

SSVEO IFA List

Date:02/27/2003

STS - 79, OV - 104, Atlantis (17)

Time:04:04:PM

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 1	MET: 000:13:09	Problem	FIAR	IFA STS-79-V-01 APU
MMACS-01	GMT: 260:09:07:58		SPR	UA Manager: Brad Irlbeck
			IPR 81V-0004	x38617 Engineer: Walter Scott

Title: APU 2 Unexplained Shutdown (ORB)

Summary: After ascent and MECO, prior to the nominal time for APU shutdown, APU-2 experienced an unexplained shutdown. Initial review of data shows nominal performance up to the time the shutdown occurred. Subsequent review of the data shows that fuel stopped flowing to the gas generator causing the turbine speed to decrease. Data also indicates that the APU controller responded to an 80% speed indication and properly closed the isolation valve. Review of historical data for the three APU's has been completed. Currently the most probable causes for the shutdown involve wiring or controller problems. The pressure, turbine speed, and temperature signature of the shutdown are not indicative of a fuel delivery system blockage or a turbine problem.

Circ pump 2 will be used for FCS C/O. For entry, a nominal APU pre-start will be performed for all three systems prior to the deorbit burn. APU 3 will be started at TIG-5 and APU 1 at EI-13. High speed will be selected for APUs 1 and 3 from TAEM through touchdown. An APU 2 start will not be attempted unless APUs 1 or 3 shut down. A troubleshooting plan was developed and approved by KSC, JSC, and RI-Downey. On 9-29-96, KSC reported that the Auto Bite Test was performed with no problems found. The CCU checkout was performed on 9-30-96 with no problems found. GGVM test was performed on 10-1-96 and found no anomalies. Wire runs involving the shutoff valve, pulse control valve, MPU1 & 2 were thoroughly manipulated from each of these components to the controller interface with no indications of failures. Resistances measured on each of these components was again nominal throughout the testing. The controller was removed on 10-3-96 and was shipped to the vendor on 10-4-96. APU removal is in work.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 9	MET: 000:02:08	Problem	FIAR	IFA STS-79-V-02 GPS
GNC-01&02	GMT: 260:11:03		SPR	UA Manager: Ray Nuss
			IPR	PR COM-4-A-0017 x31484

Engineer:

Title: GPS Position and Time Anomalies (ORB)

Summary: At liftoff+4 seconds, the GPS receiver appeared to lose track on 3 out of 4 channels with poor tracking indicated on the 4th channel. It was observed that the GPS nav solution deviated significantly from that of the BFS throughout the liftoff through ET separation period. During this flight phase, it has been concluded that the receiver had encountered the 'runaway' anomaly previously seen during ground testing at KSC.

After ET sep the receiver was still not able to track four satellites. The deviations between the nav state of the GPS receiver and the BFS continued and increased significantly between ET sep and OMS 2. These deviations are consistent with the fact that the receiver was unable to adequately track satellites. After the OMS-2 burn the receiver was power cycled prior to bringing down the BFS. When the receiver was powered back on, a +6 hour deviation between the receiver and the GPC was noted. This anomaly was also observed during ground testing at KSC during the week of 9/8/96. The BFS was then powered down resulting in the loss of GPS downlist data. After two troubleshooting attempts, the second at approximately 262:09:55 G.m.t. (002:01:00 MET), the GPS and PGSC were properly connected and the crew reported nominal GPS receiver performance. With respect to the 'runaway' anomaly, preliminary analysis indicates that the software in the receiver most probably executed the software error previously identified by the GPS developer. The software error essentially polluted the receiver's nav solution with bad data causing the deviation in position accuracy as well as the receiver's ability to track satellites. The bias time error is still under investigation. During entry the GPS experienced the runaway anomaly again.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>	
MER - 17	MET: 008:09:16	Problem	FIAR	IFA STS-79-V-03	PRSD
EGIL-04	GMT: 268:18:11		SPR	UA	Manager: Howard
			IPR 81V-0012	PR	Wagner x39048 Engineer: Ray Gonzales

Title: PRSD H2 Tank 3 Heater B Fail Off (ORB)

Summary: At 268:18:11 G.m.t. (008:09:16 MET) the H2 tank 3 system B heater failed off. Prior to this event, the B heater had been properly cycling with the A heater. The system A heater on H2 tank 3 continues to energize nominally and can be used to deplete the tank. KSC troubleshooting has started which has verified the heater to be failed off. Troubleshooting performed on 10-07-96 found the fuse to be open. Failure analysis will be performed on the fuse. A new fuse was installed.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 4	MET: 000:16:32	Problem	FIAR	IFA STS-79-V-04
DPS-01	GMT: 261:01:27		SPR	UA
			IPR 81V-0006	PR
				Manager: Rafael Munoz x38359 Engineer: David Tee

Title: CRT 1 Poll Fail (ORB)

Summary: The crew reported a poll fail and tripped BITE flag on CRT 1. The condition occurred while entering an item 4 on spec 20. A "CRT BITE 1" fault message was also annunciated. The data indicates a memory parity error occurred. There are no user notes which explain a condition of this nature. Malfunction procedure 5.4 (I/O Error CRT) was performed and the CRT was subsequently reassigned. Following reassignment, the CRT functioned nominally. CRT 1 did not experience any other problems. DEU #1 is planned removal and replacement.

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MER - 20	MET:	Problem	FIAR	IFA STS-79-V-05
GNC-05	GMT: 270:12:04:47		SPR	UA
			IPR 81V-0017	PR
				Manager: Tim Woeste x38298 Engineer:

Title: Air Data Dilemma (ORB)

Summary: Shortly after Air Data probe deploy, about 3 seconds, RM declared an Air Data Dilemma. Crew recognized the dilemma and deselected and re-selected ADTA 1 per the crew procedures, thus resetting Rm. No further problems were noted with air data for the remainder of entry or landing.

