

# STS-116 Integrated Launch Site Flow Review

Presenter

Josh Krupnick

Date

06-22-06

## Program Freeze Point

## PRCB Presentation

## S115116P

# STS-116 Integrated Launch Site Flow Review

Presenter  
**Josh Krupnick**  
Date  
**06-22-06**

Baseline the STS-116 Mission Specific Requirements and Flow Plans.

This CR and the Associated Data Package were reviewed at the 06-19-06 FRWG.

KSC Integration*		MK-SIO
<u>Orbiter Engineering*</u>	<u>Requesting Approval</u>	<u>USA-OE</u>
EVA*		XA
<u>SSME</u>	<u>Requesting Approval</u>	<u>MP21</u>
Shuttle Processing*		PH-B2

## Status in BackUp

Flight Integration		MO3/USA-PI
Flight Software		USA-FSW
GFE/FCE		MV5
Payload/Cargo Engineering		USA-PI
ISS/Payload Operations		UB-1



<b>STS-116 Integrated Launch Site Flow Review</b>	Presenter	Greg Katnik
	Date	06-22-06

**Overview**

- Mission Description To Be Presented
- Performance Margin To Be Presented
- Flight Mass Properties To Be Presented
- Ferry Flight Mass Properties To Be Presented
- SSP System Drawings No Issues\*
- SSP Authorized Modifications/Non-Standard Work No Issues\*
- SSP ICD Changes (IRNs) No Issues
- SSP LCC Changes (LCNs) No Issues
- SSP OMRS Changes (RCNs) No Issues\*

\* Backup material included



# STS-116 LAUNCH SITE FLOW REVIEW

Presenter <b>G. KATNIK</b>
Date <b>JUNE 22, 2006</b>

## LAUNCH

12/14/06 NET  
 39B/ MLP1  
 CREW SIZE:6+1UP/6+1DOWN

## CONFIGURATION

OV-103 (33)  
 LP01;RP03  
 ET-123  
 BI-128  
 RSRM-95  
*PROPOSED:* (1) 2050 (2) 2054 (3) 2058  
 OI-30  
 RMS,ODS,OBSS

## PAYLOAD

ISS 12A.1-ITS	ISS 12A.1
P5, SPACEHAB	RAMBO
SM, ICC(W/STP-	MAUI
H2 UTILIZATION	
P/L)	

## ORBIT

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

## CONSUMABLES

CRYO TANK SETS	5 (FULL)
GN2 TANKS	6 (FULL)
FWD RCS	1912# (2446# FULL)
AFT RCS	4970# (FULL)
OMS	24931#

## LANDING

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

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



## STS-116 LAUNCH SITE FLOW REVIEW

Presenter  
 G. KATNIK

Date  
 JUNE 22, 2006

### PERFORMANCE MARGIN

• SIMULATION MARGIN (SPLAF116)		+3140
• WEIGHT CHANGES SINCE SIMULATION		
• PAYLOAD	+400	
• ORBITER	+33	
• CREW COMPARTMENT	-400	
• MPS	+34	
• ROUND OFF DEVIATION	<u>-1</u>	
TOTAL WEIGHT CHANGES	+66	-66
• OTHER PERFORMANCE PROJECTIONS		
• PROTECTION FOR DOL DISPERSIONS		-700
• PARTIAL PROJ FOR MPS BDGT		-20
• SRB M/P UPDATES		-128
• ISP/THST FOR GEN BLKII @ 104.5%		+111
• PROJ TO 5 MIN WINDOW FROM INPLANE		-600
• PERFORMANCE CHANGES ADJUSTMENT		<u>+4</u>
• CURRENT BASELINED APM (06/13/06)		+1741
• IPT PROJECTED CHANGES		<u>-555</u>
• PROJ APM W/IPT CHANGES		+1186
• PROJ ISP/THRUST FOR ENGINE SET 2050/2054/2058		<u>-129</u>
• PROJ APM		+1057

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



# STS-116 LAUNCH SITE FLOW REVIEW

Presenter <b>G. KATNIK</b>
Date <b>JUNE 22, 2006</b>

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

CASE	TOUCHDOWN		MACH 3.5	
	WEIGHT pounds (LIMIT)		X C.G. inches (LIMIT)	
NOMINAL	226187	(233000)	1078.3	(1075.7)
RTLS	238512	(245000)	1078.4	(1077.2)
TAL	236179	(244000)	1077.8	(1077.2)
AOA	233851	(242000)	1076.9	(1075.7)
CONT RTRN	230562	(233000)	1078.3	(1075.7)

NOTE: RTLS 25 SEC FRCS DUMP  
 TAL 65 SEC FRCS DUMP  
 2237 LBS. AFT FUS BALLAST



## STS-116 Launch Site Flow Review

Presenter Stephen Reilly

Date 06-08-2006 Page 1

- STS-116 Orbiter/Ferry Mass Properties Have Been Reviewed by Space Shuttle Program Integration and Are Within Specified Limits

Case	Ferry Weight (LB)	Center of Gravity (inch)		
		<u>X</u>	<u>Y</u>	<u>Z</u>
<u>Nominal</u> - Orbiter c.g. (SCA c.g.) (No CM Ballast, No Fluids Off-Loaded, No Payload Bay Opening)	225592	1112.3 (1408.1)	-0.7 (N/A)	373.7 (517.3)
<u>AOA</u> - Orbiter c.g. (SCA c.g.) (No Fluids Off-Loaded, No Payload Bay Opening)	230107	1112.7 (1408.5)	-0.7 (N/A)	374.6 (517.1)
<u>TAL</u> - Orbiter c.g. (SCA c.g.) (3 SSME's and No Fluids Off-Loaded, No Payload Bay Opening, Max Weight 217000 LB)	207654	1068.3 (1364.3)	-0.7 (N/A)	374.4 (519.3)

X c.g. Limits (Orbiter Coordinates)

Nominal = 1060.0 TO 1116.0  
 AOA = 1060.0 TO 1116.0  
 TAL = 1060.0 TO 1124.8

Z c.g. Limits (Orbiter Coordinates)

Nominal = 360.0 TO 380.0  
 AOA = 360.0 TO 380.0  
 TAL = 360.0 TO 380.0

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# **STS-116 LSFR OV-103 FLIGHT 33 CONFIGURATION UPDATES**

**Alan Ling  
USA Orbiter Element**

**June 22, 2006**



# STS-116 OV-103 Fit 33– LSFR Updates

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## Modifications To Be Baselined

- 2 Mods to be baselined as mandatory
- 1 Mod to be baselined as opportunity

## Previously Baselined Mods (Info only)

## Prioritized TPS / Structures Requirements

## New Requirements Since LSRR

## Authorization Requested for MECSLSI and CCCD Updates Due to STS-116 Orbiter Mods

- Incorporate updates to CCCD and V072-200195 (OV-103 Flight 33)

## Backup

- Engineering, Hardware and Certification Status for Proposed Mods
- Mandatory and Opportunity Modification Details

# STS-116 OV-103 Flt 33 – LSFR Mod Updates

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Two additional Mods to be baselined as mandatory for STS-116

- **MCR 19476 Improved Main Landing Gear Wheel & Tire Assembly**
  - Mod was worked during the STS-121 flow
  - Environmental seal was not applied to the temperature sensor mounted to the wheel
  - Seal will be applied during the STS-116 flow
  - Modification Deferral was processed for the STS-121 flow and presented and approved at the June 7, 2006 Daily PRCB
  
- **19755 MPM Guillotine Retention Fastener Mod**
  - Shoulder and pedestal MPM guillotine installation fasteners were found to have insufficient length during design review as part of an OV-105 anomaly investigation
  - Fasteners do not engage the insert locking feature and minimal number (~2) bolt threads engaged in the insert - are used to hold the wire harness separation guillotine for each MPM
  - Fasteners (4 ea per shoulder MPM and 3 ea for pedestal MPM) will be replaced with proper grip length fasteners to engage the locking feature of the inserts

# STS-116 OV-103 Flt 33 – LSFR Mod Updates

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- **One additional mod to be authorized for implementation on an opportunity basis**

- **To be worked if the time and resources become available**

## **19903 Sky Genie Track Fastener Modification**

Changes the Sky Genie track installation fastener design to eliminate an interference / close proximity condition to wiring behind the overhead closeout panels

## **One additional tech order update to the STS-116 V072-200195-003/-004 MECSLSI to be authorized**

(IS) M072-341828-027 External Airlock Inst (Model MV0828A)

(WAS) M072-341828-024

Carry-thru configuration from STS-121 MECSLSI EO to Follow change that corrected an external airlock bracket mounting fastener (washer) installation

# Previously Baselined Mods For STS-116 (From LSRR) Info Only

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## (3) Mandatory Mods

- 19849 Seat 7 Recumbent Rail Assembly Configuration
- 19755 RMS MPM Over Center Stop
- 19824 RMS MPM Xo911 Pedestal Insulation Cover Flush Head Fasteners (work w/ 19755)

## (9) Opportunity Mods

- 19743 BRI-18 Tile, MLGD
- 19546 Hub Tile
- 19874 BRI-18 Tile, Other Locations
- 19735 WLE Sneak Flow, Panels 1-4
- 19763 WLE Horse Collar Gap Filler, Panels 1-4
- 23227 Connector Savers, OMS & KU
- 17177 ODS Vestibule Duct Strap Deletion
- 19755 MPM Pyro Guillotine Mod To Eliminate Interference
- 23463 Window Fastener Torque Increase

# TPS / Structures Requirements

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Following were assessed for implementation into the STS-116 flow:

- In Flight Tile / Blanket Damage
- Deferred WADs
- Lockbolts
- Gap fillers
  - Inspect newly installed areas (1, 1A, 2A')
  - Pull test newly installed areas
  - R & R remaining areas (2A, 2B, 3)
- Corrosion Sampling
- TPS Mods
  - Bri-18 Tile NLGD
  - Bri-18 Tile Other locations
  - WLE Sneak Flow, Panels 1-4
  - WLE Horse Collar Gap Fillers, Panels 1-4
  - Hub Tile

# TPS / Structures Requirements

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The following denotes the order to be worked

## Mandatory

- In flight damage
- Deferred work items
  - Deferred work may be inspected and if acceptable deferred again

## Prioritized Opportunity

1. BRI-18 Tile on the MLGD fwd outboard corners (see maps on pages 8, 9)
2. Lockbolts (Chit J5897)
  - Prioritized by ones in which bays are planned on being opened
3. Corrosion Sampling (Chit J5930B)
4. Mod Work (Hub Tile, Bri NLGD & Other areas, WLE Sneak Flow, Horsecollar Gapfillers)

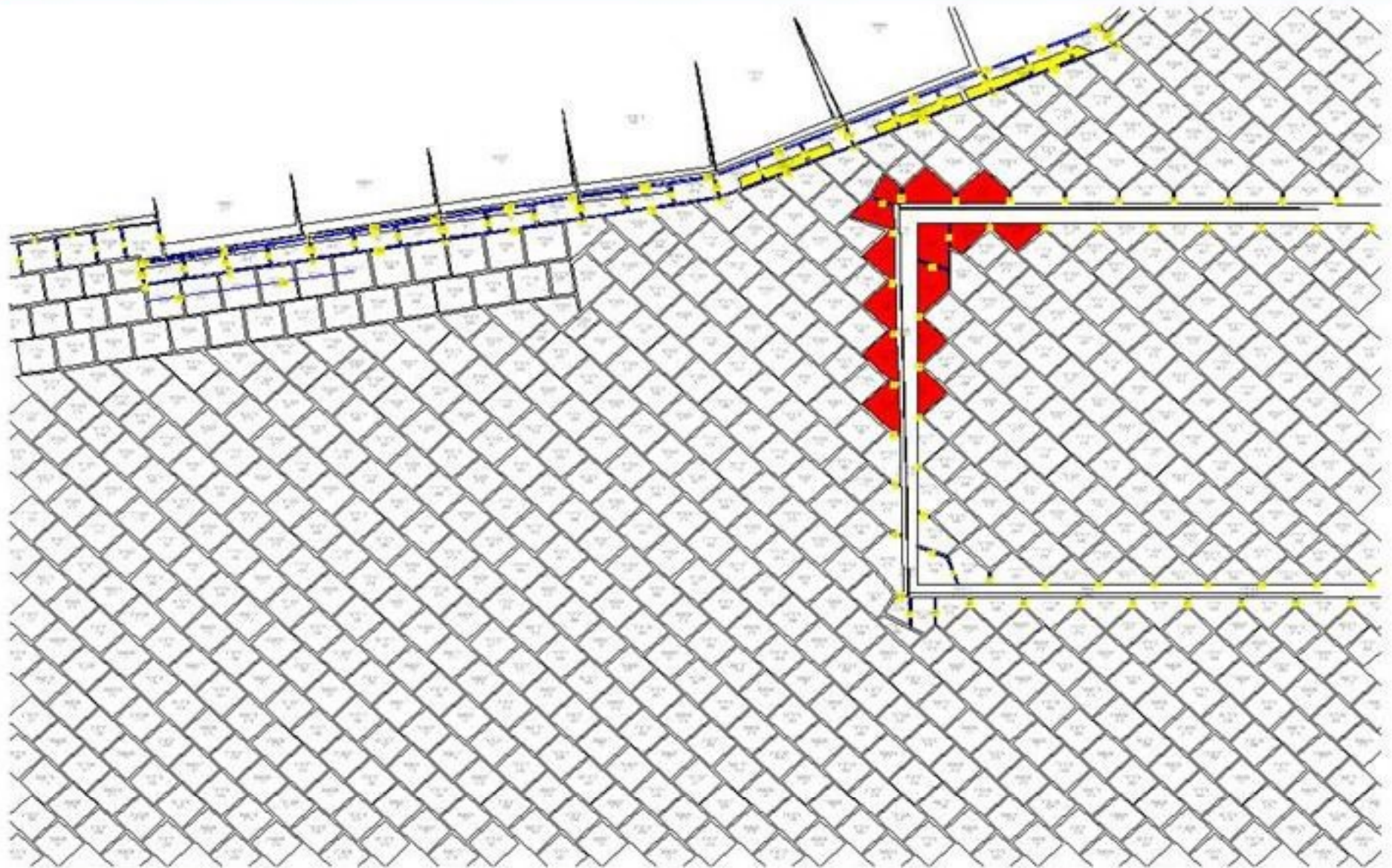
# TPS / Structures Requirements

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- In parallel with the TPS cavity removals Orbiter has requested Ground Operations to r & r gapfillers in the remaining zones in the following priority
  - Requirement is to r & r on a best effort over the life of the program
  - Goal is to accomplish ~ 5,500 over the life of the program
- 1. Zone 2A
- 2. Zone 2B
- 3. Zone 2B'
  - Priority in each zone will be from fwd to aft (see pg 10)
- In flight damage and deferrals will be cross referenced against Lockbolts and Corrosion Sampling to determine if cavities can be “double booked”
- Finalized Plan will be presented at the DLSFR after initial post flight inspections have been performed
- Unworked Lockbolt and Corrosion Sampling cavities will be addressed at the PRCB including OPF Rollout Review
  - Chit revision will be added to document the changes

