

# Systems Division

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STS-115/12A MOD FRR

August 2, 2006

DF1/Ladessa Hicks

# DF ISS CoFR Status Summary

REQUIREMENT (ISS)	CATO	ODIN	OSO	ADCO	PHALCON	PRO	ECLSS	THOR	Systems Integration
Critical Processors/Applications	G	G	G	G	G	G	G	G	G
Non-Crit Processors/Applications	G	G	Y	G	G	G	G	Y	G
ODF/SODF	G	Y	Y	Y	Y	Y	G	G	G
BCC	G	G	G	G	G	G	G	G	G
Training - MCC	Y	Y	Y	Y	Y	G	Y	Y	G
JOP - New Ops	G	G	G	Y	G	G	G	Y	G
Flight Anomaly Resolution/Impact	Y	G	G	Y	G	G	Y	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
Program Actions	G	G	G	Y	G	G	G	G	G
Mission Requirements	G	G	G	G	G	Y	Y	G	Y
Command Procedures	G	G	G	G	G	G	G	G	G
Contractor Process Insight	G	G	G	G	G	G	G	G	G

**G** Ready to support the flight

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

**R** Open work without expected resolution prior to flight, or unavoidable constraint

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

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## MCC Team Certification Status:

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

### FCR

<u>Position</u>	<u>Name</u>	<u>Team</u>	<u>Open Item</u>	<u>ECD</u>
ODIN	Brian O'Hagen	Orbit 2	Physical	8/04/06
PHALCON	Kim Ord	Orbit 2	Physical	8/01/06
THOR	Ken Attocknie	Orbit 4	Physical	8/04/06
THOR	Sean Robinson	Orbit 2	Proficiency	8/07/06

### MPSR

<u>Position</u>	<u>Name</u>	<u>Team</u>	<u>Open Item</u>	<u>ECD</u>
HAWKI	Christina Gosling	Orbit 2	Physical	8/02/06
ACE	Leonard Riche	Orbit 2	Proficiency	8/05/06
RAVEN	Eric Maier	Orbit 1	Physical	8/10/06
STARCOM	James Saultz	Orbit 2	Proficiency	8/14/06
			Physical	8/14/06
STARCOM	Jarrod Nelson	Orbit 4	Proficiency	8/14/06
AVENGER	Jeremy Del Greco	Orbit 2	Physical	8/10/06
TCON	Brian Kelly	Orbit 4	Physical	8/14/06

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

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## MCC Team Delta Certification Status:

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

### FCR

<u>Position</u>	<u>Name</u>	<u>Team</u>	<u>Open Item</u>	<u>ECD</u>
OSO	David Barrett	Orbit 1	CAS Delta Cert	8/04/06
OSO	Lisa Marszalek	Orbit 2	SSAS Cert	8/11/06
OSO	Mike Steele	Orbit 3	CAS Delta Cert	8/04/06
OSO	Phil Curell	Orbit 4	SSAS Cert	8/07/06

### MPSR

<u>Position</u>	<u>Name</u>	<u>Team</u>	<u>Open Item</u>	<u>ECD</u>
OSO MPSR	Harold Hammock	Orbit 1	SSAS Cert	8/07/06
OSO MPSR	Mark Gray	Orbit 3	CAS Delta Cert	8/04/06
OSO MPSR	Anthony Quandt	Orbit 4	SSAS Cert	7/31/06

# Status of Standard Open Work Station (Shuttle/ISS/IP Joint Stage Operations )

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- **Shuttle/ISS/IP Joint Stage Operations Status:**

As applicable to DF, 12A Shuttle/ISS/IP joint mission hardware commitments, crew training, ground operations, mission documentation, and mutual safety requirements all have been found to comply with the agreements and constraints as stated in the joint documentation (MIP, IDRDR); as applicable to DF, documentation and crew training for all joint procedures have been completed; and as applicable to DF, mission preparation is compatible with stage requirements (MIP, IDRDR, OIP, etc.) agreements and schedules, except as follows:

- **ISS Stack Pressure Profile**

- The ISS Stack Pressure profile must be negotiated with MCC-M COJ (Life Support). Coordination with MCC-M has begun. No issues expected. (ECD: L-14)

# Status of Non-Standard Open Work Station (Non-Critical Processors)

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- Non-Critical Processor/Application Status:
  - The Systems Division has reviewed the DF-maintained MCC software and verified consistency with the Systems Division Software Management Plan except as noted:

