Program Freeze Point

PRCB Presentation

S115132A
Baseline the STS-132 Mission Specific Requirements and Flow Plans. This CR and the associated Data Package were reviewed at the 09-21-09 FRWG.

<table>
<thead>
<tr>
<th>Flight Operation &amp; Integration*</th>
<th>MO3/USA-PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orbiter Engineering*</td>
<td>Requesting Approval</td>
</tr>
<tr>
<td>Payload/Cargo Engineering*</td>
<td>Requesting Approval</td>
</tr>
</tbody>
</table>

**Status in BackUp**

<table>
<thead>
<tr>
<th>KSC Integration*</th>
<th>MK-SIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight Software</td>
<td>USA-FSW</td>
</tr>
<tr>
<td>Orbiter GFE</td>
<td>MV5</td>
</tr>
<tr>
<td>EVA</td>
<td>XA</td>
</tr>
</tbody>
</table>

| SSME | Status at LSFR | MP21 |

*Backup material included*
STS-132/ISS ULF4

Launch Site Requirements Review (LSRR)

Flight Requirements Status

FRWG Sept 21, 2009

PRCB Sept 24, 2009

Phyllis Grounds, MO3 MIM
Robert Reynolds, USA Flight Mgr.
**STS-132 Payload Integration Services/Interfaces**

**ECSH** will be removed

**PDGF (Up)**
- ICAPC

**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

**ICC-VLD 2nd Flight**
- Deployable
  - 4 active longeron latches (fwd primary)
  - 1 active keel latch

**Middeck Powered Payloads**
- CGBA-X (Up/Dn)
- CGBA-2 (Up/Dn)
- GLACIER - rear breather (36 CFM) (Up/Swap/Dn)

- Note – SPDU supports OBSS
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
PPSU, ROEU, ECSH, SPDU

PAYLOAD
ISS-ULF4
(MRM1, ICC-VLD)

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 ~76 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
PERFORMANCE MARGIN

- Simulation Margin (CIRAF'132) +3385

- Weight Changes Since Simulation
  - Payload -199
  - Operator +247
  - Crew Compartment +30
  - MPS Prop (not inert) +260
  - ET +3
  - Reconstructed Ascent Perf Collector -94
  - Total Weight Changes +247 -247

- Other Performance Projections
  - Protection for DOL Dispersions -700
  - Usable Impulse for MPS BGT GEN0901S -17
  - SRB – M.P. Updates -171
  - SRB – BR / 1.80 MIL HIGHER THAN 0.3705 AVG +360
  - ISP/Thrust for GEN Block 2 @ 104.5% +6
  - Proj to 5 Min Window from Inplane -600
  - Performance Changes Adjustment +17

- Current Baseline APM (09/22/09) +2033

- IPT Projections
  - ISP/Thrust for SSME 2052, 2051, 2047 +25

- IPT Projected APM +2058
FLIGHT MASS PROPERTIES
WEIGHTS AND CG’S ARE WITHIN ACCEPTABLE LIMITS

<table>
<thead>
<tr>
<th>CASE</th>
<th>WEIGHT pounds (LIMIT)</th>
<th>TOUCHDOWN X C.G. inches (LIMIT)</th>
<th>MACH 3.5 X C.G. inches (LIMIT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMINAL</td>
<td>209732 (233000)</td>
<td>1077.9 (1075.7)</td>
<td></td>
</tr>
<tr>
<td>RTLS</td>
<td>236568 (245000)</td>
<td>1081.4 (1077.2)</td>
<td></td>
</tr>
<tr>
<td>TAL</td>
<td>234895 (244000)</td>
<td>1082.5 (1077.2)</td>
<td></td>
</tr>
<tr>
<td>AOA</td>
<td>231203 (242000)</td>
<td>1079.9 (1075.7)</td>
<td></td>
</tr>
<tr>
<td>CONT RTRN</td>
<td>211584 (233000)</td>
<td>1078.0 (1075.7)</td>
<td></td>
</tr>
</tbody>
</table>

