
STS-122 MOD FRR

FLIGHT DESIGN AND DYNAMICS

November 5, 2007

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Shuttle CoFR Status Summary

MOD Requirements Codes *	DM	USA FDD
CRITICAL PROC./APPL	G	G
NON-CRITICAL PROC/APPL	G	G
FD-TRAJECTORY	N/A	G
FD-CONSUMABLES (PROP)	N/A	G
FD-ANALYST CERT	N/A	G
FD-CTF	N/A	G
FDF	G	G
EMCC	G	G
CREW TRAINING (RNDZ)	G	N/A
CERTIFIED FLIGHT CONTROLLERS	G	Y
CERTIFIED INSTRUCTORS (RNDZ)	G	N/A
FTP-NEW OPS	G	G
FLIGHT ANOMALY RES	G	G
ANOMALY-PROCEDURE	G	Y
EX/AI FROM PRIOR READINESS REVIEW	None	None
NO CONSTRAINTS	None	None
LEVEL II (PROGRAM) ACTIONS	None	None
MISSION REQUIREMENTS	G	G
CMD PROC	G	G
EXCEPTION RESOLUTION	G	None
FPPP REQ MET	G	Y
CONTRACTOR PROCESS INSIGHT	G	N/A

G	Ready to support flight or standard open work
Y	Non-standard open work with expected resolution
R	Open work without expected resolution
N/A	Does not apply
None	None identified

* as defined in DA8-020 "MOD Certification of Flight Readiness Process" document

Mission Overview Summary

- Insertion Altitude / Inclination 122 nm / 51.6 deg
- First Stage Design Criteria DOLILU II / High Q
- Launch Window Open (10 min.) December 6, 2007 21:28:40 GMT
16:28:40 EST
- Launch Window Close (10 min.) December 6, 2007 21:38:40 GMT
16:38:40 EST
- Landing Time (KSC) December 17, 2007 16:59 GMT
11:59 EST

- I-load Design APM 1559 lbs (APM above a 5 minute window centered at in-plane)
- Projected APM** 1486 lbs (APM above a 5 minute window centered at in-plane)

** Based on 10/26/07 FRR simulation

- Launch hold capability inside of drainback is dependent upon actual DOL performance. Abort coverage has sufficient overlap from liftoff to MECO.

Significant Requirements Changes Since Design Baseline

- **Mission duration change from 11+(1)+2 to 11+1+2**
- **Increase in middeck allocation by 425 lbm**
 - **Added Volume B for additional stowage**
 - **All Xcg margins are within limits**

Significant Mission Firsts and Unique Items

- **Current launch period extends between December 6 through December 13**
 - Constrained by mated beta angle constraint of 65 deg.
 - December 13 assumes +1 day is used as a docked day
 - December 14 is a viable launch date if SSP agrees that +1 day will be used post undock
- **Geminid meteor shower peaks on December 14**
 - Not a constraint to launch window
 - Monitoring crew activities during launch period
- **Performed Orbiter swap from OV-103 to OV-104 (Baselined as part of A/E cycle)**
- **Deletion of consumables replenishment requirement for 2 stage EVA's**
 - Typically replenish O2 associated with previous ISS stage EVA (25 lbm/EVA)
 - Will perform transfer if consumables and priorities allow
- **Deletion of GN2 transfer requirement**
 - Typically assume 50 lbm transfer to ISS
 - Will perform transfer if consumables and priorities allow

Significant Mission Firsts and Unique Items- Concluded

- **Protecting Passive Thermal Control (PTC) for nominal End Of Mission (EOM) through EOM+2**
 - Expected exceedance of 60 deg. Beta angle constraint post undock
- **EDW Temporary (EDT) landing site data was included in flight design**
 - Site will not be operational until late January '08
 - Protects for launch slip into February
- **First use of Linux Trajectory Server 11.5.0.1 ML** (reference Trajectory Server charts)
- **First use of Linux Archive Server 6.1 ML** (reference Trajectory Server charts)

