



SPACE SHUTTLE PROGRAM
Flight Software Office
NASA Johnson Space Center, Houston, Texas



Flight Software (FSW) STS-118 In-Flight Anomaly Review

SR 3981

David Rutishauser/MS4

SICB Sept. 4, 2007

PRCB Sept. 6, 2007 - Replacement Charts



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FSW STS-118 IFA Review, Overview

Presenter **D. RUTISHAUSER**

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Tracking #	Description	IFA?	IIFA?
STS-118-I-007	BFS loss of Class III alert from Spacehab	N	Y, OPO: SE&I
MOD 2586	Mass Memory Unit (MMU) 2 Transient OFF/Busy during Systems Management (SM) Checkpoint	N	N
MOD 2590	Payload Deployment and Retrieval System (PDRS) Arm-based Electronics (ABE) Message Annunciation Funny	N	N
STS-118-S-001	PGSC 3COM Card Failure (MER-08)	Y	N
AR 002659	OCA Router overheat	TBD	N
	Wireless Ethernet RangeLAN card issue	TBD	N



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- **(MER “funny”) BFS loss of Class III alert from Spacehab:**
 - A payload Class 3 fault message was anticipated for the Spacehab parameter “EMERGENCY BUS VOLTAGE” but was not seen upon BFS mode from STBY to RUN.
 - **IFA?** No, does not meet criteria of NSTS 08126.
 - Not a failure or Flight Software discrepancy
 - Not a constraint to launch- Spacehab was to fly powered off and no payload monitoring was required
 - Explained condition: The lack of the message indicates that BFS received data that was within limits. Source was stale data from an unexpected power-on of Spacehab module during launch countdown under Test Preparation Sheet (TPS) FCS-5-20-621 to install a tape into a video recorder
 - **SICB 9/4/07 decision to classify as an Integrated IFA (STS-118-I-007), and assigned IIFA to SE&I.**
 - **(MOD 2586) Mass Memory Unit (MMU) 2 Transient OFF/Busy during Systems Management (SM) Checkpoint**
 - MMU 2 was powered on and SM checkpoint was requested. GPC-4 issued an OFF/BUSY MMU 2 message and CHECKPT FAIL message. A second attempt of the checkpoint was successful.
 - **IFA?** –No, explained I/O timing issue in Ops Note 107971.



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- **(MOD 2590) Payload Deployment and Retrieval System (PDRS) Arm-based Electronics (ABE) Message Annunciation Funny**
 - During RMS Direct Drive checkout procedures, a GPC-annunciated message "S96 PDRS ABE SY" occurred. However, there were no MCIU annunciation or C&W lights as would be expected. The joint drove properly during this brief test and this message did not recur.
 - **IFA?** – No, does not meet criteria of NSTS 08126.
 - Not a Flight Software failure or discrepancy
 - Nuisance alarm only. No mission impact since Direct drive mode was not required for the remainder of the flight.
 - Condition explained by transient error combined with SM/MCIU timing differences.
- **(STS-118-S-001) PGSC 3COM Card Failure (MER-08)**
 - STS-7 PGSC (which is used for WLES and LCS and IDC) dropped off the onboard network. The crew was asked to check the PGSC network connections. MS4 called down to say that they replaced the 3COM card, restarted the STS-7 PGSC and all of its software, and network connection was restored. Four spare 3 COMM cards on board.
 - **IFA?**- Yes, PRACA-reportable failure of flight hardware during flight
 - **IIFA?** – No, four space 3Com cards flown on STS-118, no impact to elements or IHRs
 - **Post-flight plan**
 - For STS-123 and subsequent flights, the PGSC network will transition to wireless access point and hub, eliminating need for 3Com cards
 - PRACA reporting: FIAR B-PGSC-219-F033
 - Trending/history data collected per process



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- **(AR 002659) Orbiter Communications Adapter (OCA) Router overheat**
 - After undocking, Crew reported OCA router blue screened and was hotter than usual. Cooled off and rebooted to restore operation
 - **IFA?** – Determination pending FCE testing, to be conducted within 6 weeks post-landing
 - **IIFA?** – No, PGSC cooled with “Duffy Duct” and rebooted. After reboot, PGSC performed normally. No impact to elements or IHRs
 - **Post flight plan**
 - Topic at crew debrief (scheduled for 9/7/07)
 - PRACA reporting: FIAR if required
 - Trending/history data collected per process
- **Wireless Ethernet RangeLAN card had issue early in flight**
 - Card replaced to restore operation
 - **IFA?** - Determination pending FCE testing, to be conducted within 6 weeks post-landing
 - **IIFA?** – No, 2 spare RangeLan cards flown on STS-118 or hardwire option; no impact to elements or IHRs
 - **Post flight plan**
 - Topic at crew debrief
 - PRACA reporting: FIAR if required
 - Trending/history data collected per process