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 09/22/09.
STS-132 LSRR
OV-104 FLIGHT 32
CONFIGURATION UPDATES
PRCB
September 24, 2009

Alvin Jenkins USA Orbiter Element
Elena Seastrom Boeing VPE
Program Authorization Is Requested For The Following:

- MECSLSI Updates
  Note: No Orbiter Modifications have been identified to date for implementation

Information Only:

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

Back-up:

- TPS Risk Reduction Priorities List and Allocation Breakdown
Update the V072-200212 MECSLSI with the following tech order changes:

- **External Airlock (Mission Kit MV0828A)**
  - Remove M072-341828-023
  - Add M072-341828-029
    - Paper Clean up only to correct the dash number configuration

- **RMS End Effector (Mission Kit MV0082A)**
  - Remove M072-544502-036
  - Add M072-544502-033
    - Paper Clean up only the current end effector will remain on the vehicle
Potential Mission Equipment Modification

• Starboard Lightweight Tool Stowage Assembly (LWTSA)
  – The final Starboard LWTSA configuration is being identified and may require a cushion modification
<table>
<thead>
<tr>
<th>CHIT</th>
<th>TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J6275A</td>
<td>ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION</td>
</tr>
<tr>
<td>J6399</td>
<td>0-GAUGE PROTECTION FOR OV-104, FLIGHTS 31-35</td>
</tr>
<tr>
<td>J6410</td>
<td>AFT STUB CRACKED TILE INSPECTION</td>
</tr>
<tr>
<td>J6501</td>
<td>STS-129 CIH CLOSE CLEARANCE MEASUREMENTS</td>
</tr>
<tr>
<td>J6527</td>
<td>FRCS THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L</td>
</tr>
<tr>
<td>J6528</td>
<td>PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION</td>
</tr>
<tr>
<td>J6543</td>
<td>ET FERRY FLIGHT DOOR ATTACH FITTING INSPECTION (Ferry flight only)</td>
</tr>
<tr>
<td>J6559</td>
<td>UPPER AFT STUB TILE INSPECTION FOR IN-PLANE CRACKS (In review)</td>
</tr>
<tr>
<td>K6561</td>
<td>GROUND LIGHTNING MONITORING SYSTEM (GLMS) (In review)</td>
</tr>
</tbody>
</table>
Potential Chit

• **W2 and W5 Windows Torque Increase**
  
  – Chit J6536 performed torque checks on OV-105 W1, W3, W4, W5 and W6
  
  • Results showed windows are still experiencing torque loss
  
  – 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
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
- Exception and Program accepted risk would be required if inspections are not performed in full prior to January 22, 2010
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
- APU wetted time extension options were presented at the LOCCB on 9/17/2009: Option approved to seek extension based on Disassembly and Inspection of the Fleet Leader at the Vendor
  - The testing will be complete in mid-December
- APU removals will not be required during the STS-132 flow, if the APU wetted life is extended to 6 years
STS-132
ISS-ULF4 – MRM1 / ICC-VLD
Launch Site Requirements Review

Payload Cargo Engineering Status

Yvette Carmona
281.212.6492
FRWG: 09/21/09
PRCB: 09/24/09
STS-132 LSRR

Engineering Flight Product Status

<table>
<thead>
<tr>
<th>Drawing Title</th>
<th>Rev</th>
<th>EO</th>
<th>Released</th>
</tr>
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<tbody>
<tr>
<td>V072-200212 MECSLSI</td>
<td></td>
<td>New</td>
<td>06/30/09</td>
</tr>
<tr>
<td>VA72-200212 Cargo Arrangement Drawing</td>
<td></td>
<td>New</td>
<td>07/01/09</td>
</tr>
<tr>
<td>VD72-200212 Avionics Interface Diagram</td>
<td></td>
<td>New</td>
<td>07/01/09</td>
</tr>
<tr>
<td>VS72-200212 Integrated Avionics Schematic</td>
<td></td>
<td>New</td>
<td>07/01/09</td>
</tr>
<tr>
<td>VS70-540424 Retention Schematic Diagram</td>
<td></td>
<td>New</td>
<td>06/29/09</td>
</tr>
</tbody>
</table>