Anomalies, Exceedances and Deviations

Exceedances/Deviations

- **Contingency Abort Black Zone Assessment was not required**
 - Liftoff mass properties did not exceed the NSTS-07700 Vol. III criteria Weight > 259,000 lbm. And Xcg > 1115.0 in.)
 - FRR cycle Liftoff Weight = 267,092 lbm, Xcg = 1111.4 in.
- **Thermal Structural Envelope Program (TSEP) version 3.6.2 violations were identified for EOM, AOA, ATO, and TAL trajectories**
 - These are expected violations of the OV-104 Chin panel
 - Trajectories were sent to Boeing for clearance (ref OCR/D S164080CG)
 - Awaiting formal closure of analysis (ECD 11/16/07)
- **No Dock PLS exceeds the NEOM downweight limit**
 - A preflight thermal analysis is not required
 - Real-time analysis will be conducted if required
 - Mission specific flight rule has been submitted

Anomalies, Exceedances and Deviations - Concluded

Previous Mission Anomalies

- **FOV-1 work-arounds in place since STS-121 are still in effect**
 - **Wallops C-band high-speed refraction correction multipliers set to zero by Nav (documented in console procedure AEGNAV-5A)**
 - **Post-MECO filter degradation for December launch expected to be ~14 fps (radial)**
 - **Reduces likelihood of using ground filter, although onboard and GPS available**
- **Previous mission (STS-120)**
 - **TBD**
- **Previous mission (STS-118)**
 - **All previous mission anomalies requiring closure prior to STS-120 launch have been completed**
- **Previous flight of vehicle (OV-104, STS-117)**
 - **None**

Non-Conformance Reports and Open Risk Assessments

- **Non-Conformance Reports (NCR)**
 - None
- **Risk Assessments**
 - None

Special Topics

- None

Issues and Concerns

- None

Exceptions, Standard and Non-Standard Open Work

- **Exceptions**
 - **None**
- **Standard Open Work**
 - **All open work is scheduled to be completed per standard flight template**
 - **Open work table in backup pages**
- **Non-Standard Open Work**
 - **No concerns identified for completing any of the non-standard open work**
 - **Details follow**

Non-Standard Open Work

Non-standard Open Work

- No concerns identified for completing any of the non-standard open work
- Internal Flight Load Checklist procedure updates (FDD AR 2007-CAF062 & FDD AR 2007-CAF078) 11/03/07
- Abort Support Operator Certification 11/09/07
- Landing Analyst Certification 11/16/07
- OCRD S164080CG TSEP Violations Clearance 11/16/07
- Lead DOL Operator Certification 11/20/07

STS-323 Rescue Mission Status

- **Flight Design has completed a flight-specific Ascent/Entry design cycle for the first OI-32 LON build on OV-105**
 - Level A GR&C originally approved on July 23, 2007 with two subsequent changes published to incorporate Edwards temporary runway updates
 - I-Load patch approved on October 4, 2007
- **All pre-callup products will be delivered per the established schedule – no issues identified**
- **Console staffing will be defined post callup - no issues anticipated**
- **Post-callup schedule, if required, includes all standard Uplink and DOL products/milestones beginning with the Uplink TDDP at L-30 days**
- **Launch date is currently targeted for January 31, 2008**

STS-122 Flight Design and Dynamics Readiness Accountability Statement

☑ **Software** : All software used to create mission products, and MCC software required for mission support including related ISS software and designated critical processors meets generic and mission-specific Program requirements, and is maintained under configuration control in accordance with the FDD Software Management Plan.

☑ **Flight Software** : All flight software Principal Functions (PFs) owned by FDD are ready for flight. All Discrepancy Reports and Program Notes and Waivers related to USA-owned PFs have been reviewed and appropriately dispositioned for this flight.

☑ **Anomaly Resolution** : All anomalies that could impact mission support have been closed, or have accepted and approved work-arounds in place.

☑ **Production** : All flight reconfiguration products and real-time console support products meet generic and mission-specific Program requirements.

