SSVEO IFA List **Date:02/27/2003**

STS - 61A, OV - 99, Challenger (9) **Time:04:25:PM**

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-61A-V-01	FC/PRSD
None	**GMT:** Prelaunch		**SPR** 30F004	**UA**	**Manager:**
			IPR	**PR**	
					Engineer:

Title: Fuel Cell 1 Condenser Exit Temperature Instability. (ORB)

Summary: DISCUSSION: Fuel cell 1 exhibited excessive condenser exit temperature cycling (123 deg F to 160 deg F) during prelaunch high load operation. The normal control range is 145 deg F to 160 deg F. Analysis of data indicated that excessively high gain on the coolant flow control valve would produce the observed beahivor. Small stack exit temperature changes would result in large coolant flow changes through the condenser. This would cause the condenser exit temperature to decrease rapidly, resulting in overcompensation by the condenser exit temperature control valve. This was an acceptable conditon for flight. The cycles damped during ascent and condenser exit temperature stabilized in the normal control band throughout the flight.

This was the first flight for this fuel cell since it was rebuilt and stored dry for approximately one year. Review of records showed the coolant flow control cartridge was marginally acceptable based on flow/gain characteristics during component-level bench testing. However, other valves with similar flow/gain characteristics have not shown a tendency to become unstable. Postflight ATP (acceptance test procedure) operation for this fuel cell showed behavior similar to flight performance, with a tendency toward minor cycling (3 to 4 deg F) with load changes, indicative of marginally high coolant flow control valve gain. CONCLUSION: It is highly probable that the dry storage caused a temporary change in the valve cartridge rubber boot operating characteristics which resulted in temporary valve operation in an unstable gain region. Once the boot was soaked in warm coolant, its operating characteristic returned to normal. CORRECTIVE_ACTION: The fuel cell has been removed and replaced. The thermal control valve cartridge in this fuel cell will be replaced prior to re-ATP at the vendor. Further analysis will be tracked on CAR 30F004. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Prelaunch	Problem	**FIAR**	**IFA** STS-61A-V-02	FC/PRSD
None	**GMT:** Prelaunch		**SPR** 30F005	**UA**	**Manager:**

IPR None **PR**

Engineer:

Title: Cryogenic Hydrogen Tank 1 Control Pressure (V45P2110A) Failed. (ORB)

Summary: DISCUSSION: The control pressure read off scale low just prior to lift-off. Hydrogen tank 1 and 2 are manifolded together and the control pressure in tank 2 maintained the proper tank set point pressure throughout the mission. A redundant pressure measurement in tank 1 was also available to monitor tank pressure.

During postflight troubleshooting the transducer connector was demated then remated. The measurement then began working. CONCLUSION: The pressure measurement failure was most probably the result of an improperly mated connector which opened during vibrations prior to hold down release. The cause of the improperly mated connector is unknown. CORRECTIVE_ACTION: The connector was remated and the measurement verified. Connector mating procedures are adequate. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:00:08	Problem	**FIAR**	**IFA** STS-61A-V-03	OMS/RCS
None	**GMT:** 303:17:08		**SPR** AD0419	**UA**	**Manager:**
			IPR	**PR**	
					Engineer:

Title: Right Reaction Control System Helium Regulators Failed. (ORB)

Summary: DISCUSSION: During prelaunch RCS (reaction control system) pressurization operations, the right RCS "A" leg fuel regulators experienced a failed open condition that resulted in a rupture of the downstream burst disc. Retest of both "A" and "B" legs fuel regulators verified acceptable performance, although the "A" leg regulators were sluggish.

At 303:19:00 G.m.t., after ET separation the right RCS fuel tank pressure was reading 208 psi at which time, it is believed the "A" leg regulator came open and did not close until the tank pressure read 274 psi. The drop in pressure was a result of both the leg "A" and leg "B" regulators not being able to supply the required flowrate. It was not known that the leg "B" regulator was operating at a reduced flowrate. As a result of the blown burst disc and the suspected bad regulator on leg "A", it was decided preflight to fly the mission on the leg "B" regulator. The crew closed the right RCS helium pressure "A" leg to accomplish this goal. After the right RCS helium pressure "A" leg was closed the fuel ullage pressure decayed to about 215 psia, indicating the right RCS regulator "B" leg was not providing enough flow to maintain tank pressure at 250 psia. The crew reopened the right RCS "A" leg regulator to repressurize the system. The right RCS leg "A" fuel regulator failed to close until the tank pressure reached 290 psia. Normal control band pressure is 242 to 253 psia on primary regulators. The right RCS leg "A" regulator opened and allowed the fuel tank pressure to exceed secondary regulator lockup pressure of 264 psia by about 26 psia. The RCS system was then configured to the right RCS crossfeed in order to obtain a blowdown