Engineering Open Work

- FRED ECD: 10/20/09
  - Includes MECSLSI changes for External A/L, RMS EE, and TSAs

Rescue-Flight Status

- STS-132 Reconfiguration Engineering Products will be developed by the standard Flight To Follow (FTF) process
Mission-Unique Deviation to NSTS 60523

Background

- NSTS 60523, Orbiter/Payload Integration Standardization Document, defines a standard payload avionics configuration for all vehicles and requires PRCB approval for changes or mission-unique exceptions

- Request authorization to revise 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

Recommendation

1. Revise number of MDM PF-1 and PF-2 DIHs required since MRM-1 power #2 signal will no longer be used

2. Provide additional cabling to support MRM-1 cable changes (includes 1553 service)

(See Backup for details of changes)
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
Backup Material

FRWG Presentation (With Minor Changes)
FO&I Backup Charts
STS-132 FRD Revision 005, dated August 25, 2009:  [https://sspweb.jsc.nasa.gov/efrd/](https://sspweb.jsc.nasa.gov/efrd/)

**Projected CR’s**

1. Add EVA Hardware to support MRM1 Contingency Operations.
2. Delete ECSH and PPSU
1. ULF 4 MIP (NSTS 21541)

- Current version available on PILS: Basic + Change 4, dated 8/18/09
- Open CR’s — none
  - CR 0009 closed 9/15/09, “Electrical Power Table 5-1 Cabin Payload bus to MRM1” in editing
- Pending CR’s:
  - Update to Appendix E, pending FPSR assessment
  - Update to launch package control weight
  - ICC VLD updates to delete LTA cable task and associated power requirements
  - Purge requirements, section 9
  - TBD closures -

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
Flight Definition and Requirements Document (FDRD)

Pending CR to delete the Sidewall SPA BEAM, PPSU, and ECSH and incorporate ICAPC/PDGF.
Back-up

• TPS Risk Reduction Priorities List and Allocation Breakdown
Mandatory (everyflow expectation)

- Flight damage, OMRS Rqmts/Chits, LRU access, & deferred work
  - 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

Multi-flow Chits

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)
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

<table>
<thead>
<tr>
<th>Priority Number</th>
<th>Total</th>
<th>OV-103</th>
<th>OV-104</th>
<th>OV-105</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BRI-18 Tile - MLGD FWD O/B Corner</td>
<td>28</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>2. BRI-18 Tile - MLGD FWD Edge</td>
<td>22</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>3. BRI-18 Tile - MLGD O/B Side</td>
<td>18</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>4. BRI-18 Tile - STR side of ET Doors</td>
<td>20</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>5. BRI-18 Tile - LESS Carrier Panels 8-10 (103 &amp; 104)</td>
<td>24</td>
<td>complete</td>
<td>complete</td>
<td>n/a</td>
</tr>
<tr>
<td>6. BRI-18 Tile - STR side of ET Doors I/B</td>
<td>8</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
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<tr>
<td>7. Inboard Elevon “Hub” Tile Mod</td>
<td>4</td>
<td>complete</td>
<td>2</td>
<td>complete</td>
</tr>
<tr>
<td>8. I/B Elevon 9lb/90 SIP</td>
<td>34</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>9. O/B Elevon 9lb/90 SIP</td>
<td>6</td>
<td>complete</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>10. MLGD – Outboard Middle 1/3</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>11. ET Door remaining STR side</td>
<td>40</td>
<td>1</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>12. MLGD - Outboard AFT 1/3</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>13. Nose Area 9lb/90 SIP</td>
<td>14 (16&lt;sup&gt;OV103&lt;/sup&gt;)</td>
<td>3</td>
<td>complete</td>
<td>0</td>
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<tr>
<td>14. Base Heat Shield 9lb/90 SIP</td>
<td>42</td>
<td>10</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>15. Body Flap Stub &quot;Piano Key&quot; tiles</td>
<td>40</td>
<td>1</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>16. Gap fillers in Subset 2B</td>
<td>5 Zones</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>17. Remaining BRI-18 - MLGD (top priority) / ET / LESS carrier panels / NLGD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLGD 100</td>
<td>MLGD 0</td>
<td>MLGD 1</td>
<td>MLGD 0</td>
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</tr>
<tr>
<td>NLGD 123</td>
<td>NLGD 15</td>
<td>NLGD 19</td>
<td>NLGD 47</td>
<td></td>
</tr>
<tr>
<td>LESS 68 (92&lt;sup&gt;OV105&lt;/sup&gt;)</td>
<td>LESS 7</td>
<td>LESS 5</td>
<td>LESS 19</td>
<td></td>
</tr>
<tr>
<td>ET Door 28</td>
<td>ET Door 5</td>
<td>ET Door 2</td>
<td>ET Door 1</td>
<td></td>
</tr>
<tr>
<td>18. Mod work LESS internal</td>
<td>44 locations</td>
<td>40</td>
<td>complete</td>
<td>complete</td>
</tr>
<tr>
<td>19. Remaining Gap Fillers &amp; Window BRI-18</td>
<td>124</td>
<td>3</td>
<td>2</td>
<td>19</td>
</tr>
</tbody>
</table>
TPS Priorities