☑ **Operations** : All mission support personnel are or will be certified and current prior to supporting mission related activities.

The FDDOC Flight Readiness Review Process Plan (USA009229) and the Flight Operations Flight Preparation and Readiness Plan (USA008977; Appendix D and E) which defines the processes and products required for a successful flight have been executed and the applicable Program CoFR requirements satisfied.

The undersigned certify that the Flight Design and Dynamics Department, upon satisfactory resolution of any noted exceptions, is ready to support flight STS-122.

Flight Design and Dynamics	A. F. Najarian Director	Original signed by R. Hill for A. F. Najarian <small>signature</small>	10/24/07 <small>date</small>
Flight Design and Dynamics Software	F. M. Hamilton Software Project Manager	Original signed by F. M. Hamilton <small>signature</small>	10/24/07 <small>date</small>
Ascent/Descent Flight Design	D. J. Brockway Manager	Original signed by D. J. Brockway <small>signature</small>	10/24/07 <small>date</small>
Orbit Flight Design	R. M. Hill Manager	Original signed by R. M. Hill <small>signature</small>	10/22/07 <small>date</small>
Navigation & Flight Design Integration	G. E. Schrage Manager	Original signed by S. Cantu for G. E. Schrage <small>signature</small>	10/22/07 <small>date</small>
Trajectory Operations & Software Development	F. M. Hamilton Manager	Original signed by J. Bedford for F. M. Hamilton <small>signature</small>	10/24/07 <small>date</small>
Management & Engineering Services	A. T. McDowell Manager	Original signed by A. T. McDowell <small>signature</small>	10/24/07 <small>date</small>

FLIGHT DESIGN AND DYNAMICS DECLARATION OF COMPLIANCE WITH CoFR ENDORSEMENT REQUIREMENTS FOR STS-122 FLIGHT READINESS

- ☑ **Software** : All software used to create mission products, and MCC software required for mission support including related ISS software and designated critical processors meets generic and mission-specific Program requirements, and is maintained under configuration control in accordance with the FDD Software Management Plan.
- ☑ **Flight Software** : All flight software Principal Functions (PFs) owned by FDD are ready for flight. All Discrepancy Reports and Program Notes and Waivers related to USA-owned PFs have been reviewed and appropriately dispositioned for this flight.
- ☑ **Anomaly Resolution** : All anomalies that could impact mission support have been closed, or have accepted and approved work-arounds in place.
- ☑ **Production** : All flight reconfiguration products and real-time console support products meet generic and mission-specific Program requirements.
- ☑ **Operations** : All mission support personnel are or will be certified and current prior to supporting mission related activities.

Requirements Compliance: All requirements defined by the documents below (as required by the FIDP Compliance Matrix) have been or will be satisfied prior to flight.

<u>DOCUMENT</u>	<u>VERSION</u>	<u>DATE</u>
Flight Implementation Data Pack (FIDP) - Generic	GEN-JB	October 22, 2007
Flight Implementation Data Pack (FIDP) - Flight Specific	122-BASE2-R	October 22, 2007

Waivers & Exceptions:

None

The FDDOC Flight Readiness Review Process Plan (USA009229) and the Flight Operations Flight Preparation and Readiness Plan (USA008977; Appendix D and E) which defines the processes and products required for a successful flight have been executed and the applicable Program CoFR requirements satisfied.

Pending completion of open work and closure of noted exceptions, if applicable, Flight Design & Dynamics Operations Center is ready to support STS-122.