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Review and Recommendation

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- **9/4/07 SICB**
 - **Assigned BFS loss of Class III alert from Spacehab to SE&I as an Integrated IFA**
 - **Accepted classification recommendation for all other anomalies**
 - **One FSW IFA for PGSC 3COM Card Failure (STS-118-S-001)**
 - **Two issues under investigation as possible FSW IFAs**
 - » **OCA Router Overheat (AR00269)**
 - » **Wireless Ethernet RangeLAN card issue**
- **Recommendation**
 - **Approve IFA and IIFA FSW screening and assessment**
 - **Approve post flight plan for FSW IFA STS-118-S-001**



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Backup

Author: MISTY WOHL	PASS Program Note	DR: 107971
Org and Phone: USA/PASS (281) 282-3921	OPS NOTE (X) USER NOTE () RELEASE NOTE ()	Date: 11/27/95 Revision: E Revision Date: 06/07/05
OI/Flight Effectivity: OI-30 AND SUBS	User Affected: CREW (X) GROUND (X) DUMP ONLY ()	
Major Software Area: SSW (X) GNC () VU () SM/PL ()	OPS Modes Affected: 0, G1, G2, G3, G6, G8, G9, S2, S4, PL9	
Software Sub-Area: MMU		
Principal Functions: SBIO		
Title: FALSE OFF/BUSY MMUX MESSAGE POSSIBLE		
<p>Description: DURING CERTAIN SOLID STATE MASS MEMORY OPERATIONS WHICH REQUIRE TWO OR MORE SEPARATE MMU I/O TRANSACTIONS, IT IS POSSIBLE FOR THE FSW TO CAUSE THE MMU OPERATION TO FAIL WITH AN "OFF/BSY MMUX" INDICATION. THIS IS CAUSED BY A PREMATURE INDICATION OF I/O COMPLETE FOR ONE MMU TRANSACTION PRIOR TO THE INITIATION OF A SUBSEQUENT MMU TRANSACTION INITIATED BY AN APPLICATION PROGRAM. FOR THIS PROBLEM TO OCCUR, THE FIRST MMU I/O TRANSACTION MUST COMPLETE (APPROX. 75-85 MICROSECONDS) PRIOR TO THE BEGINNING OF A CS SYNC CYCLE (SIP CYCLES 2, 6, 10, 14, 18, & 22). THIS PROBLEM HAS AN EXTREMELY LOW LIKELIHOOD OF OCCURRING AND IS UNPREDICTABLE, DUE TO THE ASYNCHRONOUS REQUEST FOR MMU OPERATIONS, CPU AND I/O LOADING (OPS AND ACTIVITY DEPENDENT), AND TYPE OF MMU OPERATION REQUESTED.</p> <p>IT IS POSSIBLE FOR THE ANOMALY TO OCCUR ON THE FOLLOWING: SM CHECKPOINTS, TFL LOADS, MM PATCH AND TCS SEQ FROM MMU (FIRST SEQUENCE REQUEST ONLY). CURRENTLY, THE SM CHECKPOINT IS MOST EXPOSED TO THIS ANOMALY IN FLIGHT.</p> <p>THE GENERIC SIGNATURE OF THIS CONDITION IS:</p> <ul style="list-style-type: none"> - AN "OFF/BUSY MMUX" MESSAGE - AND A BCE 27 I/O ERROR WILL BE LOGGED <p>FOR THE SM CHECKPOINT, THE FOLLOWING WILL ALSO BE NOTED:</p> <ul style="list-style-type: none"> - AN "S60 CHECKPOINT FAIL" MESSAGE - SPEC 60 (SM TABLE MAINT) WILL DISPLAY "FAIL UNIQ" - SM DOWNLIST PARAMETERS V92J1090C (CHECKPOINT R/W STATUS) AND V92J1091C (CHECKPOINT FAIL QUALIFIER) WILL HAVE VALUES OF 4 AND 3 RESPECTIVELY - AND THE I/O ERROR LOGGED AS MENTIONED ABOVE WILL HAVE AN OPCODE VALUE OF 5 		

User Response:

RETRY THE REQUESTED MASS MEMORY OPERATION.

CONCURRENCE:

USA/PASS:R. DE LA FUENTE DATE: 06/29/2005

CHAIR: P. T. SWARTLEY DATE: 06/29/2005

PF MGR: D. KIERSTEAD DATE: 06/29/2005

APPROVAL:

DARRELL E. STAMPER 07/07/2005

CHAIRMAN, SASCB DATE