- Corrosion Sampling: 10%
- BRI 18 (MLGD & ETD): 34%
- Putty Repair: 33%
- 9 lb on 90 SIP (Nose then Base Heat Shield area): 23%

Example

<table>
<thead>
<tr>
<th></th>
<th>60 tile Allocation at DLSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion Sampling</td>
<td>6</td>
</tr>
<tr>
<td>BRI-18 MLGD &amp; ETD</td>
<td>20</td>
</tr>
<tr>
<td>Putty Repair</td>
<td>20</td>
</tr>
<tr>
<td>9 lb on 90 SIP</td>
<td>14</td>
</tr>
</tbody>
</table>

- 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
Payload Cargo Engineering

Backup Charts
Replace standard payload bay cables with mission unique software deviations.

Add 1 standard payload bay cable.

### Rationale
- The PSSU requires monitoring of internal heaters via MDM-PF-1 and PF-2.
- The PSSU requires monitoring of terminal computers, power, fire alarm systems, and smoke detectors. The MRM1, using CAL-1, uses DILS signals for the fire alarm system and smoke detector monitoring. A total of two MDM-PF-2 DILS are required for MRM1.
- MRM1 also requires 1553B bus for all essential command and telemetry signals.
OMRSD

• FII V2 Payload (Post-Mate)
  Baseline Files
  • None

  RCNs
  • PP18083   P541 – ULF-4 Integrated OMRS Baseline   10/06/09

• FII V4 (Pre-Mate)
  RCNs
  • DPS13014   Early Mission-Unique List (MUL)   09/29/09
  • DPS12985   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
  • MIP U/D Input  (Purge and radiator flow)   In Work
  • Waiver Requirement for Purge OMRS violation   09/29/09 U/R
Annex 1: ISS-ULF4-NSTS 21541-A01

Activity

• Baseline

• L-4M Update
  – Customer Submittal
  – CR Approval
  – ECD: 07/31/09A

• L-1M Update
  – Customer Submittal
  – CR Approval
  – Final weight Log
  – ECD: 04/13/10
# STS-132 LSRR

## Time-Critical Ground Handling Requirements

<table>
<thead>
<tr>
<th>Activity</th>
<th>ECD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Submittal</td>
<td>01/13/10</td>
</tr>
<tr>
<td>Release for Review</td>
<td>02/12/10</td>
</tr>
<tr>
<td>Baseline</td>
<td>03/14/10</td>
</tr>
</tbody>
</table>

### Issues / Concerns

- None
STS-132 LSRR

Payload ICDs/PIRNs

• All Payload-Unique ICDs are baselined

• PIRNS that impact Flight Products:

<table>
<thead>
<tr>
<th>PIRN #</th>
<th>ICD/Payload</th>
<th>Title</th>
<th>ECD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A05781</td>
<td>ICD-A-21541-VLD2</td>
<td>Update Mechanical Figures</td>
<td>11/09/09</td>
</tr>
</tbody>
</table>

• Issues / Concerns
  – None
STS-132 LSRR

Cargo Integration Hardware Status

• Open Work
  – None

• New Build Hardware
  – 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 – V845-774986-001 (New) 12/04/09 (U/R)
  – PLB Harness – V845-774784-005 (Mod)
    • New Build Harness Leg – V845-774787-001 12/10/09

• Issues/Concerns
  – None
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 Requirements Review
Flight Software Overview

Tom Stansel
USA FSW

PRCB 09/24/09
STS-132 LSRR (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)
  – Fifth scheduled flight of MEDS IDP VI 07.00/MDUF VI 06.00 (SASCB SCR 98113 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 LSRR (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

- Potential MEDS IDP SW VI 07.01 Point Release applicable to STS-132 (pending SASCB approval)
  - DR 121432A Corrupted DK Bus Message Causes IDP Software to Halt
STS-132 LSRR (FSW)

• **Products**
  - STS-132/OV-104 Base delivery schedule (available to field)
    - FPSB
  - Shuttle Data Tape October 16, 2009
  - Mass Memory Unit 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 February 05, 2010
  - ADTL Mass Memory Unit February 15, 2010

• **Open Items**
  - None

• **Concerns/Issues**
  - No issues or concerns with STS-132 at this time
STS-132 LSRR
Flight Crew Equipment/GFE

Kenneth Brown
Manager, GFE & Flight Crew Equipment Office
Johnson Space Center
• 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
BACKUP
**Tech Order numbers are identified for reference only. Report generated Sep 9, 2009.**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Tech Order</th>
<th>KSC Eng Need</th>
<th>Eng(TO) Release</th>
<th>In MEC</th>
<th>Cert O/C</th>
<th>HDW Need</th>
<th>HDW Planned</th>
<th>Comments</th>
<th>JSC Contact</th>
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<tr>
<td>A (port forward)</td>
<td>M072-750025-076</td>
<td>1/26/10</td>
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<td>2/26/10</td>
<td>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).</td>
<td>Randall Moore</td>
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<td>B (port aft)</td>
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<td>C (starboard aft)</td>
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<td>Payload Ops camera</td>
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<td>1/8/10</td>
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<td>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.</td>
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<tr>
<td>SRMS elbow camera</td>
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### Tech Order numbers are identified for reference only. Report generated Sep 9, 2009.

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<tr>
<th>Hardware</th>
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<th>HDW Planned</th>
<th>Comments</th>
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<td>Camera from STS-130/OV-105 after repressurization.</td>
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<td>2/26/10</td>
<td>SP1/PTU from STS-130/OV-105</td>
<td>Russell Yates</td>
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EVA Status
STS-132/ULF-4
Launch Site Readiness Review

Bridget Ziegelaar
EVA Office
Johnson Space Center
September 24, 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 inspection

• **Lightweight Port TSA**
  - Port LWTSA installation – Tech Order: M072-660850-005
  - Port LWTSA Tools installation – Tech Order: M072-660853-002

• **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
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
Mandatory RCNs:
NONE

Non-Mandatory Value Added RCNs:
NONE
The Drawings Baseline Was Released By PRCB S0115132 on 08-20-09

- V072-000001-288 (Rev. WC01) Space Shuttle System (Rel. 09-02-09)
- V072-200212-001 (Rev. NEW) Mission Equipment Cargo Support (Rel. 06-30-09)
- SGD32104455-401 (Rev. TBD) Crew Compartment Configuration (Rel. TBD)
  -402 Descent
- 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 LSRR + 18 days Mission Configuration Product Plan (MCP) will be published on 10-12-09 and will be republished at ORR -14 days on TBD.
SSP System Drawings – (Continued)