Original signed by A. F. Najarian 10/26/07

Director **Date**
Flight Design & Dynamics
Operations Center

TRAJECTORY SERVER

SIGNIFICANT MISSION FIRSTS AND UNIQUE ITEMS

Significant Mission Firsts

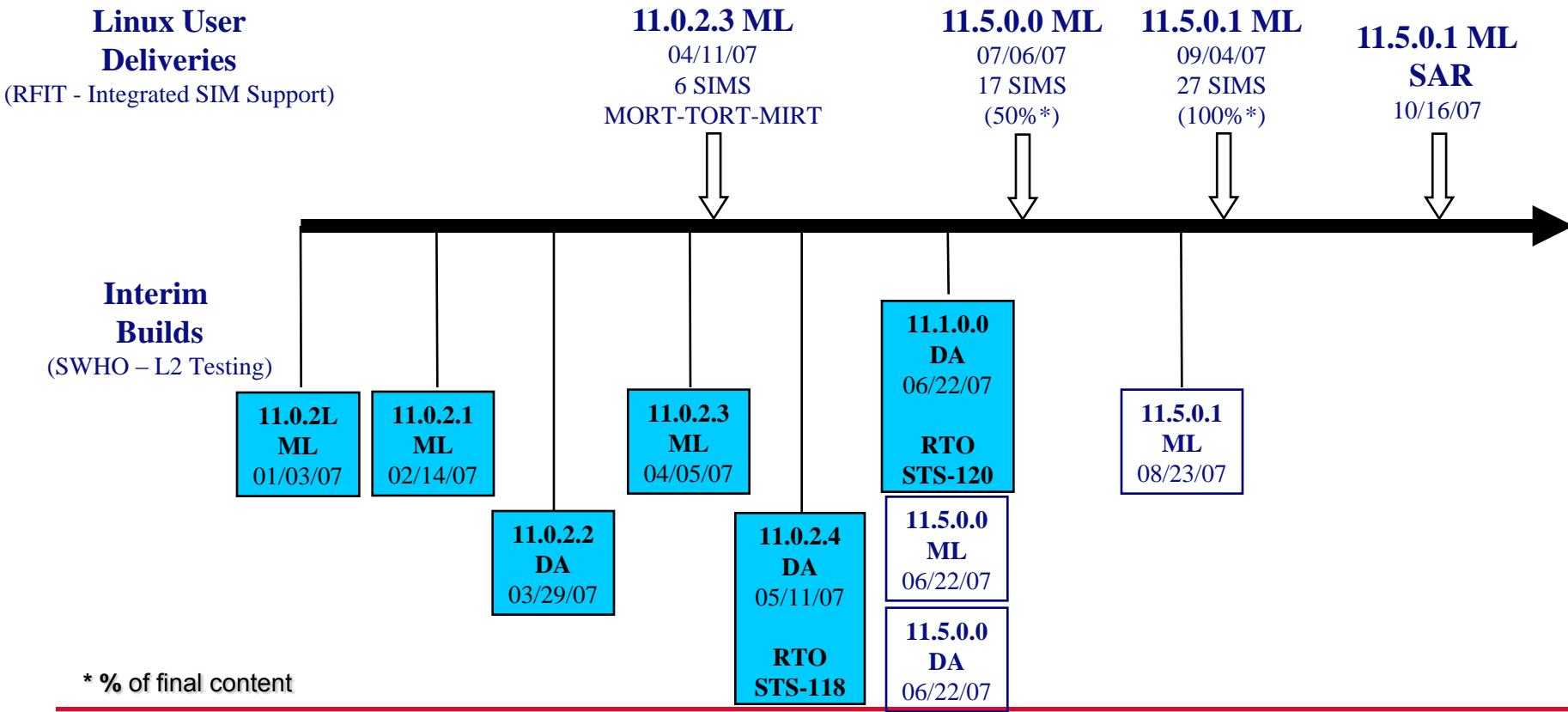
- **First flight of Linux Trajectory Server (TRJSVR 11.5.0.1 ML)**
 - Common baseline (source code) for DEC/Linux
 - All critical processors certified on Linux
 - Linux Trajectory Server Shelf Life
 - 44 total SIMS (11.5.0.0 RFIT: June, 2007)
 - Generic SIMS
 - Flight specific SIMS (STS-122 forward)
 - Linux Trajectory Server Flight Follows
 - STS-121 & STS-115 (CDE developer)
 - STS-116 & STS-117 (CDE user)
 - STS-118 & STS-120 (Ops user)
 - **First flight of Linux Archive Server (ARCSVR 6.1 ML)**
-

