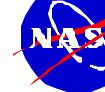


STS-114 Flight Operations and Integration
Space Shuttle Program
Flight Readiness Review
June 29, 2005



Agenda

Presenter
MO3/Robert Galvez

Date
6/29/05 Page **2**

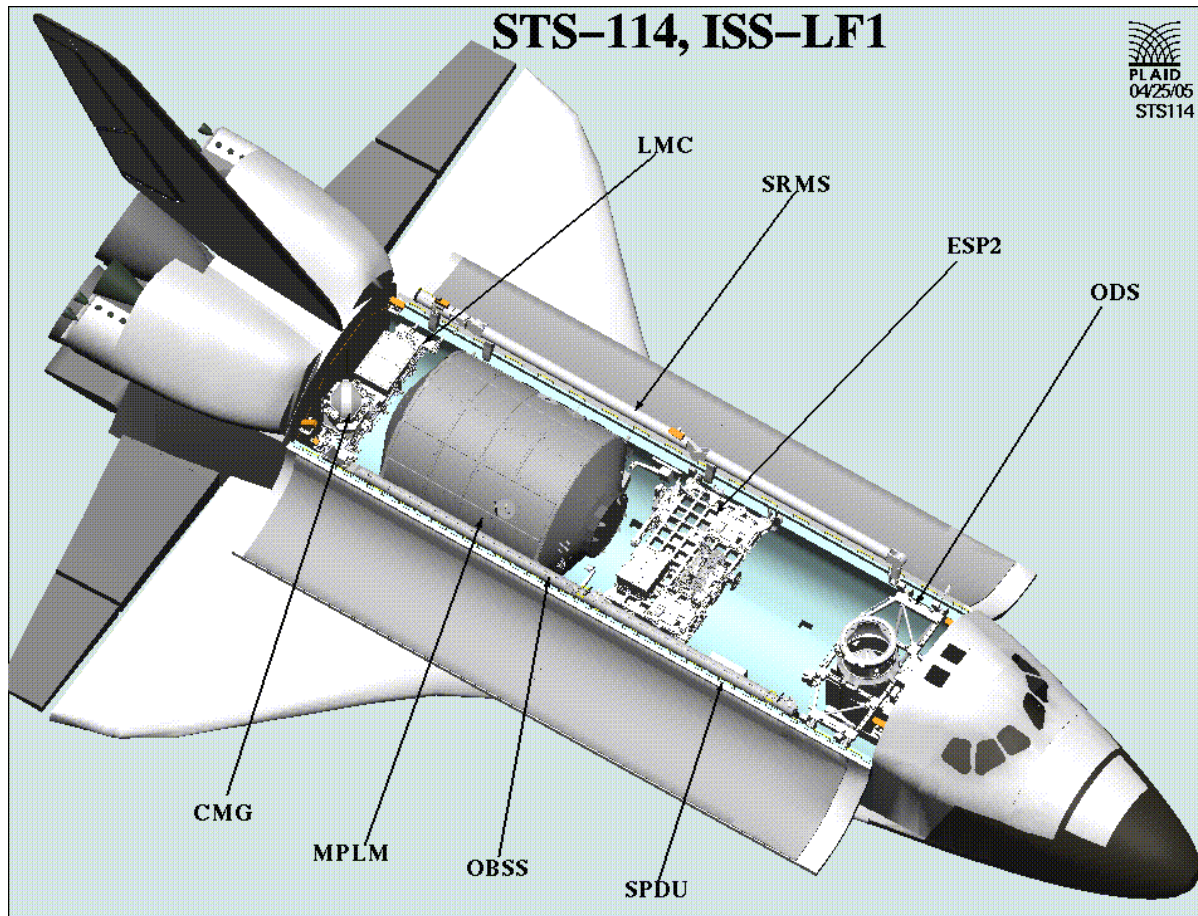
- **Payload Bay Arrangement**
- **Flight Overview**
- **Requirements/Documentation Status/Open Work**
 - **Cargo Integration Structures – Special Topic**
 - **CIPA/Ethanol Production Issue – Information Item**

- **Backup Charts**
 - **Launch Window**
 - **Digital Launch Window**
 - **DTO Detailed Description**
 - **Stowage Plan for No CIPAA's**
 - **Summary of Open Work**

Payload Bay Arrangement for Flight

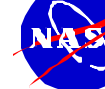
Presenter **MO3/Robert Galvez**

Date **6/29/05** Page **3**



PAYLOAD BAY PAYLOADS:

- | | |
|-----------|---|
| ODS | Orbiter Docking System |
| ESP-2 | External Stowage Platform-2 |
| MPLM-ULF1 | Multi-Purpose Logistics Module-Utilization and Logistics Flight 1 |
| LMC | Lightweight Multipurpose Experiment Support Structure (MPESS) Carrier |
| OBSS | Orbiter Boom Sensor System Starboard Sill |
| SRMS | Shuttle Remote Manipulator Port Sill |



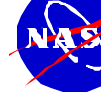
Flight Overview

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **4**

ACTIVITY	STS-114
FLT DATE	07-13-05
CONFIGURATION	
-ORB (FLT NO)	OV-103(31)
-ET	ET-121
-SRBS	BI-125
-RSRM	RSRM-92
-SSME SETTING	104.5/104.5%
-POSITION 1	2057^(a)
-POSITION 2	2054 ^(a)
-POSITION 3	2056 ^(a)
-SOFTWARE REL	OI-30
-CRYO TANK SETS	5
-GN2 TANKS	6
-MISC RQMTS	RMS, ODS, OBSS

P/L MANIFEST	ISS LF-1 (MPLM,ESP2, LMC)
-PAYLOAD BAY	
-MID-DECK	ISS LF-1, RAMBO^(b)
OPERATIONS	
-PAD/MLP	B/3
-INCLINATION	51.6 DEG
-INSERTION ALT	122 NM
-MECO TGT	DIR INSERTION
-TAL SITE	ZARAGOZA
-FLT DURATION	12 + 0 DAYS
-EVAs	3 + 0
-CREW SIZE	7
-LANDING SITE	KSC
INSTRUMENTATION	
REMARKS	(a) BLOCK II CLUSTER (b) PAYLOAD OF OPPORTUNITY. DEDICATED BURN NOT REQUIRED

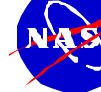


Requirements/Documentation

Presenter **MO3/Robert Galvez**

Date **6/29/05** Page **5**

- **There are no open or pending STS-114 CR's for the following Program documents:**
 - **Logistics Flight 1 (LF1) MIP (NSTS 21497)**
 - **Multi Purpose Logistics Module (MPLM) PIP (NSTS 21449)**
 - **Lightweight MPESS Carrier (LMC) CIP Addendum for STS-114 (NSTS 21494)**
 - **Ram Burn Observation (RAMBO) PIP (NSTS 21508)**
 - **Flight Requirements Document**



Flight Preparation Process

Presenter
MO3/Robert Galvez

Date
6/29/05 Page **6**

- All the Cargo Integration flight preparation activities have been completed except for planned open work – no issues identified
- Completed tasks include:
 - Release of Cargo Reconfiguration Engineering
 - Mission specific Cargo verification analyses
 - Documentation of cargo requirements
 - Reconfiguration / installation of Payload Integration hardware
 - Payload bay clearance assessment
 - KSC - ROEU to PDA Mate
- Significant Standard Open Work
 - PAD CHIT Measurements
 - P/L End-To-End Test
 - Validate the positive-static clearance based on CHIT J5821 measurement data
 - Documentation Changes to On-Orbit ICD ISS-LF1 (ICD-A-21497-OOR)
- Special Topic
 - CMG Beryllium Material



Requirements/Documentation

Presenter	MO3/Robert Galvez	
Date	6/29/05	Page 7

SPECIAL TOPIC

Cargo Integration Structures Open Work

Open Work

- Beryllium material in the CMG was identified late
 - NSTS 14046 has specific requirements for Be
 - No documentation of Be review by SWG
 - Structures Verification Plan will be provided for SWG approval

ECD: 07/01/05



Requirements/Documentation

Presenter	MO3/Robert Galvez	
Date	6/29/05	Page 8

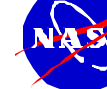
INFORMATION

CIPA/Ethanol Production Issue

Issue: Part B of STA 54 separates to A1100, moisture from the cabin atmosphere gets into the bag and creates a bi-product of ethanol

Open Work

- No Shuttle or Station crew or system impact, except for the Russian water processor consumables
 - Complete negotiations with the Russians on maximum contingency ethanol levels that might appear in the condensate processed by the Russian water recovery system
 - ECD: 07/01/05



**STS-114 Flight Readiness
 Review Readiness Statement**

Presenter	MO3/Robert Galvez	
Date	6/29/05	Page 9

This Readiness Statement Certifies That The Flight Operations and Integration Requirements For the Flight Readiness Review Have Been Met, And Pending Completion of Identified Open Work or Documentation, NASA Flight Operations and Integration Is Ready To Support Flight.

