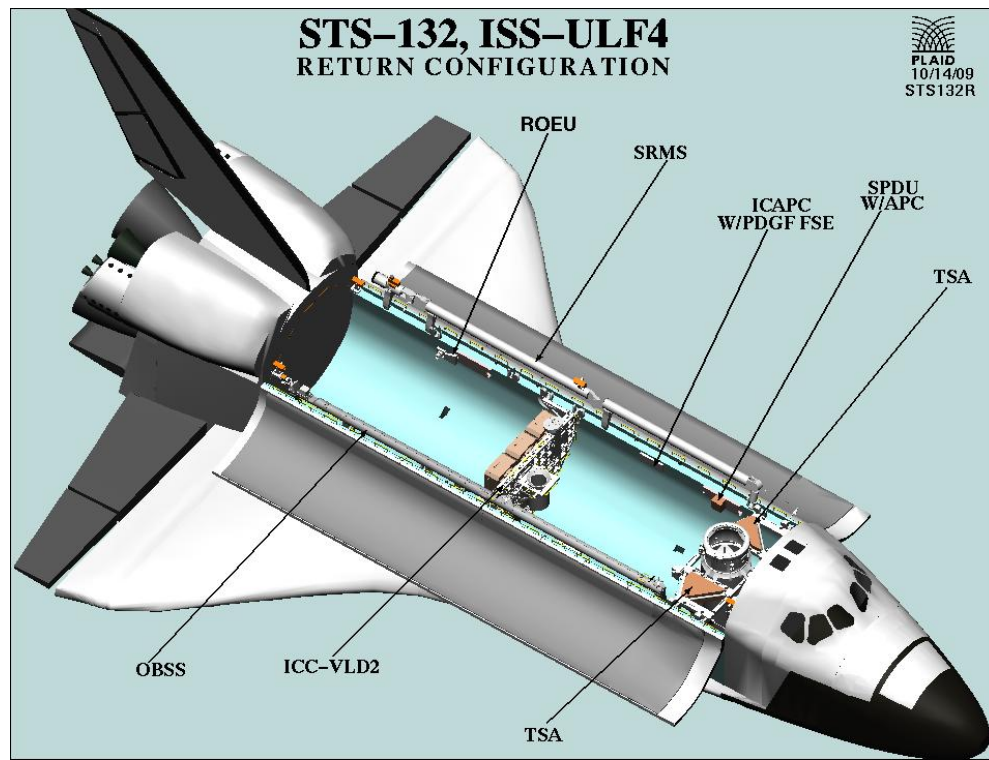


<h1>Baseline Ascent/Return</h1>		Presenter Phyllis Grounds/MO3
		Date 10/22/09 Page 2

Ascent Configuration

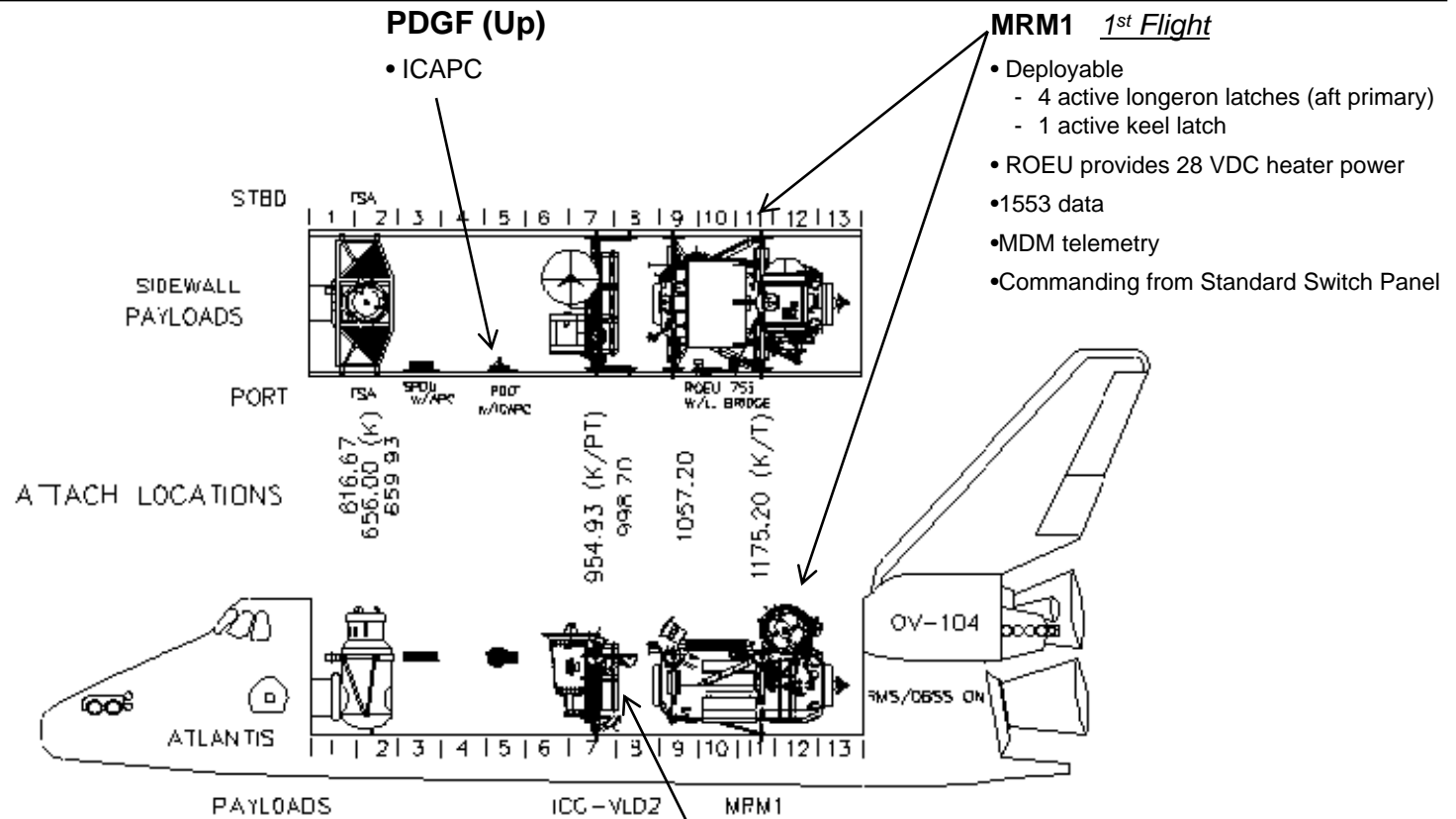


Return Configuration





STS-132 Payload Integration Services/Interfaces		Presenter Phyllis Grounds/MO3
Date 10/22/09	Page 3	



- MRM1 *1st Flight***
- Deployable
 - 4 active longeron latches (aft primary)
 - 1 active keel latch
 - ROEU provides 28 VDC heater power
 - 1553 data
 - MDM telemetry
 - Commanding from Standard Switch Panel

Middeck Powered Payloads

- CGBA-X (Up/Dn)
- CGBA-2 (Up/Dn)
- GLACIER - rear breather (36 CFM) (Up/Swap/Dn)

ICC-VLD *2nd Flight*

- Deployable
 - 4 active longeron latches (fwd primary)
 - 1 active keel latch

• Note – SPDU supports OBSS



<h1>Mission Configuration</h1>		Presenter Phyllis Grounds/MO3	
		Date 10/22/09	Page 4

LAUNCH

05/14/10
 39A/ MLP TBD
 CREW SIZE: 6UP/6DN

CONFIGURATION

OV-104(32)
 LP04; RP01
 ET-136
 BI-143
 RSRM-111
 (1) TBD (2) TBD (3) TBD
 OI-34
 SRMS, ODS, OBSS, APCU'S,
 ROEU, SPDU

PAYLOAD

ISS-ULF4 (MRM1, ICC-VLD)	ISS-ULF4 MAUI SEITE RAMBO-2 SIMPLEX
--------------------------------	---

ORBIT

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

CONSUMABLES

CRYO TANK SETS	5 (FULL)
GN2 TANKS	5 (FULL)
PAD HOLD	~86 HRS (H2 limited)
FWD RCS	2175# (MIDPOINT)
AFT RCS	4970# (FULL)
OMS	22760# (FULL)

LANDING

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



	Presenter	Phyllis Grounds/MO3	
	Date	10/22/09	Page 5

PERFORMANCE MARGIN

- **CURRENT BASELINED APM (10/13/09)** **+2050**

- **IPT PROJECTIONS**
 - **ISP/THRUST FOR SSME 2052, 2051, 2047** **+25**
 - **REMOVE ECSH** **+68**
 - **REMOVE PPSU** **+58**

- **IPT PROJECTED APM** **+2201**

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



	Presenter	Phyllis Grounds/MO3	
	Date	10/22/09	Page 6

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

<u>CASE</u>	<u>TOUCHDOWN</u>	<u>MACH 3.5</u>
	<u>WEIGHT pounds (LIMIT)</u>	<u>X C.G. inches (LIMIT)</u>
NOMINAL	209714 (233000)	1078.0 (1075.7)
RTLS	236550 (245000)	1081.4 (1077.2)
TAL	234877 (244000)	1082.5 (1077.2)
AOA	231185 (242000)	1080.0 (1075.7)
CONT RTRN*	211566 (233000)	1078.1 (1075.7)

NOTE: RTLS INCLUDES 185 SEC ARCS & 25 SEC FRCS DUMPS
TAL INCLUDES 120 SEC ARCS & 90 SEC FRCS DUMPS
1109 LBS AFT BALLAST

ESTIMATES BASED ON CIRAF132 AND MODIFIED FOR WEIGHT CHANGES THRU 10/13/09.

**STS-132 LSFR
OV-104 FLIGHT 32
CONFIGURATION UPDATES
PRCB
October 22, 2009**

Alvin Jenkins USA Orbiter Element
Elena Seastrom Boeing VPE



STS-132 OV-104 Flight 32 – LSFR Updates

Program Authorization Is Requested For The Following:

- Baseline One (1) Orbiter Modification

Information Only:

- Potential Mission Equipment Modification
- Chits
- Pending / Potential RCNs
- Wing Leading Edge (WLE) Spar Inspection
- Auxiliary Power Unit (APU) Wetted Time Extension

Back-up:

- Modification Record and MECSLSI Updates Summary
- Engineering, Hardware and Certification Status
- TPS Risk Reduction Priorities List and Allocation Breakdown

STS-132 OV-104 Flight 32 – Modification To Be Baselined

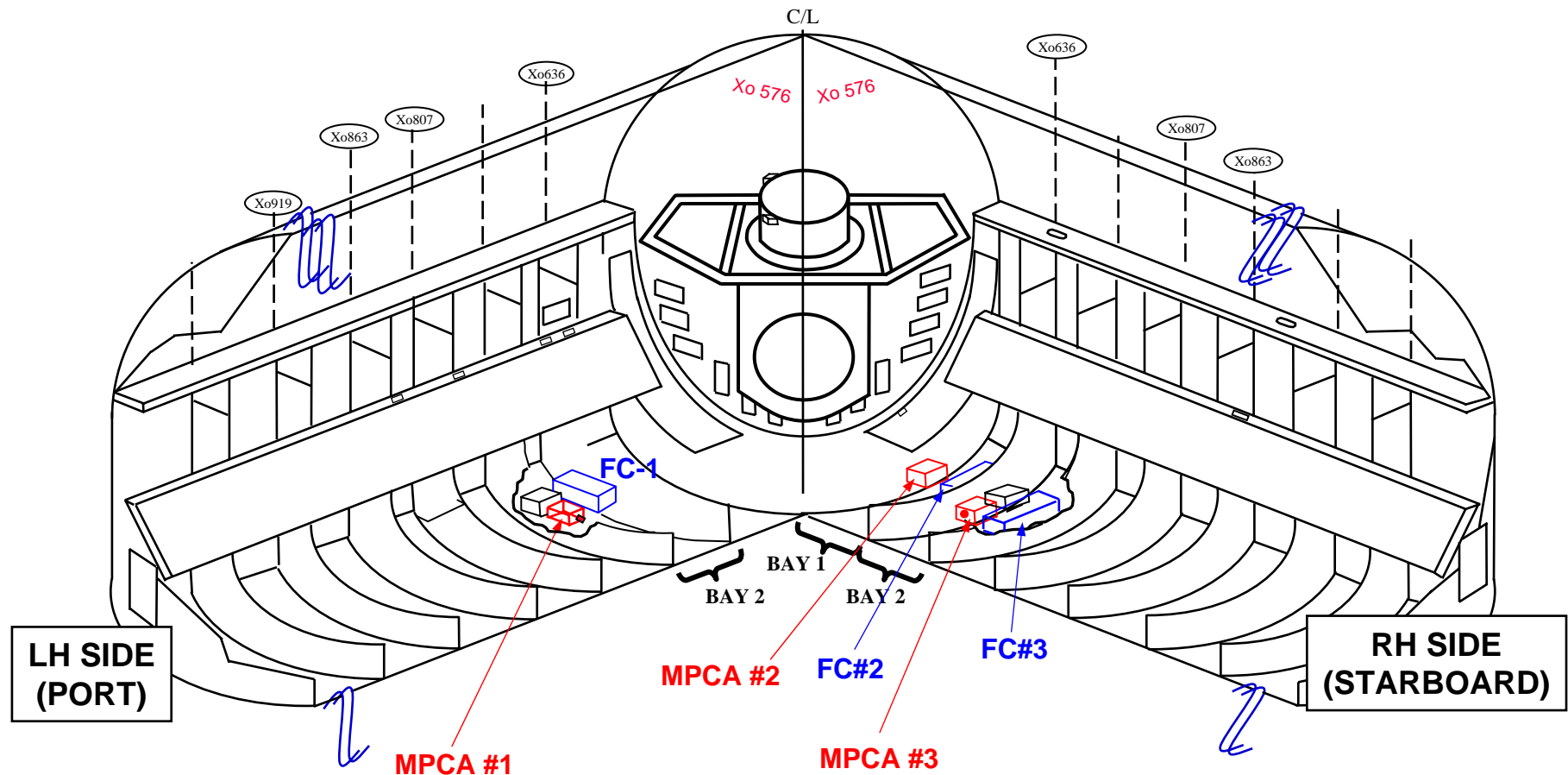
TAD 30274 – Fuel Cell H2 Flowmeter and CPM Power Source Separation

- Provides dedicated power sources for the Fuel Cell Flowmeter and Cell Performance Monitor (CPM) to protect against power loss to the CPM
 - Existing Shuttle design has the Fuel Cell H2 Flowmeter and the Fuel Cell CPM receiving power from the same 1-amp fused circuit
 - Original design used a 3-amp fuse which was changed in 2004 to 1-amp to preclude the potential for overheated electrical components on Flowmeter circuit boards
 - Part of this change was acceptance of risk for blowing 1-amp fuse for CPM
 - Recent flight anomalies with Fuel Cell H2 Flowmeter have resulted in need to re-evaluate power circuit design
 - During STS-124 MPCA#3 Fuse F6 blew, resulting in loss of both H2 Flowmeter #3 and CPM #3
 - During STS-126 no fuse was blown, however erratic behavior was observed on H2 Flowmeter #1
 - Since STS-126 H2 Flowmeter has been unpowered per MR
 - PRT recommends separation of the Flowmeter/CPM circuits by using the MPCA #1 and #3 fuse spares for Flowmeters #1 and #3, and one of the remaining existing spare MPCA #3 fuses for Flowmeter #2
 - Modification was approved by OCCB 10-20-09

STS-132 OV-104 Flight 32 – Modification To Be Baselined

TAD 30274 – Fuel Cell H2 Flowmeter and CPM Power Source Separation (Cont.)