Trajectory Server Re-Host History

- **Designed for cross-platform compatibility**
 - Sun workstations: 32 bit / big endian (development)
 - DEC/Alpha workstations: 64 bit / little endian (operational)
 - Linux workstations: 64 bit / little endian (operational)
- **POSIX standards observed**
- **Platform issues isolated by #defines and compiler options**
- **First port completed during platform compete phase**
- **Initial re-host port (pre-delivery) flight followed STS-121 and STS-115**
- **Major re-host delivery (10.0.5) supported STS-116 on the DEC/Alpha**

Build Content Overview

TRJSVR 11.5.0.1 ML Timeline & Shelf Life



Linux Shelf Life

- **11.0.2.3 ML**
 - 2 MIRTs – Entry & Undock
 - 4 MORTs – Ascent, Entry, Rendezvous
 - 1 TORT – Ascent

- **11.5.0.0 ML**
 - 15 Generic – 4 ascent, 2 deorbit/entry, 4 rendezvous, 5 orbit
 - 2 Flight Specific – 1 rendezvous, 1 orbit
 - 2 – STS-122

- **11.5.0.1 ML**
 - 14 Generic – 3 ascent, 5 deorbit/entry, 1 rendezvous, 5 orbit
 - 13 Flight Specific – 3 ascent, 1 deorbit/entry, 2 rendezvous, 7 orbit
 - 11 – STS-122
 - 2 – STS-123

Platform Support Services (PSS) Operational Notes

- **Critical Linux Server Reboot Procedure (WSPLAT0078)**
 - **STS-122 flies in hybrid mode**
 - Hybrid defined by Linux Server and DEC/Alpha workstations
 - Traj Manager User Interface (TMUI) is on a DEC/Alpha workstation
 - Reboot (loss) of Primary Server not an issue until STS-125 (pure Linux)
 - **Reboot (loss) of Backup Server**
 - Close all TMUIs
 - Start a new TMUI
 - Start Backup Server
- **TRAJ SRV – GDR dropouts (DS0016)**
 - **Workstations report GDR data displays are not refreshed**
 - Cyclic Data Acquisition error advisories
 - Cyclic application messaging (AM) error advisories
 - **Mitigation**
 - Users affected, reselect their activities
 - Further investigation on-going

TRJSVR 11.5.0.1 Content

Updated Flight-Critical Software:

CI	Version	RTO Date ¹	Changes
TRJSVR	11.5.0.1 ML	10/19/2007	2 SRs –SR 047220.11 Trj Server MCC Rehost to Linux –SR 047220.13 Trj Server MCC Rehost to Linux 9 ARs – 7 major ARs – 2 minor ARs

¹ RTO: Release to Operations

ARCSVR 6.1 Content

Updated Non-Flight-Critical Software:

Configuration Item	Version	RTO Date ¹	Changes
ARCSVR	6.1 ML	10/26/2007	<p>2 SRs</p> <ul style="list-style-type: none">– 047220.09 ARC Server MCC Re-host to Linux– 054281.01 ODRC usage calculation and makefile change <p>2 ARs</p> <ul style="list-style-type: none">– 2 minor ARs

¹ RTO: Release to Operations

Trajectory Operations

Significant Mission Firsts And Unique Items

- **First docking/undocking to PMA2 on Node 2 (Node 2 relocated Post STS-120)**
 - Until recently the community thought we would lose automatic ISS attitude moding at undocking due to wiring changes on Node 2
 - Recently discovered the wiring is in place to provide our standard undock indication to ISS (documentation has been incorrect since 1994)
- **Edwards temporary runway est. completion Jan 25th so should not be a factor in STS-122 unless flight slips 1 month or more**
- **Umbilical Photo Ops - lit 12/06/07 through 1/01/08**
- **Hand-held Photos Ops lit 12/10/07 through 1/03/08**