Original signed by:

**H. NEAL HAMMOND
 ASSOCIATE PROGRAM MANAGER
 USA PROGRAM INTEGRATION**

Original signed by:

**THERESE THRIFT, DEPUTY PROGRAM MANAGER
 LOCKHEED CARGO MISSION CONTRACT**

Original signed by:

**JOHN P. SHANNON
 MANAGER
 SSP FLIGHT OPERATIONS & INTEGRATION**



	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 1

STS-300 Launch-On-Need (LON) Readiness Summary

MO3/Robert Galvez
STS-114 and STS-300 SSP Flight Manager

Presentation to STS-114 Flight Readiness Review (FRR)
June 29-30, 2005



<h1>Agenda</h1>	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 2

- **STS-300 Program Philosophy**
- **Cargo/Stowage Engineering**
- **LON Flight Hardware**
- **Middeck Configuration**
- **Flight Design/Flight Products**
- **Integration Issue**
- **LON Readiness**
- **Backup Charts**
 - **Payload Bay Configuration**
 - **Flight Preparation post Callup**
 - **CSCS/LON Timeline**



STS-300 Program Philosophy	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 3

- **STS-300 has been managed within existing Space Shuttle Program processes from mission baseline at the SSP PRCB and throughout the pre-mission planning period.**
 - **Program documentation has been developed and managed by the STS-300 Flight IPT. These include:**
 - **Mission Integration Plan (MIP) including Product Integrated Schedules**
 - **Flight Requirements Document (FRD)**

- **Overall mission management philosophy has been to use as much of the STS-121/OV-104 products and schedules as possible and only deviate as required.**
 - **STS-300 MIP Product Schedules adjusted to coincide with STS-121 milestones.**
 - **STS-121 Orbiter configuration at time of OPF rollover determines the configuration for STS-300.**
 - **Essentially, have an empty payload bay with Latch mechanisms required for STS-121 cargo elements.**
 - **Includes OBSS/Sensor Package configuration**



STS-300 Program Philosophy (Cont'd)	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 4

- **STS-121/OV-104 Orbiter processing schedules and milestones (e.g., OPF rollover) determine ability to support LON within CSCS capability.**

- **KSC requires ~23 days from OPF rollout to launch.**
 - **~5 days in the VAB and 18 days at the PAD in preparation for flight**
 - **PAD work does not include TCDT or Payload operations.**
 - **Does require/include safing Payload attachment H/W (PRLAs, cable stowage, etc.) and final configuration for flight such as CCTV camera and OBSS sensor package installation.**
 - » **Work done concurrently with other PAD activities.**

- **STS-114 launch delay beyond July 20 will cause corresponding delay of STS-300 .**



Cargo/Stowage Engineering	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 5

- **After callup, STS-300 payload cargo engineering plan is to EOTF (Engineering Order To Follow) the STS-121 products, as required, to show the STS-300 configuration for launch**
 - **Some reconfiguration drawings will require updates to reflect STS-300 flight configuration.**
 - **10 day total time required to update drawings to support a rescue mission reconfiguration.**

- **Crew Compartment Configuration Drawings (CCCD) are complete**
 - **Reflect additional H/W to support return of 11 crewmembers.**
 - **Plan to fly same stowage configuration as STS-121 within stowage capability, minimizing CCCD changes.**
 - **Includes all EVA tools required for TPS repair (CIPAA, EWA, RCC and Tile Overlay H/W)**



LON Flight Hardware	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 6

- **The LON flight hardware is built and consists of the following:**
 - **Recumbent seats capability located in the aft middeck (ditch area) – 3 seats**
 - **Handholds (2) located on the starboard wall of the ditch area**
 - **Individual Cooling Units (ICU) (3) mounting provisions**
 - **Seat 5 modification to properly secure in a recumbent position**
 - **Sky genie mounting provisions for four (4) additional sky genies**
 - **Escape Pole mounting provisions for three (3) additional lanyards**