Fuel Cell / MPCA Locations In Mid-Body



Potential Mission Equipment Modification

- **Starboard Lightweight Tool Stowage Assembly (LWTSA)**
 - The final Starboard LWTSA configuration will be identified later in the flow and may require a cushion modification

Chits

CHIT	TITLE
J6275A	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION
J6399	0-GAUGE PROTECTION FOR OV-104, FLIGHTS 31-35
J6410	AFT STUB CRACKED TILE INSPECTION
J6501	STS-129 CIH CLOSE CLEARANCE MEASUREMENTS
J6527	FRCS THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L
J6528	PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION
J6543	ET FERRY FLIGHT DOOR ATTACH FITTING INSPECTION (Ferry flight only)
J6559	UPPER AFT STUB TILE INSPECTION FOR IN-PLANE CRACKS
J6568	SHUTTLE WINDOW CONTAMINATION EVALUATION (In review)

Potential Chits

- **W2 and W5 Windows Torque Increase**
 - OV-104 W2 and W5 (multi-flight) have been re-torqued to the 70 in-lbs as directed by OPO
 - Plans for torque checks and/or re-torques on STS-132 are still under review
- **Capture OV-104 Output Waveforms to Address Diode Concerns**
 - Evaluation to determine health of current conducting diodes in flight critical data bus communication ports
 - Pending the PRT and OPO decisions

Pending / Potential RCNs

- **KV18097 Ammonia Boiler Heat Exchanger Corrosion Protection**
 - Relaxes the requirement with regard to repeating the evacuation and backfill every time the plug is removed and replaced; ECD is October 2009
- **Auxiliary Power Unit (APU) Wetted Time Extension**
 - APU wetted life extension from 5 to 6 years
- **OV18100 TPS Requirements Update**
 - Establishes gap between ETD hinge tile and bell crank
 - MLGD periphery step and gap verification for structure work or re-rigging
 - Micro/Tactile inspection of upper Aft stub tiles for cracks
 - Micro inspection of upper surface captive gap fillers
 - Inspection of LRSI tiles for cracks

STS-132 OV-104 Flight 32 – Information

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
 - 11 LH wing and 9 RH wing panels 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
- 12 RCC panels and associated spar fittings were removed during the STS-129 flow to perform sampling inspection
 - Panels 10-16 LH and 12-16 RH
 - No active corrosion identified
- Ground Operations is currently evaluating the options for corrosion inspection of the remaining panels
- Exception and Program accepted risk would be required if inspections are not performed in full prior to January 22, 2010

STS-132 OV-104 Flight 32 – Information

Auxiliary Power Unit (APU) Wetted Time Extension

- APUs are due to be replaced prior to the last manifested flight of OV-104, STS-132 based on the 5 year wetted time requirement
 - Presently five spare APUs are available through the end of the program
 - 4 ‘planned’ removals required per the 5 year OMRSD limitation in 2010
 - At least 1 ‘unplanned’ removal can be expected based on logistics projections
- Allowable APU wetted time TACCS File II OMRSD was recently increased from 4 years to 5 years based on historical inspection results
 - Further extension of the allowable time period beyond the current 5 years requires additional inspection and test data
- LOCCB 9/17/09 approved option to perform Disassembly and Inspection (D&I) on APU 401 post WSTF testing to provide for an extension from 5 to 6 years, pending successful D&I and test results
 - Final APU 401 ascent and entry mission duty cycle runs were completed at WSTF
 - No anomalies were seen during run and preliminary data review
 - APU 401 D&I scheduled November 10th through November 24th; preliminary recommendation for extension expected by the end of November, with the new wetted time limit provided to the Program on December 17th
- The APU removals will not be required during the STS-132 flow, if the APU wetted life is extended to 6 years (March, 2011)

STS-132
ISS-ULF4 – MRM1 / ICC-VLD
Launch Site Flow Review

Payload Cargo Engineering Status

Yvette Carmona

281.212.6492

FRWG: 10/19/09

PRCB: 10/22/09

STS-132 LSFR

Engineering Flight Product Status

<u>Drawing</u>	<u>Title</u>	<u>Rev</u>	<u>EO</u>	<u>Released</u>
V072-200212	MECSLSI	New	-	10/20/09 (Planned)
VA72-200212	Cargo Arrangement Drawing	A	A01	10/15/09
VD72-200212	Avionics Interface Diagram	A	A01	10/16/09
VS72-200212	Integrated Avionics Schematic	A	A01	10/16/09
VS70-540424	Retention Schematic Diagram	New	-	06/29/09

Engineering Open Work

- None

Standardization

- Mission Configuration complies with Orbiter/Payload Integration Standardization Document, except for mission-unique waiver #10 to NSTS 60523 that was approved by PRCB CR S064102 on 04/27/09 to change Mini-Research Module-1 (MRM-1) payload-monitoring requirements
- Revision to above waiver #10 via separate PRCB CR is in work for additional changes to MRM-1 requirements (presented at LSRR)

Rescue-Flight Status

- STS-132 Reconfiguration Engineering Products will be developed by the standard Flight To Follow (FTF) process

STS-132 LSFR

Cargo Close-Clearance Process

The following Close-Clearance area has been identified:

- MRM-1 Aft Port Scuff Plate to SRMS MPM
 - Currently just over one-inch (1”) of dynamic clearance
 - This will be monitored during the VLA to see if a close-clearance measurement will be required

KSC Launch and Landing Project

STS-132

Launch Site Flow Review

October 22, 2009

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J. F. Kennedy Space Center



Multi Flow

A. Brewer

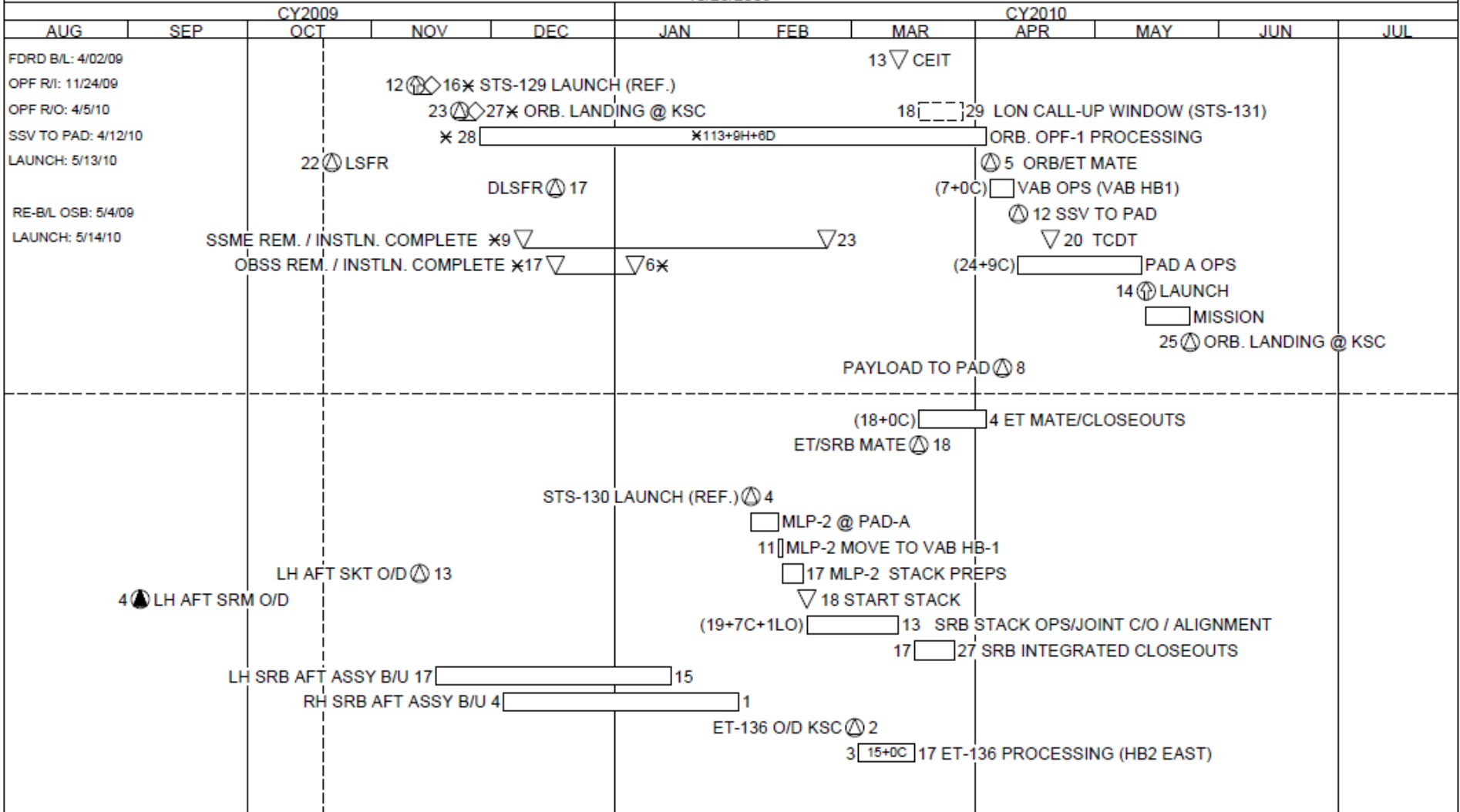


STS-132 KSC Milestone Interface Chart

OPR: USA - R. GILLETTE, INTEG. OPS.
NASA - C. FORD, PH-0

OV-104 / 32 / ISS-34-ULF4 / ICC - VLD
CREW / DURATION: 6 UP - 6 DOWN / 11
ET-136 / BI-143 / RSRM 111 / MLP-2 / PAD-A / VAB HB1

SSP APPROVED OSB 5-4-09 (REF. CR #S072132A)
Status as of:
10/20/2009



THREATS: 1. ET DELIVERY / PROCESSING

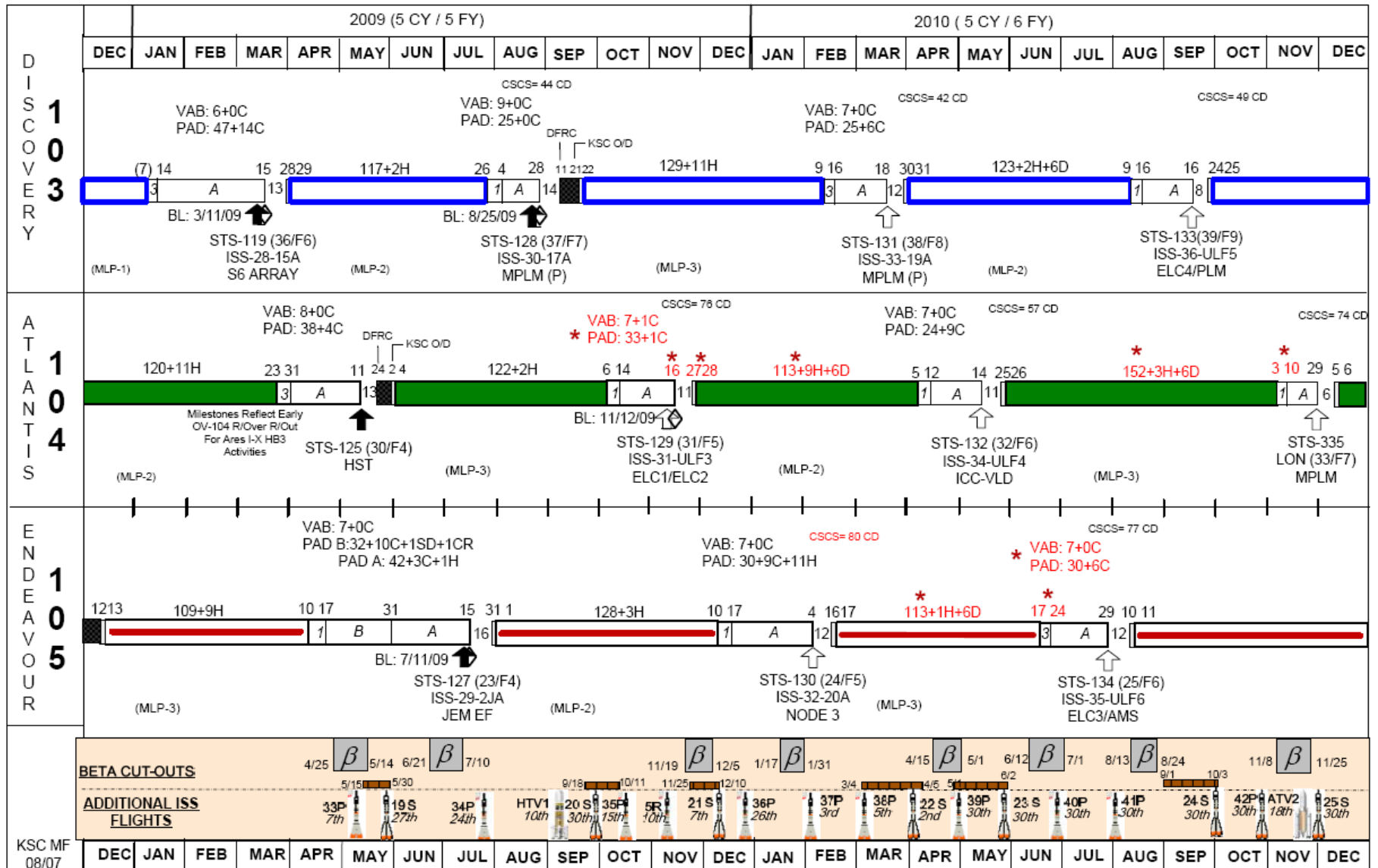
NOTES: 1. THIRTY-FOURTH ISS/SSP FLIGHT

KSC ASSESSMENT / ORB MULTI-FLOW

SSP APPROVED MANIFEST

MANIFEST REF. 09B-9

1300 EDT, 20 OCT 2009



LEGEND
 H = HOLIDAY D = DRYDEN RESERVE C = PAD CONTINGENCY Wx = WEATHER OUTAGE OFF-1 OFF-2 OFF-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

Contact: S. Wierszalowski, USA Near-Term Manifest Planning (321)861-8701

Flight Element Processing

R. Propst

STS-132 LSFR
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Flight Element Processing Overview

- **Non-Standard Processing Activities** **Presented**
- **Modification Summary** **Presented**
- **Chit Summary** **Presented**
- **OPF Flow Milestones** **Presented**
- **TPS Work Content** **Presented**
- **Issues and Concerns** **Presented**
- **Integrated Operations Summary** **Presented**



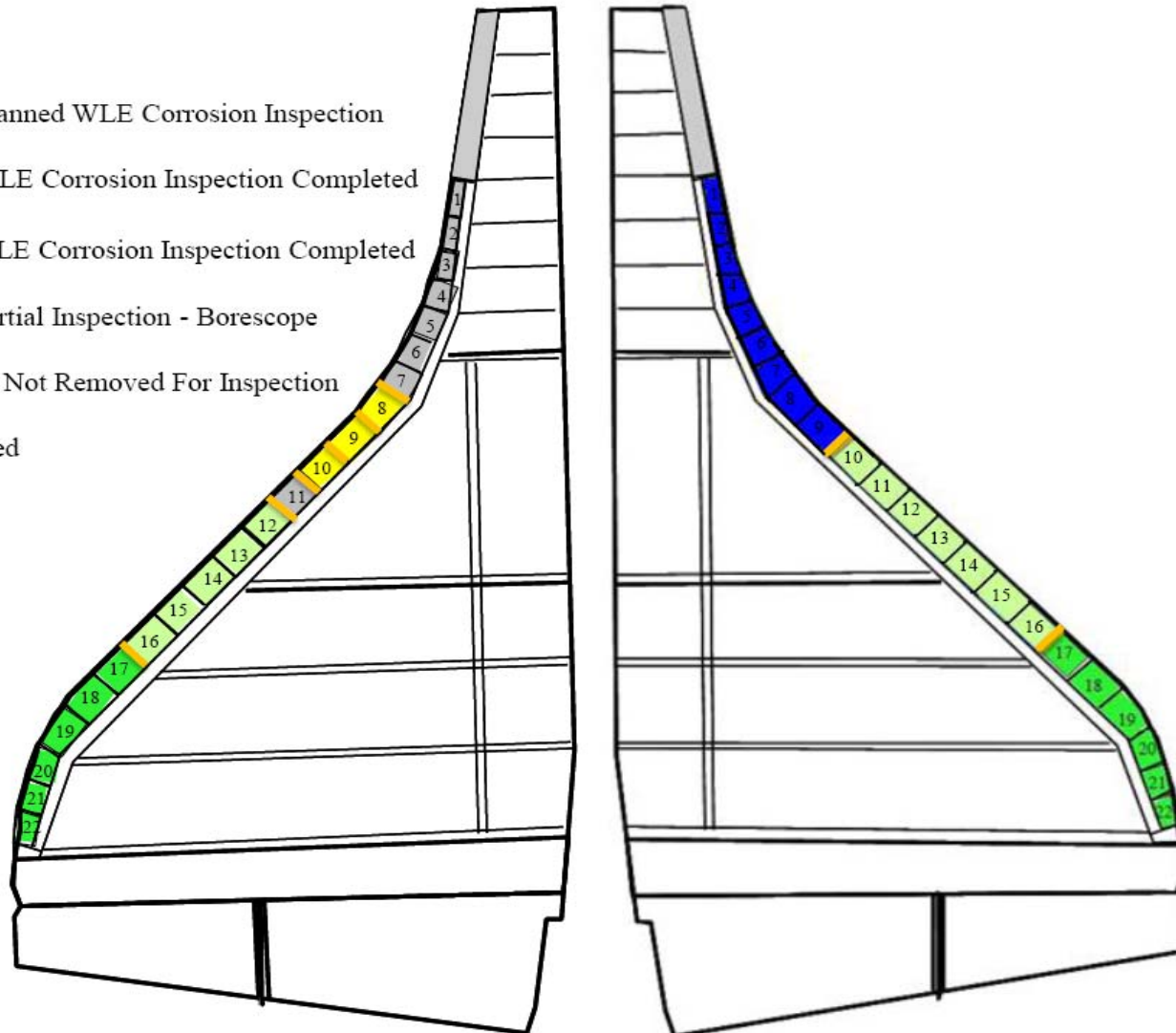
Non-Standard Processing Activities

- **RCC/LESS Removals and Replacement to Support WLE SPAR Corrosion Inspections**
- **APU (3) Replacement (if wetted time not extended)**



