

# Systems Division

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STS-117/13A MOD FRR

February 13<sup>th</sup>, 2006

DF1/Michael Interbartolo

# DF Shuttle CoFR Status Summary

REQUIREMENT	DF	GNC	DPS	PROP	INCO	MMACS	EGIL	EECOM	BOOSTER
Critical Processors/Applications	G	N/A	G	N/A	G	G	G	G	G
Non-Crit Processors/Applications	Y	G	G	G	G	G	G	G	Y
EMCC	G	G	G	G	G	G	G	G	N/A
Training - MCC/POCC	Y	Y	Y	Y	Y	Y	Y	Y	Y
LCC/MEL/MIL	Y	G	G	G	G	G	G	G	G
FTP - New Ops	Y	Y	G	Y	G	G	G	G	Y
Flight Anomaly Resolution	G	G	G	G	G	G	G	G	G
Anomaly – Procedures	G	G	G	G	G	G	G	G	G
Exceptions/Action Items from prior reviews	G	G	G	G	G	G	G	G	G
CIL/Hazards	G	G	G	G	G	G	G	G	G
No Constraints	G	G	G	G	G	G	G	G	G
Level II Actions	G	G	G	G	G	G	G	G	G
Mission Requirements	G	N/A	G	G	G	G	G	G	G
Engineering Drawings	G	G	G	N/A	G	G	G	G	G
Command Procedures	G	G	G	G	G	G	G	G	G
Fit Prep Process Plan Requirements Met	G	G	G	G	G	G	G	G	G
Contractor Process Insight	G	N/A	N/A	G	G	G	G	G	G
MOD Work Guidelines	G	G	G	G	G	G	G	G	G

**G** Ready to support flight

**Y** Open work with expected resolution prior to flight

**R** Open work without expected resolution prior to flight, or unresolvable constraint violation.

**N/A** Not applicable

# Status of Standard Open Work Shuttle (LCC/MEL/MIL)

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- LCC/MEL/MIL - The Launch Commit Criteria Minimum Equipment List and Mandatory Instrumentation Lists have been reviewed and verified as complete and accurate. Any flight unique requirements have been specified, exceptions as noted:

STS-117 MEL-13: Shuttle TA is working with the LCCWG to get approval for the MEL-13 (STS-117 Flight Specific Minimum Equipment List). It has been submitted into the LMS system and was dispositioned on 2/8. Votes are due to the LCCWG on 2/14 and once approved it will be scheduled for a PRCB Noon Board - ECD 2/23

# Status of Non-Standard Open Work Shuttle (Non-Critical Processors/Applications)

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- **NON-CRITICAL PROCESSORS/APPLICATIONS - Non-critical processing (e.g., applications, utilities, and scripts) have followed defined development and change control constraints (Software Management Plan for Mission Control Center Applications - JSC 27029) and have been tested and certified for operational use, except as noted:**

Discipline	Application Name	Open Item
BOOSTER	ECO Voltage RTPLOTS	Certification in work, ECD 2/12
BOOSTER	ECO Voltage display(s)	Certification in work ECD 2/12
BOOSTER	Voltage MSID translator ISPATOM comp	Certification in work ECD 2/12
BOOSTER	NPSP Predictor ISPATOM Comp	Development/Certification in work. NPSP cue lowered from 3.5 to 3.0 to reflect new FR

# Status of Standard Open Work Shuttle (Training – MCC)

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- **MCC Team Certification Status:**

- All team member certification requirements are complete except as follows:

**Various Physicals, Proficiency and Final Certifications to be completed prior to flight with backup personnel available if required for all positions.**

- **MOD Work Guidelines:**

- All flight controllers meet the MOD work guidelines with the following exceptions:
  - NO DF Violations

# Status of Non-Standard Open Work Shuttle (FTP- New Ops)

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- **New Ops Work Status:**

All significant differences from previous flights have been reviewed by FTP, POWG, or other appropriate operations forum and where required documented in either new procedures or new flight rules, except as follows:

Propellant Requirement for OMS/RCS Maneuver Downmode:

Due to projected OMS/RCS propellant loadings for STS-117, the deorbit propellant requirement for providing a downmode for flight success maneuvers per Flight Rule A2-114B cannot be satisfied. Therefore, the requirement is being redefined for this mission. A downmode will be provided if propellant is available to provide RCS deorbit and prebank to shallow targets with the S3/S4 truss onboard and to provide RCS deorbit to steep targets after the truss is deployed. A CR will be submitted to add a rule documenting this propellant requirement change in the STS-117 Flight Rules Annex.