- **Installation Engineering is released**

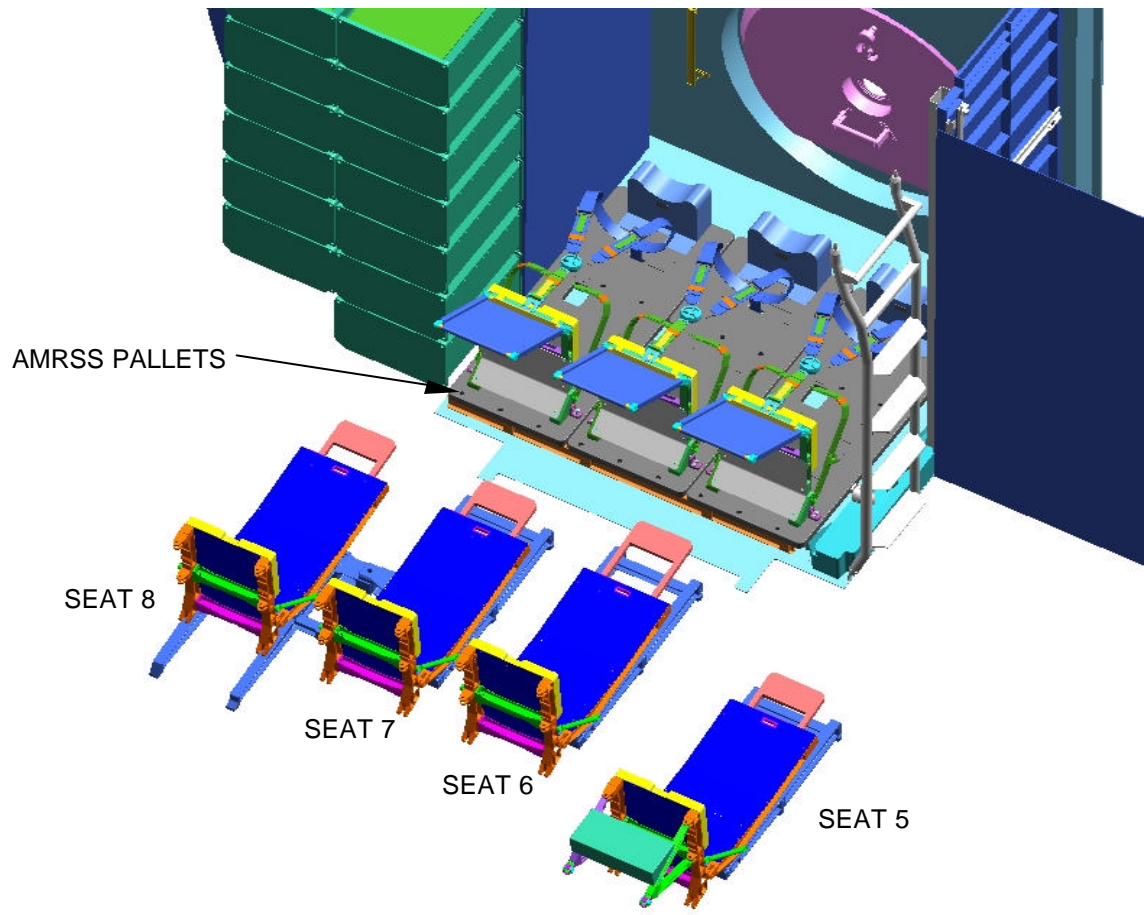
- **Hardware Certification (QSA) complete planned for 7/7/05**

- **Transfer Hardware to USA planned for 7/8/05**

- **H/W was successfully fit checked on OV-104 on April 9, 2005.**

- **JSC, Building 9 Trainer hardware in place for Crew Equipment Interface Test/Training available for STS-301 and subs.**

<h1>Middeck Configuration</h1>		Presenter MO3/Robert Galvez	
		Date 06/29/05	Page 7



ORIENTATION VIEW OF AMRSS IN MIDDECK



Flight Design / Flight Products	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 8

- **STS-300 flight specific Flight Design I-Load patch has been delivered**
 - **Used to assess ascent profile/constraints due to empty cargo bay.**
 - **Completed all LON scheduled flight S/W pre-callup and some post-callup (S/W Processing Facility (SPF)/SAIL Testing) activities**

- **Mission Control Center and Simulator Training loads for STS-300 LON are released**
 - **Training performed using LON load to characterize ascent profile/constraints.**

- **Preliminary Crew Procedures in place.**

- **Completion of flight products to be performed post callup within the 23-26 day constraints for orbiter processing.**
 - **Attached schedules show high level generic timeline for completion of products.**
 - **Schedule will be revised depending on LON callup and CSCS capability**



<h1>Integration Open Work</h1>	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 9

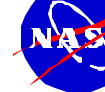
- **OBSS Loads Analysis for STS-300 Payload Bay Configuration**
 - **MDA has not completed OBSS stress analysis without the Keel Yoke Assembly (KYA) configuration**
 - **Analysis initially performed with KYA installed.**
 - **OPF installation no longer possible due to clearance constraints with OBSS.**
 - **Boeing analysis shows positive margin**
 - **OBSS NASA loads personnel feel H/W will be safe to fly**
 - **Analysis completion not expected until after STS-114 launch due to higher priority task in support of STS-114.**