OV-104 WLE Corrosion Inspection

- STS-132 Planned WLE Corrosion Inspection
- STS-129 WLE Corrosion Inspection Completed
- STS-125 WLE Corrosion Inspection Completed
- STS-125 Partial Inspection - Borescope
- Spar Fitting Not Removed For Inspection
- Not Inspected



CHITS

	<u>CHIT</u>	<u>DESCRIPTION</u>	<u>STATUS</u>	<u>RECV'D DATE</u>
1.	J6275A	Orbiter Structural IML Surface Corrosion Sampling Inspection	Approved	01/11/2008
2.	J6399	0-Gauge Protection	Approved	08/22/2008
3.	J6410	Aft Stub Cracked Tile Inspection	Pending	09/09/2008
4.	J6501	CIH Close Clearance Measurement	Approved	04/17/2009
5.	J6527	FRCS Thruster Canister Stud Inspection - F5R & F5L	Approved	06/29/2009
6.	J6528	Putty Repair Tile Replacement for Risk Reduction	Approved	06/26/2009
7.	J6559	Upper Aft Stub Tile Inspection for In-Place cracks	Approved	09/23/2009



Modification Work Summary

➤ TAD 30274 FC Flowmeter/FCMS Power Source Separations

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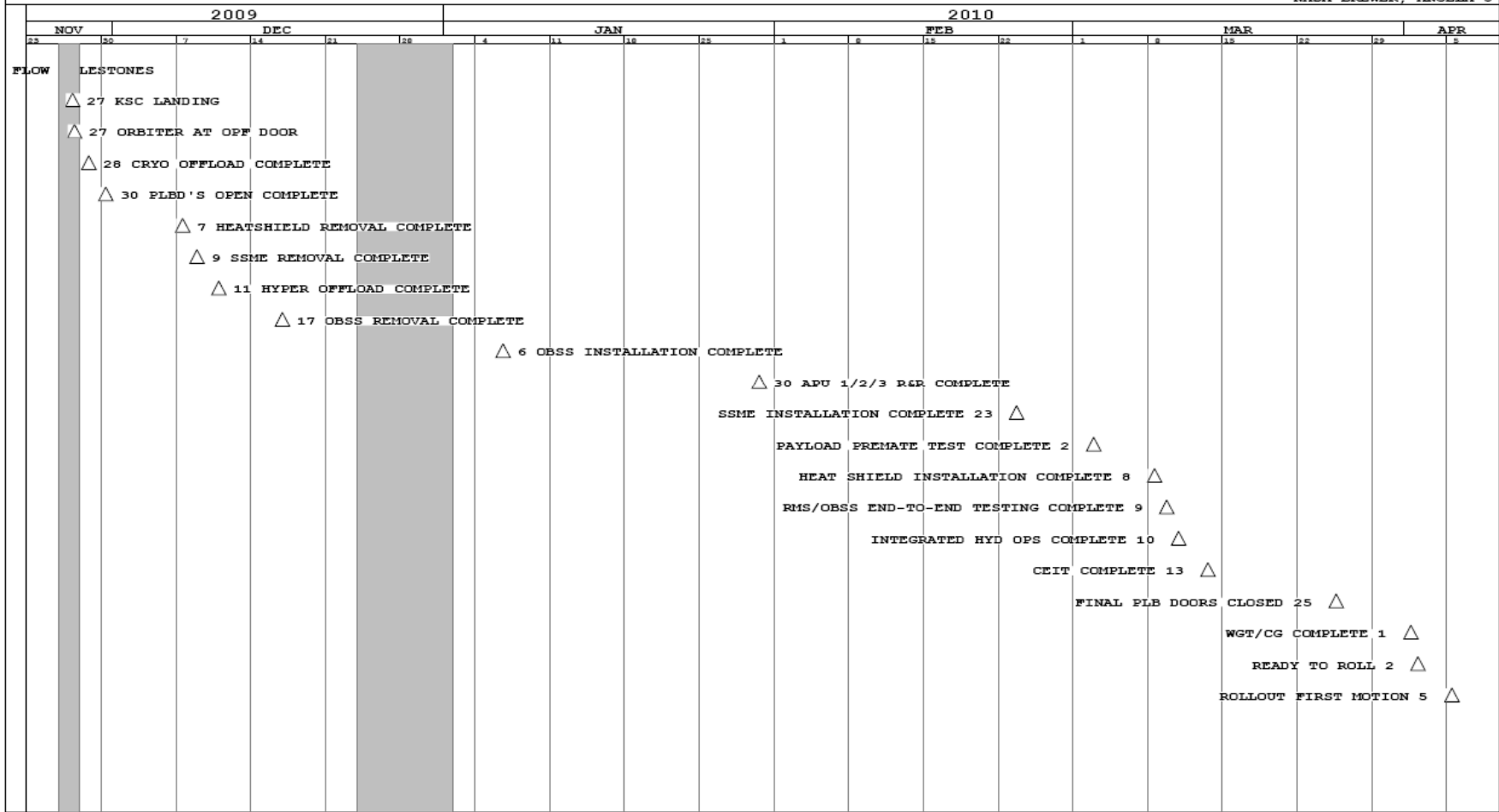


STATUS	
USA	NASA
C	C
<small>On-Contract</small>	<small>Not-Contract</small>

Creation Date:13-OCT-2009
Revision Date:20-OCT-2009
Revision :B

STS-132/OV-104 OPF FLOW MILESTONES
DOWN PAYLOAD:ISS-31-ULF3 ELC1/2 | UP PAYLOAD:ISS-34-ULF-4

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



△ PLAN/BASELINE ◇ DEVIATION FROM BASELINE ▲ ◆ ACTIVITY COMPLETED △ ACTIVITY CANCELED △ △ ACTIVITY DURATION **** SCHEDULE CHANGE
STATUS DATE: 20-OCT-2009:1 PLOT DATE: 21-OCT-2009, 7:57 am NETWORK: OPF132.701 CONTACT: B.A. COREY .1-8334 OPF BAY-1 EXE:CUSOPFSU.27
Page 1 of 1

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STS-132 TPS Work Content

TPS Removals

<u>Priority</u>	<u>Description</u>	<u>LSFR</u>
Mand	Deferred Tile/ Fib For 1 Flight (Minimum)	7
Mand	In-flight Tile/Blanket Damage (Estimate)	25
Mand	Piano Key Tile (Upper Body Flap)	6
Mand	Estimated Putty Removals (Grindouts)	14
Mand	Operational Damage (Estimate)	10
Mand	Putty Repairs (Chit Driven)	10
Mand	Corrosion Sampling	5

BRI Replacement:

10	MLGD-Outboard Middle 1/3	24
----	--------------------------	----

Projected TPS Removals TOTAL (Estimate) *101

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



TPS Work Content (Additional Work)

Planned Work:

- I-4 Requirement: Remove chin carrier panels- Additional NLG T/B Work
- Remove 9 RCC: = (20) LESS Carrier Panel removals

Get Ahead Work:

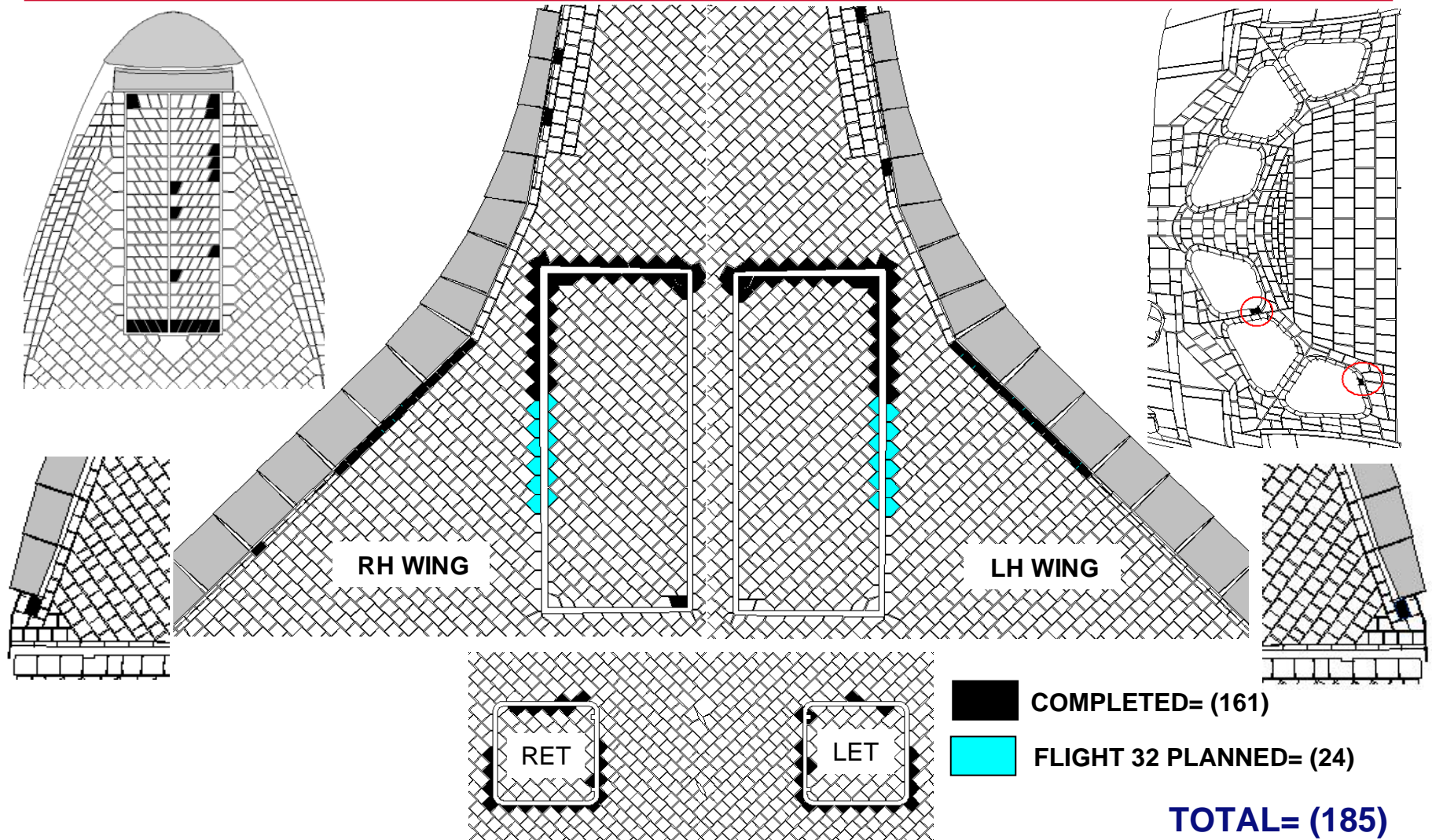
- I-7 Requirement: Re-waterproof all upper surface blankets on Flt-33
 - Vertical during Flt-32

Potential Work:

- AMES R+R – Zone 29 of 2a (fwd RH MLGD)



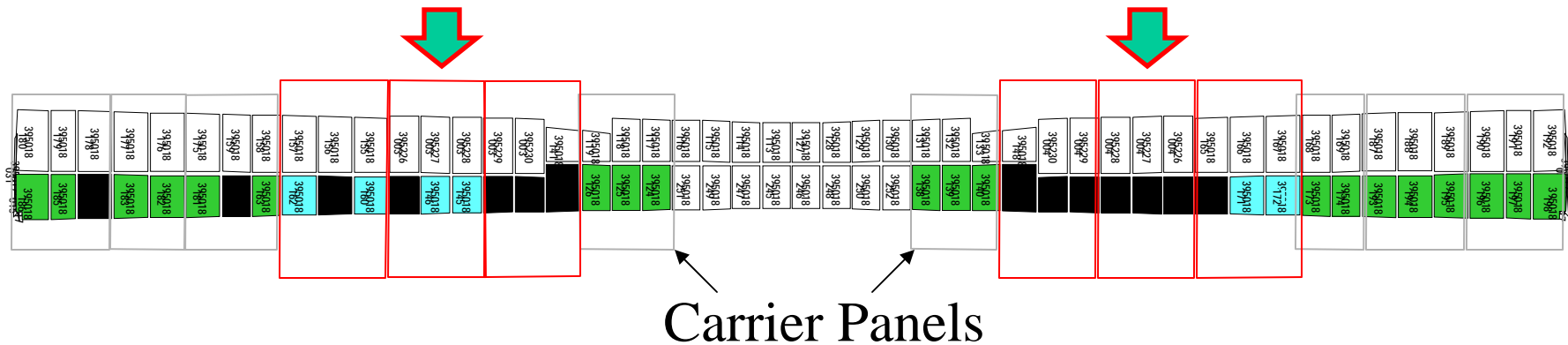
BRI Planning STS-132 (Flight 32)



STS-132 LSFR
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OV-104 (STS-132) Piano Key Tile



- Typically 3 tiles per Carrier Panel (exception 395219)
 - Highest Priority tiles (10 of 16 complete) **6 Remaining**
 - Remaining tiles can be done in any order
- Total “High Priority” Tiles STS-132= **(6)**

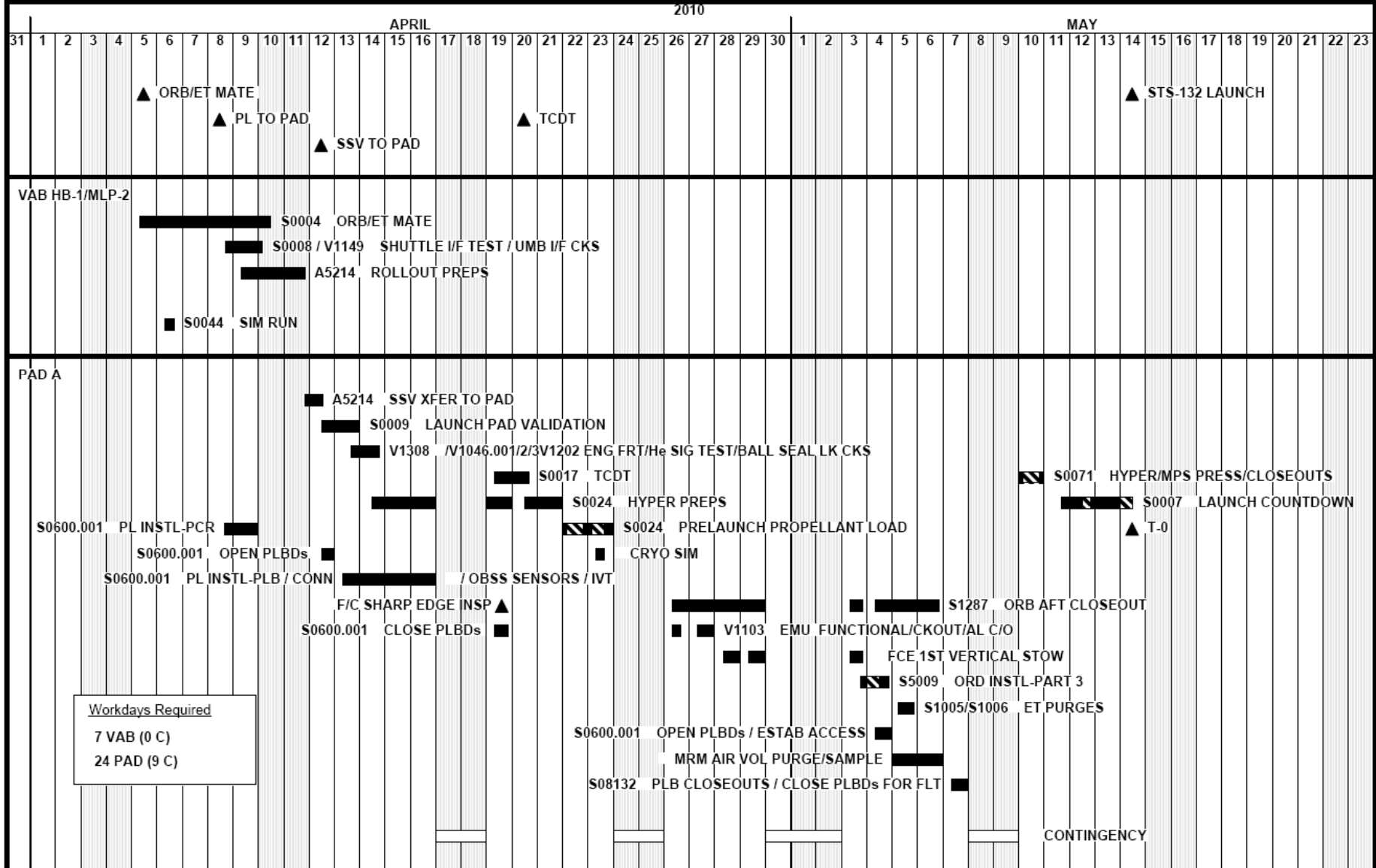
Issues and Concerns

- **Work Content/Potential Growth**
 - IFA'S
 - TPS Work Content/Growth

- **DFRC Landing**



STATUS		OPR: USA - J. Taylor, INTEG FM (1-7420) NASA - A. Brewer, PH-A (1-9104)		STS-132 / OV-104	
USA	NASA	CONCUR			
C	C			Payloads: ISS-34-ULF4 ICD-VLD (VERT)	
C=Concur NC=Non-Concur					