capability for entry. The right RCS fuel tank pressure was maintained about 247 psia while operating on vernier thrusters. This indicated that the legs "A" and "B" primary fuel regulators were providing enough flow to maintain the proper tank pressure. Normal on-orbit usage allows repressurization of the propellant tank through the pilot poppet in the regulator. Analysis indicated that even if the main poppet did not open, the pilot poppet flow would maintain propellant tank pressures above the RCS tank constraint of 190 psia during entry. An on-orbit test of the right RCS "A" leg fuel regulator was conducted to simulate the entry propellant flow rates and obtain the main poppet opening characteristics. The test was performed at 309:18:53 G.m.t. and verified the capability of the right RCS fuel regulators to support entry primary thruster flow requirements. No changes were made to the normal entry configuration. The right RCS leg "A" fuel regulators maintained an acceptable fuel tank pressure during the mission entry phase. The right RCS legs "A" and "B" fuel regulators were removed and returned to the vendor for failure analysis. The failure analysis revealed blocked sensing ports of both regulators which accounts for the observed irregular behavior. Analysis is continuing to determine the contaminant and its source. CONCLUSION: The right RCS legs "A" and "B" fuel regulators experienced off-nominal operation due to contamination which partially plugged the regulator pressure sensing ports. Both the secondary and primary sensing ports of leg "A" were clogged. Only the secondary sensing port on leg "B" was clogged. In addition, the leg "B" postflight flow data analysis indicated that the regulator did not exhibit sluggish behavior like leg "A", but was flowing at a much reduced flowrate. Leg "B" regulator never did go to the expected open position. The flowrate increased linearly with respect to a decrease in outlet pressure. This would indicate an additional failure mode which could not be found during the regulator tear-down. CORRECTIVE_ACTION: The right RCS legs "A" and "B" fuel regulators were returned to the vendor for failure analysis and the results will be tracked by CAR AD0419. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:00:05	Problem	**FIAR**	**IFA** STS-61A-V-04	APU
None	**GMT:** 303:17:05		**SPR** 26F0011	**UA**	**Manager:**
			IPR	**PR**	
					Engineer:

Title: Auxiliary Power Unit 1 Gearbox Nitrogen Pressure (V46P0151A) High. (ORB)

Summary: DISCUSSION: During ascent, APU (auxiliary power unit) 1 gearbox pressure (V46P0151A) climbed to 29 psia prior to APU shutdown (normal gearbox pressure is about 18 psia). The gearbox oil out pressure (V46P0153A) also exhibited an elevated pressure which confirmed the proper operation of the gearbox pressure transducer.

During the flight control surface checkout on orbit, and again during entry, the APU 1 gearbox exhibited an elevated pressure. Postflight, a lube oil sample was taken from APU 1 gearbox and was found to contain 2700 ppm of water. An analysis was performed that established 2000 to 3000 ppm of water in the lube oil is required to generate the APU 1 gearbox pressure profile which was observed during ascent. The analysis verified that the amount of water found in the postflight lube oil sample would cause the observed gearbox pressure profile during ascent. The APU 1 gearbox has been drained and a hot lube oil flush was performed to remove the moisture from the gearbox. A lube oil sample was taken from the gearbox after the hot oil flush. The sample analysis indicated 350 ppm of water, which is well within the specification limit of 500 ppm. A similar problem was observed during the STS 51F mission which was the previous flight of the OV-099 vehicle (reference problem closeout STS 51F-02).