STS-300 LON Readiness	Presenter MO3/Robert Galvez	
	Date 06/29/05	Page 10

- **Preparations for STS-300 are proceeding as planned.**
 - **All required H/W to support a returning crew complement of 11 are complete and available.**
 - **Schedules and processes in place to respond to LON callup.**
 - **Engineering changes required to reconfigure the orbiter from STS-121 to STS-300 are well defined.**
 - **LON implementation can be performed within the time constraints required to prepare the orbiter for flight and within ISS CSCS capability.**

- **Only open work pending is the resolution of the OBSS stress analysis with the empty orbiter payload bay.**

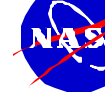


Flight Operations and Integration

Presenter
MO3/Robert Galvez

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Backup Charts



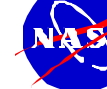
Flight Operations and Integration

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **11**

Backup Charts

- Launch Window
- Digital Launch Window
- DTO Detailed Description
- Stowage Plan for No CIPAA's
- Summary of Open Work



STS-114 Digital Launch Window

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **12**

May 27, 2005

STS-114 LDP R2 DIGITAL LAUNCH WINDOW
 NOMINAL FLIGHT DURATION = 11:19:28 (D:H:M) MET

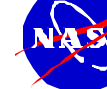
T. Nguyen/USH-483L
 N. Wortham/USH-483L

WINDOW OPENINGS

WINDOW CLOSINGS

DATE AT Greenwich (M/D/Y)	1	2	3	4	5	6	7	8	9	10
	TAL/ZZA SR-15 min GMT (H:M)	$ \beta < 60^\circ$ Beta Angle Open GMT (H:M)	KSC Sunrise SR+3 min GMT (H:M)	EOM+1 KSC SR-10 min GMT (H:M)	Planar/ Phase Opening GMT (H:M:S)	KSC Sunset SS-3 min GMT (H:M)	EOM EDW SS+10 min GMT (H:M)	TAL/ZZA SS+15 min GMT (H:M)	Planar/ Phase Closing GMT (H:M:S)	$ \beta < 60^\circ$ Beta Angle Close GMT (H:M)
7/12/2005	03:52	06:51	10:37	14:36	20:11:26	00:20	04:35	19:15	20:21:26	23:50
7/13/2005	03:52	06:50	10:38	14:37	19:45:42	00:19	04:35	19:14	19:58:52	23:51
7/14/2005	03:53	06:49	10:38	14:37	19:23:11	00:19	04:34	19:14	19:33:11	23:52
7/15/2005	03:54	06:48	10:39	14:38	18:57:28	00:19	04:33	19:13	19:10:37	23:52
7/16/2005	03:55	06:48	10:39	14:38	18:34:56	00:19	04:33	19:12	18:44:56	23:53
7/17/2005	03:56	06:47	10:40	14:39	18:09:13	00:18	04:32	19:12	18:22:22	23:54
7/18/2005	03:56	06:46	10:40	14:40	17:46:41	00:18	04:31	19:11	17:56:40	23:55
7/19/2005	03:57	06:45	10:41	14:40	17:20:58	00:17	04:30	19:10	17:34:07	23:55
7/20/2005	03:58	06:43	10:42	14:41	16:58:26	00:17	04:29	19:09	17:08:25	23:56
7/21/2005	03:59	06:42	10:42	14:41	16:34:17	00:17	04:28	19:09	16:45:52	23:57
7/22/2005	04:00	06:41	10:43	14:42	16:10:11	00:16	04:28	19:08	16:20:11	23:58
7/23/2005	04:01	06:40	10:43	14:42	15:47:40	00:16	04:27	19:07	15:57:41	23:59
7/24/2005	04:02	06:39	10:44	14:43	15:21:56	00:15	04:26	19:06	15:31:56	*
7/25/2005	04:03	06:37	10:44	14:43	14:59:25	00:15	04:25	19:05	15:09:25	00:00
7/26/2005	04:04	06:36	10:45	14:44	14:33:41	00:14	04:24	19:04	14:45:56	00:01
7/27/2005	04:05	06:34	10:45	14:45	14:11:10	00:14	04:23	19:03	14:21:10	00:02
7/28/2005	04:06	06:33	10:46	14:45	13:45:26	00:13	04:22	19:02	13:58:37	00:03
7/29/2005	04:06	06:31	10:47	14:46	13:22:55	00:12	04:21	19:01	13:32:55	00:04
7/30/2005	04:07	06:29	10:47	14:46	12:57:12	00:12	04:20	19:00	13:10:22	00:05
7/31/2005	04:08	06:28	10:48	14:47	12:34:40	00:11	04:19	18:59	12:44:40	00:06
8/01/2005	04:09	06:26	10:48	14:47	12:08:57	00:10	04:17	18:58	12:22:07	00:07