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



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

Backup Material

FRWG Presentation (With Minor Changes)



	Presenter Phyllis Grounds/MO3
	Date 10/22/09 Page 7

**Backup Charts-Requirements Documentation Status:
Flight Requirements Document (FRD)
ULF 4 MIP (NSTS 21541)
07700 Vol III, FDRD**



STS-132 FRD Status		Presenter Phyllis Grounds/MO3
Date 10/22/09	Page 8	

STS-132 FRD Revision 005, dated August 25, 2009: <https://sspweb.jsc.nasa.gov/efrd/>

Closed CRs

FRD17462-132-0015 – Remove PLB Lighting Requirement for RAMBO-2

Open CRs

**FRD17462-132-0016 – Remove Launch to Activation Supporting Hardware
(Evals past due)**

**FRD17462-132-0017 – Add DTO 703 Reflective Elements Kit
(Evals due 10/19/09)**



STS-132/ULF4 Requirements Status

Presenter **Phyllis Grounds/MO3**

Date **10/22/09**

Page **9**

1. ULF 4 MIP (NSTS 21541)

- **Current version available on PILS: Basic + Change 5, dated 9/15/09**
- **Open CR's --**
 - **21541-0010 Delete LTA Task and 1 GLACIER, and add CGBA and update Appendix E (Closed – in editing)**
 - **21541-0011 ICD-VLD2 Ferry Flight Reqmts Update ECD 10/23/09**
- **Pending CR's:**
 - **Update to Appendix E, pending FPSR assessment**
 - **Update to launch package control weight**
 - **TBD closures**
 - **Add reference to DTO 703 Integration Plan and the Annex 5 (POCC) reqmts for ICC-VLD in section 8.4 and 14.0**

2. Payloads Of Opportunity status:

SEITE – NSTS 21542, Basic + Change 1 dated 9/4/08

SIMPLEX – NSTS 21327, Revision A, dated 6/16/08

RAMBO-2 – NSTS 21556, Basic, dated 2/23/09

MAUI, NSTS 21530, Basic + Change 2, dated 5/5/08



STS-132/ULF4 Flight Requirements Status

Presenter **Phyllis Grounds/MO3**

Date **10/22/09**

Page **10**

- **Flight Definition and Requirements Document (FDRD)**
 - **S072132C CR to delete the Sidewall SPA BEAM, PPSU, and ECSH and incorporate ICAPC/PDGF.**
 - **Closed 10/15/09**

Back-up

- **Modification Record and MECSLSI Updates Summary**
- **Engineering, Hardware and Certification Status**
- **TPS Risk Reduction Priorities List and Allocation Breakdown**

Modification Records and MECSLSI Update Summary

MCR/ TAD NO.	TITLE	KIT / MOD RECORD & DESCRIPTION	TECH ORDER IMPACT	REMARKS
<u>Orbiter Modification To Be Baselined</u>				
30274	Fuel Cell H2 Flowmeter and CPM Power Source Separation Provides dedicated power sources for the Fuel Cell Flowmeter and Cell Performance Monitor (CPM) to protect against power loss to the CPM.	030274_0104_0 - Modifies MPCAs 1 & 3 to utilize existing spare 1 amp fuses to power the circuits for the Fuel Cell Hydrogen Flowmeters 1, 2, and 3. Provides separate power sources for Fuel Cell H2 Flowmeter and CPMs.	No Tech Order Impact	No MECSLSI Impact

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
<u>Orbiter Modification To Be Baselined</u>										
30274	<u>Fuel Cell H2 Flowmeter and CPM Power Source Separation</u> Provides dedicated power sources for the Fuel Cell Flowmeter and Cell Performance Monitor (CPM) to protect against power loss to the CPM.	12/8/09	12/8/09	N/A*	N/A*	GO	1/22/10	2/20/10	21-764430-001K 08-21-764430-001K	* Hardware available on site OCR/D S165454 approved 10/20/09

TPS Risk Reduction Priorities List

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 (23% with 10 tile min.)(Chit J6514,J6497,J6504)
- Continue G/F R & R on a best effort basis - zones 2B subset
- *Deferred work may be redeferred with acceptable inspection*

Prioritized Opportunity

1 - 9 1 thru 9 complete on all vehicles (with one exception #7 on OV-104)

7 Inboard Elevon “Hub” Tile Modification – *104 only remaining* (2 Tiles Port Side)

10 MLGD BRI-18 – Outboard Middle 1/3 -24 Tiles (6 Door/6 STR)

11 ET Door - Remaining STR side of Door & leading edge on Door - 40 tiles (24 STR/ 16 door)

12 MLGD BRI-18 – Outboard AFT 1/3 - 24 Tiles (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 AETB-8 – 42 Tiles (32/stinger, 10/Box Attach point)

TPS Risk Reduction Priorities List (Cont.)

- 15 **Body Flap Stub "Piano Key" Upgrade to AETB-8 -40 Tiles** (Order as defined in PRT map)
- 16 **Gap fillers in Subset 2B - 5 Zones** (Defined as a line across MLGD edge)
- 17 **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)
- 18 **Mod work** (WLE sneak flow, WLE Horsecollar Gap Fillers,)
- 19 **MADS Instrumentation Failures** (104 & 105 L/H OMS Pod)(place holder)
- 20 **Remaining Gap Fillers & Window BRI-18**
 - Windows 2, 3, 4, & 5 Upper Carrier Panels (top priority)

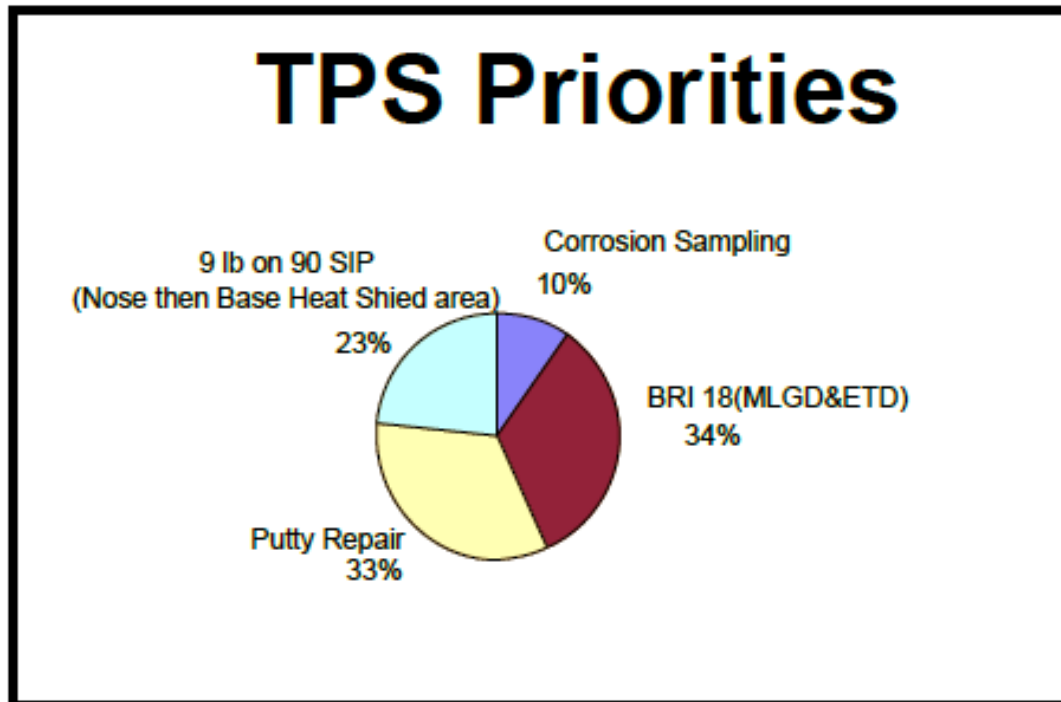
Current Fleet Status

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 ^{OV103})	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



Allocation Breakdown

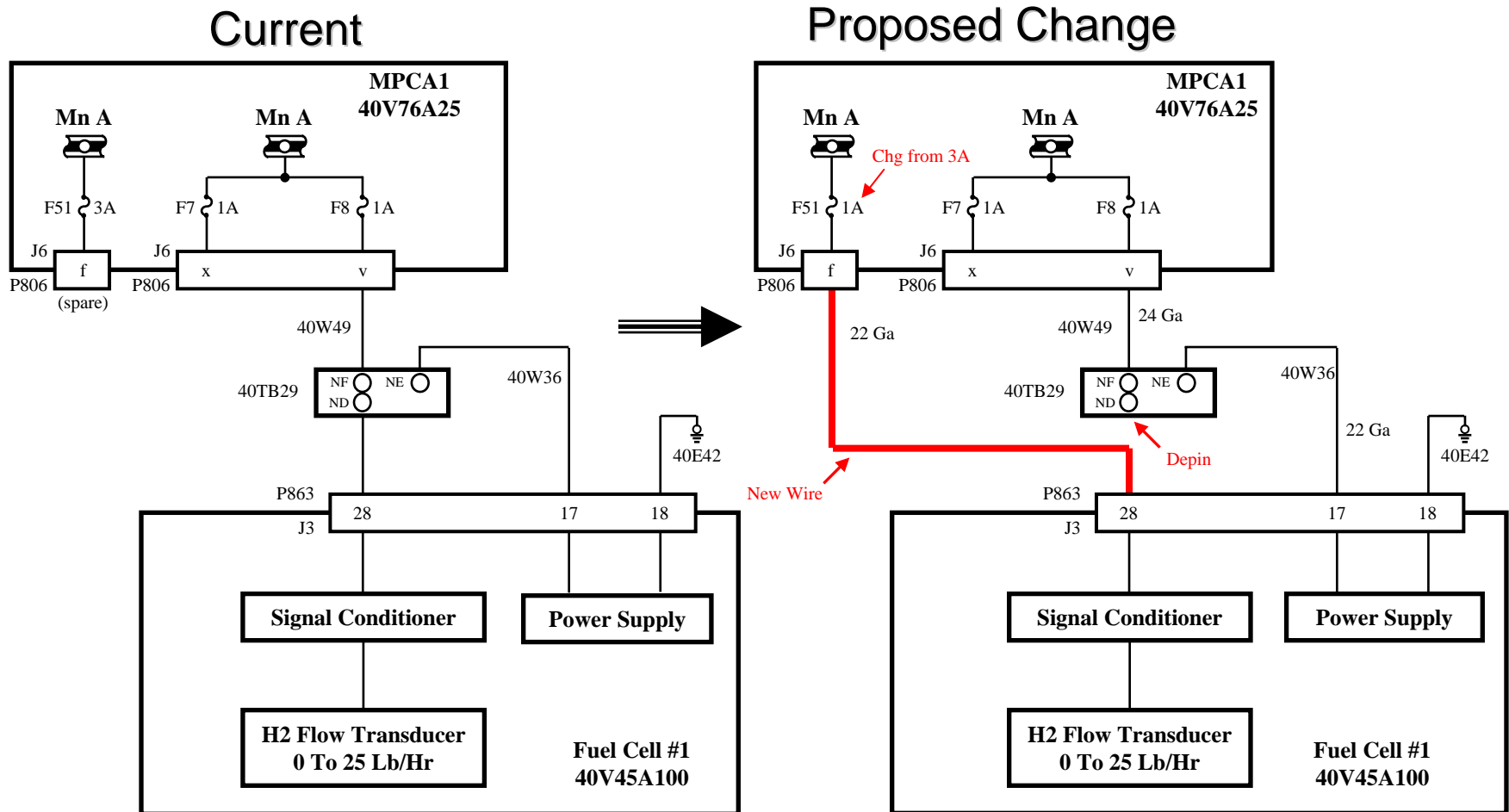


Example	60 tile Allocation at DLSF
Corrosion Sampling	6
BRI-18 MLGD&ETD	20
Putty Repair	20
9lb on 90 SIP	14

- 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

STS-132 OV-104 Flight 32 – Modification To Be Baselined

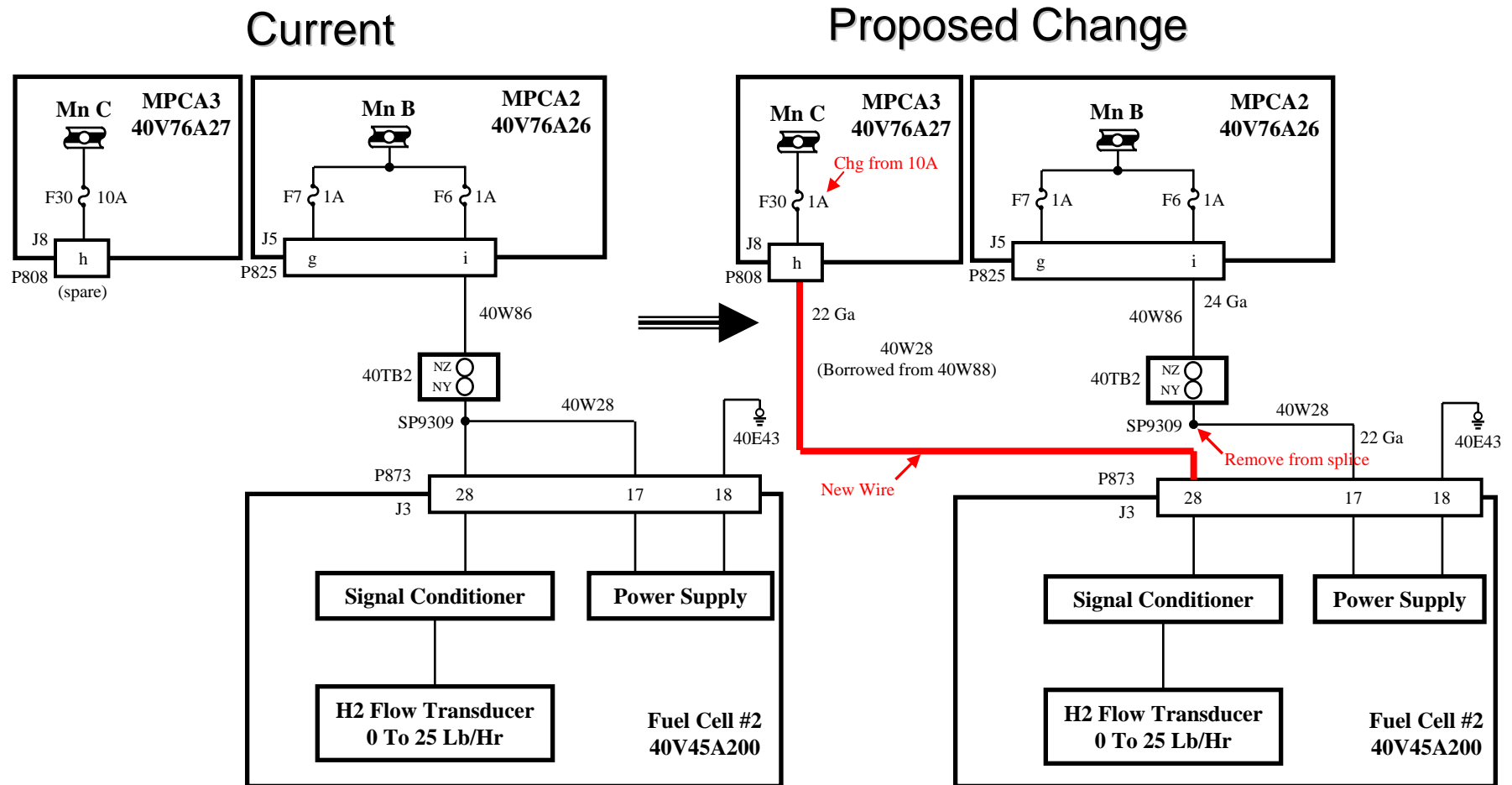
TAD 30274 – Fuel Cell H2 Flowmeter and CPM Power Source Separation (Cont.)