Residual water probably remained in the gearbox from the STS 51F occurrence, thus causing the STS 61A gearbox pressure rise. Samples from the service cart and compressibility tool prior to the STS 61A mission were within specification. However, lube oil samples probably were not taken directly from the gearbox which would have possibly indicated excess water content, but were taken from either side of the gearbox which indicated acceptable water content. CONCLUSION: The APU 1 gearbox pressure was high due to water above specification levels being contained in the lube oil. CORRECTIVE_ACTION: 1. The APU 1 gearbox has been drained and hot flushed. Samples taken from the gearbox after the flush operation indicate 350 ppm of water which is within the specification limit of 500 ppm. 2. A change to the procedures is being negotiated to require lube oil samples being taken directly from the gearbox. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:08:04	Problem	**FIAR**	**IFA** STS-61A-V-05	APU
None	**GMT:** 305:01:04		**SPR** 30F014	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: Auxiliary Power Unit 1 Fuel Tank Isolation Valve Temperature (V46T0173A) Low On Heater A. (ORB)

Summary: DISCUSSION: The APU (auxiliary power unit) 1 fuel tank isolation valve temperature (V46T0173A) steadily decreased after ascent until the fault detection annunciation lower limit of 45 deg F was reached at 305:01:04:14 G.m.t. The crew switched to heater system "B" and the temperature recovered to about 55 deg F for the remainder of the flight.

Troubleshooting of heater system "A" found that the fuel tank isolation valve heater had become debonded. The heater system "A" has been repaired and reverified. CONCLUSION: The APU 1 fuel tank isolation valve temperature was low on heater system "A" due to a debonded heater. CORRECTIVE_ACTION: The APU 1 fuel tank isolation valve heater has been rebonded and the heater system "A" reverified. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:06:56	Problem	**FIAR**	**IFA** STS-61A-V-06	MADS
None	**GMT:** 303:23:56		**SPR** 30F008	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: The Modular Auxiliary Data System Pulse Code Modulation Master BITE Failed. (ORB)

Summary: DISCUSSION: At about 303:23:56 G.m.t., the MADS (modular auxiliary data system) PCM (pulse code modulation) master BITE (V78X9611E) failed. This same failure had occurred prior to the flight of STS 51-F. Since the failure was associated only with the BITE monitoring of the 30 milli-volt channels (only two

measurements), and since the MADS data was not affected on STS 51-F, the unit was flown with the noted condition. Postflight data review showed that the MADS data was not affected on STS 61-A and the BITE failed indication was intermittent. There was no mission impact.

From the analysis of the inflight data, it appears that the failure is within the BITE monitoring circuits. The MADS PCM will be removed and replaced when a spare unit becomes available. This problem will then be tracked in the CAR system for the results of the failure analysis. CONCLUSION: The MADS PCM master BITE intermittent failure indication was most probably caused by an intermittent failure within the BITE monitoring system. CORRECTIVE_ACTION: The MADS PCM unit will be removed and replaced when a spare unit becomes available. The anomalous unit will then be returned to the vendor for failure analysis. EFFECTS_ON_SUBSEQUENT_MISSIONS: None pending failure analysis.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 002:00:14	Problem	**FIAR**	**IFA** STS-61A-V-07	Atmospheric
None	**GMT:** 305:17:14		**SPR** 30F001	**UA**	Revitalization Subsytem
			IPR	**PR**	**Manager:**
					Engineer:

Title: Smoke Detector 3B Triggered False Alarms. (ORB)

Summary: DISCUSSION: At approximately 305:17:14 G.m.t., the crew reported that there were several audible smoke alarms, and they could not isolate the cause. The smoke concentration output of all sensors remained at the normal background level which is well below the alarm trip point. Analysis of the data indicated that there were 5 alarms caused by smoke detector B in avionics bay 3. Since the redundant avionics bay 3 smoked detector was operable, the 3B smoke detector was powered down for the remainder of the flight to prevent additional erroneous smoke alarms. There was no further mission impact.

A similar problem, which occurred on STS-3, was caused by contamination (loose gold particle) in the LSI (large scale integrated) circuit chip. This circuit monitors the smoke sensor output and triggers the alarm. Reference flight problem report STS-3-33A. CONCLUSION: The false alarms triggered by smoke detector 3B were most probably caused by LSI circuit chip contamination. CORRECTIVE_ACTION: Smoke detector 3B has been removed, replaced, and returned to the vendor for failure analysis. The results of this activity will be tracked via CAR 30F001. EFFECTS_ON_SUBSEQUENT_MISSIONS: None pending the results of failure analysis.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:14:00	Problem	**FIAR**	**IFA** STS-61A-V-08	CREW
Nonw	**GMT:** 305:07:00		**SPR** 30F002	**UA**	**Manager:**

IPR **PR**

Engineer:

Title: Sleep Station Sliding Panel Could Not Be Removed In Flight For Cabin Fan Filter Cleaning. (GFE)

Summary: DISCUSSION: On flight day 2, the crew reported that the sleep station sliding panel could not be removed for access to the filters for the cabin fans. The sliding panel had been trimmed preflight (at KSC) after it could not be removed during crew equipment interface tests. KSC was unable to reproduce the interference during postflight checks.