The Launch Period begins 10 minutes before Launch Window Open and ends 10 minutes after Launch Window Close
 The nominal launch window open and close times are shown in boxes

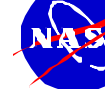


Development Test Objectives (DTO's)

Presenter
MO3/Robert Galvez

Date
6/29/05 Page **13**

- DTO 805** **Crosswind Landing Performance (DTO of Opportunity)**
- Demonstrate the capability to perform a manually controlled landing in the presence of a crosswind component of 10 to 15 knots steady state.
- DTO 848** **Orbiter Thermal Protection System (TPS) Repair Techniques**
- Demonstrate on-orbit repair techniques for both tile and RCC samples during an EVA.
- DTO 850** **Water Spray Boiler Cooling with Water/PGME Antifreeze**
- Demonstrate if a mixture of 53% water and 47% propylene glycol monomethyl ether will freeze after the auxiliary power units are shut down. For STS-114, only WSB number 3 tank will be filled with the mixture.
- SDTO 1200-U** **Shuttle Booster Fan Bypass**
- Optimize cryogenic oxygen savings by operating the booster fan differently with the context of the flight rules and expenditure of other resources (crew time, LiOH, etc). On-orbit operations will demonstrate that intervehicle air circulation and specifically POCO₂ levels can be maintained by using the U.S. Lab IMV fan to draw air from the Shuttle to the ISS without the assistance of the Shuttle Booster fan (airlock fan).



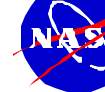
Stowage Plan for No CIPAA's

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **14**

“Plan B” Stowage Plan for no CIPAA's

- In the event the CIPAA's are not ready for flight on STS-114, a backup plan is in work to fly alternate hardware in place of the CIPAA's
- Only two stowage locations will be impacted by this plan
 - Middeck Starboard Floor Bag 1
 - Contains one CIPAA and two hose assemblies
 - Contents can be replaced with four CTBs
 - ML60E (center section of the lightweight MAR)
 - Contains one CIPAA and other TPS repair hardware
 - CIPAA can be replaced with three half-CTBs
- Replacement hardware will be identified by the Launch Package Manager and will be available for L-10 day Bench Review
- These two stowage location will be staged in both the nominal config with CIPAA's and in the Plan B config at L-10 day Bench Review
- Both configs will be shipped to KSC
- Propose NLT July 7 for decision on which config to stow into the middeck
- Detailed schedule is in work

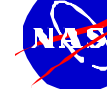


Summary of Open Work

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **15**

Open Work	Standard Open Work	Completion Date	Actionee
<p><u><i>Payload/Cargo Engineering</i></u> Payload /Cargo Requirements Documentation</p> <ul style="list-style-type: none"> - Approval of PIRN A05116, update NSTS 37329 revision date (MPLM) - Approval of PIRN A05129, Update Sec. 3 for addition of Longeron Wiper - Approval of PIRN A05127, Document sections S4 and S14 per JTWG inputs <p>Annex 1</p> <ul style="list-style-type: none"> - ISS LF1 MIP 21497-A01 – Final Weight Log - LMC 21494-A-1 – Final Weight Log <p>Reconfiguration Engineering</p> <ul style="list-style-type: none"> - CHIT J5821, document measurements to validate positive-static clearance - Update MECSLSI (V072-200193) – Sill Longeron wiper bond to be added 	<p>No</p> <p>No</p> <p>No</p> <p>Yes</p> <p>Yes</p> <p>No</p> <p>No</p>	<p>06/30/05</p> <p>06/30/05</p> <p>06/30/05</p> <p>07/06/05</p> <p>07/06/05</p> <p>06/29/05</p> <p>06/30/05</p>	<p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p>