Fuel Cell #1 H2 Flowmeter/CPM Wiring

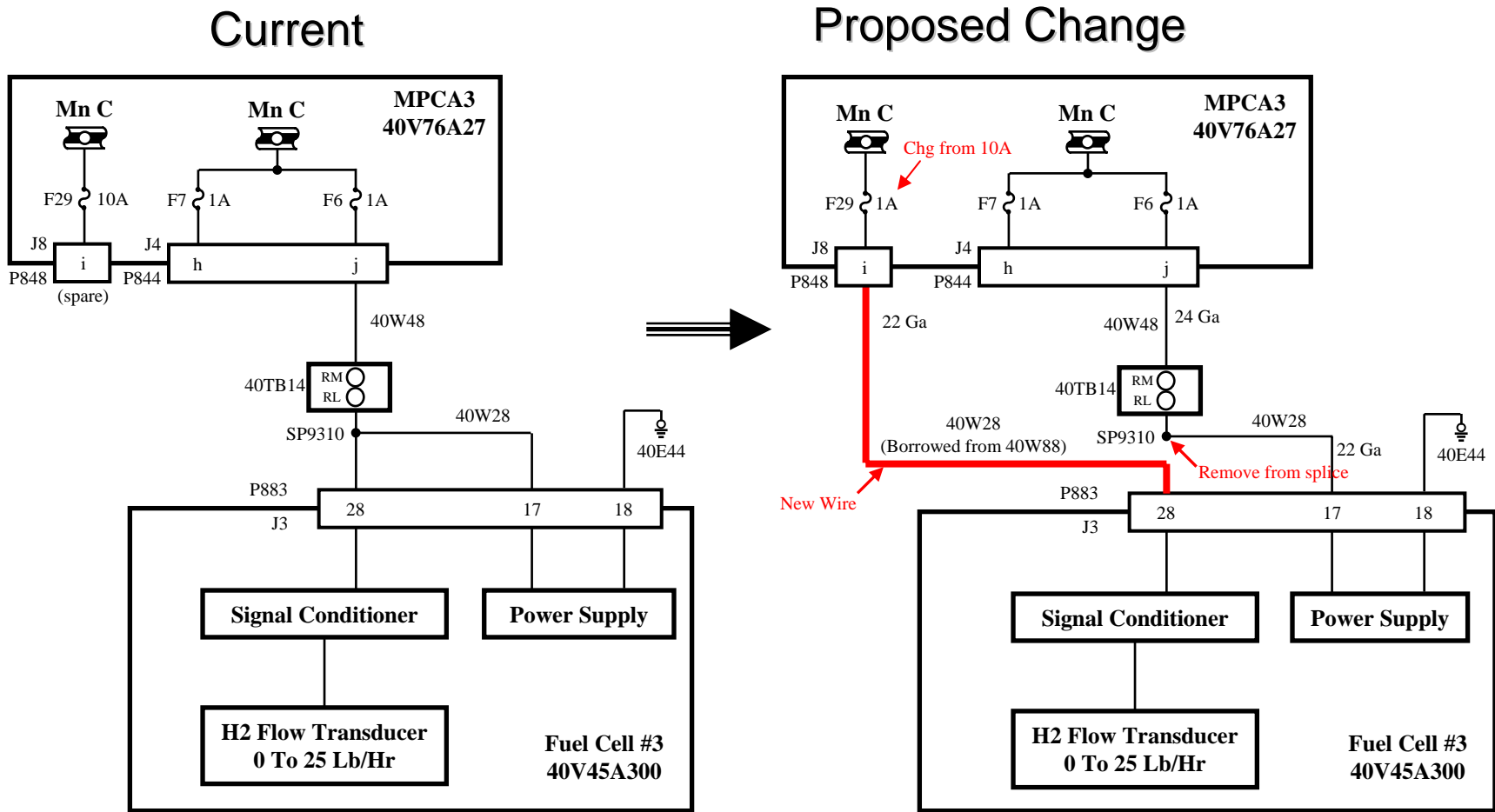
STS-132 OV-104 Flight 32 – Modification To Be Baselined

TAD 30274 – Fuel Cell H2 Flowmeter and CPM Power Source Separation (Cont.)



STS-132 OV-104 Flight 32 – Modification To Be Baselined

TAD 30274 – Fuel Cell H2 Flowmeter and CPM Power Source Separation (Cont.)



Fuel Cell #3 H2 Flowmeter/CPM Wiring

Payload Cargo Engineering Backup Charts

STS-132 LSFR

OMRSD

- FII V2 Payload (Post-Mate)

Baselined Files

- P541 – ULF-4 Integrated OMRS

- FII V4 (Pre-Mate)

Baselined Files

- S07 STS-132 Mission-Unique List (MUL) – Early Release

RCNs

		<u>Baseline</u>
• DPS12985	S07 STS-132 MUL Update	11/20/09
• DPS12984	FIII MUL	11/20/09
• DPS12983	Adjacent Pin Test	11/20/09

- FII V6 (Shuttle Experiments) – None
- Issues / Concerns
 - None

STS-132 LSFR

Annex 1: ISS-ULF4-NSTS 21541-A01

<u>Activity</u>	<u>ECD</u>
• Baseline	07/31/09A
• <u>L-4MUpdate</u>	
– Customer Submittal	12/23/09
– CR Approval	01/13/10
• <u>L-1M Update</u>	
– Customer Submittal	03/29/10
– CR Approval	04/13/10
– Final weight Log	04/13/10

STS-132 LSFR

Time-Critical Ground Handling Requirements

Activity

- Customer Submittal
- Release for Review
- Baseline

ECD

01/13/10
02/12/10
03/14/10

Issues / Concerns

- None

STS-132 LSFR

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>
A05781	ICD-A-21541-VLD2	Thermal & Dynamic Env. Figure Update	11/09/09
A05794	ICD-A-21541-VLD2	LTA Cable & Hardware Removal	11/30/09

- Issues / Concerns
 - None

STS-132 LSFR

Cargo Integration Hardware Status

- Open Work

- None

- New Build Hardware

ECD

- Camera Bracket – V787-340035-003 (Mod)

12/04/09

- AFD Harness – V845-773990-001 (New)

12/04/09

- PLB Harness – V845-774984-001 (New)

12/04/09

- PLB Harness – V845-774985-001 (New)

12/04/09

- PLB Harness – V845-774784-005 (Mod)

- New Build Harness Leg – V845-774787-001

12/10/09

- Issues/Concerns

- None

BACKUP

STS-132 LSFR
J. F. Kennedy Space Center



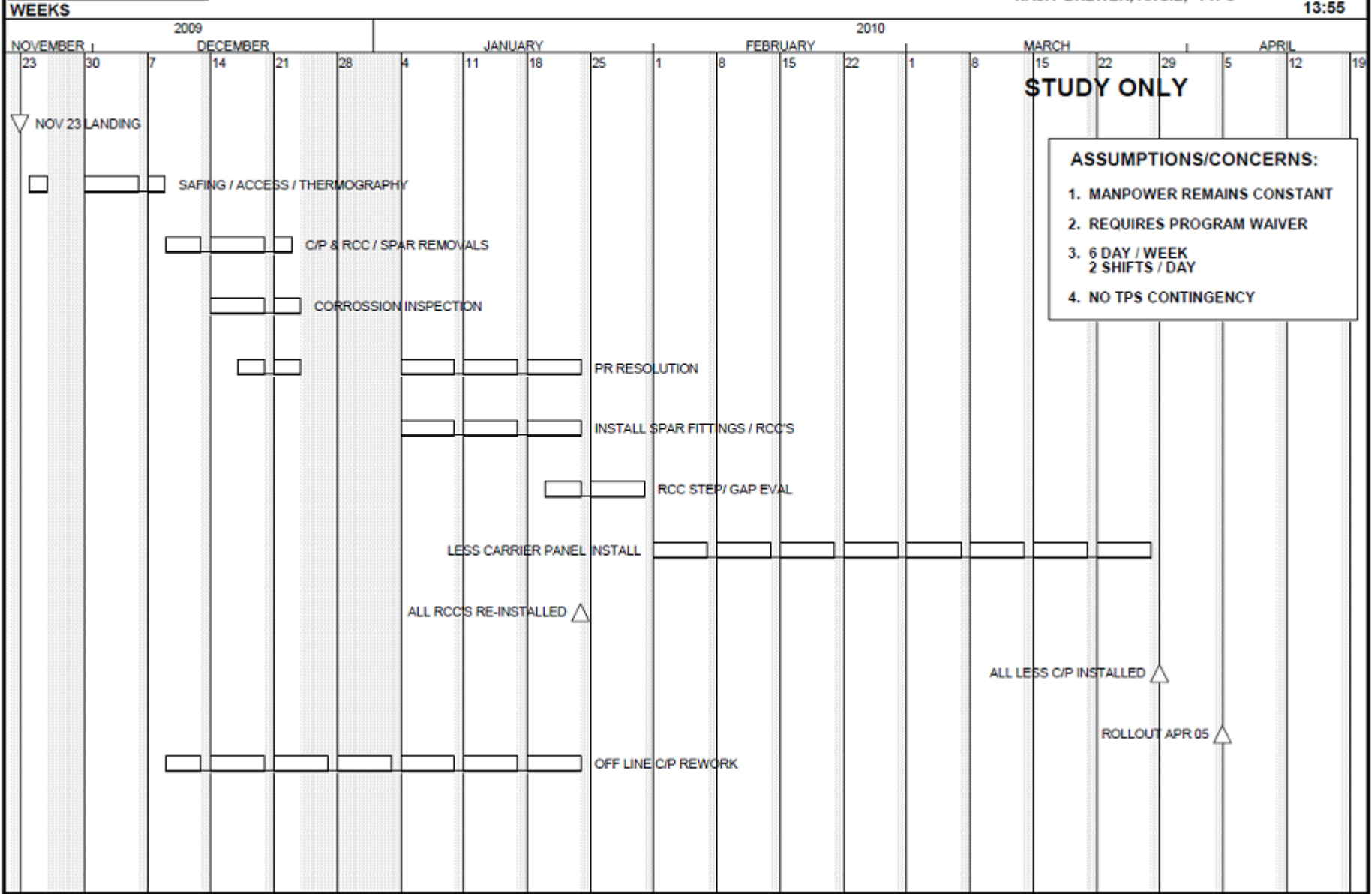
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C	C
C=Concur	NC=Not-concur

**STS-132 OV-104 WLE INSPECTION
RCC PANELS RH 1-9**

CONTACT : RAY PROPST 1-5178
 CREATION DATE : 20 OCT 2009
 REVISION DATE : 20 OCT 2009
 REVISION : A

OPR : USA-PROPST, RAY, FM
 NASA- BREWER, ANGIE, PH-O

13:55



STATUS

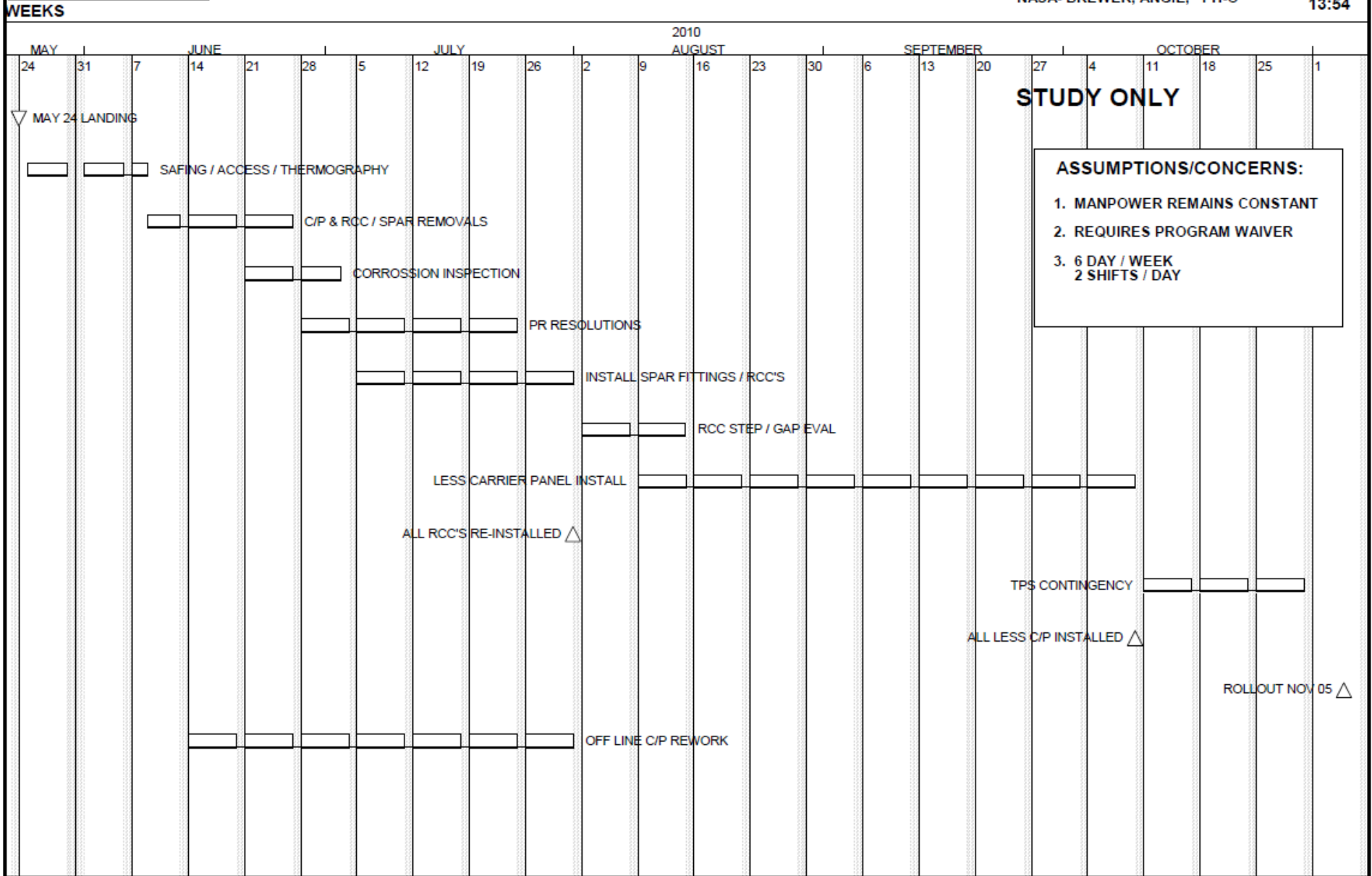
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C	C
C=Concur	NC=Not-concur

**STS-335 OV-104 WLE INSPECTION
RCC PANELS LH 1-11**

CONTACT : RAY PROPST 1-5178
 CREATION DATE : 20 OCT 2009
 REVISION DATE : 20 OCT 2009
 REVISION : A

OPR : USA-PROPST, RAY, FM
 NASA- BREWER, ANGIE, PH-O

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STATUS

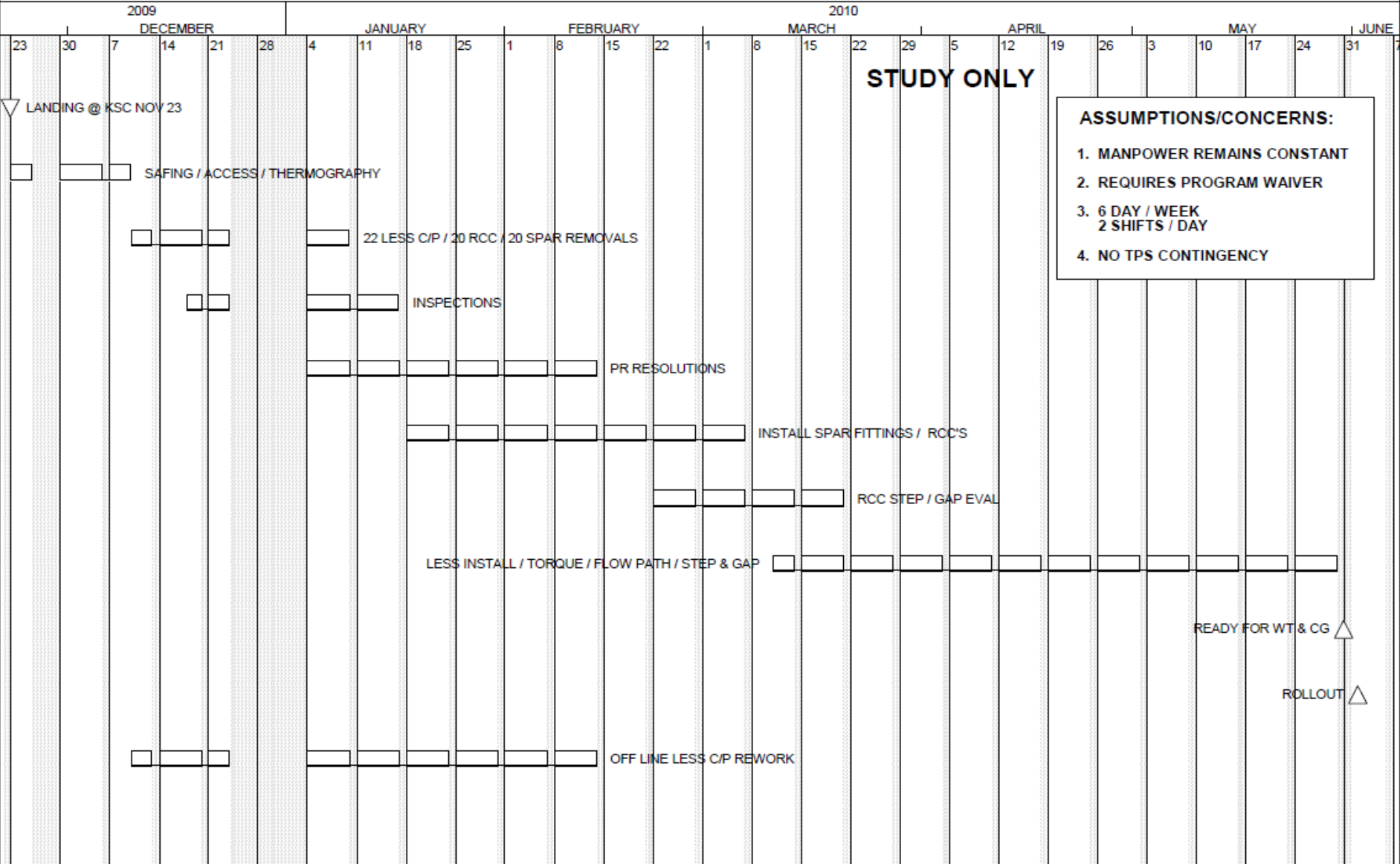
USA	NASA
C	C
C=Concur	NC=Not-concur

**OV-104 WLE INSPECTION
(LESS FOUR SPAR FITTING)**

CONTACT : RAY PROPST 1-5178
 CREATION DATE : 20 OCT 2009
 REVISION DATE : 20 OCT 2009
 REVISION : A

OPR : USA-PROPST, RAY, FM
 NASA- BREWER, ANGIE, PH-O

WEEKS 13:54



CONFIGURATION / Facilities

- **OV-104: Flight 32**
- **OMS Pods: LP04 / RP01**
- **ET: 136**
- **SRB: BI-143/RSRM 111**
- **SSME: TBD (#1), TBD (#2), TBD (#3)**
- **Payload: ISS-ULF4 (MRM1, ICC-VLD)**
- **Flight Software: OI-34**
- **Firing Room: 4**
- **OPF Bay: 1**
- **MLP: 2**
- **VAB High Bay: 1**
- **Pad: A**