# STS-116 LH MLGD BRI Replacement- 14 Tiles

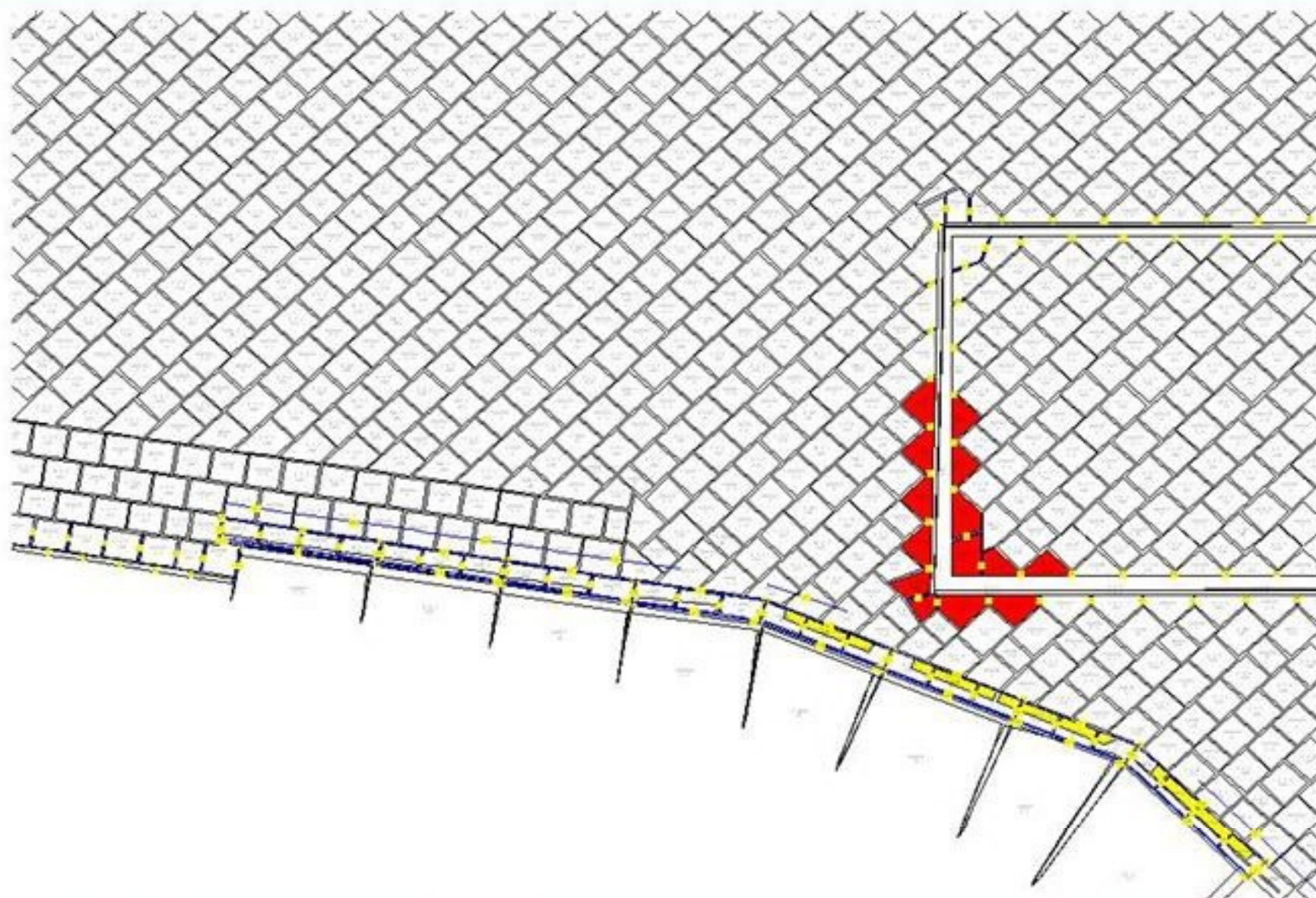
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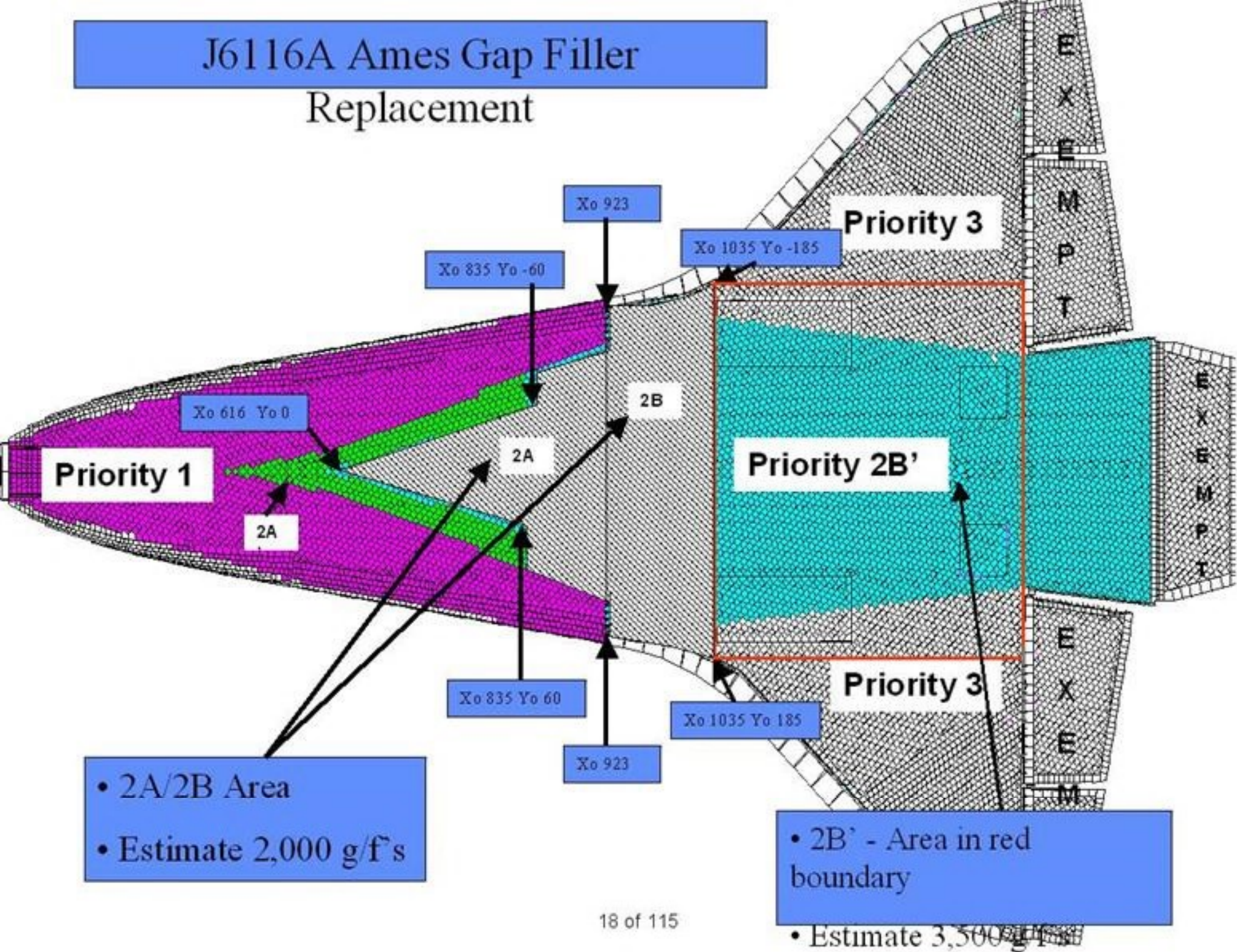


# STS-116 RH MLGD BRI Replacement- 14 Tiles

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# J6116A Ames Gap Filler Replacement



# New Requirements Since LSRR

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Removal and Replacement of GPC#5 Backup Battery Unit (BBU) for potential KOH leakage

- Plan is to r & r GPC #5 BBU during STS-116
- Will be worked per Chit

MPS 750 psi Check Valve X-ray

- 3 check valves have the potential for loose spring guides
- Spring guides will be x-rayed to determine if they are properly seated
- Will be worked per Chit



# **EVA Status**

**STS-116/12A.1**

**Delta Launch Site Flow Review**

**XA/John Raines**

**Johnson Space Center**

**June 8, 2006**



- **No PFR Sill Stack**
  
- **Bulkhead PFR, SED33105308-307**
  - Bulkhead PFR installation – Tech Order: M072-661568-029
  
- **Port TSA (Lightweight)**
  - *\*\*Port LW TSA installation – Tech Order: M072-660850-005*
    - This is to clarify rigging instructions
    - Next revision of ESEL will reflect this change
  - Port LW TSA Tools installation – Tech Order: M072-660853-002
    - No Tile Repair Kit
    - First flight of this dash number is on STS-121

*\*\*Indicates change from  $\Delta$ LSRR on 5/11/06*

**Discovery STS-116**  
**Launch Site Flow Review**  
**Space Shuttle Main Engine**  
**12-June-2006**

**SSME- KSC**  
**Greg Haile**  
**(321) 861-4060**  
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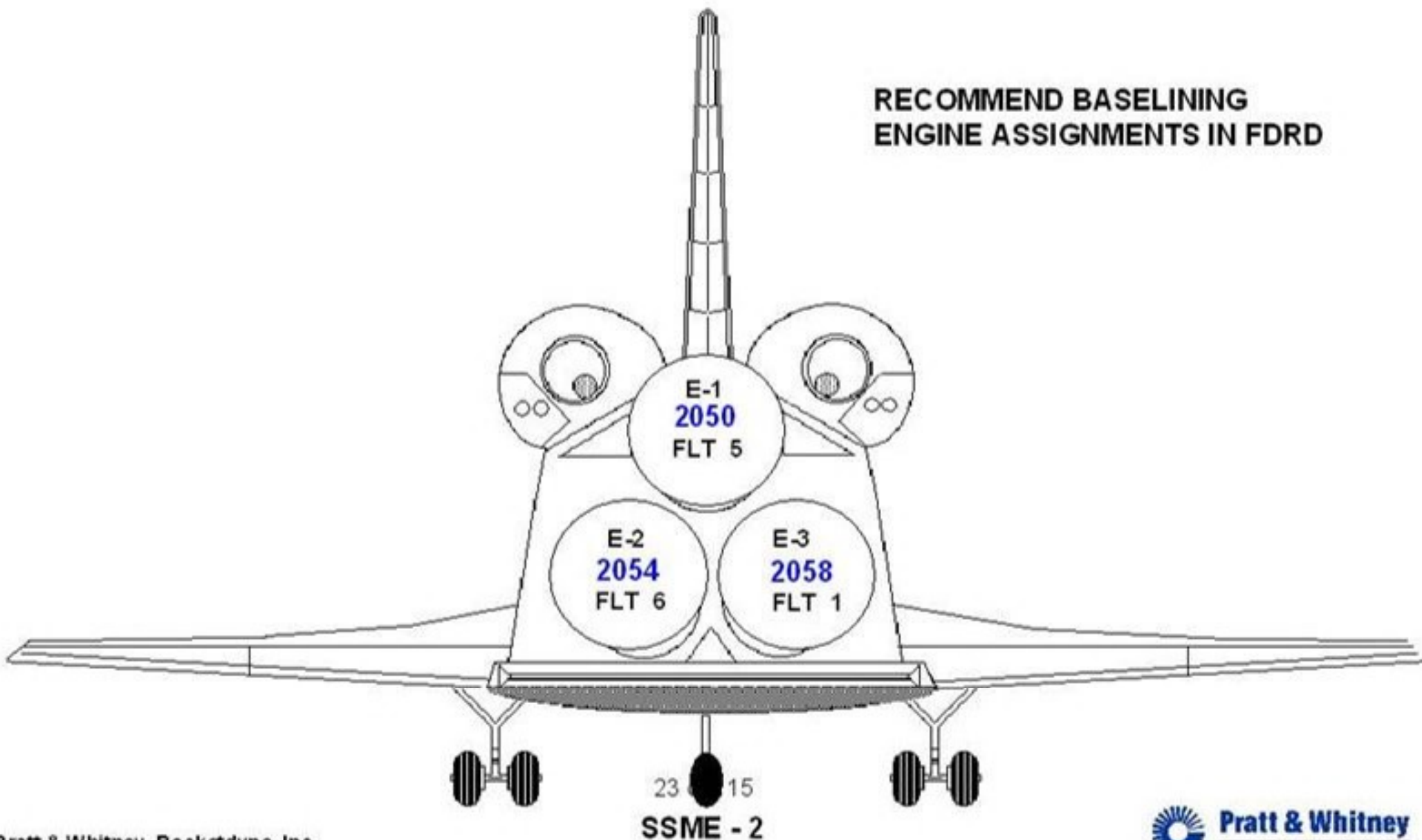
**SSME – 1**



# STS-116 Launch Site Flow Review

*SSME Allocations / Locations*

**RECOMMEND BASELINING  
ENGINE ASSIGNMENTS IN FDRD**



23 15  
**SSME - 2**



# STS-116 Launch Site Flow Review

## SSME Planned Modifications

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

ECP	Kit No	Description	Weight Impact	SPAR No./ CR No.	Engine	Status
1379	2R091522-10	MFV Install	+0 LB	ME-0208 R02	2050	Complete
1414	2R091543-10	HPFTP Mass Prop	+0 LB	ME-0208 R08	2050	Complete
1431	2R091545-10	LAI Redesign	+0 LB	ME-0208 R17	2050	Complete
1439	2R091548-10	HPFTP 1-Piece Sensor	+0 LB	ME-0208 R22	2050	Complete
1440R2	2R091544-10	Frac Crit Bolts	+0 LB	ME-0208 R22	2050	Complete
1473	2R091567-10	Incorp -19 Controller	+0 LB	ME-0208 R19	2050	Complete
1477	2R091569-10	LAI Covers	+0 LB	ME-0208 R21 ME-0217 R01	2050 2054	In-Work In-Work
1491	2R091576-10	Clamping Fasteners	+0 LB	ME-0208 R23	2050	Complete
1507	2R091599-10	LAI Tape Req'ts	+0 LB	ME-0217 R02 ME-0219 B	2054 2058	In-Work In-Work

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# STS-116 Launch Site Flow Review

## *Rocketdyne Action Requests (RAR)*

RAR	Title	Engine(s)	SPARs / CRs	Status
KLO-1480	Inspect HPFTP Speed Sensor RTV/LAI.	2050	ME-0208 B	Complete
KLO-1481	Inspect LPFTP Kevlar Insulation.	2050	ME-0208 R01	Complete
KLO-1488	Ultrasonically Inspect Main Injector Row 13 LOX Posts	2050	ME-0208 R03	Complete
KLO-1490	Inspect LPOTP Inducer for ripples/waviness.	2050	ME-0208 R04	Complete
KLO-1492	Allocate LPOTP.	2050	-----	Complete
KLO-1494	Borescope Inspect Nozzle Aft Manifolds. (Unit 4026, currently installed on E2050, was installed on E2048 at time of inspection)	2050	ME-0205 R06	Complete
KLO-1495	Borescope Inspect Nozzle Heat-Shield Ring Interface Areas (ponyfoot).	2050	ME-0208 R05	Complete
KLO-1498	Inspect LPFTP & LPOTP Inlet Areas (BSTRA FOD issue).	2050	ME-0208 R06	Complete
KLO-1499	Borescope Inspect Nozzle Mixer Bowl.	2050	ME-0208 R07	Complete

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SSME - 4



# STS-116 Launch Site Flow Review

## *Rocketdyne Action Requests (RAR)*

RAR	Title	Engine(s)	SPARs / CRs	Status
KLO-1500	Borescope Inspect Fuel Preburner Manifold.	2050	ME-0208 R07	Complete
KLO-1503	Baseline OMRSD 10-Start Leak Checks and LPFTP Disc Duct Ovality Checks.	2050	ME-0208 R09	TBD
KLO-1511	Photograph HPFTP LAI.	2050	ME-0208 R09	Complete
KLO-1513	Remove HPOTP & Ship to West Palm Beach.	2050	S060877P	Complete
KLO-1514	Remove LPFTP Discharge Duct.	2050	S060878L	Complete
KLO-1515	Remove Controller & Ship to Honeywell.	2050	S071807J	Complete
KLO-1520	Inspect POGO Accumulator Lines.	2050	ME-0208 R11	Complete
KLO-1526 KLO-1526R1	X-Ray Nozzle (Braze Void issue).	2050	ME-0208 R12 ME-0208 R15	Complete
KLO-1531	Inspect Bolts at Joints N2.4, N8, N9, & O7.1.	2050	ME-0208 R13	Complete



# STS-116 Launch Site Flow Review

## *Rocketdyne Action Requests (RAR)*

RAR	Title	Engine(s)	SPARs / CRs	Status
KLO-1536 KLO-1536R1	Borescope Inspect LPOTP Disc Ducts (weld issue).	2050	ME-0208 R14	Complete
KLO-1537	Weigh Engines.	2050	ME-0208 R16	TBD
KLO-1543	Inspect Gimbal Bushings.	2050	S060983P	Complete
KLO-1547	Inspect HEX Inlet & Outlet.	2050	SR2753	Complete
KLO-1551	Inspect HPFTP Turbine Bellows Outer Heatshield & H-Ring (post STS-114).	2054	-----	Complete
KLO-1552	Dye Penetrant Inspect HPFTP Speed Sensor (post STS-114).	2054	ME-0217 B	Complete
KLO-1554	Measure HPFTP LAI Thickness.	2050 2054	ME-0208 R20 ME-0217 B	Complete
KLO-1555	Allocate HPOTP.	2054	-----	Complete
KLO-1558	Allocate HPOTP & LPOTP.	2050	-----	Complete
KLO-1562	Fit Check LAI Boots on Fuel System Ducts.	2050	ME-0208 R24	Complete
KLO-1563	Reallocate Controller from E2057 to E2054.	2054	-----	Complete

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**KSC Launch and Landing Project**

