



SPACE SHUTTLE PROGRAM
Space Shuttle Program Integration
NASA Johnson Space Center, Houston, Texas



STS-111 Flight Readiness Review

May 16, 2002



Agenda

Presenter

Date 05/16/2002 Page 2

- • **Program Integration - Flight Manager ***
 - **Key Program Considerations**
 - **Payload & System Safety**
 - **Orbital Debris Status ***
 - **Payload In-Flight Anomalies**
 - **Launch Commit Criteria ***
- **USA Program Integration**
- **Boeing Integration**
 - **Waivers to Vol X**
- **System Integration TMR**
- **Flight Readiness Statement**

Randall Adams

No Issues

No Issues

CoFR Exception

Bob White

No Issues

Rod Wallace

*** Backup Material Included**



Key Program Considerations

Presenter **Randall Adams**

Date **05/16/2002** Page **3**

- **Mission Duration (12+0+2) Pad Hold (+ 48 Hrs Margin)**
 - DI 122 supports FD3 rendezvous
- **EVA's from ISS Airlock**
 - 3 scheduled EVA's; FD5, FD7, FD9
 - Performed by 1 Space Shuttle EVA team
- **Middeck Stowage**
 - Manifest finalized / L-10 day BR 5/21/02
 - All ISS Program requirements supported
- **Return Configuration Frozen (middeck and MPLM)**
 - Changes to the baseline will be issued via CHIT
- **Space Shuttle Secondary Payloads**
 - RAMBO (Customer DoD)