STS-132

Launch Site Flow Review

Flight Software Overview

Tom Stansel

USA FSW

PRCB 10/22/09

STS-132 LSFR (FSW)

- **STS-132/OV-104 Flight Software (FSW) Versions**
 - Fifth scheduled flight of Operational Increment (OI) 34 Flight Software (SASCB SCR 98107A documents PASS and BFS OI-34 content)
 - Third scheduled flight of MEDS IDP VI 07.01/MDUF VI 06.00 (SASCB SCR 98113A (pending approval) documents content)
 - Sixth scheduled flight of MAGRS-3S Link 613-996-008 Software (Link-008) (SASCB SCR 98115 documents content)
- **STS-132/OV-104 Flight Software Payload Support:**
 - ISS ULF4
 - 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)
 - Mini Research Module 1 (MRM1)
- **Major New Flight Software Support Items:**
 - None

STS-132 LSFR (FSW)

- **STS-132 Source Changes/Edits for Primary Flight Software (Base)**
 - 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-132 Patch Implementation for Primary Flight Software**
 - None.
- **STS-132 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-132 Patch Implementation for Backup Flight Software**
 - None

STS-132 LSFR (FSW)

- **Products**

- **STS-132/OV-104 Base delivery schedule (available to field)**

FPSB

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

October 16, 2009 A

October 30, 2009

- **An STS-132/OV104 ADTL SDT/Mass Memory may be required**

- **Decision to generate these products will be made in November, 2009**

FPSB

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

February 05, 2010

February 15, 2010

- **Open Items**

- **None**

- **Concerns/Issues**

- **No issues or concerns with STS-132 at this time**



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Space Shuttle Orbiter Project Office
NASA Johnson Space Center, Houston, Texas

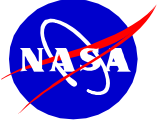


STS-132 LSFR Flight Crew Equipment/GFE		Presenter MV6/Bill Lane	
		Date Oct 22, 2009	Page 1

STS-132 LSFR

FCE/GFE Status

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



STS-132 LSFR
Flight Crew Equipment/GFE

Presenter MV6/Bill Lane	
Date Oct 22, 2009	Page 2

- **No changes since LSRR**
- **All GFE hardware delivery dates were partnered at CIR**
- **Tech orders and hardware list noted in backup charts, reference only**
- **No modifications planned for STS-132**
- **Starboard TSA manifested to contain OFK items but exact configuration TBD (likely will fill to max capacity)**
- **Based on DSR-25 clock reset issues experienced in flight (FIAR JSCEV1676F), the VTR may be replaced**



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Space Shuttle Orbiter Project Office
NASA Johnson Space Center, Houston, Texas



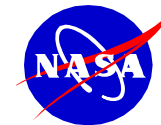
STS-132 LSFR
Flight Crew Equipment/GFE

Presenter MV6/Bill Lane	
Date Oct 22, 2009	Page 3

BACKUP



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



STS-132 LSFR
Flight Crew Equipment/GFE

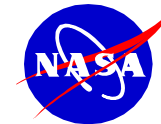
Presenter MV6/Bill Lane	
Date Oct 22, 2009	Page 4

Tech Order numbers are identified for reference only. Report generated Sep 9, 2009.

Hardware	Tech Order	KSC Eng Need	Eng(TO) Release	In MEC	Cert O/C	HDW Need	HDW Planned	Comments	JSC Contact
A (port forward)	M072-750025-076	1/26/10	1/17/07	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
B (port aft)	M072-750025-077	1/26/10	1/17/07	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
C (starboard aft)	M072-750025-078	1/26/10	1/17/07	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
D (starboard forward)	M072-750025-079	1/26/10	1/17/07	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
Payload Ops camera	M072-340109-TBD	12/8/09		7/1/09	O	1/8/10	1/8/10	Keel Camera from STS-127/OV-105. 6 month life limit on camera pressurization. JSC requests a later delivery date to allow margin on the life limit.	Randall Moore
SRMS elbow camera	M072-544504-014	1/26/10	8/4/08	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
SRMS wrist camera	M072-544504-008	1/26/10	8/4/08	7/1/09	C	2/26/10	2/26/10	Camera/PTU from STS-130 which lands 2/16/10. Plan for assy ready for installation 5 days after removed from OV-105 (if expedite required).	Randall Moore
Centerline Airlock Camera (stowed)	M072-660828-002, plus CCCD stow		3/17/99	7/1/09	C				Randall Moore
Lefthand Umbilical Camera (aft)	M072-705001-016	2/26/10	10/28/04	7/1/09	C	3/29/10	3/29/10	Ready to Roll out of OPF planned for 04/02/2010	Randall Moore
Righthand Umbilical Camera	M072-705001-028 M072-705001-027	2/26/10	10/28/04 10/28/04	7/1/09	C	3/29/10	3/29/10	Ready to Roll out of OPF planned for 04/02/2010	Randall Moore
Digital Television (DTV)	M072-710570-007		11/15/07		C				Larry Schmidt
MCIU/RMS Situational Awareness Display (RSAD)	M072-710543-001		3/7/00	7/1/09	C				Larry Schmidt



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



STS-132 LSFR
Flight Crew Equipment/GFE

Presenter MV6/Bill Lane	
Date Oct 22, 2009	Page 5

Tech Order numbers are identified for reference only. Report generated Sep 9, 2009.

Hardware	Tech Order	KSC Eng Need	Eng(TO) Release	In MEC	Cert O/C	HDW Need	HDW Planned	Comments	JSC Contact
Tools for Rendezvous and Docking (TRAD)	M072-730021-019		7/20/07	7/1/09	C				Larry Schmidt
Video Processing Unit (VPU)	M072-710338-007		3/2/08		C				Larry Schmidt
Wireless Video System (WVS)	M072-744007-001 UHF M072-344828-001 mount M072-744004-012 S-BAND M072-744004-013 S-BAND M072-744004-015 S-BAND M072-744004-016 S-BAND M072-744004-017 S-BAND M072-744004-018 S-BAND		6/2/04 8/24/04 3/21/08 3/21/08 3/21/08 3/21/08 3/21/08 3/21/08	7/1/09	C				Randall Moore
Space to Space Orbiter Radio (SSOR)	M072-344828-002 M072-740828-002 Harness		9/24/04	7/1/09	O				Larry Schmidt
RMS Sideview Camera (RSC)	M072-710281-002 M072-000416-006 camera	3/12/10	11/24/04	7/1/09	C	4/12/10	4/12/10	Camera from STS-130/OV-105 after repressurization.	Randall Moore
Wing Leading Edge (WLE) Instrumentation - Left Wing	M072-756111-007		8/21/07	7/1/09	C				Micheal Wright
Wing Leading Edge (WLE) Instrumentation - Right Wing	M072-756111-008		8/21/07	7/1/09	C				Micheal Wright
OBSS Sensor Package 2 *** (OPF)	M072-710282-006	1/26/10	4/18/08	7/1/09	C	2/26/10	2/26/10	SP2 from STS-129/OV-104	Larry Schmidt
OBSS SENSOR PACKAGE 1 ** (OPF)	M072-710282-008	1/26/10	4/18/08	7/1/09	C	2/26/10	2/26/10	SP1/PTU from STS-130/OV-105	Russell Yates



*Extravehicular
Activity
Office*



EVA Status STS-132/ULF-4 Launch Site Flow Review

**Bridget Ziegelaar
EVA Office
Johnson Space Center
October 22, 2009**

- **Forward Bulkhead PFR**
 - Portable Foot Restraint, SED33105308-307 installed on forward bulkhead
 - Released T.O. M072-661568-029
 - Required to protect for contingency EVA TPS repair
- **Lightweight Port TSA – contains standard EVA contingency tools**
 - Port LWTSA installation – Tech Order: M072-660850-005
 - Port LWTSA Tools installation – Tech Order: M072-660853-002
- **Lightweight Starboard TSA – contains OFK (not EVA hardware)**
 - Starboard LWTSA installation – Tech Order: M072-660850-006
 - Starboard LWTSA Cushion installation – Tech Order: M072-660859-001
- **Winches**
 - Winch P/N SED33101570-327 on Forward Bulkhead
 - Winch P/N SED33101570-325 on Aft Bulkhead
- **Forward work to determine location of High Strength Bridge Clamps (HSBC) to support MRM-1 contingency operations**
 - In work with MOD and Cargo Engineering (ECD 10/23)



STS-132/ISS-ULF-4 Launch Site Flow Review

ISS/Payload Processing, KSC

October 19, 2009

**Robbie Ashley
Mission Management Office
321-867-6037**





ISS/PAYLOAD PROCESSING AGENDA

Presenter:

Robbie Ashley

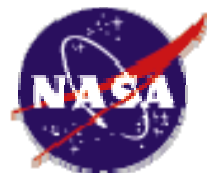
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10/19/09

Page

1

- Remaining Milestones
- Issues & Concerns - None
- Master Milestone Schedule (MMS)
- Backup Charts
 - Payload Bay Configuration
 - MRM 1 Components
 - ICC-VLD Components





ISS/PAYLOAD PROCESSING REMAINING MILESTONES

Presenter: Robbie Ashley	
Date: 10/19/09	Page 2

SSPF

- SAPA/SGANT FSE Integration
- SGANT Boom O/D at KSC
- SGANT O/D at KSC
- SGANT I/A T/O to Astrium
- ISS Batteries (QTY 6) T/O to Astrium
- ICC-VLD Installation to Canister
- MRM1 Installation to Canister

ECD

- 30 October 2009
- 4 December 2009
- 9 December 2009
- 9 February 2010
- 9 February 2010
- 29 March 2010
- 5 April 2010

Spacehab Facility

- MRM1 O/D at SLF
- EOTP O/D at KSC
- Payload Crew Equipment Interface Test (CEIT)
- MRM1 Processing
- ICD Walkdown

- 15 December 2009
- 22 January 2010
- 12-13 March 2010
- 4 April 2010
- TBD

OPF

- PDGF Installation to Sidewall

TBD

Integrated Operations

- Payload Transfer to Pad A
- Payload IVT
- Final Payload Bay Door Closure
- Launch