**STS-116**

**Launch Site Flow Review**

June 22, 2006

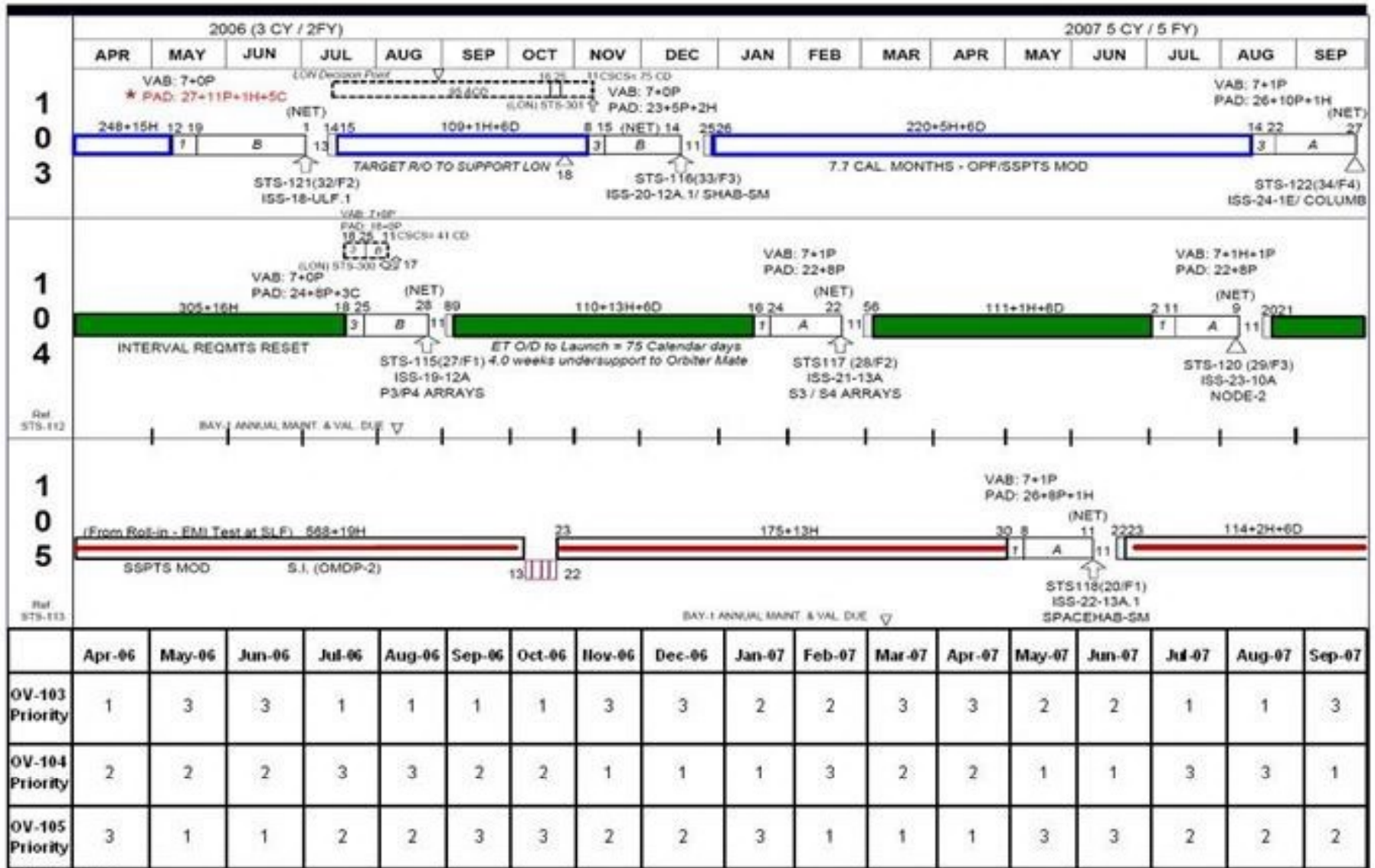


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# Multi Flow

S. Stilson

# Vehicle/TPS Manpower Allocation Priority



STS-116 LSFR

J. F. KENNEDY SPACE CENTER

# Introduction

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- Schedule Pre Columbia Baseline was 92 days – Due to process changes and new requirements increase to 140 days – took Program challenge to process in 110 days
- STS-116 is focus of this review; however, schedule execution is a multi-flow concern.
- Critical resources have been allocated across all vehicles to support Manifest
  - Diverting resources away from lower priority vehicles will place the Manifest at risk
  - Must continue work on OV-104/105 to meet Manifest
  - STS-115 (OV-104) flow is green but next OV-104 flow is 110 days (7/3's – no contingency-Red)

# Introduction

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- To meet the schedule challenge and provide flexibility
  - Forecasted tech demand for all three vehicles
    - Track actuals against forecast and report at the delta LSFR
  - Will have to maximize O/T within work-time rules
  - Increase TPS workforce
  - Recommend Reducing some requirements already approved via LSRR (pick up next flow)
  - Risk
    - Work content growth will draw resources from OV-105 and put manifest at significant risk
    - Issues that affect critical path may drive longer OPF duration – no contingency available



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# Flight Element Processing

**W. Bingham**

# Flight Element Processing Overview

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- Significant Processing Deltas Presented
- Modification Summary Presented
- Chit Assessment Presented
- Nonstandard Work Summary Presented
- OPF Summary Presented
- Issues and Concerns Presented
- Vehicle Manpower Demands Presented
- TPS Manpower Demands Presented
- Mitigation Presented
- Stoplight Chart Presented

# Significant Processing Deltas (Vehicle)

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- 110 Day Processing Flow
  - Shifting Is Based on 7/3's
  - Overtime Required to Achieve Manifest Resources Allocation
  - No Contingency Days in Flow
- RMS Swap
- OBSS Removal / Installation
- Tin Whiskers LRU's
- RJD LRU'S R/R
- Requirements Added From LSRR
- Critical Path Issues Will Drive OPF Duration

# Significant Processing Deltas (TPS)

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- 110 Day Processing Flow
  - Shifting Is Based on 7/3's
  - Overtime Required to Achieve Manifest Resources Allocation
  - No Contingency Days in Flow
- Tile
  - Deferred Items (growth beyond projection)
  - In-Flight Damage ( growth beyond projection)
  - Gap Fillers (~800 replacements planned)
  - Acreage Blanket Inspections
- Additional Tile Technicians in September Will Provide Some Tile Surge Capability
- Critical Path Issues Will Drive OPF Duration

# Modification Work Summary

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## Proposed

- MCR-19755 RMS MPM Over Center Stops
- MCR-19824 MPM XO911 Pedestal Insulation Cover Flush Head Fasteners
- MCR-19849 Seat 7 Recumbent Rail Assy. Configuration
- MCR-19476 Improve MLG Wheel & Tire Assembly
- MCR-XXXX MPM Guillotine Fastener Changeout

## Tech Order Added

- V070-200195-003/004 MECSLSI- External Airlock Bracket Mounting Fastener (washer) Installation

# Modification Work Summary

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## Potential/Opportunity

- MCR-19743 BRI-18 Tile MLGD (attrition, no authorization required)
- MCR-19546 HUB Tile (attrition, no authorization required)
- MCR-19874 BRI-18 Tile, Other Locations (attrition, no authorization required)
- MCR-19735 WLE Spar "Sneak Flow" Protection, Panels 1-4
- MCR-19763 Lower WLE Carrier Panel Horse Collar Gap Filler Redesign, Panels 1-4
- MCR-23227 Connector Saver (ME414-0630) Redesign (OMS Pod, Ku Band)
- MCR-17177 ODS Vestibule Air duct Strap Deletion
- MCR-19755 MPM Pyro Guillotine Cover Mod To Eliminate Interference
- MCR-23463 Increase Torque on Window 7 Fasteners to Class 2 (Paper Only)
- MCR-19903 Sky Genie Track Fastener Modification

# Chits Work Summary

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- J5765 WSB Post Flight Tank Offload Quantity
- J5881 Lower LESS Access Carrier Panel Post Flight Torque Check Verification
- J5883 Hub and Drain Hole Tile Manual Deflection Test
- J5884 Thermal Barrier Flow Path Inspections
- J5885 Arrowhead Tile Inspection
- J5897 Mid Fuselage Sampling & Fastener Replacement
- J5919B O-Gage Protection for OV-103, Flight 32-35 and OV-104 Flight 27-30
- J5925 OV-103 Body Flap (BF) Power Drive Unit (PDU) Gearbox Fluid Level Inspection
- J5930B Orbiter Structure IML Surface Corrosion Sampling Inspection
- J5959 RJD Removal & Installation on OV-103

# Chits Work Summary

- J5988 SRMS Wireless Strain Gauge Instrumentation System (WSGIS)
- J5991A MPCA Fuse Holder Chit in work to do Heater checks only
- J6087 Inspection Boom Assembly (IBA) Post flight Inspection
- J6103 Flush VRCS Thruster PC Tube Thruster flush
- J6104 Post Flight AMES Gap Filler Verification Pull Test 10 gap fillers; Inspect 250-walkdown only
- J6106 ASA #2 & #4 ATVC #1 & #2 R&R for OV-103 Will require spares to be available for R/R to meet scheduled R/R date
- J6110 WSB PGME/Water Loading for STS-116
- J6111 Hydraulic TVC Isolation Valve Bay Clear  
X-Rays
- J6112 Removal of OV-103 Window Thermal Pane 1 thru 6 and Replace



# Chits Work Summary

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- J6115 Blanket Stitching Closeout Blanket Inspection
- JXXXX Blanket Stitching Acreage Blankets Awaiting OV-105 results
- J6116 AMES Gap Filler Replacements ~800 planned
- J6117 Inspection of Putty Repairs for Potential Loss Potential work growth from inspection
- J6118 External Tank (ET) Door Paint Stripe Rework post flight Verification
- J6119 ET Door Cavity Screed Evaluation Screed seal Inspection
- J6120 Post Flight Damage 3-D Acquisition Results of post flight data
- J6121 MMod Inspection Walk down only
- J6122 RCC Thermography Inspection
- J6109 Radiometer at RCC 9 Location Do over next 2 flows

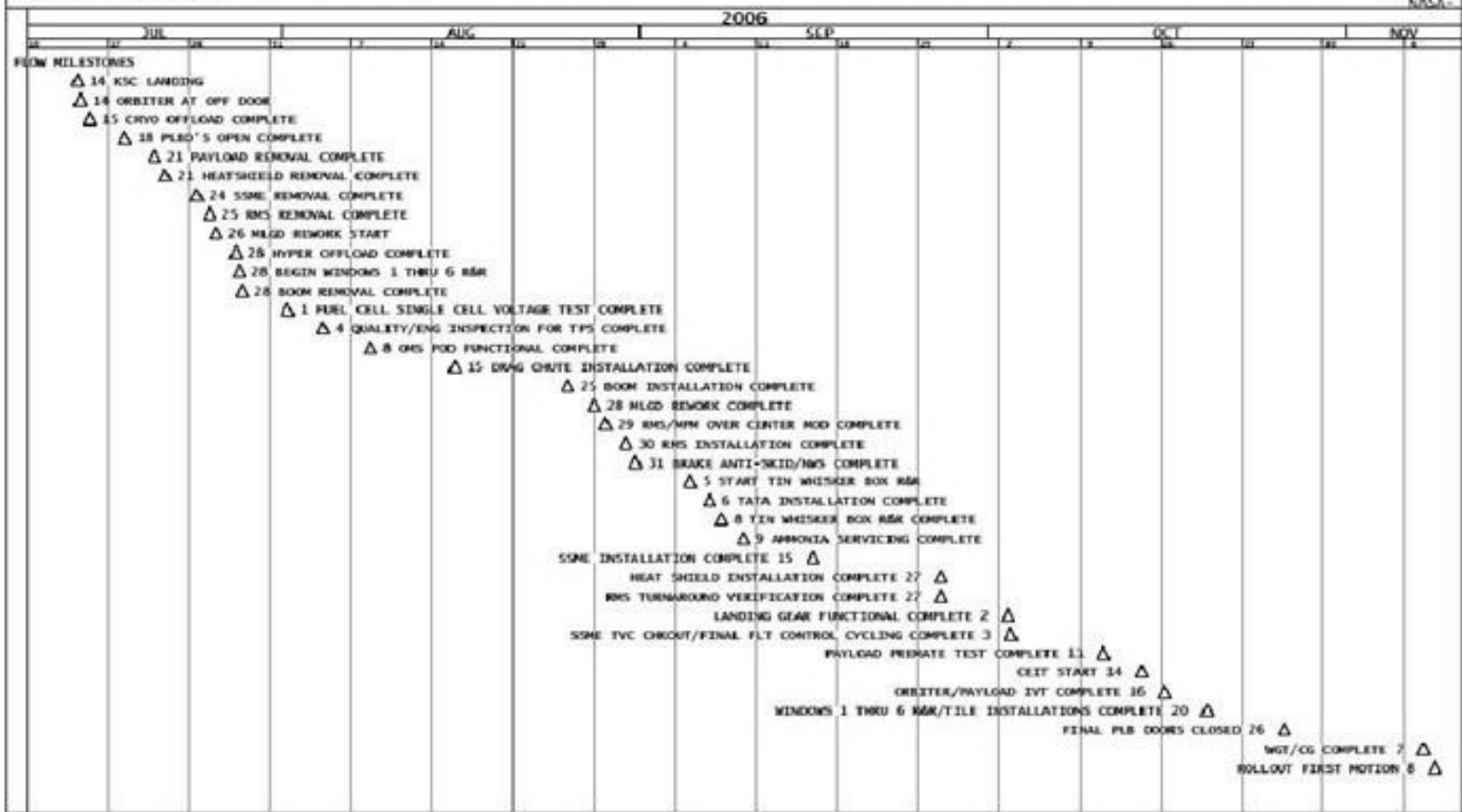
# Chits Work Summary

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## Potentials

- J5994R1 Pyro Checkout Need Chit/RCN ov17063
- J5987 WLE Characterization Test Need Chit if Micro Tau is r&r"d
- J5980A OBSS Test Requirement Need Chit/RCN ov17026/9
- J5831A BCI Photos Need Chit/RCN
- JXXXX File IX Requirement Need Chit Post Landing
- JXXXX NLG IML Thermal Barrier  
Gap Need Chit/Mod
- JXXXX Additional GPS # 5 BBU Need Chit
- JXXXX MPS Check Valve X-Ray Need Chit

STUDY ONLY		NON-CONCUR	STS-116/OV-103 OPF FLOW MILESTONES DOWN PAYLOAD: ISS-18-ULF1.1/ UP PAYLOAD: ISS-20-12A.1	Creation Date:30-JAN-2006
USA	NASA	this product should not be used for planning purpose of impact assessments.		Revision Date:30-JAN-2006
				Revision :A
C-Group		NON-CONCUR		OPR:USA-NASA-



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

# Issues and Concerns

---

- 7/3's Shifting - No Contingency
- Work Content Growth
  - IFA'S
  - IPR'S
  - File IX Requirements
  - In-flight TPS Damage
  - Additional Chits And Mods
  - Minimum Gap Concerns  
OV-103 Chin Panel
  - Data Analysis from Inspections
- Requirements added from LSRR
  - Fib Acreage Blanket Inspection---Fallout from OV-105  
Inspection Under Review

# Issues and Concerns (Cont'd)

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- **MLGD “Seal Rework”**
  - MLGD “BRI Tile” Mod Conflict- Potential Seal “ MR “ Criteria I/W
- **117 Tile Cavities Allocated**
  - Additional Cavity Capability projected to increase with increased resources starting in September
  - Forecast = 108 Cavities Not Including BRI/lock Bolts/Corrosion
  - Potentials could drive and additional 59 removals
- **Tin Whiskers Box R/R Could result in Coldplate Damage / Removal**
  - 110 day Schedule Does not support Orbiter Power Down for Coldplate R/R
- **Hurricane Season**
- **DFRC Landing**

# Projected Tile Removals

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• Deferred Tile/ Fib For 1 Flight (Minimum)	23
• Less Carrier Panel Tile (Shaved Flt 32)	10
• Tile Estimate Of In-flight Tile Damage Resulting In Tile Removal/ Replacement	60
• Operational Damage	12
• 800 Gap Fillers -Result In Tile Removal	3
• <b>Projected Tile Removals SUB TOTAL</b>	<b>108</b>