Discipline	Application Name	Open Item
OSO	ELOG	Unpressurized Cargo Carrier Attachment System (UCCAS) ELOG certification planned in next ORT (ECD 8/11/06)
OSO	MSK Display	Unpressurized Cargo Carrier Attachment System (UCCAS) MSK Display certification planned in next ORT (ECD 8/11/06)
THOR	CDDT Script	THOR P3/P4 Install Command Scripts (ECD: MCT on 7/31)

# Status of Non-Standard Open Work Station (SODF)

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- SODF Status

- All SODF, Multi-element and Impact procedures controlled by this division are complete and have been validated, except as follows:

- The following procedures are late because PVTCS flow rate A0 and A1 coefficients (gain and offset) were delivered in psi vs kPa in SPN 4275. Since this SPN was previously approved, a new SCR was required to obtain the corrections. PHALCON submitted a CHIT to obtain the data quicker. CHIT 3947 was dispositioned last week:

– 1.3.350 PVTCS PFCS XX Activation	EPS	ECD 8/11/06
– 3.141 PVTCS PFCS XX Deadhead Trip - PVM	EPS	ECD 8/11/06
– 3.151 PVTCS PFCS 4B(2B) Pump Switchover Failed - P6	EPS	ECD 8/11/06
– 3.153 PVTCS PFCS 4B(2B) Pump A(B) Failure - P6	EPS	ECD 8/11/06
– 3.154 PVTCS PFCS XX Leak Condition - PVM	EPS	ECD 8/11/06
– 4.108 PVTCS PFCS XX Restart	EPS	ECD 8/11/06

- The Load Shed table and procedure are waiting for 12A Load Shed PPL approval. Requirements have been developed/approved and PPLs have been delivered. Testing is scheduled for completion on 7/28 (per SIF 3656). Final ASCB approval scheduled for 8/9.

# Status of Non-Standard Open Work Station (SODF)

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- SODF Status – cont'
  - The following procedures are needed, but cannot be completed until information is obtained from Boeing
    - This procedure requires P3 memory location information from Boeing:
      - 5.294 EPS MDM BDT/50HZ Address Ground Book
    - The following procedure requires SPN implementation details from Boeing:
      - 5.362 Generic ORU Firmware Controller Bit Failed Ground Book
  - The following procedures are of low criticality, and will be updated via EZ CR to add SPN references (ECD 8/2/06)
    - 5.350 Primary PMCU MDM Detected Local Bus Ancillary Data Error - LAB Ground Book
    - 2.638 DDCU LA1B (LA2B) Overtemp or DDCU LA1B (LA2B) Overtemp Safing Failed - WARN Warning Book
    - 2.639 DDCU LA1B (LA2B) Overvoltage or DDCU LA1B (LA2B) Overvoltage Safing Failed - WARN Warning Book
    - 2.112 PVM Configure BGA XX To Autotrack EPS Book
    - 2.103 PVM Configure BGA XX To Manual Free Mode EPS Book
    - 2.105 PVM Configure BGA XX To Rate Mode EPS Book



# Status of Non-Standard Open Work Station (SODF)

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- SODF Status – cont'

- The following procedures are still under review and will be executed via flight notes. PV Required:

- SSAS Bolting MAL(s) OSO Book ECD 8/9/06
    - SSAS Latching and 1553 Mal(s) OSO Book ECD 8/9/06

- This procedure is required for one time use (pre-12A) only (ECD 8/11/06)

- P1P3 SSAS Pre-12A C/O OSO Book PV in-work.

- The following procedures are late because of ULF1.1 post flight lessons learned, new operations and program action recommendations. PV Required:

- PMA 2 Pre-Departure Config on Thrusters Joint Ops Book ECD 8/11/06
    - PMA 2 Departure on Thrusters Joint Ops Book ECD 8/11/06
    - PMA 2 Post Departure on Thrusters Joint Ops Book ECD 8/11/06
    - Attitude Hold and Momentum Management  
Activation using USTO MCS Book ECD 8/11/06
    - Update Desat Pulse Pattern (New) MCS Book ECD 8/02/06

# Status of Non-Standard Open Work Station (New Operations)

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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:

- **Desat pulse pattern** - Engineering recommended a change to the pulse pattern to reduce fatigue loading on the Solar Array Wings (SAW) once they are deployed on FD6. The change is from a single-pulse desat to a three-pulse desat, with the pulses timed to avoid resonant frequencies. Reference Flight Rule 12A\_B8-X - US Thruster Only Pulse Pattern Constraints, FR CR 7712A. Open work: SODF CR for procedure (ECD 8/2).
- **Thermal Analysis/Flight Rule for EVA 3 Activities (S-Band ORU R&R)** – Analysis of thermal requirements for installation and removal time constraints are complete for S-Band BSP and transponder. Still waiting for SASA thermal transfer analysis from VIPER (ECD 7/31)

# Status of Non-Standard Open Work Station (Flight Anomaly Resolution)

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- **Mnvr to water dump on ULF1.1 FD5 using USTO (AR 1656).** This AR documents that procedures did not anticipate performing back-to-back maneuvers with USTO controllers. As a result, flight software inhibits were not correctly configured for the second maneuver, and a procedure deviation was required. Procedure updates are in work (ECD 8/2).
- **LAB1S6 CCAA HX R&R – Threads stripped.** The bolt is not available for electrical grounding of the CCAA. LAB1S6 CCAA can not be operated without this bolt installed. LAB1S6 CCAA is mandatory for 12A, since LAB1P6 CCAA will be powered down for P3/P4 install. Current plan is for onboard crew to develop a grounding strap and attach it to the S6 CCAA HX. An ops constraint will be put in place such that crew will not open the rack panel that provides access to the HX. This constraint will be accomplished with a placard on the face of the door. If crew needs to open the panel, the RPC to the TCCV (active part of the HX) will be opened. This is documented in CHIT 4009 (currently open). The final installation is scheduled for Monday July 31
- **Campout STDO –** The campout SDTO uncovered MCA issues that require ops workarounds to be documented in nominal procedures. CRs to address MCA ops workarounds in EVA and ECLSS procedures and Flight Rules all in workflow and will be published for 12A. Campout procedures were simpacked during the 12A Long Sim. SSTF Campout Test (ECLSS only w/ new total pressure PPL) is scheduled on 8/7/06.

# Status of Non-Standard Open Work Station (Flight Anomaly Resolution)

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- **Approach and Docking FCOH** - During the CATO groups ULF1.1 post flight follow-up discussions with Rendezvous, the CATO group became aware of an approach corridor exceedance of 0.1 degrees that had occurred during the ULF1.1 docking. Both shuttle and station have masks that are designed to protect each other from direct beam radiation. These masks are only valid as long as the orbiter is within the approach corridor. Per flight rules, both shuttle and station must terminate Ku-band radiation if the orbiter is outside the corridor. During the ULF1.1 approach, the CATO team was under the understanding that the orbiter was well within the corridor and therefore did not take any action to terminate the Ku-band radiation. As a result, the orbiter was vulnerable to ISS Ku-band radiation during this minor exceedance since the existing mask only protects the orbiter within the approach corridor. The CATO team has performed a review of the TDRS pass and determined the ISS Ku-band antenna was not pointed in this mask region during this minor exceedance.
  - Coordination between Rendezvous and CATO during approach and docking needs to be documented in a FCOH SOP. This SOP will prevent the miscommunication of the orbiter's location during the approach and will allow the CATO team to accurately make the decision of when to terminate the Ku-band radiation (ECD 8/11).

# Status of Non-Standard Open Work Station (Program Actions)

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- **Program Action to explicitly define the attitude control options and priorities, and develop an ISS-only undocking option.**
  - Current generic flight rule lists Orbiter as a higher priority over ISS Attitude Hold. New proposed 12A rule by MOD adds USTO control as an option, and explicitly shows ALT DAP as higher priority than either USTO or Russian thruster control. It also provides an improved rationale that explains the risk-tradeoff being made between VRCS, ALT DAP, and ISS control. VIPER disagrees with prioritizing PRCS before USTO and RS Thruster control due to fatigue loads on ISS with PRCS control and the potential for inadvertent jet firings. FR CR 7719 cannot be approved until SSP and ISS final decision is made. (ECD Required: 8/11/06)
  - CR in work for FR 12A\_C2-42 - ISS System Management for Undocking. This update will show the various pre- and post-undocking attitude control options available. The update will also clarify that USTO control is not an option post-undock, since USTO is not certified for Orbiter plume loads. As part of the CR preparation, the sequence of using the Russian thrusters for the maneuver to undock and the post-undock attitude control will be tested to verify existing procedures will work correctly (ECD 8/11/06).