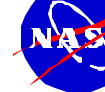


Summary of Open Work

Presenter
MO3/Robert Galvez

Date **6/29/05** Page **16**

Open Work	Standard Open Work	Completion Date	Actionee
<p><u><i>Payload/Cargo Engineering</i></u></p> <p>KSC Cargo Processing</p> <ul style="list-style-type: none"> - Clearance measurements between ESP2 & MPLM adjacent MPMs - Payload interface verification and end-to-end test - Payload bay walk down and PCE configuration photos <p>Payload / Cargo Loads, Dynamics & Stress</p> <ul style="list-style-type: none"> - Final clearance assessments based on as-installed measurements - Final VLA Report (L-1) Addendum 2 - Beryllium material in the CMG identified late <p>Payload / Cargo Safety</p> <ul style="list-style-type: none"> - Tracking log items closure 	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p> <p>No</p> <p>Yes</p>	<p>06/29/05</p> <p>06/30/05 UR</p> <p>06/30/05 UR</p> <p>07/01/05</p> <p>07/06/05</p> <p>07/01/05</p> <p>07/08/05</p>	<p>Martin Garcia</p> <p>Martin Garcia</p> <p>Martin Garcia</p> <p>Erica Bruno</p> <p>Erica Bruno</p> <p>Erica Bruno</p> <p>Martin Garcia</p>



Summary of Open Work

Presenter **MO3/Robert Galvez**

Date **6/29/05** Page **17**

Open Work	Standard Open Work	Completion Date	Actionee
CIPA/Ethanol Production - Complete negotiations with the Russians on maximum contingency ethanol levels	No	07/01/05	Rick Miller
MIP Production Schedule - Pending CR to update to 7/13/05 launch date and reflect actual deliveries	No	07/01/05	Mary Anne Plaza

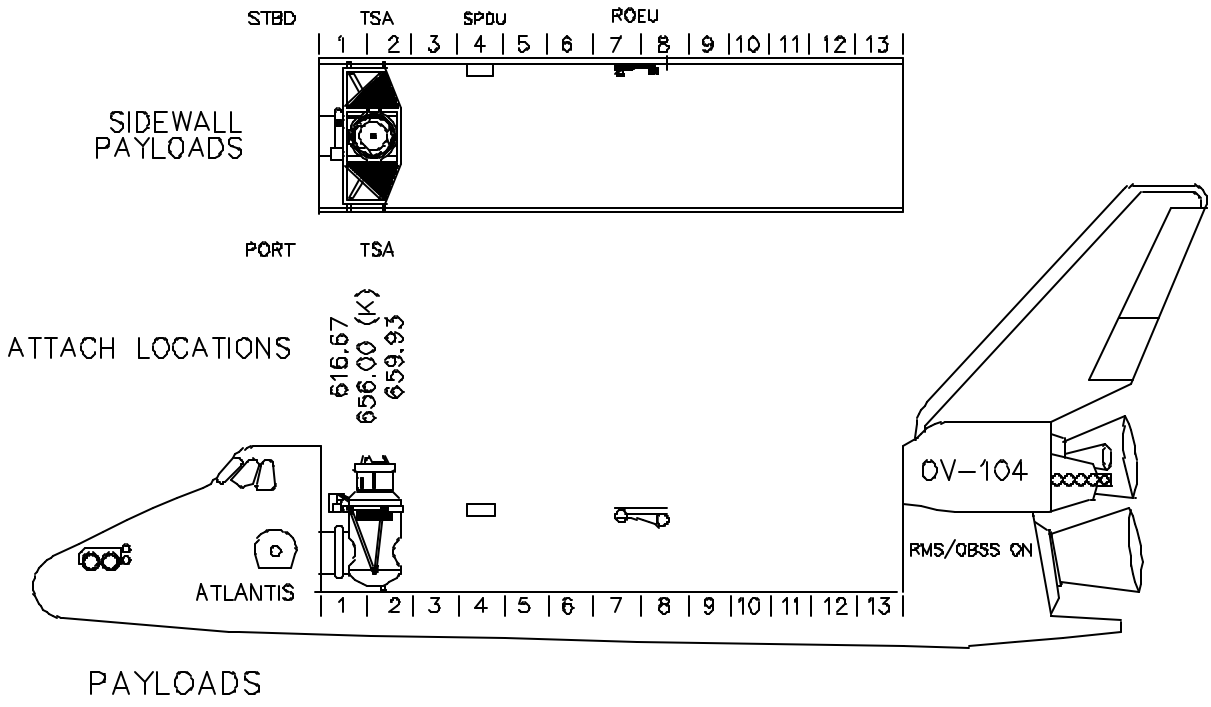


	Presenter MO3/Robert Galvez	
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BACKUP Charts