Ferry Configuration

- V072-000001-289 (Rev. WC01) Space Shuttle System Drawing (Rel. 09-02-09)
- V072-200212-002 (Rev. NEW) Mission Equipment Cargo Support (Rel. 06-30-09)
- SGD321004455-001 (Rev. TBD) Crew Compartment Configuration (Rel. TBD)
- V072-300055-025 (Rev. BU) Ferry Flight Configuration (Rel. 05-11-09)

SCA 911
Modification Impact Report

• Mission Equipment Modifications and Orbiter Modifications analyzed for impacts to OMRSD, LCC, ICD, EMI, Software, and GSE.

• A total of 3 MCRs have been approved and/or pending mods

• Current MCR impact status:
  
  • No impacts for all six disciplines 3
  • One or more disciplines with impacts, documentation approved and/or pending approval 0
  • Possible impacts still under review 0
ST SPE捅give
LAUNCH WINDOW

19:40:56
19:27:46
LAUNCH WINDOW
ISS PLANAR OPENING

LAUNCH DATE
5/13/2010

EOM+2/KSC
2-1-1-1 KSC
2-2-2-1 EDW

SUNSET/KSC
TAL/ZZA

EOM/EDW
1-1-1-2 KSC
1-1-2-1 EDW

60° BETA VIOLATION
SUNRISE/KSC

TAL/ZZA

Note: EOM lighting lines, based on an OMS2 phase angle of 178 deg, are representative only.
The ISS beta angle (|\(\beta\)| < 60°) for mated operation is beginning -- 1/20 03:08 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.

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<td>KSC</td>
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<td>ORBITER STRUCTURE IML SURFACE CORROSION SAMPLING INSPECTION</td>
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<td>CORROSION SAMPLING CAPABILITIES WILL BE PROJECTED AT THE LSFR, AND FINALIZED AT DLSFR FOR EACH FLOW.</td>
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AUTH  J6516A          0104 001  WLE JOGGLE REGION IR THERMOGRAPHY REQUEST FOR HIGH LINE SCAN
S-J6516A          MAND                   KSC                   SPAR      WF PANELS
2009-06-16       032

AUTH  J6527           0104 001  FRCS THRUSTER CANISTER STUD INSPECTIONS - F5R AND F5L
S-J6527           MAND                   KSC                   SPAR      OV-104 (FRC4) FLT 32
2009-07-02       032

AUTH  J6528           0104 001  PUTTY REPAIR TILE REPLACEMENT FOR RISK REDUCTION
S-J6528           MAND                   KSC                   SPAR      OV-104 FLT. 32
2009-07-06       032

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**TOTAL MODS = 1**
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<td>S053298ZC EK10572R1 (A)</td>
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<td>ORB</td>
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TLEAKAGE (WK10600R3)

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

S053296YG WK10318R1 (A) OMRSD WAIVER REQUEST - RIGHT RCS OXIDIZER GHE SYSTEM INTERNAL LEAKAGE (WK10318R1)

S053298JF WK10503 (A) OMRSD WAIVER REQUEST - RRCS OX TANKOUTLET TRANSDUCER ACCURACY (WK 10503)
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<td>OMRSD WAIVER REQUEST - LEFT REACTION CONTROL SYSTEM FUEL GHE ISO LATIONVALVE LEAKAGE (WK10634)</td>
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<td>LH FWD AND RH MID SRB JOINT TEMP SENSORS (STS-103)</td>
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Waivers  Excep  Deviat  Cannib  Total  
+---------------------------------------------------------------+  
Total Extracted  9  4  0  0  13  
+---------------------------------------------------------------+
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**Constraints**

1 = ET/SRB MATE  
2 = OPF ROLL  
3 = VAB ROLL  
4 = LAUNCH  
O = ORBITER  
M = MISSION EQUIP.
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Constraints
1=ET/SRB MATE  3=VAB ROLL
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Elements
O=ORBITER
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