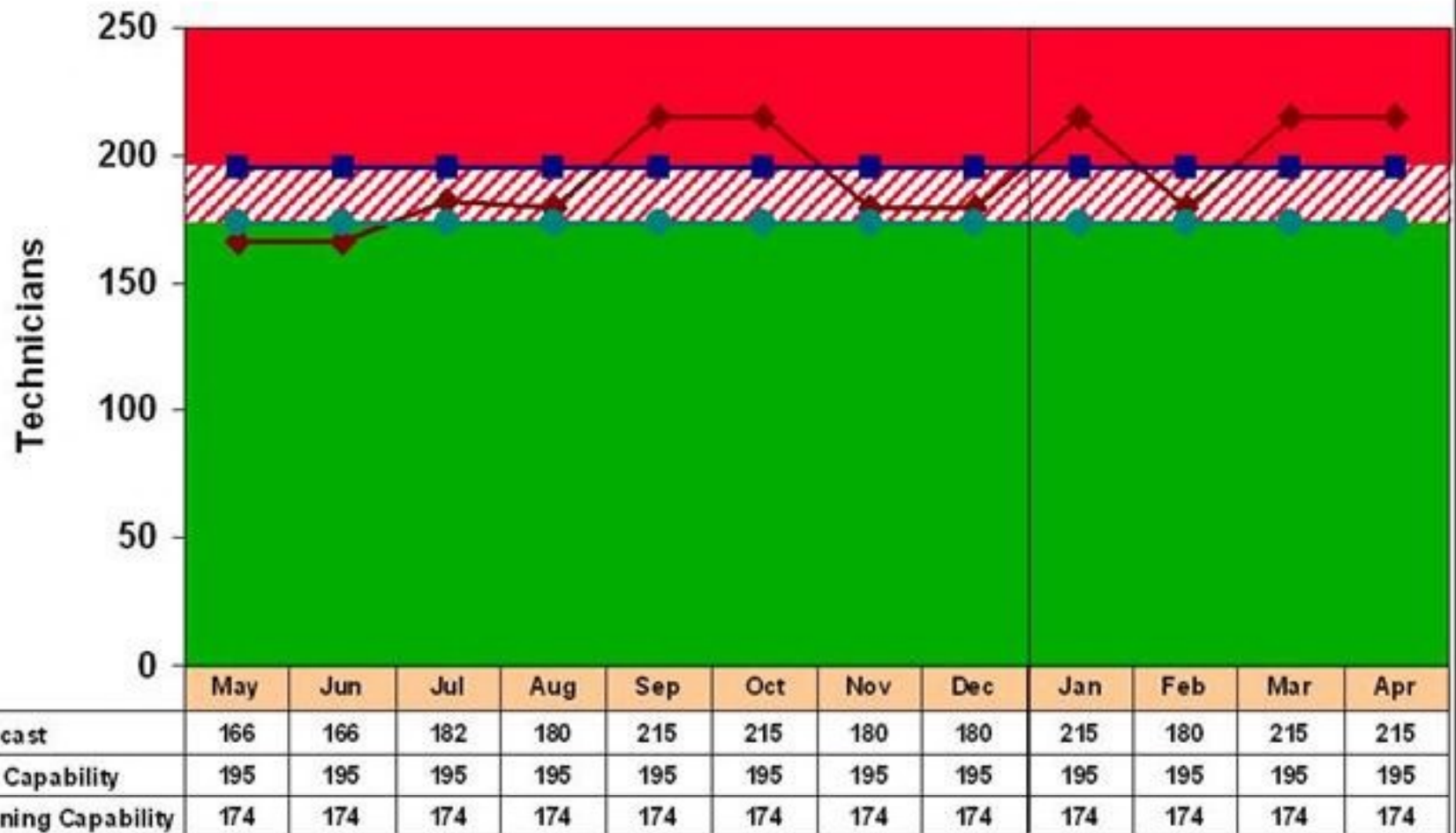
\* **Does Not Include Potential 10% Growth for FIB Blanket Inspection Removal and Replacement**

# Potential Additional TPS Requirements

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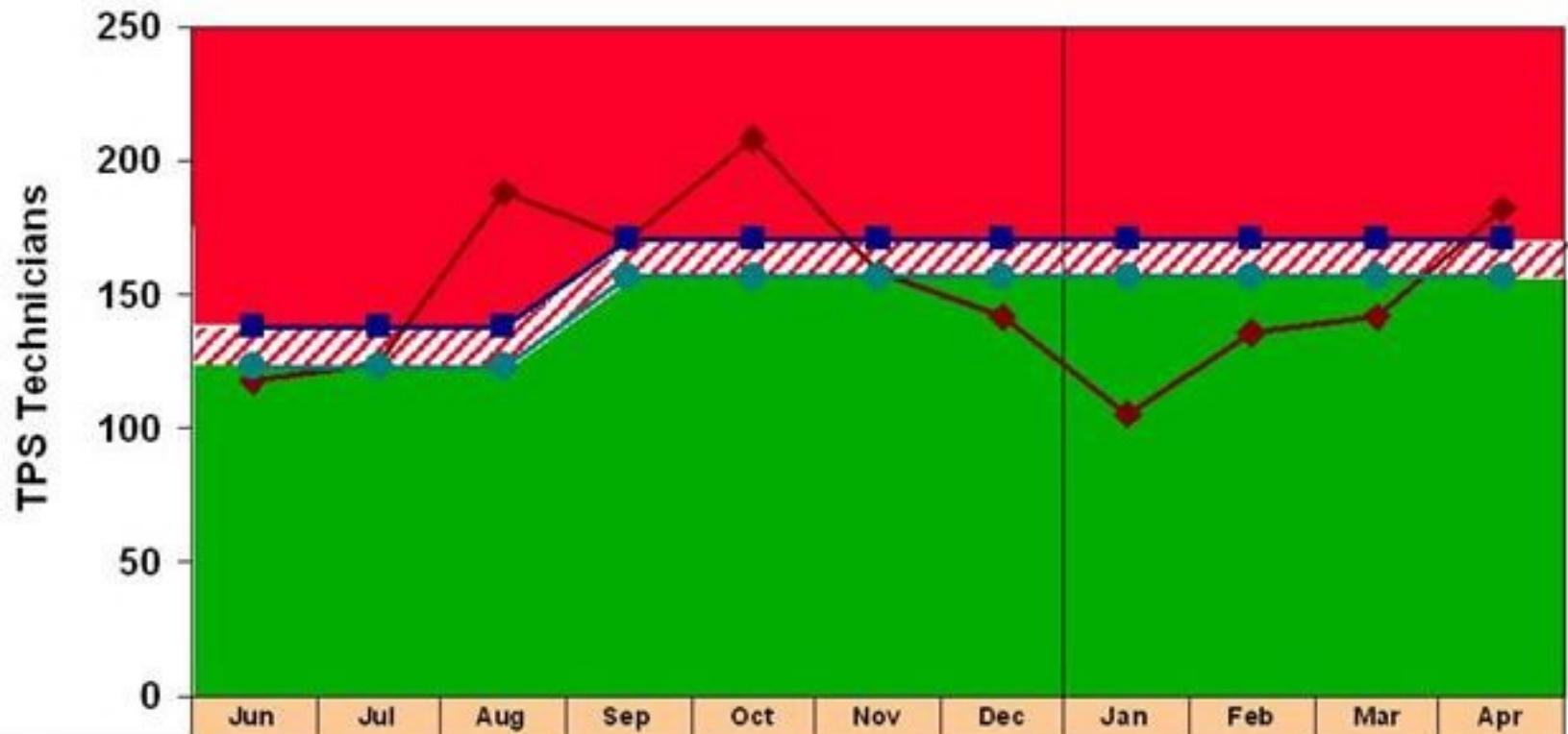
- Does not include potential 10% growth for FIB Blanket Inspection removal and replacement
- Implementation of these requirements will require additional resources from priority vehicles 2/3 and will put the Manifest at risk
- Lockbolts Completion Would Result In (TILE/FIB/FRSI) 24
- Window R/R May Result In Tile Damage 6
  - Estimated for 1-6 Window Removals
- Radiometer Removal 1
- Putty Repairs 10
- Tile Removed Again After Bond 12  
Due To Processing or O/T S&G
- BRI Tile On MLG Door 6  
(Effects NLGD Tile Rework)
- Potential Additions 59
- Projected / Potential Tile Cavities 167
- Planned 117

# Vehicle Manpower Demand





# TPS Manpower Demand



	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Forecast	118	124	188	171	208	158	142	105	136	142	182
Max Capability	138	138	138	171	171	171	171	171	171	171	171
Planning Capability	123	123	123	157	157	157	157	157	157	157	157

# MITIGATIONS

---

- Tech Demand Forecast & Tracking
- Bay Clears To Weekend/off-Shifts To Maximize O/T Use Within Work-time Rules
- Continue Efficiency Studies
- Close Management Attention to Work-Stoppage and Schedule Issues
- Increase TPS Workforce- Training Period Required
- Potential Deferral of MPM Over Center Mod-Increase Schedule Flexibility

# STS-116/OV-103 OPF

	Program Milestone	Activity/Remarks
STS-116 OPF Overall	<b>R</b>	Rollout: 11/08/06; Working 7/3's
<u>Critical Path/Issues</u>	<b>Milestone</b>	
Orbiter OPF Processing	<b>R</b>	Extensive every flow requirements/additional work being incorporated by Chits/RCN from STS-121
TPS Cavities	<b>R</b>	Projected 108 / Plan 117/ Potential 167
Tin Whisker Boxes/Driver Transistor Leakage (3 RJD's, 2 ASA's, 2 ATVC's)	<b>Y</b>	Delivery dates/R/R potential cold plate damage
<u>Potential Significant Growth</u>		
One Flight Deferrals	<b>U/R</b>	Potential PRT fallout
Work Content Growth	<b>U/R</b>	IFA's/IPR's/File IX/post flight inspections/ additional Chits/Mods

**G**

Issue remains on schedule, 67% or better available Contingency Days remain in schedule

**Y**

Issue encountering concerns/problems which may cause an impact, 34-66% available Contingency Days remain in schedule

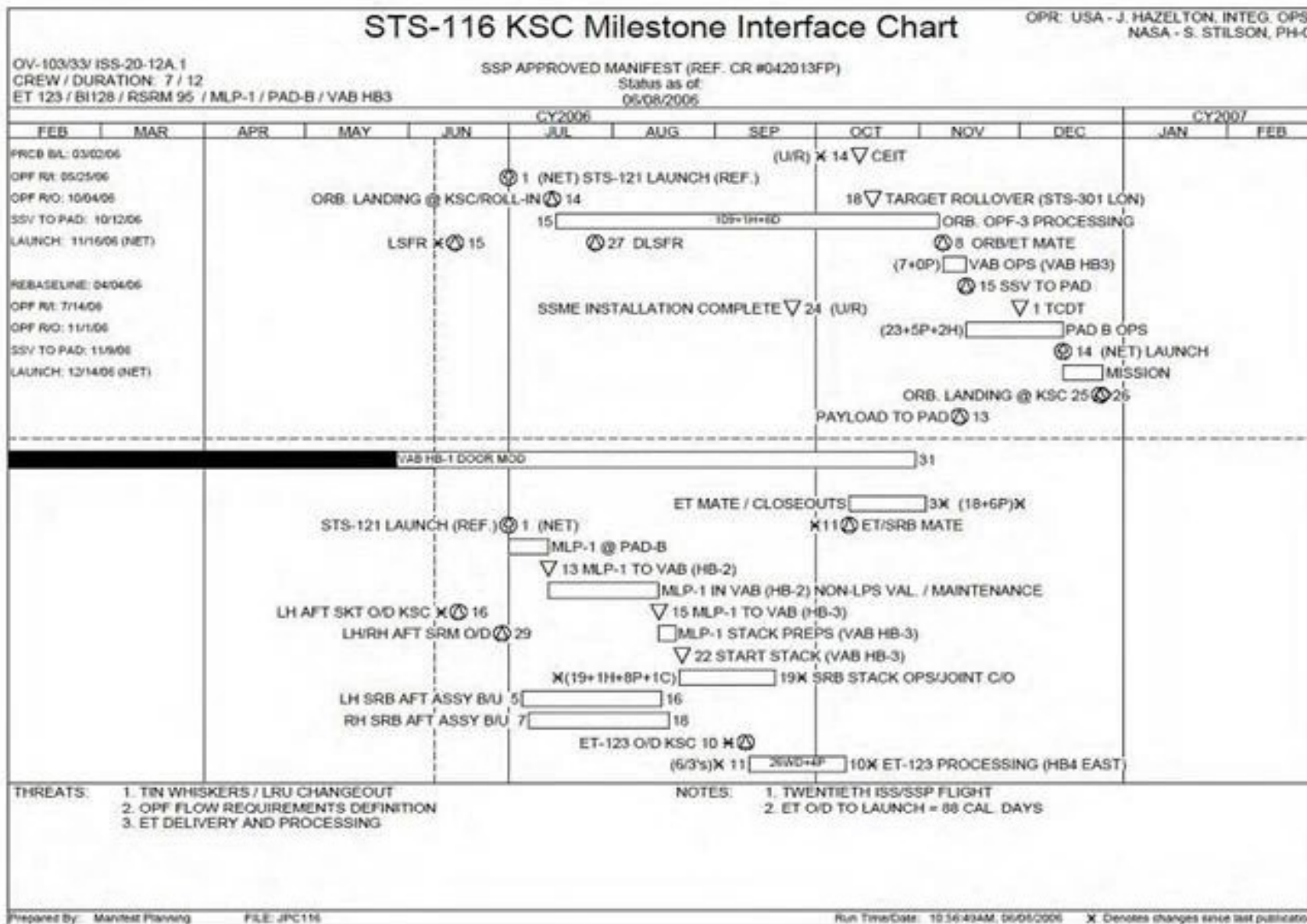
**R**

Issue may impact a specific Program milestone, 33% or less available Contingency Days remain in schedule

STS-116 LSFR

J. F. KENNEDY SPACE CENTER

# KSC Milestone Interface Chart



Prepared By: Manifest Planning

FILE: JPC116

Run Time/Date: 10:56:43AM, 06/05/2006

X Denotes changes since last publication

# STS-116 Integrated Launch Site Flow Review

Presenter

Josh Krupnick

Date

06-22-06

## Backup Material

### FRWG Presentation (With Minor Changes)



**STS-116 Integrated Launch Site Flow  
 Review**

Presenter	Greg Katnik	
Date	06-22-06	

**SSP System Drawings**

The Drawings Baseline Was Released By PRCB S115116 on 09-12-02

- V072-000001-255 (Rev. UL01) Space Shuttle System (Rel. 03-21-06)
  - V072-200195-003 (Rev. G01) Mission Equipment Cargo Support (Rel. 06-01-06)
  - SGD32104439-301 (Rev. E01) Crew Compartment Configuration (Rel. 05-12-06)
  - 302 Descent
  - V070-000001-003 Orbiter General Assembly
    - V070-410100-017 SSME Installation
  - 10100-0061-166 Integrated SRB General Assembly (BI-128)
  - 80901000000-510 External Tank Assembly (ET-123)
  
- STS-116 LSRR + 18 days Mission Configuration Product Plan (MCP) was last published on 05-29-06 and will be republished at ORR - 14 days on 10-20-06.



# STS-116 Integrated Launch Site Flow Review

Presenter	Greg Katnik	
Date	06-22-06	

## SSP System Drawings - Cont'd

### Ferry Configuration

- V072-000001-256 (Rev. UM01) Space Shuttle System Drawing (Rel. 04-21-06)
- V072-200195-004 (Rev. G01) Mission Equipment Cargo Support (Rel. 06-01-06)
- SGD321004439-001 (Rev. E01) Crew Compartment Configuration (Rel. 05-12-06)
- V072-300055-024 (Rev. BK01) Ferry Flight Configuration (Rel. 01-09-06)

SCA 905

LW MA 8



VOL 8



VOL 18

QUICK DRY WASH (2)  
CLOTH CLEANER  
SPOTLIGHT BATTERIES  
FD100  
LCD MONITORS 700/  
400 MM LINE

A16

DRY CAMERA BAG  
DRY CAMBAG BAG  
CLOTHING DRYER

C DR	MARK POLARSKY
PIE	WILLIAM OBERHEIM
M/S #1	HE NOLAN PATRICK
M/S #2	ROBERT CURRAN
M/S #3	CHRISTIE FUGLEBANG
M/S #4	JOAN HIGGINS/ROTHAM
M/S #5 (UP)	SUNITA WILLIAMS
M/S #5 (DR)	TED

# MODULAR LOCKER LAYOUT ASCENT

FASTFOOD	MP57A	FASTFOOD
----------	-------	----------

MINIC FINE CL CAMERA	MP57C ISSUES	MP71C DC VACUUM CLEANER
----------------------------	-----------------	----------------------------

### MIDCIC FORWARD

MP14E FRESHFOOD	MP20E BIBERAKOUT BOX TURBULENCES AIRBOTTLES WIND ALT MASKIT
MP14G FRESHFOOD	MP20G BIB TOOLS 2359-303 2355-305 2352-300

MP40E BINDER HEATABLE HT SAFETY-PURGE HT LUBRICA HOSES SOUNDWALL STOP LAT VIBR. SLIP SHOE MISCELLANEOUS	MP57E SOOP RECORDING TUBES	MP71E GSLITS
---	-------------------------------------	-----------------

MP14G FRESHFOOD	MP20G BIB TOOLS 2359-303 2355-305 2352-300
MP14H MENUFOOD	MP20H MENUFOOD

MP40G SHUTTER CS-CP/ SLIPALIZ/ CONDENSATE COLL/ EGRESS HARDWARE/ CVC	MP57G ORBITER PDP SOOP	MP71G ORBITER PDP
---	------------------------------	----------------------