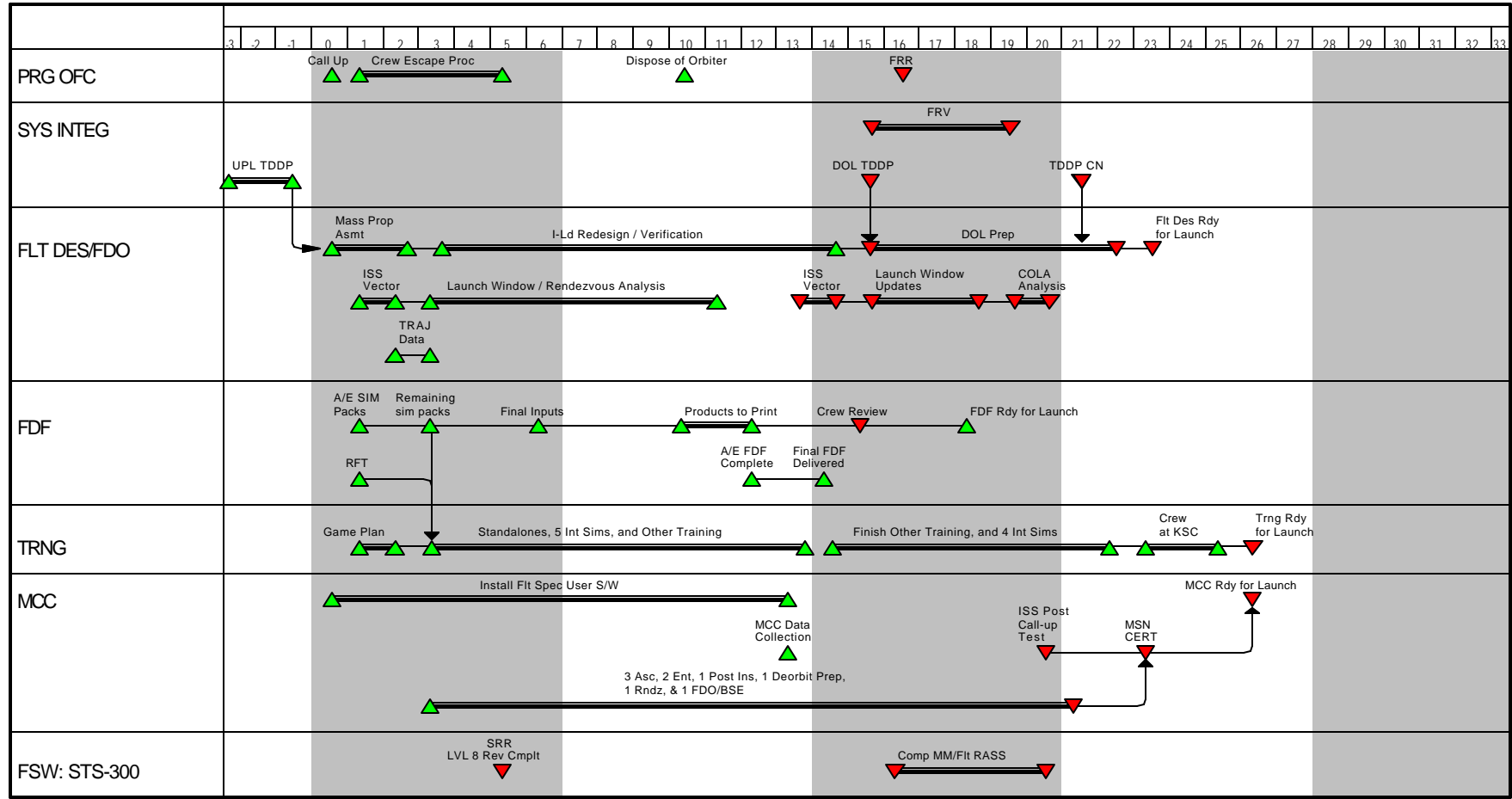
<h1>Payload Bay Configuration</h1>		Presenter MO3/Robert Galvez	
		Date 06/29/05	Page 12





Flight Preparation Post Callup		Presenter MO3/Robert Galvez
		Date 06/29/05 Page 13

LON POST-CALL-UP SCHEDULE



▲ Tied to Call-up

▼ Tied to Launch



<h1>CSCS/LON Timeline</h1>		Presenter MO3/Robert Galvez	
		Date 06/29/05	Page 14

Durations from STS-114 dock:

- ISS CSCS capability **56 days** (O₂ limited)
- Shuttle LON **29 days** (27 days to launch + 2 days to dock)