Anomalies, Exceedances And Deviations

- STS-120 actions will be addressed post-flight

Special Topics

PRIMARY LAUNCH WINDOW

- Nominal Launch Window December 6th through December 14th (11 + 1 + 2)
- December 14th good launch opportunity assuming FD3 rendezvous but +1 day can not be used as a docked day due to beta constraint

BETA CUTOUT: DEC 15-28

SECONDARY LAUNCH WINDOW

- 65 deg Beta Angle constraint clear again on the 29th of December
- Jan 1st launch opportunity violates KSC ground processing constraints (No launch within T-18 hours to T+24 hours of YERO)
- First launch opportunity after new year is January 2nd
- Current forecasts show beta angle will be below 65 deg limit until May 2008

Issues And Concerns

- None

Exceptions and Standard Open Work

- **Exceptions**

- None

- **Standard Open Work:**

- Remaining Integrated Sims (Asc # 3&4, PI, TCDT, Entry # 2&3, D/O Prep)
- CTL Trajectory Data (L-30)
- TCDT Checkout in Ops Cert Mode (L-16)
- DOD Support Readiness (L-15)
- FS Orbit FDO Console Handbook Annex (L-14)
- CTL Mass Properties (L-7)
- PERA Pre-Flight Product (DM42 PERA Lead) (L-7)
- Flight Load Checkouts
 - Orbit , Ascent, A/E GPO, Entry, LSO (L-6)
- Real Time Data Transfer Schedule (L-1)
- Cargo Transfer Spreadsheet (L-1)

Non-Standard Open Work

- None

STS-122 Flight Design & Dynamics Division Readiness Statement

The Flight Design and Dynamics Division has performed the reviews necessary to assess the flight readiness relating to flight design requirements definition, crew and flight controller rendezvous training, and trajectory operations. We have determined all applicable responsibilities acceptable for flight pending closure of the identified open work and issues.

Original signed by Barbara A. Conte

Barbara A. Conte

Chief, Flight Design Requirements and Integration Branch

Original signed by Michael F. Collins

Michael F. Collins

Chief, Flight Design and Dynamics Division

**As compiled by: FDO/D. Leleux
FDM/R. Moreno**

Backup

- **Flight Readiness Open Work**
- **Launch Date/Time Summary**
- **Items listed below in separate file**
 - **Launch Window**
 - **Abort Regions**
 - **Nominal ET Impact Area**
 - **Ascent/Descent Flight Critical Software**
 - **RNDZ Training COFR Letter**

Flight Readiness Open Work

Item	Responsible	Due Date	Closed	Closure Rationale
USA Flight Design Standard Open Work:				
PROP37 SODB Volume II Amendment	PROP	10/26/07	10/26/07	Completed
DATA43 FDD FRR Data Pack	FDM	10/30/07	10/30/07	Completed
FSW Verification Test Results Review	ADFD	11/01/07		
FSW Verification Test Results Review	Orbit	11/06/07		
RNDZ/FDO Phasing Plan Meeting	Orbit	11/06/07		
CM FOE L-30 day audit	Bedford	11/06/07		
Review of ICHA Report	Orbit	11/06/07		
DATA45 FDD FSW PF Sign-off	FDM	11/07/07		
ONOR29B RNDZ Launch Target Data	Orbit	11/07/07		
PROP06 OMRSD OMS/RCS	PROP	11/08/07		
PROP07 Abort Propellant Dump Tagup	PROP	11/08/07		
PROP02 Mass Properties	PROP	11/09/07		
L-4 week LDO Database Freeze	ADFD	11/08/07		
RNDZ08 RNDZ Phasing Limits	Orbit	11/12/07		
Prop Analyst & Flt Controller Tag-up	PROP	11/12/07		
ONOR37B Daily Planar/Phase Windows	Orbit	11/14/07		
ASCT04 Uplink APM	ADFD	11/15/07		