MP14H MENUFOOD	MP20H MENUFOOD
MP14K MENUFOOD	MP20K MENUFOOD

MP40H CVR	MP57H MSF1	MP71H MSF2
MP14K MENUFOOD	MP20K MENUFOOD	MP14M MENUFOOD

MP14M MENUFOOD	MP20M MENUFOOD
MP14N MENUFOOD	MP20N MENUFOOD

MP40K COAS/BTA FLUORIT LT SHIELD/SDCS700 AUDIO DOSEMIETER	MP57K GRAB SAMPLERS/ BAG/ SP. MASS WATER SAMPLERS CTB	MP71K ALP
---	--	--------------

MP14M MENUFOOD	MP20M MENUFOOD
MP14O MENUFOOD	MP20O MENUFOOD

MP40M RST	MP57M M/SF2	MP71M M/SF4
MP14O MENUFOOD	MP20O MENUFOOD	MP14P MENUFOOD

MP14O MENUFOOD	MP20O MENUFOOD
MP14P MENUFOOD	MP20P MENUFOOD

MP40O M/S #5 UP CLOTHING	MP57O HYGHE	MP71O HYGHE
MP14P MENUFOOD	MP20P MENUFOOD	MP14Q MENUFOOD

A16	A17	VOL D
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VOLUME F	VOLUME G	VOLUME H
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LEA DEE: OMAE MASHIM  
 DATE: 3-31-08  
 LAUNCH: NET 12-14-08  
 FLIGHT: STS-116 ISS 12A.1  
 VEHICLE: CV-103  
 CREW: 7 PERSON 11 + (10 + 2 DAYS)  
 ROOMS: NO ECRS, SLEEPING  
 BAGS: DITA/L, EROGOMETER, ENG.  
 LW MAE 5 BAGS

### MIDCIC RAFT

MA1D WVS CAMBAG	MA1SD STS-2/ STS-8 ACCESS
-----------------------	------------------------------------

MA1F STS-1/STS-3	MA1OF CREW SUPPORT
---------------------	-----------------------

MA1G STS-4/ STS-5/ ACCESS	MA1OG STS-7/STS-8/ PWR SPVS
------------------------------------	-----------------------------------

MA1J COLOR PRINTER AND PAPER INK CARTRIDGES CTB	MA1OJ PCS CD CASE
---	-------------------------

MA1L PRINTER TRAYS NOISE REMOVA	MA1OL HOLE PUNCH SCISSORS SOX, BP, DVA/L BPS/A/B/A/T
---------------------------------------	--

MA1N SOFT STGW BAGS	MA1ON GPE TV CONTROLLER ULTRASONIC LEAK DET.
------------------------	--

W/MC TOWELS AND RESUPPLY ITEMS WAC EXPENSER M/DAY CLOTH	EXT A BLOC K 2-BAGS
---	------------------------

EXT A/L FLOOR  
 BATT BATTERIES 25-AMPS  
 CCC (M) THERMS  
 MBE WORKSTATION  
 BAKU W/BEH/PROCS HT  
 ALHON BATTERIES  
 BAKU SPACER BAG  
 S-BAK HCN



L10HBOX (7435-303)  
 49 UNCH TOTAL + 1 ATCO  
 28 IN UNCH BOX  
 2 REPAIRED  
 SPACER BAG STORAGE  
 35 UNCH  
 1 M/S CLOTHING M/S #3 UP ENTRY GARMENTS  
 1/2 M/S HYGHE

WINDOW SHADE BAG - WINDOW SHADES  
 (5549-134)  
 B/M CABLES SHOES (4299-137)  
 FUM OIL/WAX BAG (4829-305)  
 PANEL COVERS

L10A L V TO A/L AT (PES) (0000-134)  
 L10A2 DTY  
 L11 PEP 2  
 L11A2A SOUP PANS  
 L12A1 SSP 1  
 L12A2 SSP 2  
 L12A3 PDP 1  
 R12A1 WPU  
 R12A2 OPP/PASP

- NOT APPROVED
- EXHAUST LOAD
- TRANSFORMER/STAIR
- CANISTER/STAIR BAG
- SHAP
- HALF CANISTER/STAIR BAG

DWG. NO. 56.D.32.104439  
 CCR: YVETTE CARMONA  
 (201) 489-3744  
 USR.DWG.SLOCKER.STS116

SEE LOCKER LAYOUT FOR IDENTIFICATION OF VOLUME PER RELEASED QUANT. FOR RESUPPLY CHANGES  
 PLEASE REPORT TO THE CREW/COMPARTMENT COMMANDER/ATTENDING PERSONNEL FOR THIS FLIGHT (50) STOWAGE





<b>STS-116 Integrated Launch Site Flow Review</b>	<b>Presenter</b> Greg Katnik	
	<b>Date</b>	06-22-06

**Modification Impact Report**

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

**A total of 20 MCR's have been approved or are pending approval**

**Current MCR impact status:**

**No impacts for all six disciplines 13**

**One or more disciplines with impacts, documentation approved 3  
and/or pending approval**



<b>STS-116 Integrated Launch Site Flow Review</b>	Presenter	Greg Katnik
	Date	06-22-06

**Modification Impact Report - Cont'd**

Possible impacts still under review 4

CR 18888, 19114, & 19343 are being reviewed for OMRSD impacts

CR 19114 is being reviewed for Software impacts

CR 19343 & 19533 are being reviewed for GSE impacts  
underlined MCR's have impacts in other disciplines



<b>STS-116 Launch Site Flow Review</b>	<b>Presenter</b> MK-SIO / A. Swift	
	<b>Date</b> 06-22-06	<b>Page</b> 1

### **Mandatory RCNs:**

OV17063	V55 – PIC BITE CIRCUITRY EFFECT	06/26/06 Daily
OV17029	V74 – OBSS SENSOR REQUIREMENTS	06/26/06 OSB Daily
OV17026	V54 –OBSS SP2 INSTRUMENTATION RQMTS	06/30/06 ORB

### **Non-Mandatory Value Added RCNs:**

KV16732	V58 – RUDDER SPEED BRAKE SHAFT ASSY	06/26/06 Daily
OS16982	S00 – MPS LH2 & L02 LEVEL SENOR	06/27/06 SICB
KV16980R1	V05 – MULTI UPDATES	PRELIM
OV16951	V41 – POINT SENSOR SYSTEM W/E	06/27/06 SICB
OV16914R2	V30 – RCM PHASE III AFT FUSE/THRUST	06/26/06 OSB Daily
KS16841R1	S00 – ORB/ET UMB PLATE GAP PURGE	06/23/06 ORB
OV16801R1	V58 – FIG V58AC0.040 WSB GN2 TANK GRND	PRELIM
OV17009	V30 – CORROSION SAMPLING – GEN REQ	PRELIM

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
BO2100	AUTH MAF	NO93	0123 000	LOE FEEDLINE BELLOWS HEATERS RTF CAIB RECOMMENDATION 3.2-1 FOR ET THERMAL PROTECTION SYSTEM MODIFICATION.	SO62612B 2005-06-10	

## MEQ

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
019760	PLND JSC	TCTIM6619760REF	0002 000	RECUMBENT SEAT KIT (RSK) SEAT 8 RAIL ASSY ALIGNMENT ADDED PER V865-660002 NEW/PENDING VERIFICATION. POTENTIAL LON REQMT	SO63027P 2004-05-13	MAND 033

## OMS

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
	AUTH KSC	J5338	0024 009 SPAR	OMS POD ACCESS DOOR INSPECTION RPO4-28	OMS-0034B 2000-07-21	SCHD 028
023227	DEFR KSC	K598-430013-002 NOT REQUIRED	0011 000	MODIFICATION KIT - CONNECTOR PROTECTOR REDESIGN ADDED BY EDS I/F & K598-430013 A01. OBTAIN PARTS F ROM VK70- 795153. DEF'D FROM STS-121, 4/21/06 DAILY		OPTY 033

## ORB

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
	COMP KSC	J5636	0105 000 SPAR	MODAL IMPULSE GROUND TEST TO DETERMINE FLEXLINE CHARACTERIST ICS AND VALIDATE STRUCTURAL MODELS	ORB-0066 R16 2003-07-22	MAND 020
	PLND KSC	J5677A	0105 000 SPAR	VENDOR NDE INSPECTION & BASELINING OF RCC CHIN PANEL ASSEMBLIES AND OV-104 NOSE CAP	ORB-0066R17 2003-11-06	MAND 020
	AUTH KSC	J5881A	0103 000 SPAR	LOWER LESS ACCESS CARRIER PANEL POST FLT TORQUE CK VERIF	ORB-0075R10 2006-06-05	MAND 033
	AUTH KSC	J5959A	0103 000 SPAR	RJD REMOVAL AND INSTALLATION ON OV-103	ORB-0075R09 2006-06-05	MAND 033
	AUTH KSC	J5988A	0103 000 SPAR	SRMS WIRELESS STRAIN GAUGE INSTRUMENTATION SYSTEM (WSGIS) CHIT J5988A SUPPLEMNTS J5988 FOR ADD'L RMS WORK	ORB-0075 R08 2006-05-31	MAND 033

	AUTH J6087	0103 000	INSPECTION BOOM ASSEMBLY (IBA) POST FLIGHT INSPECTION	ORB-0075R07	MAND
	KSC	SPAR		2006-05-26	033
019618	AUTH TCTIV7919618REF	0103 000	WIRE TRAY RISER REMOVAL	S115114AC	OPTY
	KSC NOT REQUIRED		ADDED BY EDS I/F. SEQUEG ISSUES W/MCR'S 23167 , 19631, 23288 & 23278	2005-03-04	033
	AUTH VK70-340023-001	0103 001	WIRE TRAY RISER REMOVAL, MOD KIT	S115114AC	OPTY
	KSC		ADDED PER MCR BASIC/MOD CODE IS "TBD". TO HOUSE R EMAINDER OF WORK, REF: SEQ. 0	2005-03-04	033
023463	AUTH 023463	0103 000	INCREASE TORQUE ON WINDOW #7 TO CLASS II	S115116M	MAND
	KSC	CONTR	ADDED PER C. MARTIN REQUEST	2006-05-02	033

PIH

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
008750	COMP KSC	TCTIN6308750REF NOT REQUIRED	0001 003	PROVIDE FLEX DUCT WITH IMPROVED MAT'L - KEVLAR RUBBER BASE ADDED PER V727-634006 AOS, (NOTE: MOVED OUT OF STS -107 PER D. AZAMA'S REPORT) (REMANIFTD FRM STS-116)	NOT REQD	033
008806	APPD KSC	K845-773008-001 NOT REQUIRED	0001 000	SPACEHAB WIRE HARNESS ASSY ADDED PER V845-773954 NEW	NOT REQD	033
008820	APPD JSC	K845-773013-001	0001 000	ADD'L HARDWARE TO SUPPORT OBSS/ISS INTEGRATION ADDED PER V845-774975 NEW MOVED FROM 116 TO 121 PER REMANIFEST D SO63215	NOT REQD	033
008824	COMP KSC	K845-774020-001 NOT REQUIRED	0001 000	MOD KIT STP - H2 WIRING ADDED BY EDS I/F & V845-774973 NEW. MOD CODE CHGD FROM GNS TO GOE PER KIT EO A01	NOT REQD	033

SRB

MCR/ECP	STAT SITE	ITEM/KIT NUMBER TCTI NUMBER	SEQ EISN NO.	DESCRIPTION / GENERAL REMARKS	PRCB AUTHDATE	PRIO FLT
	AUTH KAS	B470ECP3789R000	B128 000	RSRM AFT SEGMENT STIFFENER RING FOAM APPLICATION TCTI	S170809R1 2005-06-30	
	AUTH KAS	CR S090912K	B128 000	INC OF APPROVED SRB ENG TO MODIFY AFT BSM SUPPORT TPS CLOSE	S090912K 2006-05-10	
	PLND KSC	H0850A	B128 000 NSW	REMOVAL OF TPS, FROTH-PAK AND PDL 1034-2.5 FROM SRB HW	S052923YA 2006-03-27	MAND 033

1

FLIGHT-SPECIFIC  
Approved STS-116 ODS Waivers and Exceptions

WVR FLIGHT WAIVER (STAT)	PRCD NUMBER	ABSTRACT	FISH	STS	REQ
EXC PROTECT (INITIAL STS)		RAS REQUIREMENTS	PAYLOAD		
E ODS 040	S0532960K EK10327 (A)	ODS-D EXCEPTION REQUEST - RIGHT BC-OXIDIZER B-LEG PMD REGULATOR L O CKUPPRESSURE (EK10327)	0023		032
039	S053297WA EK10452 (A)	ODS-D EXCEPTION REQUEST - RCS FUEL GHE TANK P-1 TRANSDUCER ACCURACY (EK10452)	0023		032
00B 040	S0532960L EK1014601 (A)	ODS-D EXCEPTION REQUEST - WATER SEPARATOR ASSEMBLY REMOVAL (EK1014601)	103		031
W ODS 040	S0532960H WK10299 (A)	ODS-D WAIVER REQUEST - RF-3 TK302 DYNATUBE LEAK RATE (WK10299)	0023		032
00B 038	S0532970Z WK10415 (A)	ODS-D WAIVER REQUEST - MADS FDM CALIBRATION MANUAL MODE (WK10415)	103		031

ACTIVE WAIVERS FOR  
OV-103 (STS-116)

Item #	Authority	Date	Waiver Description	Effectivity	Wad
47	S052310A	02/14/91	Fly with FRSI instead of tile	OV-103, Flight 12 & Subs (flight by flight evaluation)	<b>OK TO RETIRE</b> <b>S061954B MV 4-2</b> <b>RTF-130 Briefing</b>
53	S052428A	03/27/91	Allows specified flights to fly with interim TPS repair after each mission to minimize damage to surrounding tile during ferry flight	STS-37, STS-39, STS-40, STS-42 thru STS-999	<b>STAYS OPEN</b>
101	S076972	11/19/91	Permit the modified GPCs (AP101-S) Battery Back-up Unit to fly with annotated fastener improvements without rolling the LRU Part Number	STS-42, STS-44, STS-47 and STS-49 thru STS-999	<b>STAYS OPEN</b>
327	S115114VR5	03/17/05	Partial installation of M072-784633-014 (harness installation - interface panel - MADS #3). The M072-784663-014 Technical Order was established to incorporate the crossover bracket modification at locations X0863 and X0750. The dash number configuration for the Technical Order was not baselined until January 25, 2005 (PRCBD S115114VR2). This area was closed out before this time and would cause significant impact to verify configuration of this Technical Order dash number -014.  ***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****	OV-103, Flight 31 OV-103, Flight 32 <b>WAIVER for STS-121</b>	INS-3-28-279 (installed Tech Order)
328	S115114WR1	04/07/05	Partial installation of M072-794500-004, for Integrated Vehicle Health Monitoring (IVHM) harness installation, calls for the removal of the unused IVHM harness and routing hardware. This requirement was manifested after the Bay 13 Longerons Bridge installation was complete. With the installation of the bridge, the removal of the IVHM harness is no longer possible without the removal of the bridge.  ***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****	OV-103, Flight 31 OV-103, Flight 32 <b>WAIVER for STS-121</b>	OEL-3-31-304 PTL OEL-3-31-4432 PTL

ACTIVE WAIVERS FOR  
OV-103 (STS-116)

Item #	Authority	Date	Waiver Description	Effectivity	Wad
329	S115114AM	08/15/05	<p>The following requirements are waived to allow OV-103, Flight 31 to fly (ferry) with the following out-of-configuration conditions:</p> <p>1) V070-391139-025 (blanket under window #1 removed for ferry flight)</p> <p>2) M072-421502-002 (did not perform acetone wipe prior to universal thruster plug assemblies - procedural omission)</p> <p>3) V070-753110-003 (camera mount will not be installed for ferry flight)</p> <p>***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****</p>	OV-103, Flight 31	Ferry Flight from Dryden
330	S115114VR15	09/16/05	<p>The following requirement is waived to allow OV-103 to ferry from DFRC to KSC with the following out-of-configuration condition:</p> <p>TCS blanket V070-362917-001 located at Door #44 NOT installed.</p> <p>***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****</p>	OV-103, Flight 31 Ferry Flight	Ferry Flight from Dryden



ACTIVE WAIVERS FOR  
OV-103 (STS-116)

Item #	Authority	Date	Waiver Description	Effectivity	Wad
331	S115114VR15	09/16/05	<p>The following requirement is waived to allow OV-103 to ferry from DFRC to KSC with the following out-of-configuration condition:</p> <ol style="list-style-type: none"><li>1) Two switches on Panel A15 will ferry without switch guards (P/N G070-700904-001). In lieu of switch guards at two locations, tape was installed.</li><li>2) Eight GSE switch guards were left installed and not removed as required by Technical Order M072-710700-002 as called out in the ferry flight drawing.</li><li>3) Three switch guards are not installed on Panel L4 for TACAN circuit breakers. The procedure does not include the switch guard installation.</li></ol> <p>***** SEE NSTS 07700 VOLUME IV BOOK 2 FOR COMPLETE DETAILS *****</p>	OV-103, Flight 31 Ferry Flight	Ferry Flight from Dryden



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



**STS-116 LSFR**

**STS-301 LON LSFR**

**Flight Requirements Status**

**FRWG 6/19/06**

**PRCB 6/22/06**

Phyllis Grounds, Lead MIM  
Frank Richmond, USA Flight Mgr.