- 8 April 2010
- 16 April 2010
- 7 May 2010
- 14 May 2010

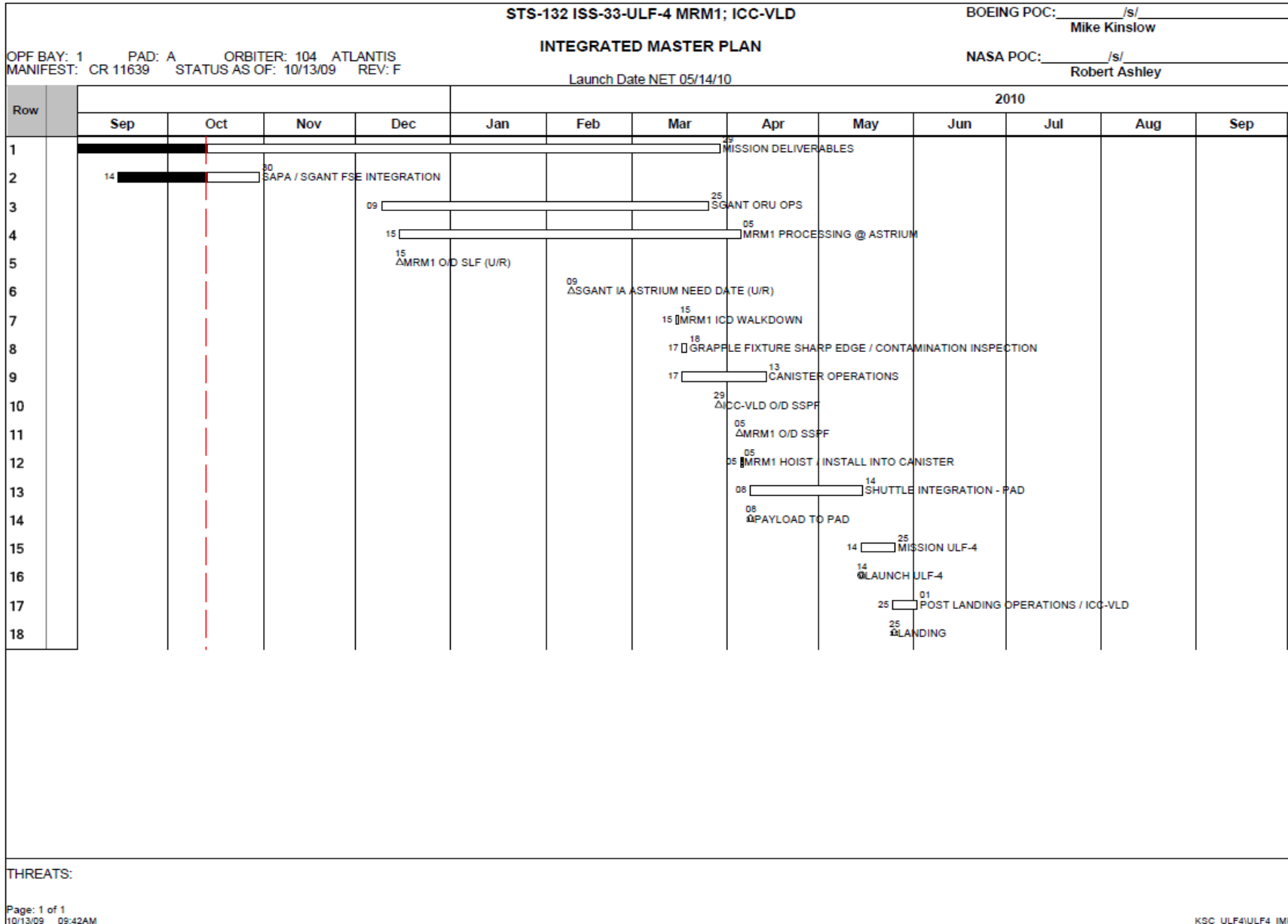




ISS/PAYLOAD PROCESSING STS-132 / ISS-ULF-4 MASTER MILESTONE SCHEDULE

Presenter:
Robbie Ashley

Date: **10/19/06** Page **3**

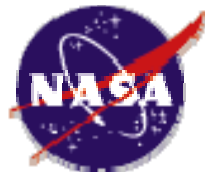




ISS/PAYLOAD PROCESSING BACKUP

Presenter: Robbie Ashley	
Date: 10/19/09	Page 4

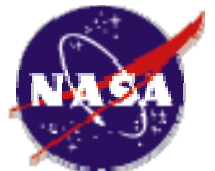
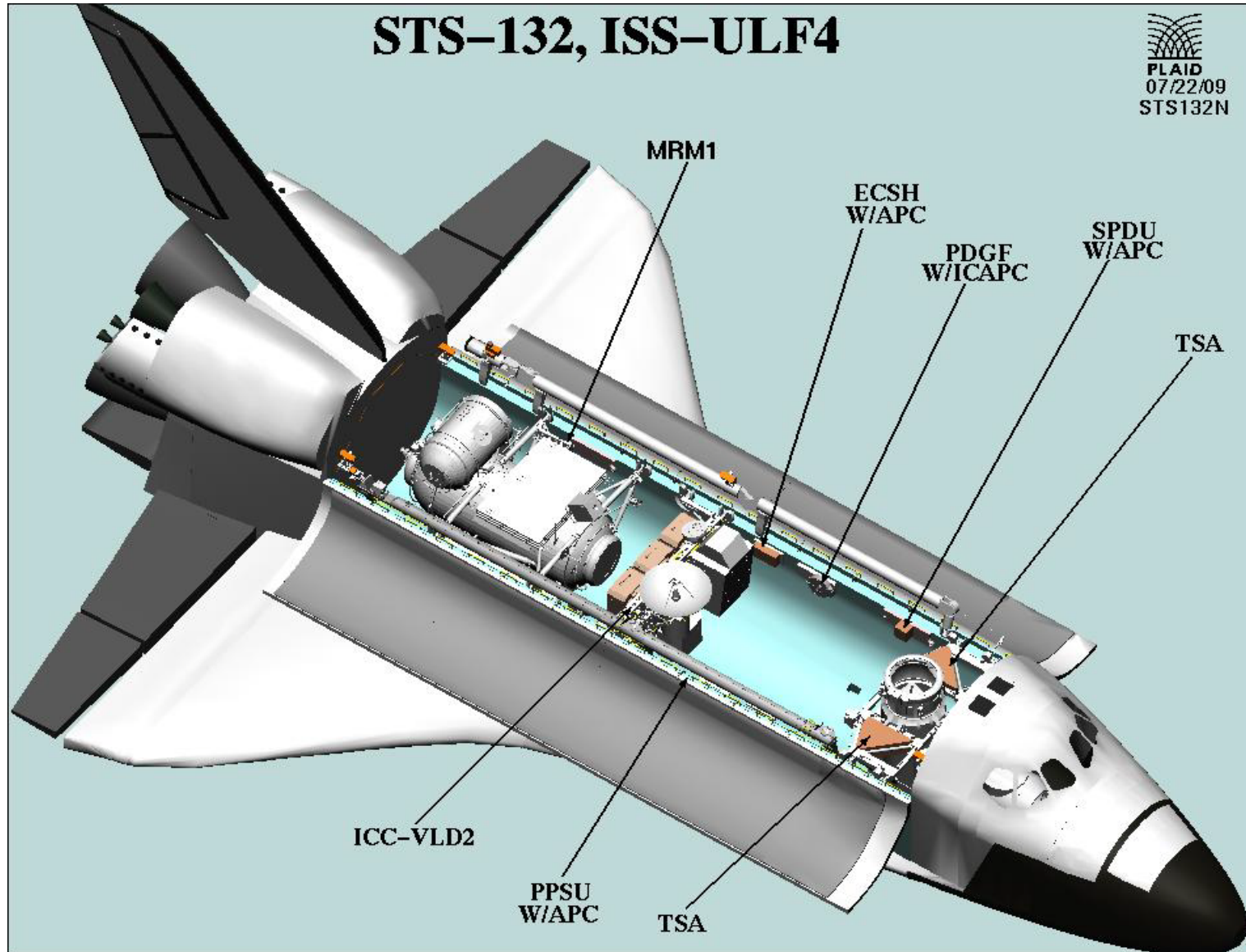
BACKUP CHARTS





STS-132/ISS-ULF-4 PAYLOAD BAY CONFIGURATION

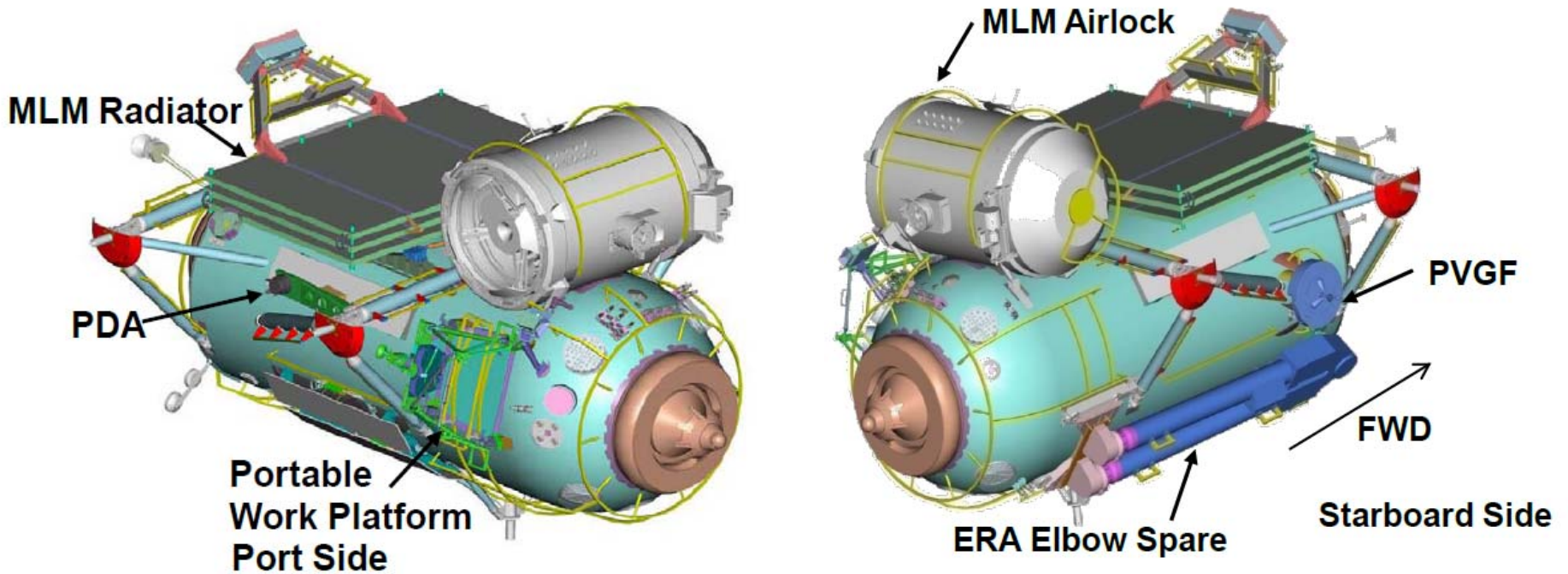
Presenter: Robbie Ashley	
Date: 10/19/09	Page 5





Mini Research Module - 1

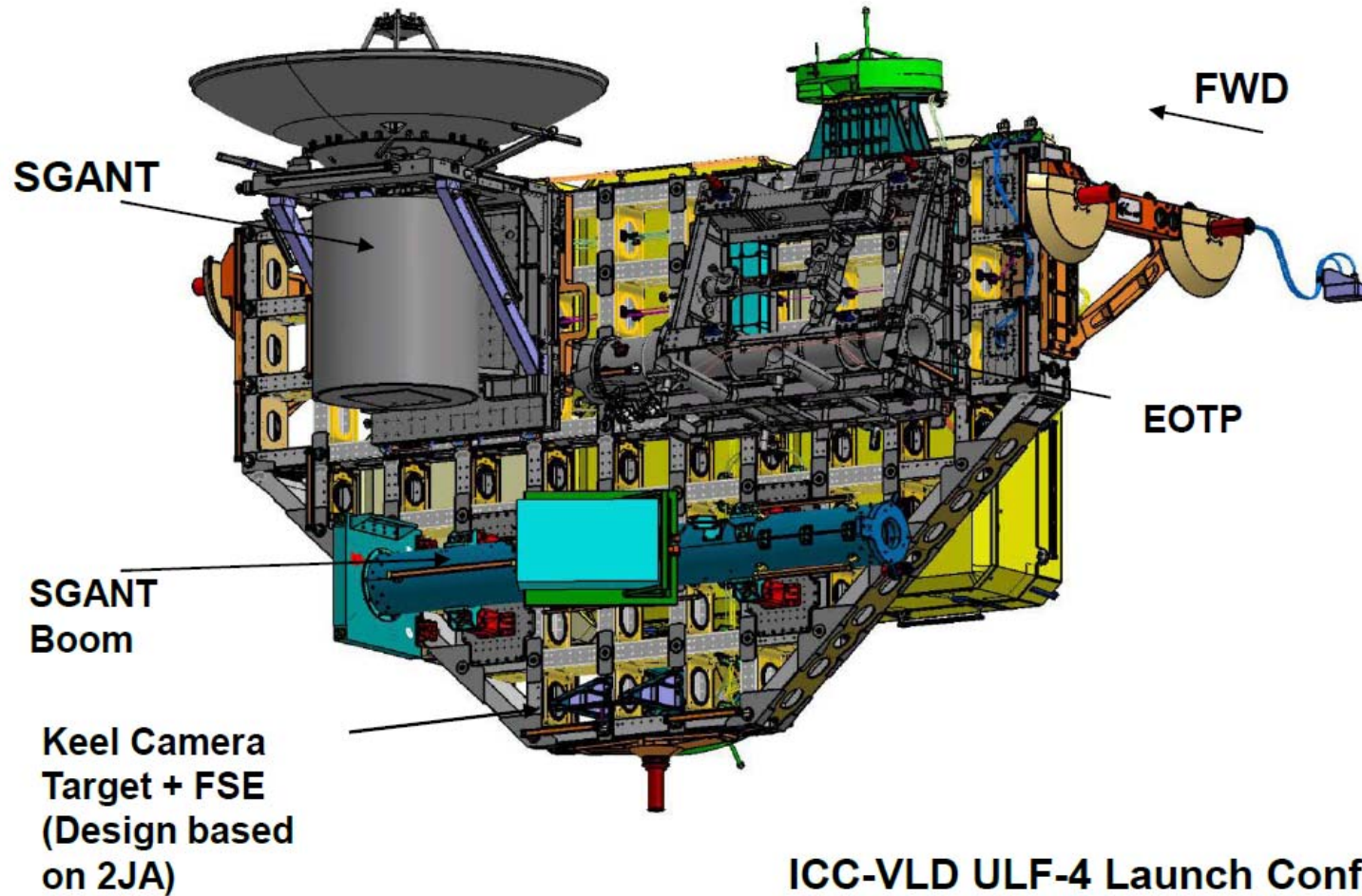
Presenter: Robbie Ashley	
Date: 10/19/09	Page 6





Presenter: Robbie Ashley	
Date: 10/19/09	Page 7

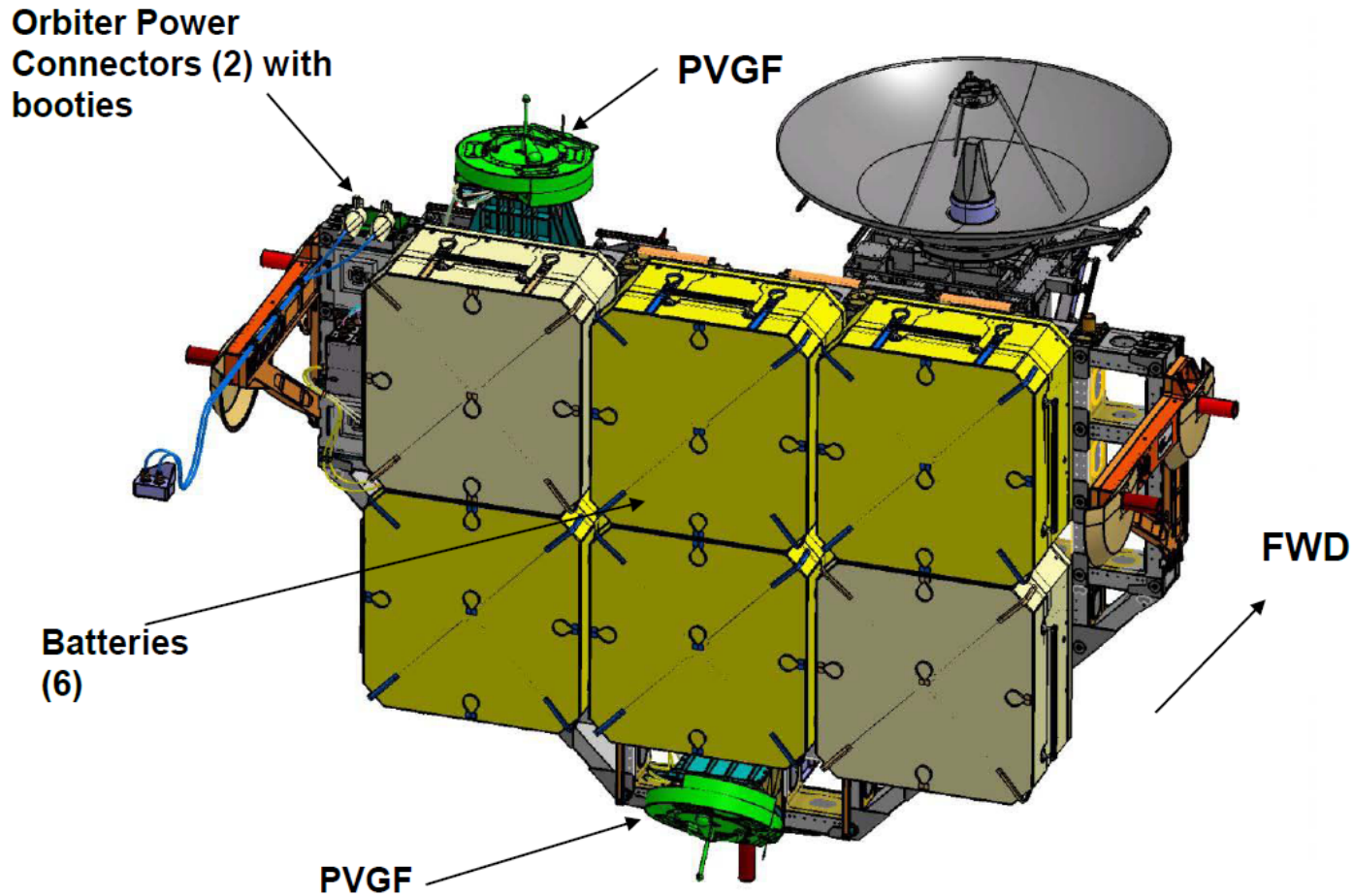
ICC-VLD COMPONENTS





Presenter: Robbie Ashley	
Date: 10/19/09	Page 8

ICC-VLD COMPONENTS



ICC-VLD ULF-4 Launch Configuration





STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

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**



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

Overview

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

* Backup material included



STS-132 Launch Site Flow Review	Presenter MK-SIO / A. Swift	
	Date 10-22-09	Page 1

Mandatory RCNs:

NONE

Non-Mandatory Value Added RCNs:

NONE



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

SSP System Drawings

The Drawings Baseline Was Released By PRCB S115132 on 08-20-09

- V072-000001-288 (Rev. WC) Space Shuttle System (Rel. 09-02-09)
 - V072-200212-001 (Rev. NC) Mission Equipment Cargo Support (Rel. 06-30-09)
 - SGD32104455-401 (Rev. NC) Crew Compartment Configuration (Rel. 10-01-09)
 - V070-000001-004 Orbiter General Assembly
 - V070-410100-018 SSME Installation
 - 10100-0061-180 Integrated SRB General Assembly (BI-143)
 - 80901000000-530 External Tank Assembly (ET-136)
- STS-132 CIR + 70 days Mission Configuration Product Plan (MCPP) was published on 10-09-09 and will be republished at LSRR +18 days on 10-12-09.