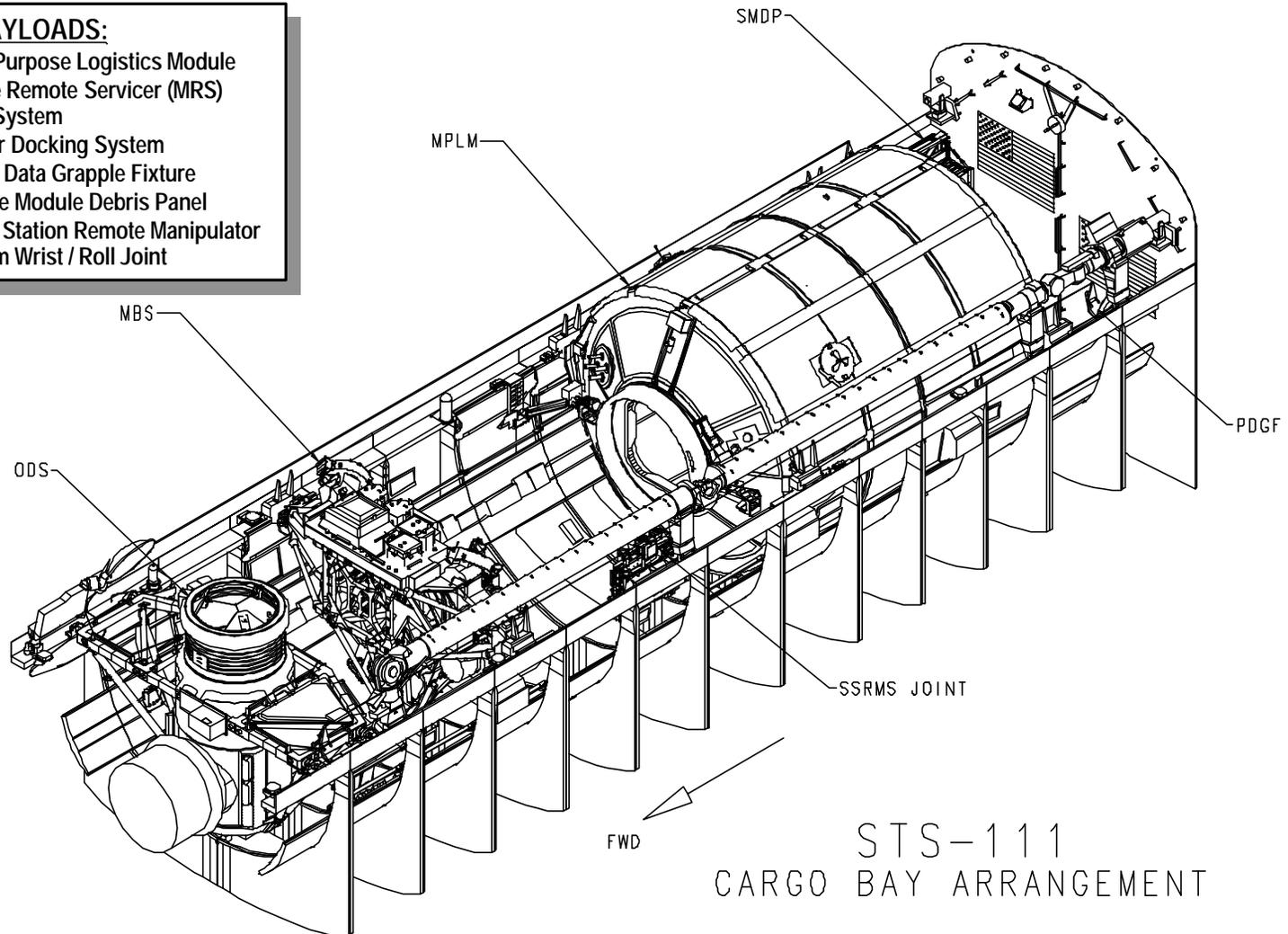
Payload Bay Configuration

Presenter **Randall Adams**

Date **05/16/2002** Page **4**

PAYLOAD BAY PAYLOADS:

- MPLM Multi-Purpose Logistics Module
- MBS Mobile Remote Servicer (MRS)
 Base System
- ODS Orbiter Docking System
- PDGF Power Data Grapple Fixture
- SMDP Service Module Debris Panel
- SSRMS Joint Space Station Remote Manipulator
 System Wrist / Roll Joint



STS-111
CARGO BAY ARRANGEMENT



Payload and System Safety

Presenter **Randall Adams**

Date **05/16/2002** Page **5**

- **Integrated Experiment Hazards Assessment - Complete**
- **Toxicology Process**
 - Verification 1: Complete
 - Verification 2: Standard open work for late load items
- **Payload Safety Review Process - Complete**
- **One Non-compliance Report (NCR) – Approved**
 - Biomass Production System Pinch Point Hazard (Integrated ISS Express Rack Issue – same as STS-110)
 - Payload hardware labeled and crew trained



Agenda

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Date 05/16/2002 Page 6

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Randall Adams

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USA PROGRAM INTEGRATION FLIGHT PREPARATION PROCESS

Presenter:

Bob White

Organization/Date:

Program Integ/05-16-2002

- **All the Systems and Cargo Integration flight preparation activities have been completed except for planned open work – no issues identified**
- **Completed tasks include:**
 - Verification of compliance with generically certified requirements
 - Mission specific analyses
 - Documentation of vehicle and cargo requirements
 - Reconfiguration / installation of Payload Integration hardware
 - Payload bay clearance assessment

Program Integration Is Ready to Support Flight

SSME TAG ISSUE**Presenter:**

Bob White

Organization/Date:

Program Integ/05-16-2002

- **Systems Integration Post Flight reconstruction has revealed lower than predicted SSME mixture ratio and higher Isp on last 3 flights**
 - Could result in potential low-level LH₂ cut-off (worst-case)
 - Could effect Abort Region Determinator (ARD) accuracy
- **Coordinated findings with SSME project**
- **SSME project has discovered root cause to be an input error in SSME controller logic equation**

SSME TAG ISSUE**Presenter:**

Bob White

Organization/Date:

Program Integ/05-16-2002

- **SSME project is developing corrected engine tags for all engines**
 - STS-111 has been completed and documented
- **STS-111 main engine controller s/w update in work**
- **Systems Integration will include up-dated tags into the upcoming STS-111 Trajectory Design Data Package (TDDP) on 05/21/07**
- **USA Flight Ops will utilize STS-111 TDDP for Ascent Design products, ARD products, and DOL I-Loads**



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Date 05/16/2002 Page 10

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STS-111 NASA System Integration TMR Flight Readiness

Presenter **Rod Wallace**

Date **05/16/2002** Page **11**

- **Insight, audit and surveillance requirements complete**
- **No out-of-family problems have been identified for impact to safety of flight, or planned flight operations**
- **Approved Program requirements changes have been implemented and verified**
 - **ICD, OMRS, LCC**
 - **Vehicle configuration**
 - **DOSS configuration**
 - **NSTS 07700, Volume X**
 - **Joint requirements**
- **All Joint Shuttle / International Space Station on-orbit Systems Integration analyses have been completed and compatibility verified for STS-111-UF-2 baseline mission**
- **System Integration is ready for flight pending the completion of remaining open work**