## STS-116 Flight Requirements Status

Presenter **Frank Richmond**

Date **6/19/06**

Page **2**

- **Latest Revision: eFRD Revision 013, dated April 7, 2006**
  
- **Open CRs**
  - **FRD17462-116-0077 – Update Photo TV Configuration Table**
  - **ECD: 06/21/06**



STS-116/12A.1 Requirements Status

Presenter Phyllis Grounds

Date 6/19/06

Page 3

**1. 12A.1 MIP (NSTS 21504 )**

- **Current version available on PILS: Revision B + Change 9, 3-29-06**
- **Two open CR's, ECD 6/21/06:**
  - **21504-0051 Revise Table 4-3 Mated Attitude Requirements**
  - **21504-0052 STP-H2 Reqmt for Interface testing (Orb. In-A-Box) & Ground Straps**
- **Pending MIP CR Add the +(1) energy dependent day**

**2. Spacehab Single Module CIP (NSTS 21426), STS-116 Mission Unique Addendum**

- **Current version available on PILS: Basic + Chg 1 – 54, 3-10-06**
- **CR's in review:**
  - **21426-0124 Add +(1) Energy Dependent day ECD 6-21-06**

**Pending CR's,**

**Shuttle Booster Fan Bypass – under IPT consideration  
SSP Provided FCE GFE Table update.**

**ECD 7-19-06 in support of SH Bench Review in August**



STS-116/12A.1 Requirements Status-continued

Presenter

Date 6/19/06

Page 4

- **3. Integrated Cargo Carrier (ICC) Carrier Integration Plan (CIP) Addendum for STS-116 (NSTS 21448)**
  - Current version avail. on PILS: CIP Basic, Change 1-25, 3-29-06,
  - CRs in review: none



**STS-116/12A.1 Requirements Status-continued**

Presenter

Date **6/19/06**

Page **5**

- **4. Payload Integration Plans**
  - **NSTS 21418 RMS Sideview Camera Integration Plan**
    - Current Version avail on PILS: Basic-change 3 6/28/05
    - CR's in Review: None
  
  - **NSTS 21516 Canister for All Payload Ejection/Internal Cargo Unit/Atmospheric Neutral Density Experiment (CAPE/ANDE)**
    - Current Version avail on PILS: Basic-change 2 9/8/05
    - CR's in Review: None
  
  - **NSTS 21501 Microelectromechanical System-Based Pico-Satellite Inspector (MEPSI)**
    - Current Version avail on PILS: Basic – change 7 10/19/05
    - CR's in Review: None
  
  - **NSTS 21526 Space Shuttle PICOSAT Launcher-5510 with STS-116 Addendum for RADAR Fence Transponder (RAFT)**
    - Current Version avail on PILS: Basic – change 2 3/29/06
    - CR's in Review: None
      - CR pending to resolve conflicts in ejection velocities.



## **STS-116 Flight Requirements Status**

Presenter **Phyllis Grounds**

Date **6/19/06**

Page **6**

- **Flight Definition and Requirements Document (FDRD)**
  - **PRCB CR # S072116F Add Energy Dependent Day to STS-116**
    - **Directive Signed 5/22/06**
    - **Flight Duration change**
      - **from: 11+0+2**
      - **To: 11+(1)+2**



**Launch On Need Crew Rescue  
Mission Integration Plan (MIP) Status**

Presenter

Date 6/19/06

Page 7

- **Launch On Need Crew Rescue (LONCR) Flight MIP, NSTS 21519, Rev. A Change 1, 7-25-05**
  - No Open CR's under review.
  - CR's pending are TBD





## STS-301 Flight Requirements Document

Presenter **Frank Richmond**

Date **6/19/06**

Page **8**

- **Latest Revision: eFRD NSTS 17462-301, Revision 004, dated April 27, 2006**
- **Open CR**
  - **FRD17462-301-017 – Update Photo TV Configuration Table**
  - **ECD: 06/21/06**



**STS-301 Requirements Summary  
(Concluded)**

Presenter **Frank Richmond**

Date **6/19/06**

Page **9**

**Payload Bay**

- Keel Yoke Assembly (KYA) to be removed
- Remove Aft Ballast excluding Boxes
- Install External Airlock Aft "B" Hatch
- Remove Tunnel Adapter Assembly (TAA) including Top "C" Hatch and Aft "D" Hatch
- Re-route EVA Safety Tethers (currently routed to TAA)
- Orbiter Docking System (ODS) changes to Configuration 1 from Configuration 3
- Install 2 Wireless Video System (WVS) Antennas at Xo = 1126

**Crew Compartment**

- LiOH quantity changes from 49 to 54 with all canisters stowed in middeck
- Middeck 5 MLE Stowage Bags change from 8 to 4 up/2 down
- Install Middeck Accommodations Rack (MAR)/LW
- Install Volume B
- Tools for Rendezvous & Docking (TRAD) changes to Conf. F from Conf. A
- Install LON Mission Kit (T.O. MO72-660932)-Recumbent Seat System

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# STS-116/STS-301 Launch Site Flow Review

Dan Gaskill  
Flight Software Element

PRCB 6/22/06

# STS-116/STS-301 LSFR (FSW)

---

- STS-116/OV-103 is the Fourth Scheduled Flight of Operational Increment (OI) 30 Flight Software (FSW)
- STS-301 is the Rescue Mission for STS-115
- STS-116 Base 5 Products:
  - Shuttle Data Tape available in the field on August 21, 2006
  - Mass Memory available in the field on September 19, 2006
    - Mass Memory release will contain Base 3 requirements plus
      - Flight specific I-Loads
      - SCR 93040A – Antenna Attitude Compensation Matrix Fix for DR 111696
      - SCR 93028 – Expand Effectivity of SCR 92971D (RCO) (patched on mass memory – area 3 only)
      - SCR 93067A – Expand Effectivity of SCRs 92970B and 92982B to Include STS-116 (SSPTS)

# STS-116/STS-301 LSFR (FSW)

---

- STS-301/OV-103 Deliveries will consist of the STS-114 Base 3 SDT and Base 4 Mass Memory
  - Mandatory changes (including Flight Specific I-Loads) will be done post call-up
- Concern
  - Flight slip could cause a Year End Roll Over (YERO)
    - FSW YERO status was discussed at 5/22/06 FOICB – a set of mitigations have been initiated to prepare for the possibility of year end rollover during flight. (e.g., formal performance tests) – further FOICB discussions are expected
- No FSW issues exist at this time that would impact launch site flow activities or flight.

# STS-116/STS-301 LSFR (FSW) Backup Charts

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- **STS-116/OV-103 Flight Software Will Support the Following:**
  - ISS-12A.1
  - Orbiter Interface Unit (OIU)
  - Spacehab-Single Module (Shab-SM)
  - Sequential Still Video (SSV)
  - Orbiter Docking System (ODS)
  - Trajectory Control System (TCS)
  - Assembly Power Converter Units (APCUs)
  - Solid State Recorder (SSR)/Modular Memory Unit (MMU)
  - Orbiter Boom Sensor System (OBSS)
  - Remote Manipulator System (RMS)
  - ET Umbilical Well Digital Camera RTC Command Capability
  - Automatic Manifold Close for RCS Jet Failed- On
  - Space Test Program - H2 (STP- H2)
  - Improved MLG Wheel and Tire Assembly
  - Station-Shuttle Power Transfer System (SSPTS)

# STS-116/STS-301 LSFR (FSW) Backup Charts

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- STS-116 Base 5 will include the following Base 3 Requirements for Primary Flight Software
  - DR 121191 - IPV Load/Store Problem on Discretes' Set/Resets may Cause Loss of Settings and Divergent Processing
  - DR 101072 - Immediate Moding Skipped
  - CR 92844A - Allow Uplink Change of AV Bay 3 Delta Pressure Parameter Scaling
  - CR 92871C - RCS Manifold Auto-Close for Failed-On Jet
  - CR 92872A - Make Cameras-Heater On Command Subject to RTC Moding
  - CR 92877A - RMS SPEC 94 Changes to Support Starboard Boom
  - CR 92879D - RMS Position Orientation Hold Select in Automatic Mode
  - CR 92887A - RCS Auto Manifold Close Enable/Disable via SPEC 23
  - CR 92889 - Remove Abort PE Engine-Out SSME Pitch Trim
  - CR 92894B - RMS Auto POHS MSID Change
  - CR 92899A - Correction CR to CR's 92871C and CR 92887A
  - CR 92900A - SPEC 23 Display Change for Auto-Manifold Close
  - CR 92909A - ET Camera Power Control Commands

# STS-116/STS-301 LSFR (FSW) Backup Charts

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- STS-116 Base 5 will include the following Base 3 Requirements for Primary Flight Software (cont.)
  - **CR 92920A - Eliminate Undesirable Roll Attitude Error Bias**
  - **CR 92922B - RCS Manifold Isolation Valve Close Command Timing Correction**
  - **CR 92950 - G/C Steer Roll Bias Ramp at PPD or MECO**
- STS-116 Base 5 Source implementation for Primary Flight Software
  - **SCR 93040A - Antenna Attitude Compensation Matrix Fix for DR 111696**
  - **SCR 93067A – Expand Effectivity of SCRs 92970B and 92982B to include STS-116**
- STS-116 Base 5 Patch implementation for Primary Flight Software
  - **SCR 93028 - Expand Effectivity of SCR 92971D (RCO)**
- STS-116 Base 5 Patch Implementation for Backup Flight Software
  - **CR 92804A - Provide BFS Target Nz for Composite Display**
  - **CR 92889 - Remove Abort PE Engine-Out SSME Pitch Trim**
  - **CR 92909A - ET Camera Power Control Commands**



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# BACKUP

- **Mod Record and MECSLSI Updates**
- **Engineering, Hardware and Certification Status**
- **Mandatory Mods - details**
- **Opportunity Mods - details**

# Modification Records for STS-116 LFSR Authorization

MCR NO.	MCR TITLE	KIT/ MOD RECORD & DESCRIPTION	TECH ORDER IMPACT	REMARKS
<b>Mandatory Mod</b>				
19755	<u>MPM Gullotine Retention Fastener Mod</u> Change fastener (washer should be BFB and 3 fasteners to BFB) used to secure fastener gullotine with appropriate length fastener to engage insert locking feature.	<u>019755.0100.1</u> - Increase fastener length on MPM gullotine mounting bolts	M072-544501-18D (IS) -075 (WAS)MV0002A M072-544605-013 (IS) -010 (WAS)MV0002A	MECS LSI Impact

MCR NO.	MCR TITLE	KIT/ MOD RECORD & DESCRIPTION	TECH ORDER IMPACT	REMARKS
<b>Opportunity Mod</b>				
19903	<u>Sky Genie Track Infil and AFD Overhead Closeout Panel Mod</u> Change the Sky Genie track installation design to eliminate an interference / close proximity condition existing between the overhead closeout panels	<u>019903.0100.0</u> - Sky Genie Track Infil and Overhead Closeout Panel Mod	No Tech Order Impact	No MEC/LSI Impact Separate mod codes for the crew systems Sky Genie track work and the structures closeout panel work.



# Engineering, Hardware and Certification Status

BCR NO.	BCR TITLE	Est. Bcr Phase (MM/YY)	OO Bcr Need (MM/YY)	Est. Mile Delivery (MM/YY)	OO Mile Need (MM/YY)	MOD CERT (OO/NO-OO)	CERT SUBMITAL DATE	CERT APPROVAL DATE	CERT FACILITY (CF/CAP/BO/BO)	REMARKS
<b>Mandatory Mods</b>										
19849	<b>New Seat7 Recumbent Seat (R) PBR (R) Assembly Configuration</b> The ROST is being revised to provide the RCR brackets in order to support the return of the Egoose in its installed position. This change is required to avoid interference between the RCR Go back bracket and the Egoose during storage. The OTC-HS crew is planning to have the one existing OTC crew member's workstation installed at the Seat7 position.	Released	N/A	N/A (1)	N/A (1)	Go	4/24/06 A	5/21/06 A	CF 25-39129002-3018 CAP 04-05-39129002-3018	OCRD 0700143480281 OTC-HS replace OTCs. The OTC-HS crew is planning to have the one existing OTC crew member's workstation installed at the Seat7 position.  (1) Hardware installation orders derived OTC  OCRD 0700143480281 OTC-HS replace OTCs. OCRD-66065-010 (ADD -01/065A) OCRD-66065-000 (1/04/06)
19755	<b>PBR BPR Pedestal Over-Center Stops</b> New fitting caps to replace OF fittings on PBR BPRs (Chassis, FWD, M & A1 Locations) due to provide installation unique loads all revised BPR over-center chassis cap will	Released	N/A	Delayed	N/A	Go	5/9/06 A	6/13/06 A	CAR 05-44-000002-0018	The -000 replace -001 fits. Program the new stop depends upon flight specific code analysis, completed by the flow per back analysis temp fit. Due to engineering issue, BCR 19754 needs to be worked on first mod.  Added a 270/10CA update processed per to OTC-121 form of the OTC-121 on the BPR
19824	<b>BPR Pedestal Insulation Cover Fasteners</b> Change the nuts for spanhead connection with a finished or recessed nut washer to provide clearance between the PBR Actuator bolt and the <u>BPR/BPR</u> Pedestal Insulation Cover at 0101	Released	N/A	N/A (1)	N/A	Go	N/A	N/A	N/A	Engine fit change after the 1st order line - Mod 54400 (PBR). Reengineering case - new data member before top of OTC PBR over-center stop - needs to be worked with PBR over-center stop mod to avoid interference. (3) Part (010101) and 01010101
19755	<b>BPR Over-Center Extension Fastener Rod</b> Fastener is a copper chrome BPR and 3 lead pedestal BPR used to mount the airframe to pull the air to be up and a longer pin length fastener to engage interlocking flange of the nuts. Review per OTC-121 issue after a final found that these fasteners are no. of sufficient length and have correct number of 2.000000 inch engaged in the hole.	0.0000	TED	N/A	N/A	Go	TED	TED	TED	Corrected after the 1st order line per OTC-121 issue - add to both PBR 5.0 BCR 010101 and pedestal BPR. Note: These fastener configurations will be 14 inch top of the BPR PBR Over-Center Cover Mod (010101).  OCRD 0700143480281 OTC-HS replace OTCs. OCRD-64400-TED (01 -01/06) 01010101 OCRD-64400-010 (01 -01/06) 01010101





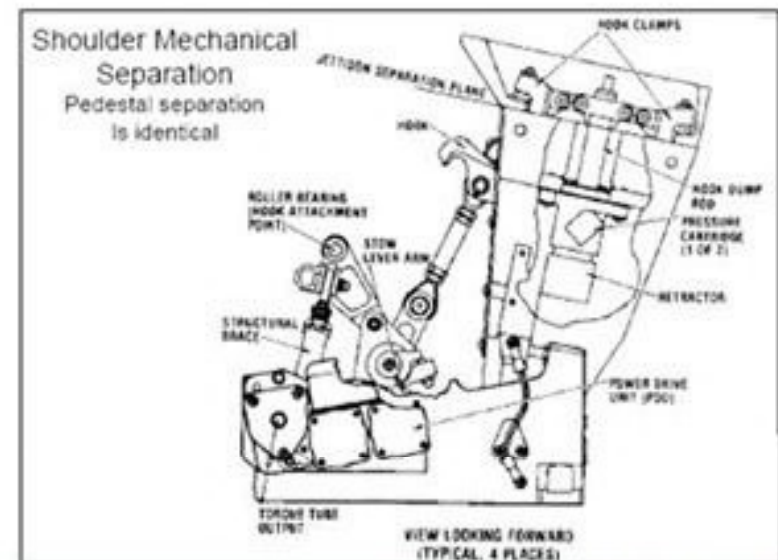
# Engineering, Hardware and Certification Status

BCR NO.	BCR TITLE	Est. Start Date (MM/DD/YY)	O.O. Start Date (MM/DD/YY)	Est. Mile Delivery (MM/DD/YY)	O.O. Mile Mile (MM/DD/YY)	MODCPT GO #0-00	CEPT SUBMITTAL DATE	CEPT APPROVAL DATE	CERTIFICATION CR CAP/BOB/RO	REMARKS
<b>Opportunity Mods</b>										
19874	RF-18 TPS Hardening - Other Vehicle Areas Reference: TST loaded 5/11/06 aircraft. Request for ground HCC coated U-220 and RF-18 etc. This BCR authorizes implementation on acquisition built for the MLO9 program. ST 500 per line, Window (16) center panel and lower LEDO card Panel location.	Released	N/A	See Remarks ⊕	See Remarks ⊕	Go	3/6/06 A 3/6/06 A	5/21/06 A 5/21/06 A	CR 07-391001-001AE CAR 33-07-391001-001AE	MLO Door Portion of Mod ⊕) - Applied to all BCR 19874 material (Reference) Current JAR/OTC/TA provide 100% of RF-18 material (per test) 5.00 portions of Testimony under BCR 19874, which will be used to code certain implementations under BCR 19874. As of June 2006, 200 of the 450 built and 25 of the 50 containers of material have been delivered with remainder of materials to be shipped in increments this September 2006. Will require flight location and final HCC backstop to address problem based on release status needs.  Certification will be 3 weeks behind current flight status on cert to be started in July 2006.
		Released ⊕)	TBD	See Remarks ⊕	See Remarks ⊕	Go	5/23/06 P	10/10/06 P	CR 05-199200-003 CAR TBD	Lower WLE Carrier Panel Portion of Mod ⊕) All 14 days ago - coded by test-up released. Certification will cover flight flight certification - Go to phase status based on 17 completion of environment cycle testing completed - additional on-line area specific analysis required prior to cert status.
		5/21/06 ⊕)	TBD	See Remarks ⊕	See Remarks ⊕	Go	10/30/06 P	12/12/06 P	CR 07-391001-001 CAR TBD	Window Carrier Panel Portion of Mod ⊕) 1 of 3 days ago - released - EPD is a MIL date. Certification will cover flight flight certification - Go to phase status based on 17 completion of environment cycle testing completed - additional on-line area specific analysis required prior to cert status.
		11/5/06 ⊕)	TBD	See Remarks ⊕	See Remarks ⊕	No Go (S)	~12/21/06 P	~1/12/07 P	CR 07-395001-001 CAR TBD	ET Door Panel Portion of Mod (Libs) not ready for STS-116) ⊕) Request held for 4 test days in support of impact testing at OVRH completed for Oct 2006. Enot approved at 5/17/06 OCCB - approved OCPD in order 5/31/06. Engineering release consists of 2 work by avoidance and 1 test-up test-up development (25.06) and all from ice dependent upon testing results.