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

SSP System Drawings – (Continued)

Ferry Configuration

- V072-000001-289 (Rev. WC) Space Shuttle System Drawing (Rel. 09-02-09)
 - V072-200212-002 (Rev. NC) Mission Equipment Cargo Support (Rel. 06-30-09)
 - SGD321004455-001 (Rev. NC) Crew Compartment Configuration (Rel. 10-01-09)
 - 402 Descent
 - V072-300055-025 (Rev. BU) Ferry Flight Configuration (Rel. 05-11-09)

SCA 911

LW MAR
SID32108929-TBD

CDR	KEN HAM
PLT	TONY ANTONELLI
M/S #1	GARRETT REISMAN
M/S #2	PIERS SELLERS
M/S #3	MICHAEL GOOD
M/S #4	STEVE BOWEN

ASCENT MODULAR LOCKER LAYOUT

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

LEADER:	DEWEY LOUVIER
DATE:	9-24-09
LAUNCH:	5-14-2010 NET
FLIGHT:	STS-132
VEHICLE:	OV-104
CREW:	6 CREW/11 + 1 + 2 DAYS
RQMTS:	NO RCRS, SLEEPING
BAGS, EXT A/L, ERGOMETER, RMS	
LW MAR, NON-EDO VOL B	

ML60B 6013 -310
PRIME C/L CAM GFE TV CNTRLR
ML60E 1379 -TBD
PGSC (6)
STS1=OCA STS2=WINDECOM STS3-KFX STS4-RPOP STS5-RPOP2 STS6-WLES
ACCESS PT ACCESSORIES
WLE CABIN RELAYS
PCS DATA CBL B/U
ML60M 6014 -312
B/U C/L CAM ULTRA TRASONIC LEAK DETECTOR

MIDDECK FORWARD

5962 MF14E 6269 -303 -309 PRINTER TRAYS IODINE REMOVAL (GIRA) 6256-306	MF28E/G TBD -TBD GLACIER
MF14G 2766 -305 MENU FOOD	MF28H 5452 -328 IFM BREAKOUT BOX TURNBUCKLES AIR SAMPLERS VWD FILTER RMS KIT ALTIMETER ON LOCKER DR
6300 MF14H 6250 -347 -355 IFM TOOLS 2163-302 2161-305 2162-307 MULTIMETER	MF28K 6231 -TBD POST INSERTION 1
MF14K 6231 -TBD POST INSERTION 2 SEE/LIGHTSTICKS/	MF28M 2763 -304 MENU FOOD
MF14M 6299 -321 COAS/BTA WORK LTS(2)/LT SHADES/D2X AUDIO DOSIMETER	MF28O 8965 -317 SHUTTLE CSA/CP SUPA (13)/FMK CONDENSATE HOSE DOCKING KIT/ O-RINGS BRAYCOTE/CWC (2)
MF14O 8047 -304 DC VACUUM CLEANER (CTB) 6015-326	

MIDDECK AFT

MA9D/F 9882 -309 T-RAD SPARE DTV VIP MUX/TOOLS DTV DSR 25	MA16D TBD -TBD NLP-CELLS-4 (CGBA2)
MA9G 8737 -311 RCC COLD BAG (NOAX) DOUBLE COLD BAG	MA16F TBD -TBD ISS RESERVE
6066 MA9J 8719 -334 -309 COLOR PRINTER CTB	MA16G TBD -TBD TBD
MA9L 8723 -302 STOW-N-GO CTB	MA16H TBD -TBD CheCS CTB 1491-TBD
MA9N 7432 -337 SOFT STWG BAGS PHK(S)(6) 4980-309 CCK/COM. PHK 8071-323 RSTRNTS/ RE-ENT FIBERSCOPE 8070-302	MA16I TBD -TBD MA16J TBD -TBD MA16K TBD -TBD MA16L TBD -TBD MED KITS MAK(1)
	MA16N 0631 -313 RESUSCITATOR AMMONIA DETECT HRM(2) KIT

VOL B 7436 -TBD MA4D/J
HYGIENE
VOL 3B 7425 -327 MA7B/J
QUICK DON MASK (2) CABIN AIR CLEANER SPOT (FLASHLIGHT) G1 CAMCDR/FLASH D2X/400 MM LENS 12-24MM LENS

A16 7490 -TBD STILL CAMERA BAG PILOT HAND CNTRL * PGSC DESK (2) * BOGEN BRACKET (2)
A17 7424 -304 DTV CAMCORDER BAG BINOCULARS CC SYSTEM BAG QUICK DON MASK (4) HATC H TOOL

VOLUME D TBD (MD52C) TILE REPAIR/ RCC TOOLS CCC (2)
VOLUME F 1403 -306 (MD76M) WET TRASH
VOLUME G 1800 -346 (MD80R) CWC (2) CONT UCDS WASTE MGMT ODOR BACT FLTR

VOLUME H 8068 -TBD (MD23R) EVA ACCESS (INBD)
4575 WMC 0914 -315 (MA82H) -332 TOWELS AND RESUPPLY ITEMS WMC DISPENSER
EVA ACCESS (OBD)
1ST DAY CLOTH SUPA (1) 1641-TBD

5555 EXT A/L 5557 -TBD -TBD 2-EMUs EXT A/L FLOOR TBD CCC(2) /DIDB (8) 1 LCVG 85' TETHERS (2) SAFER (1)
--

TOTAL LIOH (43) LIOH BOX (7435-TBD) 29 LIOH IN LIOH BOX & 1 ATCO 2 INSTALD 12 MIDDECK STOWED * 6 G-SUITS

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

WINDOW SHADE BAG- (5548--TBD)
1. WINDOW SHADES
2. IFM CABLES & HOSES 4259-344
3. PANEL COVERS
4. OCA CABLE (B/U)
5. ZIPLOCK 36 X 36 (10)
6. ZIPLOCK 24 X 24 (6)

L10A1: AVIU (6686-338)
L10A2: DTV MUX
L10A3: DTV/VTR/VIP
L11A1: PDIP 2
L11A2:A3: OIU 1 & 2
L12A1: SSP 1
L12A2: SSP 2
L12A3: PDIP 1
R12A1: VPU
R12A2: OBSS/OPP

CTB HLF SGL
LAUNCH TBD TBD TBD
RETURN TBD TBD TBD

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

SEAT 7 TBD
S7 REPLACEMENT BAG ISS TBD EQUIP (3 MLE)

MD CEIL (PORT 1) TBD RCC
SAFER HAND CONTROLLER/ (DCM HARD MOUNT)
MD CEIL (PORT 2) 1374 -302

MD CEIL (STBD)
3RD EMU

MD FLOOR (PORT 2) TBD
⊗ ISS RESERVE

MD FLOOR (PORT 1) TBD
⊗ ISS TBD EQUIP

MD FLOOR (STBD 2) 1381 -303
EVA EQUIPMENT

MD FLOOR (STBD 1) 1386 -304
⊗ ISS TBD EQUIP
WATER TRANSFER EQUIP.

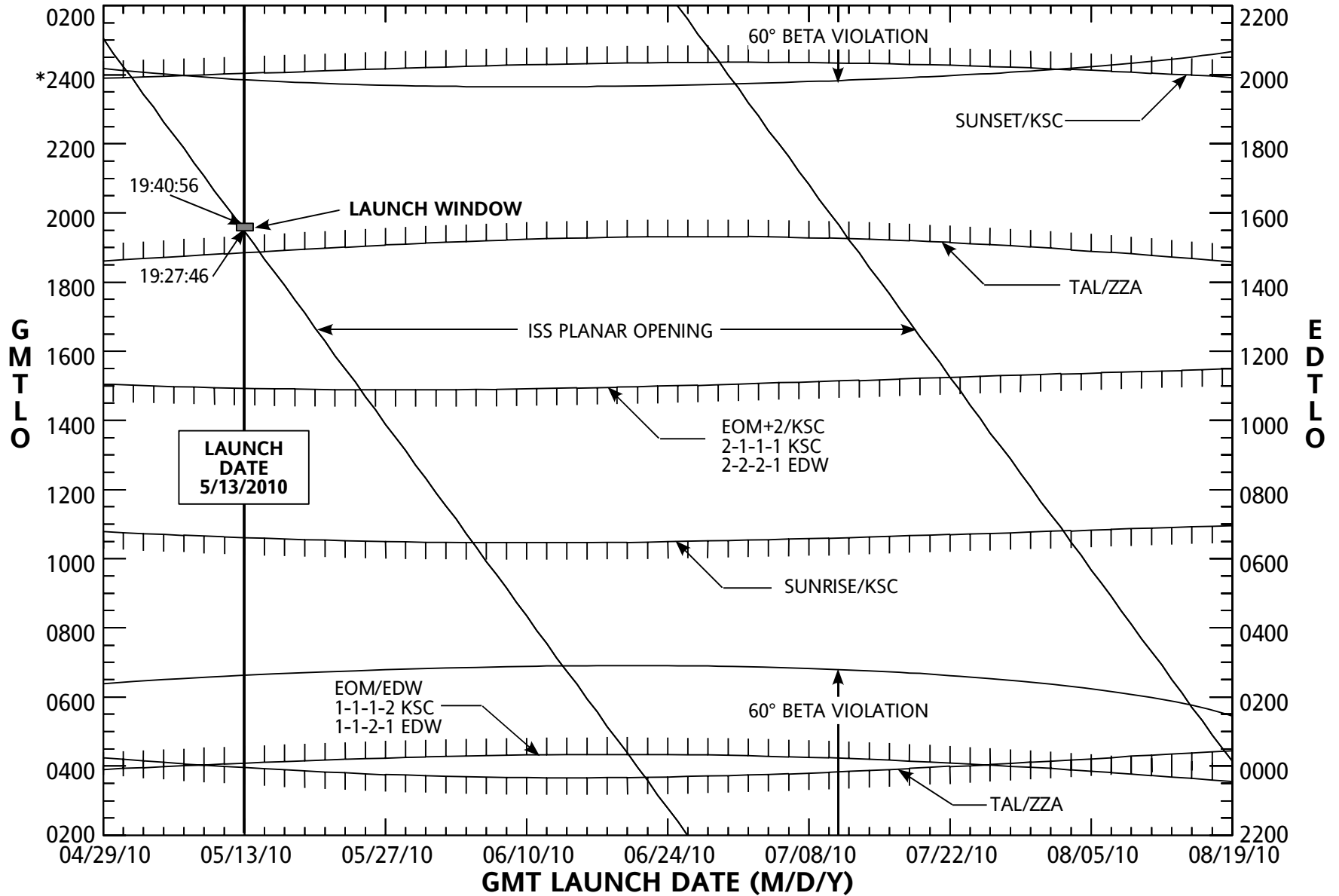
DWG NO. SGD32104455
CCMM: DELLA WYLIN
281-483-9790
/USR/DWGS/LOCKER/STS-132

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 (SGD32104455)

Mission Duration = 11+1+2
 Inclination = 51.6°
 OMS2 ha/hp = 124 x 85 nmi.
 Target ha/hp = 203 x 198 nmi.

STS-132 OCF LAUNCH WINDOW

N. Wortham/USH-483L
 P. Gentry/USH-483L
 May 14, 2009



Note: EOM lighting lines, based on an OMS2 phase angle of 178 deg. are representative only.
 The ISS beta angle ($|\beta| < 60^\circ$) for mated operation is beginning ~ 1/20:43:08 MET (FD3 Rendezvous) and ending ~ 9/15:22:00 MET.
 * Indicates the dateline. Launch times above this point are on subsequent days from the date indicated on the corresponding date axis



STS-132 Launch Site Flow Review

Presenter **Kenneth Nowak**

Date **10-22-09**

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** **2**
 - **One or more disciplines with impacts, documentation approved and/or pending approval** **0**
 - **Possible impacts still under review** **0**

1MRC5 REPT. 4650-1
PAGE NO. 1

SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0132

ORB

ECP-MCR/KIT SEQUENCE

RUN TIME

09:56 DATE 10/14/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIO	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
S-J6275A	AUTH	J6275A	0104 002	ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION
2008-02-26	MAND		SPAR	CORROSION SAMPLING CAPABILITIES WILL BE PROJECTED AT THE
	KSC			LSFR, AND FINALIZED AT DLSFR FOR EACH FLOW.
	032			
S-J6341A	COMP	J6341A	0104 001	EVALUATION OF OMS POD LI-900 TILE INSTALLED ON 0.090" SIP
2008-04-09	MAND		SPAR	TILES REMOVED AND REPLACED DURING FLT 30 PROCESS.
	KSC			
	032			
S-J6399	AUTH	J6399	0104 001	0-GAUGE PROTECTION FOR OV-104, FLIGHTS 31-35
2008-10-03	MAND		SPAR	
	KSC			
	032			
S-J6410	AUTH	J6410	0104 001	AFT STUB CRACKED TILE INSPECTION
2008-09-18	MAND		SPAR	
	KSC			
	032			
S-J6501	AUTH	J6501	0104 001	STS-129 CIH CLOSE CLEARANCE MEASUREMENTS
2009-04-28	MAND		SPAR	POST FLIGHT WORK
	KSC			
	032			
S-J6516A	COMP	J6516A	0104 001	WLE JOGGLE REGION IR THERMOGRAPHY REQUEST FOR HIGH LINE SCAN
2009-06-16	MAND		SPAR	WF PANELS WORK ACCOMPLISHED DURING FLIGHT 31
	KSC			
	032			

S-J6527	AUTH J6527 MAND KSC 2009-07-02	0104 001	FRCS THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L
		SPAR	OV-104 (FRC4) FLT 32
S-J6528	AUTH J6528 MAND KSC 2009-07-06	0104 001	PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION
		SPAR	OV-104 FLT. 32
S-J6543	AUTH J6543 MAND KSC 2009-09-17	0104 001	ET FERRY FLIGHT DOOR ATTACH FITTING INSPECTION
		SPAR	NDE OF FERRY FLT DOOR ATTACH FITTINGS WILL ONLY BE REQ'D FOLLOWING F/FLT BACK TO KSC. FERRY FLT ONLY.
S-J6559	AUTH J6559 MAND KSC 2009-10-01	0104 000	UPPER AFT STUB TILE INSPECTION FOR IN-PLANE CRACKS
		SPAR	
S052924DA	AUTH K6566 SCHD KSC 2009-10-13	0104 001	SSME NOZZLE PURGE HOT WALL CORROSION PREVENTION
		NSW	
TOTAL MODS =		11	

1MRCS REPT. 4650-1
PAGE NO. 2

SSP SUMMARY MOD ITEMS - PRCBD MOD BASE LINE STS-0132

PIH

ECP-MCR/KIT SEQUENCE

RUN TIME

09:56 DATE 10/14/2009

PRCB	STAT	ITEM/KIT NUMBER	SEQ	
MCR/ECP	PRIO	TCTI NUMBER	EISN NO.	DESCRIPTION / GENERAL REMARKS
AUTHDATE	SITE			
	FLT			
008851	APPD	TCTIM0008851REF	0001 000	ADD HARDWARE REQUIREMENTS IN SUPPORT OF STS-132
NOT REQD	MAND			
	KSC			ADDED PER THE RELEASE OF EO V787-340035 A02

TOTAL MODS = 1

Approved STS-132 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
		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
		S053299YG WK10723 (A)	OMRSD WAIVER REQUEST - RIGHT OMS FUEL CV501 ELEMENT 4 LEAK CHECK FAIL(WK10723)	0021	038 040
	ORB	S053299BLR1 WK10600R2 (A)	OMRSD WAIVER REQUEST - OXYGEN SYSTEM 1 RELIEF VALVE FAILED RESEA	104	029 032

TLEAKAGE (WK10600R3)

RCS	S053296GY WK10188R1 (A)	OMRSD WAIVER REQUEST - LRCS OXIDIZER GHE ISOLATION VALVE LEAK(WK 10188R1)	0014	025 032
	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

Approved STS-132 OMRS Waivers and Exceptions

		PRCBD NUMBER			EISN	STS	BEG	END
WVR	ELEMENT	WAIVER# (STAT)	ABSTRACT					
EXC	PROJECT	(INITIAL STS)	RAS REQUIREMENTS		PAYLOAD			
W	RCS	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

+-----+												
0		0	Waivers	0	Except	0	Deviat	0	Cannib	0	Total	0
+-----+												
0	Total Extracted	0	9	0	4	0	0	0	0	0	13	0
+-----+												

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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	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
325	S061956	07/15/03	Blanket on the Control Moment Gyro (CMG) Orbital Replacement Unit (ORU) on the Lightweight MPESS Carrier (LMC) will NOT 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	<p>The following requirement is waived to allow OV-104 to fly with the following out-of-configuration condition:</p> <p>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.</p>	OV-104, Flight 27 thru OV-104, Flight 999	STAYS OPEN
339	S063652	07/09/07	<p>The following requirement is waived to allow OV-104 to ferry from DFRC to KSC with the following out-of-configuration condition:</p> <p>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.</p>	OV-104, Flight 28	

Prepared by: Jeff McRoberts
USA CM/CVAS
861-2505

10/15/2009

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>	

ACTIVE WAIVERS FOR
OV-104

Item #	Authority	Date	Waiver Description	Effectivity	Wad
351	S115125BR9	06/03/2009	<p>Allow OV-104 to ferry from DFRC to KSC with out-of-configuration conditions for removal of Flow Control Valve (FCV) assemblies for ferry flight and install Main Propulsion System (MPS) cap and plug set GSE plugs:</p> <p>Three MPS GH2 FCV solenoid and poppet sleeve assemblies (P/N 80420-1301) for each engine.</p> <p>Engine 1 GH2 FCV LV56 Engine 2 GH2 FCV LV57 Engine 3 GH2 FCV LV58</p> <p>NOTE: The following MPS cap and plug set GSE plugs will be installed in place of the Flow Control Valve System (FCSV): 3 G070-602824-001.</p> <p>RATIONALE: There is adequate access and time to remove the requested parts. Removal of these parts is well within USA's experience base. These valves have been removed numerous times at KSC. Removal at DFRC will be no different than removal at KSC. There is no increase in risk performing this work at DFRC, and the early removal will better support the upcoming manifest. There is no GH2 FCV position specified for ferry flight, and no blanket pressure is required. The manifold is firmly mounted/restrained and requires no additional support due to removed FCV components.`</p>	OV-104, Flight 30 (Ferry Flight)	