Flight Readiness Open Work

Work Item	Responsible	Due Date	Closed	Closure Rationale
USA Flight Design Standard Open Work - Continued:				
NAVO16B GPO COTM Data Pack	Navigation	11/15/07		
NAVO18B GPO/ONAV Ops Memo	Navigation	11/15/07		
LDO: L-3 week LDO Checkout/TCDT Sim	ADFD	11/15/07		
ONOR27 Launch and Landing Data	Orbit	11/16/07		
ASCT44 DOL Uplink I-loads	ADFD	11/21/07		
ONOR29C RNDZ Launch Target Data	Orbit	11/27/07		
Dial Down Decision FIDP	FDM	11/28/07		
DSCT17 Landing Site Tables	ADFD	11/29/07		
ONOR37C Daily Planar/Phase Windows	Orbit	11/29/07		
RNDZ02 Target Drag Characteristics	Orbit	11/29/07		
PROP00A PROP/Ascent Aborts Tagup	PROP	11/29/07		
C-Band tracking Scheduling Message	Navigation	11/29/07		
ASCT99 OMS Assist - ATO Update	ADFD	11/30/07		
RNDZ09 Rendezvous COLA Plans	Orbit	11/30/07		
PROP02A DOL Mass Properties Updates	PROP	12/01/07		
Pre-Launch Mass Properties Request	PROP	12/01/07		

Flight Readiness Open Work - Continued

Work Item	Responsible	Due Date	Closed	Closure Rationale
USA Flight Design Standard Open Work - Continued:				
PROP31 ARD Data	PROP	12/01/07		
PROP33 Ferry Data Package	PROP	12/01/07		
PROP34 MCC Data	PROP	12/01/07		
SRB & ET RTLS Impact Point Update Memo	ADFD	12/03/07		
ASCT42 Collision Avoidance Data	ADFD	12/03/07		
ASCT47 Final MCC Trajectory Inputs	ADFD	12/03/07		
DSCT66 Real-Time Support Files	ADFD	12/03/07		
Range Safety Launch Window Cutout	ADFD	12/03/07		
Flight Annex	Navigation	12/03/07		
ASAB32B AME MCC Support Tables	ADFD	12/04/07		
L-2 day DOLILU System Checkout	ADFD	12/04/07		
DSCT05 Maximum Crossrange Capability	ADFD	12/04/07		
ASAB25 ARD Bias Tables	ADFD	12/0507		

Flight Readiness Open Work - Continued

Work Item	Responsible	Due Date	Closed	Closure Rationale
USA Flight Design Non-Standard Open Work:				
Generic FIDP to Update RTLS dump configuration	ADFD	11/02/07	10/26/07	Completed
FDD AR 2007-CAF062 Implementation	Nav	11/03/07		
FDD AR 2007-CAF078 Implementation	Nav	11/03/07		
Update NSTS08329 Vol. VIII DOSP	ADFD	11/06/07	10/30/07	Generic update. Not a constraint for STS-122.
Abort Support Operator Certification	ADFD	11/09/07		
Landing Analyst Certification	ADFD	11/16/07		
OCRD S164080CG TSEP Violations Clearance	Boeing	11/16/07		
Lead DOL Operator Certification	ADFD	11/20/07		

Flight Readiness Open Work - Continued

Item	Responsible	Due Date	Closed	Closure Rationale/Status
Trajectory Operations Standard Open Work				
L-30 HA Server Audit	TOCSS	11/09/07		
Close to Launch Trajectory Data	OFDO	11/06/07		
TCDT Checkout in Ops Cert Mode	AE GPO	11/20/07		
DOD Support Readiness	LSO	11/21/07		
Flight Load Checklist Complete	Nav	11/21/07		
Flight Load Checklist Complete	DOLILU	11/21/07		
Flight Load Checklist Complete	Entry Support	11/21/07		
Flight Load Checklist Complete	Orbit-RNDZ	11/21/07		
FS Orbit FDO CHB Annex	OFDO	11/22/07		
PERA Pre-Flight Product	DM42 PERA Lead	11/29/07		
Close to Launch Mass Properties	OFDO	11/29/07		
L-5 HA Server Audit	TOCSS	11/30/07		
Flight Load Checklist Complete	RGPO	11/30/07		
Flight Load Checklist Complete	AE FDO	11/30/07		
Flight Load Checklist Complete	AE GPO	11/30/07		