# Engineering, Hardware and Certification Status

BCR NO.	BCR TITLE	Ext. Sign. Release (MM/DD/YY)	S.O. Sign. Recd (MM/DD/YY)	Ext. Issue Del. req. (MM/DD/YY)	S.O. Issue Recd (MM/DD/YY)	MOD/CEP OO: #0-00	CERT ESSENTIAL DATE	CERT APPROVAL DATE	CERTIFICAT OR CR /CAR/BOB/KO	REMARKS
<b>Opportunity Mods</b>										
23227	<u>Connector Gasket Redesign</u> Redesign connector gaskets (B641-0630) provide a non-hazardous seal and easy access - engage/disengage function to reduce risk of inoperative fire handle during use - top installation of existing unworked locations (OBD Pod and fu. handle) as opportunity	Released	NA	NA	NA	Go	10/11/05 A 10/11/05 A	3/17/06 A 3/17/06 A	CR 21-710000R CAR 08-21-710000R	
23483	<u>Increase Torque on Window 7 Fasteners To CLASS 1</u> Increase torque on overhead window 7 installation fasteners to produce concern for window gasket gapping based on updated stress analysis. Fasteners were brought up to the class 2 torque range by HFF during the flight 02 flow.	6/30/06	YTD	NA	NA	Go	6/16/06 A	6/28/06 F	CAR 21-01-390001-001N	two flight critical crew log CPD handle spacers and replace title of associated flight instruction as well as window gapping analysis updated and torque increase. Log to be update when the spacers complete of rework by certificate analyst.
19903	<u>Eliminate Track Pins and APO Overhead Closeout Panel Mod</u> Mod change: The Sky Drive Fast. installed on helmet design as a new multiple design to a cut design which will have the threaded stud installed in the case as shown on a side view and reference to design only condition of the case track. Eliminate existing behind the closeout panel.	7/13/06	YTD	6/30/06 (S)	YTD	Go	7/25/06 F	9/6/06 F	CAR 04-231002R CR 25-660001-001R CAR 30-25-660001-001R	OCRD 01600W approved 26/13/06 OOC. (S) Complete by of date 1/1/07 at HFF - 3 week track to mod back at HFF spc exception IDC.

# 19755 MPM Guillotine Retention Fastener Mod - Backup





## STS-116 OV-103 Flt 33 – (Mandatory Mods)

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### **19849 New Seat 7 Recumbent Seat Kit (RSK) Rail Assembly**

The RSK 7 is being revised to remove the RSK 8 brackets in order to support the return of the Ergometer in the installed position.

This change is required to eliminate interference between the RSK 8 attach brackets and the Ergometer during installation / stowage for landing.

STS-116 will have one returning ISS crewmember's recumbent seat installed at the Seat 7 position.

## STS-116 OV-103 Flt 33 – (Mandatory Mods)

---

### **19755 OBSS/RMS MPM Pedestal Over-Center Stops**

New design Boeing stops limit the over-center travel of the Boom/RMS due to vibration loads and deflection. New design stops currently installed on Starboard MPMs on OV-103. Flight-specific load profiles will determine whether new design stops will be required on the Port side (RMS) MPMs for STS-116.

All Engineering released and hardware delivered to support Flight 33 if required.

### **19824 MPM Pedestal Insulation Cover Fasteners**

Changes fasteners from a pan head screw / plain washer to a flush head screw / countersink washer to improve clearance between the PLBD Actuation Bellcrank and the RMS MPM Pedestal Insulation Cover at Xo911

### **19743 TPS Hardening (BRI-18 tile) – MLGD Perimeter Location**

Implements TUF1-coated BRI-18 tile which is a direct drop-in replacement for current RCG-coated LI-2200 and FRCI-12 tiles. Tile has been under development for the past several years and is tougher (~78% more impact tolerant) than the current tiles.

This MCR covers MLGD perimeter location (structure and door side) and is engineered with Attrition effectivity (install only as required for tile replacement).

### **19874 TPS Hardening (BRI-18 tile) – Other Locations**

Implements BRI-18 tile on NLGD perimeter, LESS Carrier Panel and Window 1-6 Carrier Panel locations. Implementation on ET Door perimeter location is currently under review.

This MCR will also be engineered with Attrition effectivity (install only as required for tile replacement).

## STS-116 OV-103 Flt 33– (Opportunity Mods)

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### **19735 WLE Spar “Sneak Flow” Protection**

Increases RCC panel damage tolerance by adding a flow restrictor to limit allowable plume flow to 50% across the flow restrictor. Also adds protection to the exposed lower 2” of the WLE spar to protect against hot gas sneak flow convective heating conditions in the event of a 0.25” hole in the lower RCC surface.

Panels 5-22 are complete, 1-4 left to be worked

### **19763 Lower WLE Carrier Panel Horse Collar Gap Filler Redesign**

Redesigns the lower WLE access carrier panel horse collar gap fillers with an enhanced design with additional sleeving

Damage to the lower access carrier panel tile could allow hot gases into the WLE cavity - redesign is expected to increase heating contingency margins in the event of a partial carrier panel tile loss.

Panels 5-22 are complete, 1-4 left to be worked

### **23227 Connector Saver (ME414-0630) Redesign**

Connector savers have been found in the fleet with incorrect interfacial seal and retention force too low to insure proper locking following installation. Remaining implementation locations for this mod include OMS Pod interface and Ku-Band (T-0 and ET Umbilical Monoball locations implemented during STS-114 flow).

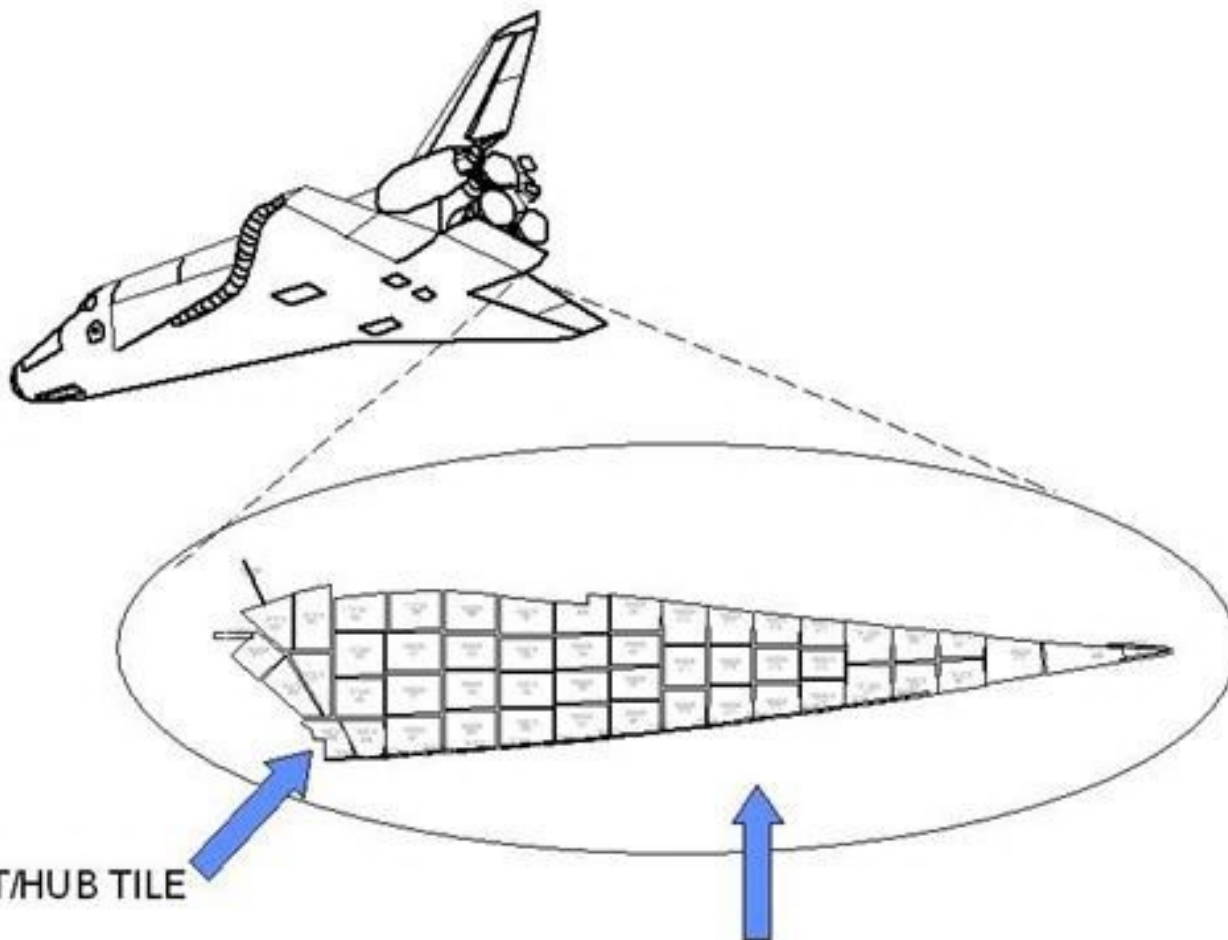
Connector Saver mod approved to provide proper interfacial seal and wavy washer engagement retention force to reduce risk of inadvertent demate during use

### **19546 Hub Tile Modification**

Replaces 2 tiles in the inboard elevon area with a single more robust tile. Previous design could lead to installation errors which could result in loss of tile in flight.

Tile is difficult to bond due to complex design. New tile allows a Bond Verification (BV) check to be done on the newly installed tile (BV could not be done on previous design) This is the only Crit 1 Tile on lower surface that cannot be BV'd

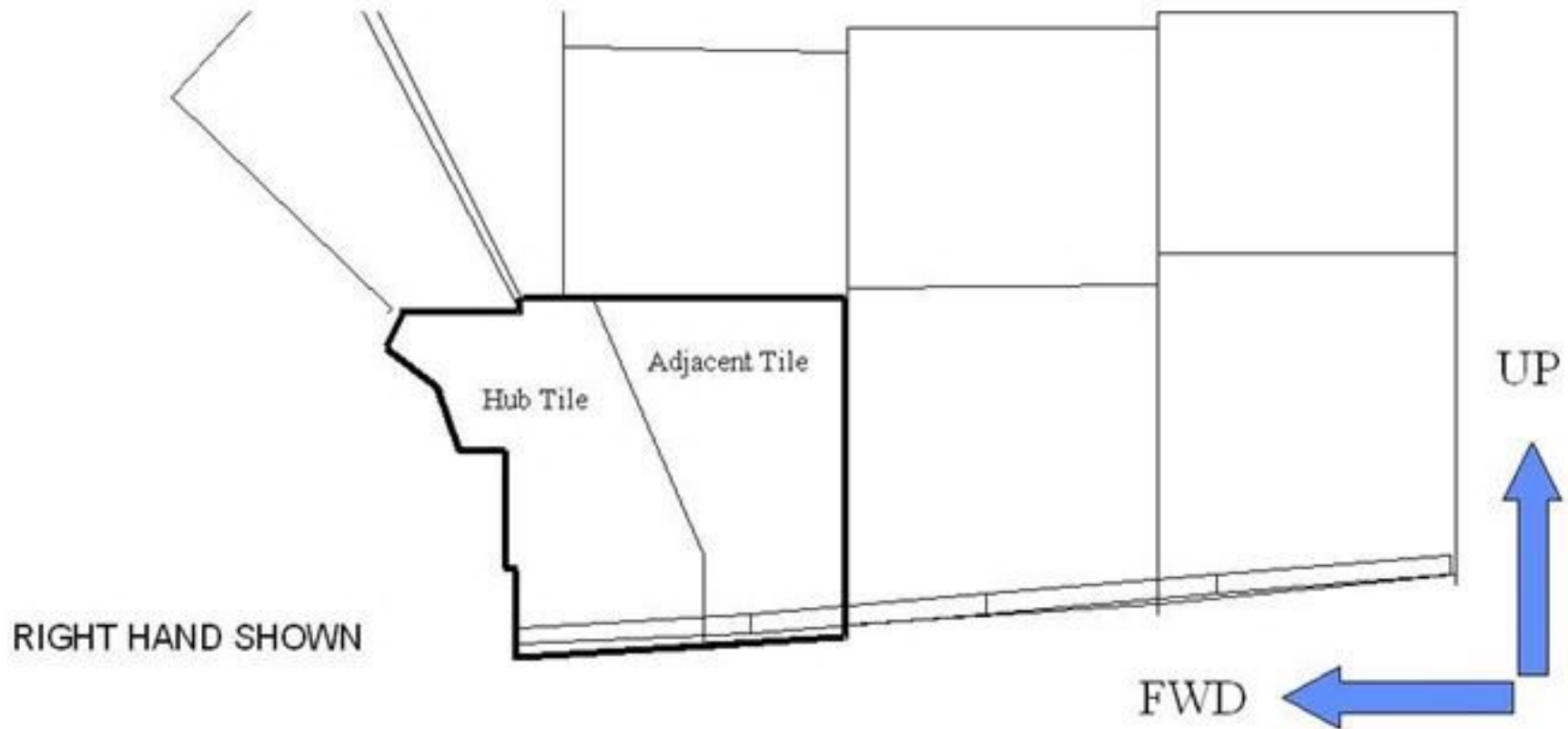
## Hub Tile (Cont.)



HINGE POINT/HUB TILE

APPROXIMATELY 50 TILE ARE LOCATED ON ELEVON SIDEWALL

## Hub Tile (Cont.)



## STS-116 OV-103 Flt 33 – (Opportunity Mods)

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### **17177 ODS Vestibule Airduct Strap Deletion**

Eliminates an air duct velcro retention strap from the ODS vestibule duct which is no longer used or required.

Strap was previously utilized for attaching the duct end in the ODS vestibule to provide some mixing of air with ISS and has been replaced with an improved ISS air circulation system (halo by-pass ducting configuration)

New configuration uses a T-handle clamp to attach the end of this duct to an ISS duct, therefore, the velcro strap is not needed for duct securing

### **23463 Increase Torque on Window 7 Fasteners To Class 2 (Info Only)**

Increases torque on overhead window 7 installation fasteners to preclude concern for window joint and seal gapping based on updated stress analysis

Fasteners were brought up to the class 2 torque range by MR during the flight 32 flow – mod paper update only.