Crew compartment stuctural deformation on orbit probably caused the sleep station to interfere with the removal of the sliding panel. Additional clearance will be provided for inflight removal by adjusting or retrimming the sliding panel prior to the next flight of the sleep station. CONCLUSION: The sleep station sliding panel could not be removed in flight for cabin fan filter cleaning because crew compartment deformation probably caused interference within the sleep station. CORRECTIVE_ACTION: The sliding panel will be adjusted or retrimmed prior to the next flight of the sleep station to provide additional clearance for inflight removal. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 000:00:09	Problem	**FIAR**	**IFA** STS-61A-V-09	C&T - S-Band
None	**GMT:** 303:17:09		**SPR** 30F009	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: S-Band Antenna Switched Late And Reflected Power Was High Using Antenna Switch Assembly 2. (ORB)

Summary: DISCUSSION: At about 303:17:09 G.m.t., the S-Band antenna switching response to GPC (general purpose computer) commands was delayed by as much as 40 seconds and reflected power was high when using antenna switch assembly 2. This occurred when antenna electronics system 2 was being used in the GPC mode. An inflight test confirmed that the delayed response was present in the GPC mode. System 2 manual mode operation was normal.

The high reflected power observed is attributed to multiple paths produced by the delayed switching action. During postflight troubleshooting at KSC, the problem was duplicated using antenna electronics system 2. GPC command discreets and bus voltages were verified and the problem was isolated to the antenna switch assembly. The antenna switch assembly S/N 304 will be removed, replaced, and returned to the vendor for failure analysis. CONCLUSION: The cause for antenna electronics system 2 delayed response has been isolated to the antenna switch assembly. CORRECTIVE_ACTION: The antenna switch assembly S/N 304 will be removed, replaced, and returned to the vendor for failure analysis. The results of this activity will be tracked by CAR 30F009. EFFECTS_ON_SUBSEQUENT_MISSIONS: None pending the results of failure analysis.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 006:00:15	Problem	**FIAR**	**IFA** STS-61A-V-10	OMS/RCS
None	**GMT:** 309:17:15		**SPR** 30F007	**UA**	**Manager:**
			IPR None	**PR**	
					Engineer:

Title: Primary Left Reaction Control System Thruster L2L Injector Heater Failed On After RCS Hot Fire. (ORB)

Summary: DISCUSSION: After the RCS (reaction control system) hot fire at 309:17:15 G.m.t., the primary left RCS thruster L2L fuel and oxidizer valve temperatures remained above the high heater thermostat set point of 102 deg F. The temperatures continued to increase reaching a maximum of approximately 130 deg F on the fuel and 138 deg F on the oxidizer prior to entry. This temperature profile indicates a failed on heater.

The left RCS thruster L2L has been removed and the heater and controller replaced. The L2L thruster has been reinstalled into the pod. CONCLUSION: The left RCS thruster L2L heater failed on most probably as a result of a failed on heater controller. CORRECTIVE_ACTION: The replaced left RCS thruster L2L heater and controller will be reverified prior to the next flight. The left RCS thruster L2L heater and controller will be returned to the vendor for failure analysis and the results tracked by CAR 30F007. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 001:08:09	Problem	**FIAR**	**IFA** STS-61A-V-11	OI - Recorders
None	**GMT:** 305:01:09		**SPR** None	**UA**	**Manager:**
			IPR	**PR**	
					Engineer:

Title: Payload Recorder Track 5 Not Recoverable. (ORB)

Summary: DISCUSSION: On flight day 2 data from track 5 of the payload recorder could not be recovered using either forward or reverse dumps. Postflight troubleshooting after Spacelab removal was unable to repeat the problem.