# Status of Non-Standard Open Work Station (Program Actions)

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- METOX FIT #3 (6-8-06) recommended METOX performance test prior to 12A in support of the Campout SDTO. The METOX/CO2 control issue is still being worked by EVA/Engineering community with recommendations to improve METOX performance. A workaround to change CCAA fan speed to provide more flow to METOX canisters is under review. Procedure and timeline updates will be required. This test has been scheduled for Aug 15-17.
- SRP (6/7/06) recommended a change to the AL Cabin Pressure high caution limit to mitigate risk of undetected O2 leakage (if MCA failed)/break in pre-breathe protocol upper pressure. Current 10.4 psia caution limit is inside the 10.0 to 10.84 psia protocol nominal limits. ASCB approved PPL to change upper caution limit to 10.83 psia (10.84 psia - PCA accuracy).
  - The PPL is scheduled for delivery to the MCC on 7/31/06. The SSTF Campout Checkout is on 8/7/06. PPL will be available for uplink to ISS post MCC step-up on 8/14/06.

# Status of Non-Standard Open Work Station (Program Actions)

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- ISS Electrical Power Management
  - Power balance analysis has been performed and presented twice to 12A JOP
    - Power requirements for ISS expected to exceed the 12.2 kW flight rule limit during eclipse due to:
      - High loads on both channels throughout first half of mission as new power channels are activated and batteries warmed and charged.
      - Flight rule conflict between requirement to provide xfer power to 3 RS CHTs (US-to-RS power xfer box) during high roll ops vs. requirement to not exceed 12.2 kW primary power in eclipse.
    - Negotiations with Russia underway to attempt to define smaller subsets of time when 3rd CHT can be powered without violating 12.2 kW flight rule limit (ECD Required 8/11/06)
  - Currently there are no showstopper issues with power balance violation. Power management requirements and workload increase significantly for 12A operations:
    - For manning on 12A, two PHALCONs, two Powers and a PRO will be required per shift. Five people per shift are needed for the duration of the mission because there are too many PHALCON activities for a standard PHALCON/POWER/PRO team.
      - During EVA 1,
        - PHALCON 1 team does the activities related to the EVA - powerdowns/ups, safing steps etc,
        - PHALCON 2 team runs P4 channel activation.
      - After, initial activation, one team runs the battery charging on P4 while the other team runs the nominal mission activities.

# Status of Non-Standard Open Work Station (Shuttle/ISS/IP Joint Stage Operations )

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- **Solar Array Wing (SAW) Feathering Constraints** - SAW loads require specific feathering angles depending on the thruster configuration. A new OIP is in work between ADCO and Russian counterparts for thruster configuration information request/exchange to support the SAW feather constraints (ECD: 8/11/06).



# Conclusion Station

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- All identified open work will be completed in time to support 12A.

# Status of Non-Standard Open Work Station (Flight Anomaly Resolution)

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## (Backup Chart)

- **P1LOOB ETVCG Tilt Anomaly** - During ULF1.1, the P1LOOB was powered to support docking. After activation a tilt command was issued. The camera started tilting from -90 degrees and stopped on its own at -82.30 degrees. A total of four power cycles were accomplished with no prevail on gaining tilt function. Approximately, 16 hours after initial activation, the crew powered the P1LOOB light and began panning and tilting with no issues. This was presented at the 12A JOP, and it was decided due to a video requirement on 12A to view the 2A BRS Pin verification and the only other view is an EVA or rotate the BGA 2A 180 degs and use the SSRMS Lee Camera for verification, that the camera will be parked after usage at -105, 0. It was also decided that the camera would only be used for critical activities requesting this camera, and power the camera up 24 hours in advance to warm it up (incase this was a thermal issue). The C&T MER will be submitting a Chit with these new stipulations of usage
- **Video Tape Recorder (VTR) By-Pass cabling**- During LF1 and ULF1.1, a VTR by-pass cable configuration developed by the Photo-TV was used to provide images to and from the orbiter while maintaining record and limited playback capability on the VTR. However, the video image sent to the orbiter started out black and white to color to all black. Among other suspects, it is possible that the new video cabling configuration may be the cause for the video distortion. A trouble shooting cable configuration developed by Photo/TV (OCA MSG 13-0506, which basically changed the flow of data through the CVIU and VTR2 was configured by the crew and checked out by the ground. 12A Team is considering this new cable configuration.