Mod was baselined for OV-103 flight 33 at 4/28/06 noon PRCB (ref S060900F)



## STS-116 OV-103 Flt 33 – (Opportunity Mods)

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- **19755 MPM Pyro Guillotine Cover Mod To Eliminate Interference**

Trims the OBSS and RMS Manipulator Positioning Mechanism (MPM) shoulder mechanism assembly guillotine cover and cover bracket and re-locates the bracket nutplate to eliminate interference with cover attach screw and MPM deploy stop. Worked by MR during flight 32 flow – mod paper update only



**STS-116 LSFR**  
**Flight Crew Equipment (FCE) and Government Furnished**  
**Equipment (GFE)**

Presenter **Bruce W. Sauser**

Date **May 22, 2006** Page **1**

- **At this time we show no hardware certification issues in support of STS-116.**
- **Waiting on KSC need dates and then will partner the dates between JSC and KSC.**
- **Anticipate no issues with meeting hardware need dates.**



- **No Starboard TSA**
  
- **Port Slidewire**
  - Slidewire installation – Tech Order: M072-544700-016
    - Incorporation of new forward thermal cushion
  
- **Safety Tether Routing**
  - Tether Reel Box installation – Tech Order: M072-661618-002
  - Safety Tether Routing to Slidewire – Tech Order: M072-661618-015

*\*\*Indicates change from  $\Delta$ LSRR on 5/11/06*

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**STS-116**  
**ISS – 12A.1 P5, SPACEHAB, ICC**  
**LAUNCH SITE FLOW REVIEW**

**PAYLOAD CARGO ENGINEERING STATUS**

**MICHAEL BARIDO**

**281.212.6072**

**06-22-2006**

# STS-116 LSFR

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## ENGINEERING FLIGHT PRODUCT STATUS

<u>DRAWING NO.</u>	<u>TITLE</u>	<u>REV</u>	<u>EO</u>	<u>RELEASED</u>
• V072-200195	MECSLSI	G	G01	06-01-2006
• VA72-200195	CARGO ARRANGEMENT DRAWING	F	F01	05-30-2006
• VD72-200195	AVIONICS INTERFACE DIAGRAM	C	C01	06-01-2006
• VS72-200195	INTEGRATED AVIONICS SCHEMATIC	C	C01	06-01-2006
• VS70-540374	RETENTION SCHEMATIC DIAGRAM	B	B01	07-12-2005

## OPEN WORK

- Δ Δ Δ FRED – VEHICLE SWAP 06-02-2006A

## ISSUES/CONCERNS

- NONE

# STS-116 LSFR

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## PAYLOAD ICDs/PIRNs

ALL PAYLOAD-UNIQUE ICDs ARE BASELINED

### PIRNs THAT IMPACT FLIGHT PRODUCTS

<u>PIRN #</u>	<u>ICD/PAYLOAD</u>	<u>TITLE</u>	<u>ECD</u>
A05174	ICD-A-21504-ICC	UPDATE SEC. 3 MECHANICAL FIGURES	06-29-06
A05228	ICD-A-21504-P5	UPDATE PER 04-04-06 CAD AND EVA/SRMS/SSRMS FIGURES	07-17-06

### ISSUES/CONCERNS

- NONE

# STS-116 LSFR

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## OMRSD

THE OMRSD FILE II VOL. 2 POST-MATE AND FILE II VOL. 4 POST-MATE FILES ARE PREVIOUSLY BASELINED AND THE UPDATES FOR THE FILES WILL BE DELIVERED AS FOLLOWS:

### PAYLOAD OMRS (FILE II, VOL. 2 -POST MATE) -OPEN WORK

- OMRS P1426 SPACEHAB UPDATES –WATER LOOP CHECKOUT

ECD

07/12/2006

### PAYLOAD OMRS (FILE II VOL.4 –PRE MATE) - OPEN WORK

- STS-116 MISSION UNIQUE LIST (S07MUL.844) UPDATES
- STS-116 FILE III MUL (S07MUL.845) UPDATES
- STS-116 ADJACENT BENT PIN TEST (S0712A.954) UPDATES

ECD

07/14/2006

07/14/2006

07/14/2006

## ISSUES/CONCERNS

- NONE

## TGHR STATUS

### OPEN WORK

- CUSTOMER SUBMITTAL (L-4) 08/14/2006
- RELEASE FOR REVIEW (L-3) 09/14/2006
- BASELINE (L-2) 10/16/2006

ECD

## ISSUES/CONCERNS

- NONE

# STS-116 LSFR

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## ANNEX 1 OPEN WORK

### ITS-P5 –NSTS 21504- A01

- INTERIM WEIGHT UPDATE (L-4)
- FINAL WEIGHT SUBMITTAL (L-1)

### CUSTOMER SUBMITTAL

07/24/2006  
10/30/2006

### CR RELEASE

07/31/2006  
11/06/2006

### CR BASELINE

08/14/2006  
11/14/2006

### ICC –NSTS 21448 – A01

- INTERIM WEIGHT SUBMITTAL (L-4)
- FINAL WEIGHT SUBMITTAL (L-1)

07/24/2006  
10/30/2006

07/31/2006  
11/06/2006

08/14/2006  
11/14/2006

### SPACEHAB –NSTS 21426 –A01

- INTERIM WEIGHT SUBMITTAL (L-4)
- FINAL WEIGHT SUBMITTAL (L-1)

07/24/2006  
10/30/2006

07/31/2006  
11/06/2006

08/14/2006  
11/14/2006

## ISSUES/CONCERNS

- NONE



# STS-116 LSFR

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## HARDWARE

### DELIVERY

- ALL HARDWARE DELIVERED

### CERTIFICATION

- CERTIFICATION DOCUMENTATION UPDATES REQUIRED TO REFLECT DCR FINDINGS – ECD  
7/28/2006

### ISSUES/CONCERNS

- NONE

# STS-116 Launch Site Flow Review

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## ISS Mission 12A.1

- ITS P5 TRUSS
- SPACEHAB Single Module
- ICC
  - 3 Stacks of Service Module Debris Panels
  - SMDP Adapter
  - STP-H2 PICO Satellite Launcher
  - PFRAM

Jack Keifenheim  
Mission Project Engineer  
KSC ISS/Payload Processing  
June 22, 2006



# Payload Processing Milestone Summary

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## ISSUES and CONCERNS

- Aggressive pad schedule from payload arrival through closing P/L bay doors prior to Thanksgiving.

**The KSC STS-116 ISS/Payload Processing Team is ready to process the 12A.1 Mission payload complement.**



# Payload Processing Milestones

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## PRE-SHUTTLE PLANNED INTEGRATION ACTIVITIES

### Space Station Processing Facility

- ITS P5

- Final P5 Assembly & Integration on-going through 09-11-06
- P5 Closeouts 09-11-06
- Final P5 Wt & CG and Transfer to Canister 10-31-06

- ICC delivery to SSPF 10-23-06

- ICC transfer to Canister 10-25-06

- SPACEHAB Module delivery to SSPF 11-01-06

- SPACEHAB Module transfer to Canister 11-02-06



# Payload Processing Milestones

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## SHUTTLE PLANNED INTEGRATION ACTIVITIES

### Orbiter Processing Facility

- APCU IVT 08-29-06 (U/R)
- Install ICC-KYA 09-28-06 (U/R)

### PAD

- PAYLOAD TRANSFER TO PAD 11-13-06
- PAYLOAD INSTALLED INTO ORBITER 11-17-06
- SPACEHAB MODULE ORBITER IVT Start (2 days) 11-21-06
- SPACEHAB EARLY STOW (MVAK) 12-04-06
- SPACEHAB LATE STOW (MVAK) Start 12-12-06
- LAUNCH (N.E.T.) 12-14-06



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# BACKUP

# CONFIGURATION / Facilities

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- OV-103: Flight 33
- OMS Pods: LP01 / RP03
- ET: 123
- SRB: BI – 128
- SSME: 2050 (#1), 2054 (#2), 2058 (#3)
- Payload: Spacehab
- Flight Software: OI-30
- Firing Room: 3
- OPF Bay: 3
- MLP: 1
- VAB High Bay: 3
- Pad: B

# DEFERED WORK SUMMARY

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As Of 6/15/06

- Orbiter OV-103 flight 33
  - Planned Work 52
  - Future Work 122
  - Total 174
- OMS pod
  - Planned Work 3
  - Future Work 20
  - Total 23
- TPS
  - Planned Work (WADS) 28
  - Future Flight 13
  - Total 41

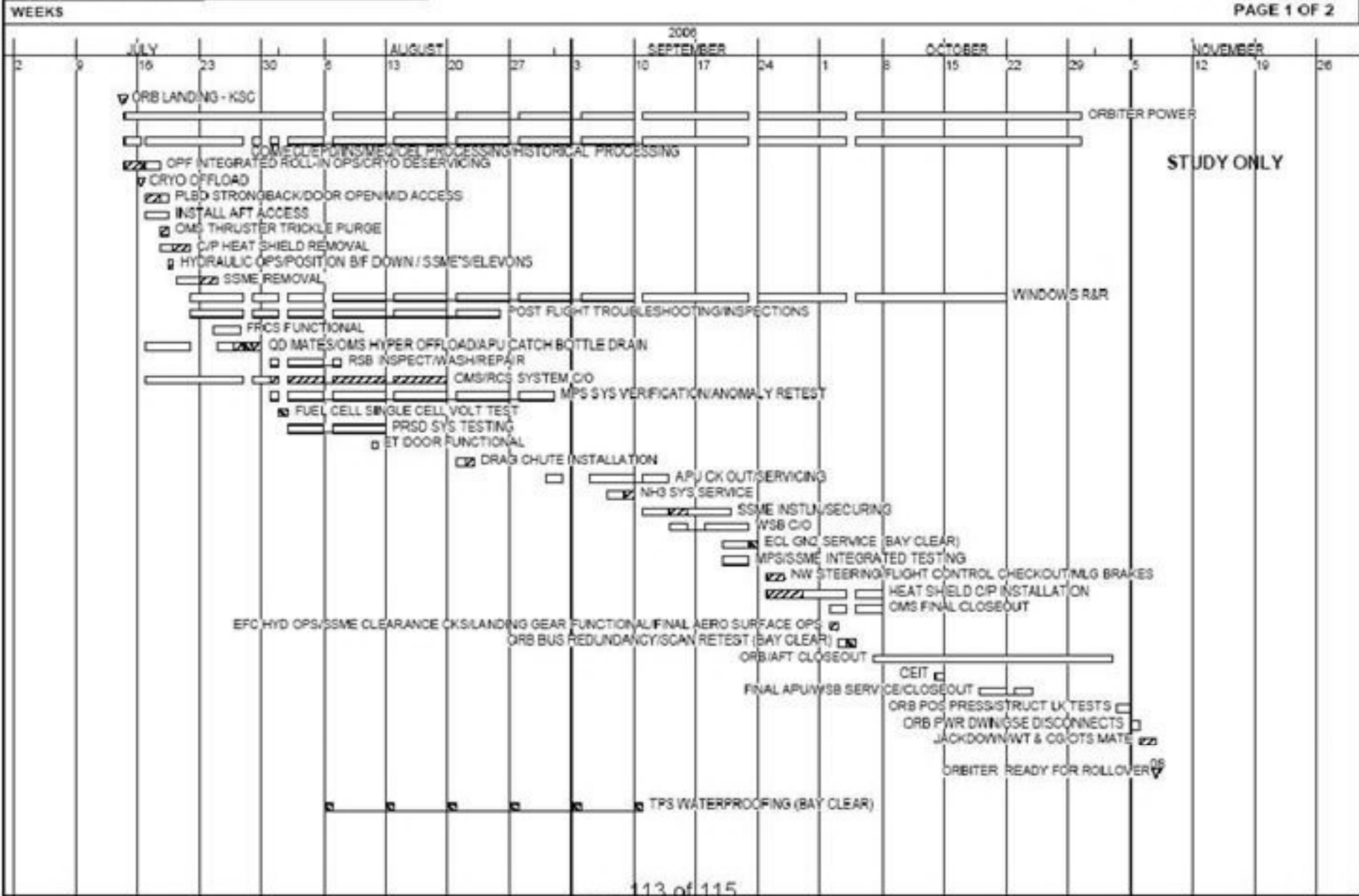


<b>STATUS</b>		<b>NON-CONCUR</b>  This product should not be used for planning purposes or impact assessments.
USA	NASA	
NC	NC	
C=Concur	NC=Not-concur	

**STS-116/OV-103  
OPF ASSESSMENT SUMMARY**

CONTACT : WAYNE BINGHAM 1-5562  
 CREATION DATE : 06 JUN 06  
 REVISION DATE : 08 JUN 06  
 REVISION : A

OPR : USA-BINGHAM WAYNE, FM  
 NASA-STILSON,STEPHANIE, PH-O



**STATUS**

**NON-CONCUR**

STS-116/OV-103

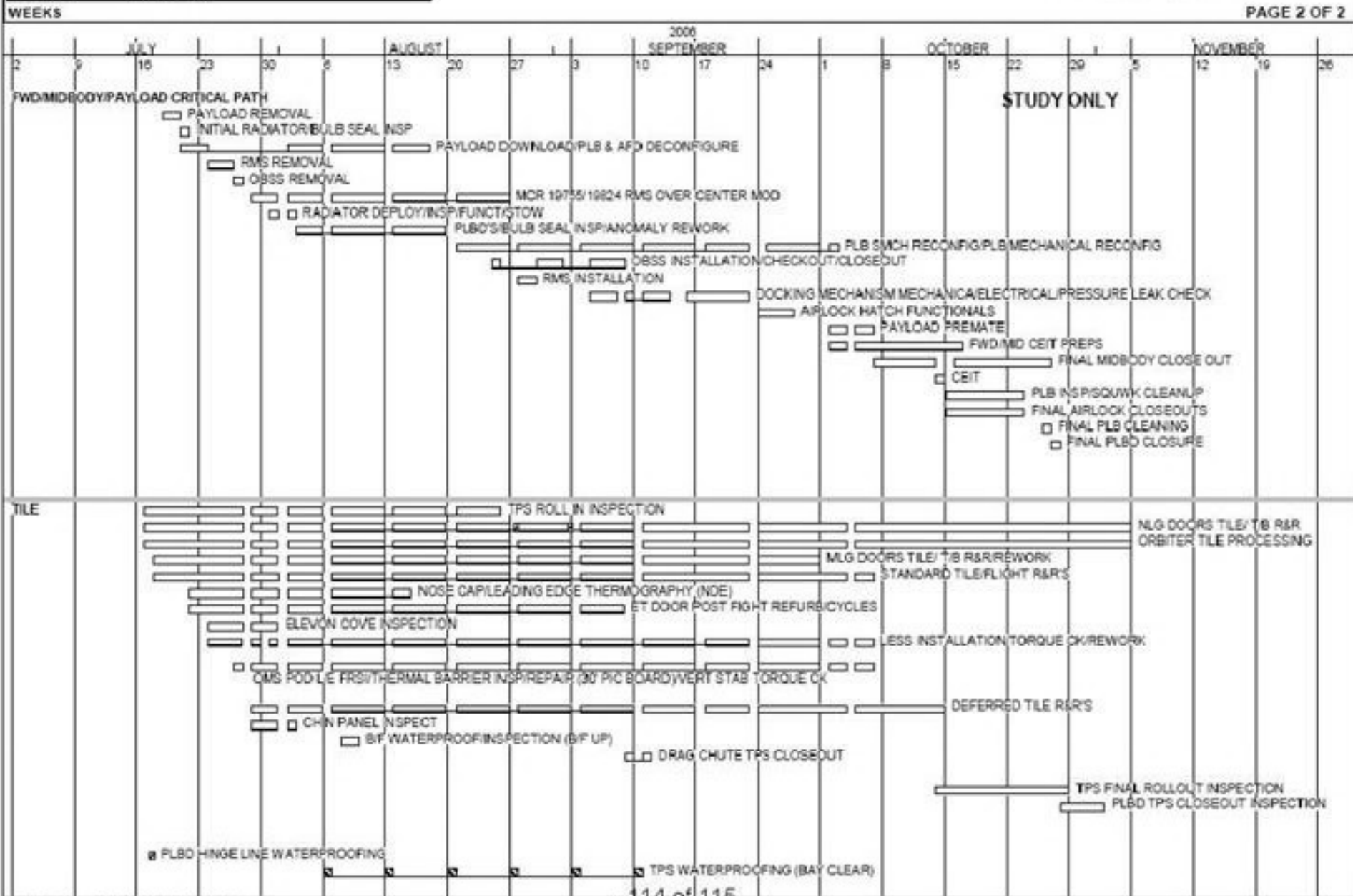
CONTACT : 1WAYNE BINGHAM 1-5662  
 CREATION DATE : 06 JUN 06  
 REVISION DATE : 08 JUN 06  
 REVISION : A

OPR : USA-MOIST, JEFF, FM  
 NASA- STILSON,STEPHANIE, PH-O

**OPF ASSESSMENT SUMMARY**

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

This product should not be used for planning purposes or impact assessments.



**STATUS**

**NON-CONCUR**

STS-116/OV-103

CONTACT : TWATRE BIRGAM 1-0002  
 CREATION DATE : 06 JUN 06  
 REVISION DATE : 08 JUN 06  
 REVISION : A

**OPF ASSESSMENT SUMMARY**

OPR : USA-MOIST, JEFF, FM  
 NASA-STILSON, STEPHANIE, PH-O

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

This product should not be used for planning purposes or impact assessments.

WEEKS