STS-111 NASA Systems Integration TMR Boeing Relocation Status

Presenter **Rod Wallace**

Date **05/16/2002** Page **12**

- **Relocation Progress and Metrics are Stated as Part of the CoFR Process and Monthly Joint NASA / USA / Boeing Reviews**
 - **66% of Hiring Complete**
 - **62% of New Hires Have Applicable Shuttle Experience**
- **Current Transition Risk Assessment**
 - **93% of Personnel Still Available at Boeing-Huntington Beach**
 - **30% of Personnel Committed to Relocate**
 - **Risk Through Relocation Complete = Yellow**
 - **Currently Available Skills Meet All Contract Requirements**
 - **No Flight Product Delivery or Quality Issues Identified for STS-111**
- **Systems Integration Transition Process Assessment for STS-111 CoFR Process = Green**

STS-111

STS-107

STS-112

STS-113

STS-114

CoFR EXCEPTION FORM

EXCEPTION NUMBER: 001	ELEMENT: PROGRAM INTEGRATION SERIAL NUMBER: OV-105	STS FLT NUMBER: STS-111
REQUIREMENT/DESCRIPTION OF EXCEPTION: NSTS 08117, SECTION 8.5.12.1-b, SECTION 8.5.18.1-K LCN 1099 - LAUNCH COMMIT CRITERIA REQUIREMENTS IDENTIFIED ARE DEFINED AND APPROVED		
INITIATOR/TITLE: F. HINSON, ASSOCIATE PROGRAM MANAGER USA PROGRAM INTEGRATION		DATE: 05-16-02
CONCURRENCE/TITLE: R. L. SEGERT, MANAGER SPACE SHUTTLE KSC INTEGRATION		DATE: 05-16-02
ACTION/ACTIONEE: LCC REQUIREMENTS APPROVAL/R. L. SEGERT		DUE DATE: STS-111 PMMT REVIEW
REVIEW BOARD CHAIR:		DATE:

RESOLUTION OF EXCEPTION:	DATE RESOLVED:		
CONTRACTOR MANAGER:	DATE:	NASA PROJECT MANAGER:	DATE:
SPACE SHUTTLE PROGRAM:			DATE:



STS-111 Flight Readiness Statement

Presenter

Date 05/16/2002 Page 14

**THIS CERTIFIES THAT ALL MISSION REQUIREMENTS HAVE BEEN MET AND
SPACE SHUTTLE INTEGRATION IS READY FOR FLIGHT, PENDING COMPLETION
OF THE DEFINED OPEN WORK AND NOTED EXCEPTION**

/s/ Lambert D. Austin, Jr.

**L. D. AUSTIN, JR., MANAGER
SPACE SHUTTLE SYSTEMS INTEGRATION**

/s/ Michele A. Brekke

**M. A. BREKKE, MANAGER
SPACE SHUTTLE CUSTOMER AND
FLIGHT INTEGRATION**

/s/ Fred R. Hinson

**F. R. HINSON, Acting ASSOC. PROG. MGR
PROGRAM INTEGRATION
UNITED SPACE ALLIANCE**

/s/ David E..O'Brien for

**A. M. LARSEN, MANAGER
PAYLOAD SAFETY**

/s/ Henry J. Kunkel for

**R. N. RICHARDS, PROGRAM DIRECTOR
SHUTTLE & SPACE STATION INTEGRATION
BOEING HUMAN SPACE FLIGHT &
EXPLORATION**

/s/ R. L.Segert

**R. L. SEGERT, MANAGER
SPACE SHUTTLE KSC INTEGRATION**

/s/ Randall Adams

**R. W. ADAMS, FLIGHT MANAGER
SPACE SHUTTLE PROGRAM INTEGRATION**



SPACE SHUTTLE PROGRAM
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STS-111 Flight Readiness Review

Backup Charts



STS-111 Orbital Debris Status

Presenter	Randall Adams	
Date	05/16/2002	Page 2

- Orbital Debris / Micrometeoroid Risk Is Acceptable**

<u>Criteria</u>	<u>Risk</u>	<u>Guideline</u>
Critical Penetration	1 in 290	1 in 200
Radiator Tube Penetration	1 in 343	1 in 61
Window Replacements	60%	N/A



Approved Launch Commit Criteria for STS-111	Presenter Randall Adams	
	Date 05/16/2002	Page 3

- **STS-111 Minimum Equipment List (MEL) Mission Dependent (LCN 1097)**

- **Haz Gas Cleanup LCN (LCN 1095)**
 - **Updates requirements and preplanned procedures for hydrogen concentration at the Orbiter / ET disconnect as well as cleanups following the HGDS implementation**



Open Mandatory Launch Commit Criteria for STS-111

Presenter **Randall Adams**

Date **05/16/2002** Page **4**

- **FEP Requirements Update (LCN 1099)**
 - **Potential update of LPS Section to clarify FEP (Front End Processor) requirements and preplanned procedures for active and standby FEP recovery due to the STS-110 late hold**
 - **ECD: Prior to L-2 Day**