ECD 2/23

# Status of Non-Standard Open Work Shuttle (FTP- New Ops)

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- **New Ops Work Status:**

Final DAP Configuration/Constraints:

The current versions of the FDF and Flight Rules contain the preliminary data from C. S. Draper Laboratory. Upon receipt of the official memo, GNC will review the document and update any DAP constraints in the FDF and Flight Rules as required. This will include specific DAP parameters (attitude & rate deadbands, maneuver rate, ALT config, etc.), RCS jet group selection/deselection for mated control, orbiter external airlock pressurized/depressurized constraints, robotics operations DAP constraints, and any other required system constraints. Estimated Delivery Date 2/15

# Status of Non-Standard Open Work Shuttle (FTP- New Ops)

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- **New Ops Work Status:**

Three-Engines On Running Helium Interconnect Flight Rule:

The helium leak Flight Rule is in the process of being updated with a new running interconnect procedure. This procedure increases the run time of an SSME after it has sustained an MPS/SSME helium leak by taking helium from a non-leaking, running SSME. This procedure was first presented to the A/EFTP #218 on 3/31/06 and was approved for use during integrated simulations. Several actions were also issued at that time which are in work. Most notably is an action to Boeing to confirm that the donor engine will not shutdown due to interconnecting its helium supply with the leaking SSME and pneumatic helium supplies. Booster and Boeing MPS personnel have completed the engineering analysis to confirm that donor engine will not shutdown. This procedure and the closure of the Boeing action was approved at the 2/1/07 Propulsion System Integration Group. It is slated for the 2/16/07 Ascent/Entry Flight Techniques Panel for final approval. If approved for use on STS-117, the Flight Rule be placed in the STS-117 Flight Rule Annex. (ECD 2/16/07)



# Status of Non-Standard Open Work Shuttle (FTP- New Ops)

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- **New Ops Work Status:**

ECO Voltage Instrumentation use on STS-117:

Instrumentation will be installed for the first time on STS-117 that will provide insight into the Engine Cutoff (ECO) sensor circuitry. The intent of this instrumentation is to aid in pre-launch troubleshooting of a failed ECO circuit. When used in conjunction with Point Sensor Box (PSB) simulation commands, voltage measurements will clarify location of open circuit either upstream or downstream of instrumentation inserted between the PSB and the avionics bay interface. When used standalone, voltage measurements can provide insight into a failed WET ECO sensor after PSB SIM commands are removed (during the T-9 minute hold) through MECO. An OMRSD is being updated to include expected ECO voltage outputs and the expected range, but exceeding the anticipated voltage range is not considered a flight constraint since STS-117 will be the first flight of this instrumentation. Its limited use for real time decisions during LCC time frame and ascent is under review. The strategy for the use of this new data will be discussed at Ascent/Entry Flight Techniques Panel on 2/16. If approved for use on STS-117, a Flight Rule defining a sensor failure signature based on this instrumentation will be placed in the STS-117 Flight Rule Annex. (ECD 2/16/07)

# Special Topic- AHMS

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- AHMS Vibration Redline Active – The 1/18/07 PRCB decided that the Advanced Health Monitoring System (AHMS) synchronous vibration redline would be active on the Right SSME on STS-117. The Left and Center SSME's will be in monitor mode, identical to the Right SSME on STS-116. SSME project has recommended that no LCC's be applied to the AHMS. The pad abort limits were presented to the Ascent/Entry Flight Techniques Panel # 226 and require PRCB approval prior to implementation. This is not expected until STS-120. The Flight Rules associated with the AHMS as well as all Booster section products are in place.
- STS-116 Right SSME (ME2058) HPFTP 21 Degree Accelerometer Disqualification – At 45.32 seconds MET, the 21 degree accelerometer on the Right SSME HPFTP was disqualified and FID 116-001 was posted to the FID buffer. This disqualification came during the thrust bucket, and was indicative of a known possibility with quiet pumps at low power levels. This check is used to detect failed low accelerometers. If the vibration redline had been active, the FID would have been detected in the MCC and the synchronous redline would have changed from a 3 of 3 accelerometers required for shutdown to a 2 of 2 accelerometers required for shutdown. The failure of a second accelerometer would have resulted in the deactivation of the synchronous redline on the HPFTP. SSME Project has not recommended a change to this disqualification limit for STS-117. The Right SSME on STS-117 is expected to have higher vibration levels at low power levels( due to its construction) when compared with the Right SSME on STS-116 and hence should have some margin against this type of disqualification.

# Conclusion Shuttle

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All identified open work will be completed in time to support STS-117/13A.