When in PASS, the RM only uses pressure data to declare failures and dilemmas. Post flight data review shows that the right side pneumatics had a 10 to 15 second lag on the Pau pressure. The lag caused the comparison of the Pau pressures between the right side ADTAs (ADTA 2 & 4) and the left side ADTAs (ADTA 1 & 3) to differ by greater than the cross-side comparison limit in RM. All other pressure data tracked normally (Pt, Ps, Pal). The data from the past three flights, STS-71, 74, and 76, was nominal during probe deploy. The problem on STS-79 could have been cause by blockage of the port or the tube. Troubleshooting has been developed and agreed to by KSC, JSC, and RI. Troubleshooting performed on October 8, 1996 found no problems.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 22	MET:	Problem	FIAR	IFA STS-79-V-06
				SOFTWARE

GMT:

SPR

UA

Manager: M.

IPR

PR S/W DR-110271

Hammerschmidt

Engineer:

Title: Unexpected RCS Jet Firings during PTI DTO 255 (ORB)

Summary: There were unexpected yaw RCS jet firings during the Wraparound DAP part of PTI #1 (DTO 255) during STS-79 entry. The PTI maneuver is a roll doublet with the first roll pulse using the Wraparound DAP and the second roll pulse using the current baseline DAP. The Wraparound DAP I-Loads for the yaw RCS jet deadbands were set to zero on STS-79 so that a test of the core "no yaw jet" mode of the Wraparound DAP could be performed. Post flight examination of the STS-79 flight data shows that yaw RCS jets fired during the Wraparound DAP part of the PTI when there should have been absolutely no jet firings. This was discovered last Friday afternoon September 27,1996.

An Entry IET GNC Panel was held to discuss the post flight analysis of DTO 255. By the time of the meeting, the flight software community had identified the source of the unexpected RCS jet firings. During the reconfiguration process, the flight I-Loads are merged with the flight software to build an executable load for flight. The mapping of I-Load MSID's to actual locations in the flight software is defined with "PSF" cards. The PSF cards that define the "first pass" initialization values for the Wraparound DAP's yaw RCS jet deadband values were omitted from the STS-79 flight software build. Therefore, the initial values for these deadbands defaulted to the hardcoded values used during the CR development for the Wraparound DAP. DR 110271 has been opened to document this omission. STS-79 SAIL testing did not show this problem because of where the PTI started execution. There are two sets of yaw RCS jet deadbands; one set for lowq (qbar < 40 psf) and one set for highq (qbar > 40 psf). The code that reinitializes the deadband values when transitioning from lowq to highq or vice versa works properly as the PSF cards are properly defined for this piece of flight code. Therefore, once the trajectory reaches highq (qbar > 40), the yaw RCS jet deadbands are properly set to the I-load values. The window for PTI #1 on STS-79 was I-Loaded to occur between qbar = 35 and qbar = 50 which spans the lowq/highq switch point. PTI #1 on the STS-79 SAIL test executed shortly after highq was set and so worked as expected. PTI #1 on the actual flight of STS-79 executed shortly before highq was set and so did not work as expected. Re-examination of the STS-80 SAIL testing shows the same problem as seen on the STS-79 flight. On STS-80, PTI #1 executed before highq was set and so the jets fired. Rockwell-Downey wrote a SAIL IDR yesterday to document the STS-80 problem. The consensus of the Entry GNC Panel is that no software changes should be considered for STS-80. STS-80 is the only other flight for DTO 255 where we have set the yaw RCS jet deadband I-Loads to zero. The window for PTI #1 is from Mach 22 to Mach 18. The Mach 22 point is just before the switch to highq. We asked the flight directors to change the crew procedure to enable the PTI's after qbar 40 is reached. This will prevent the PTI from starting before highq switch point. The flight directors agreed that this would be a simple matter for them to handle.

Tracking No

Time

Classification

Documentation

Subsystem

MER - 14

MET: 005:09:56:03

Problem

FIAR

IFA STS-79-V-07

C&T

INCO-01

GMT: 265:18:50:52

SPR

UA

Manager: Andrew Chu

IPR 81V-0011

PR

x31445

Engineer: Marty O'Hare

Title: Ku-Band BCE Bypass - FF3/PF1 (ORB)

Summary: An unexplained Ku-Band BCE bypass occurred at 265:18:50:52 G.m.t. (005:09:56:03 MET). At the time, the Ku-Band was in standby as part of the group B powerdown. The Ku-Band system was power cycled and then an I/O reset was commanded, resulting in recovery of Ku-Band I/O to the GPC. There is no mission impact as long as I/O can be recovered. KSC plans to perform the troubleshooting plan that was developed for the OV-105 Ku-Band BCE bypass problem.

Tracking No

Time

Classification

Documentation

Subsystem

MER - 23

MET:

Problem

FIAR

IFA STS-79-V-08

DPS

DPS-03

GMT:

SPR

UA

Manager: Rafael Munoz

IPR

PR

x38359

Engineer: David Tee

Title: CRT 2 Display Shrunk Momentarily (ORB)

Summary: Post mission the crew reported that CRT 2 display shrunk twice horizontally by approximately 10 % during the mission. The crew report the occurrence happened early in the mission and then on entry near the time of probe deploy. The crew stated that the condition existed for only 2 to 3 seconds each time occurrence. No indications of any problem was seen in the downlisted data.