Flight Readiness Open Work - Continued

Item	Responsible	Due Date	Closed	Closure Rationale/Status
Trajectory Operations Standard Open Work				
Flight Load Checklist Complete	OFDO	11/30/07		
Flight Load Checklist Complete	LSO	11/30/07		
Present new ops notes at Trench tagup	TOCSS	DM Trench Tag-Up		
Real-time Data Transfer Schedule	OFDO	12/05/07		
Cargo Transfer Spreadsheet	OFDO	12/05/07		
Trajectory Operations Non-Standard Work:				
SAR ARCSVR 6.1	TRS	11/01/07		
RTO ARCSVR 6.1	TRS	11/05/07		

Flight Readiness Open Work - Concluded

Item	Responsible	Due Date	Closed	Closure Rationale/Status
DM Standard Open Work:				
Orbiter Readiness Statement	FDRIB	11/16/07		
Range Safety Readiness Statement	FDRIB	11/20/07		

The Flight Design and Dynamics Division has performed a final review and determined all Division and USA FDD open work and/or actions for this mission are closed or acceptable rationale is provided for proceeding with the flight.

 Flight Design Manager
 Date_____

 Chief, Flight Design Requirements and Integration Branch
 Date_____

 Director, Flight Design and Dynamics Department
 Date_____

 Chief, Flight Design and Dynamics Division
 Date_____

Launch Day/Time Summary

	GMT Day	Inplane GMT launch time	Local KSC time (EST)	Local Houston time (CST)	
	12/6/2007	340	21:34	4:34 PM	3:34 PM
	12/7/2007	341	21:11	4:11 PM	3:11 PM
	12/8/2007	342	20:45	3:45 PM	2:45 PM
	12/9/2007	343	20:23	3:23 PM	2:23 PM
	12/10/2007	344	19:57	2:57 PM	1:57 PM
	12/11/2007	345	19:35	2:35 PM	1:35 PM
	12/12/2007	346	19:09	2:09 PM	1:09 PM
	12/13/2007	347	18:46	1:46 PM	12:46 PM
	12/14/2007	348	18:21	1:21 PM	12:21 PM
	12/15/2007	349	17:58	12:58 PM	11:58 AM
	12/16/2007	350	17:33	12:33 PM	11:33 AM
	12/17/2007	351	17:10	12:10 PM	11:10 AM
	12/18/2007	352	16:44	11:44 AM	10:44 AM
	12/19/2007	353	16:22	11:22 AM	10:22 AM
	12/20/2007	354	15:56	10:56 AM	9:56 AM
	12/21/2007	355	15:33	10:33 AM	9:33 AM
	12/22/2007	356	15:08	10:08 AM	9:08 AM
	12/23/2007	357	14:45	9:45 AM	8:45 AM
	12/24/2007	358	14:20	9:20 AM	8:20 AM
	12/25/2007	359	13:57	8:57 AM	7:57 AM
	12/26/2007	360	13:31	8:31 AM	7:31 AM
	12/27/2007	361	13:09	8:09 AM	7:09 AM
	12/28/2007	362	12:43	7:43 AM	6:43 AM
	12/29/2007	363	12:21	7:21 AM	6:21 AM
	12/30/2007	364	11:55	6:55 AM	5:55 AM
	12/31/2007	365	11:33	6:33 AM	5:33 AM
	1/1/2008	1	11:07	6:07 AM	5:07 AM
	1/2/2008	2	10:44	5:44 AM	4:44 AM
	1/3/2008	3	10:18	5:18 AM	4:18 AM
	1/4/2008	4	9:56	4:56 AM	3:56 AM
	1/5/2008	5	9:30	4:30 AM	3:30 AM

Beta Cutout