The cause appears to be related to payload recorder dumps using the Spacelab high rate MUX (multiplexer). The problem can be detected by the ground and the high rate MUX dumps from Spacelab can be terminated with subsequent dumps made via S-band. Similar problems have been reported in the past during ground testing when the payload recorder was dumped using the Spacelab high rate MUX. CONCLUSION: Loss of track 5 payload recorder data occurred when the recorder was dumped using the Spacelab high rate MUX but the actual cause is unknown at this time. CORRECTIVE_ACTION: Payload recorder dumps using the Spacelab high rate MUX will be evaluated during preflight testing prior to the next Spacelab flight. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR	IFA STS-61A-V-12	MECH
None	GMT: 305:07:40		SPR 30F003	UA	Manager:
			IPR	PR	
					Engineer:

Title: Remote Manipulator System Shoulder Mechanism Deploy Indications Were Lost. (ORB)

Summary: DISCUSSION: At about 305:07:40 G.m.t., the RMS (remote manipulator system) shoulder MPM (manipulator positioning mechanism) system 1 deploy indication was lost. During RMS maneuver operations for the water nozzle survey, the MPM system 2 deploy indication was lost. Later, during the RMS cradle and latch operations, both system 1 and system 2 deploy indications were recovered. There was no mission impact.

A similar problem occurred on OV-099 during the STS 41-C mission, but could not be repeated postflight. The problem was attributed to minor deflections of the MPM induced by thermal and mechanical loads coupled with the sensitive mechanical rigging of the position-sensitive deploy microswitches. Reference Flight Problem Report STS-41C-10. The STS 61-A problem could not be duplicated postflight at KSC. The mechanical rigging for both system 1 and system 2 deploy microswitches has been readjusted. The electrical circuits to both microswitches have been reverified. All flight and ground operations to deploy and stow the MPM indicate that the system is fully operational. CONCLUSION: The RMS deploy microswitch failures were most probably caused by minor deflections within the MPM assembly. CORRECTIVE_ACTION: The mechanical rigging has been readjusted and the electrical circuits to both deploy microswitches have been reverified. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR	IFA STS-61A-V-13	STR
None	GMT: 307:20:40		SPR None	UA	Manager:
			IPR	PR	
					Engineer:

Title: Stream Of Particulate Matter Struck The Orbiter. (ORB)

Summary: DISCUSSION: At 307:20:40 G.m.t., in the southernmost part of orbit 66 at about 52 degrees south latitude (south of Kirtland Island), the crew observed a stream of fine particulate matter coming from the north and lit up by the rising sun. The Orbiter was in a gravity gradient attitude with the nose down and the right wing forward. Particles could be seen hitting the nose and ricocheting off. Conical or triangular splash marks about 1/2-inch long were peppered all over the front windows where the particles knocked loose, or cleared off, the haze coating. The splash marks on the front windows can be seen clearly in photographs taken by the crew.

Postflight inspection and sampling of the TPS (thermal protection system) and the windows found no unusual damage, pitting or foreign material. Residues were mainly silcon, calcium, aluminum, and iron. These contaminants were probably combustion products fromt he SRB separation engines and Orbiter local-surface desorption caused by SRB separation heating. Entry heating also contributed some contamination. A 65-minute supply water dump was concluded 25 minutes before the stream of fine particles was seen. Water dump particles exit the spacecraft with a definite range of velocity and direction. It is possible that the stream of fine particles observed by the crew consisted of water particles from the prior Orbiter water dump. CONCLUSION: The stream of particulate matter observed striking the Orbiter probably were water particles from a prior Orbiter water dump. CORRECTIVE_ACTION: Future water dump clouds will be observed in accordance with DTO (detailed test objective) 0330, Waste and Supply Water Dump Formation. This DTO has the final objective of defining dump attitudes and conditions that preclude recontact between the Orbiter and the dump particles. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 006:23:08	Problem	**FIAR**	**IFA** STS-61A-V-14	Water and Waste
None	**GMT:** 310:16:08		**SPR** 30F012	**UA**	Management System
			IPR None	**PR**	**Manager:**
					Engineer:

Title: Waste Collection System Fan Separator 1 Motor Current High. (ORB)

Summary: DISCUSSION: At about 310:16:08 G.m.t., during the WCS (Waste Collection System) fan separator 1 operation, normal startup A.C. currents (4.5 amperes per phase) were observed; however, the currents did not drop off to the run levels of 2 amperes per phase within the nominal 5 to 6 seconds. (This fan separator was equipped with the high torque, quiet motor which has a shorter startup time and draws higher current than the baselined motor.) The currents remained at 4.5 amperes per phase for approximately 33 seconds and then fan separator 1 was turned off. Fan separator 2 was not used since entry occurred shortly after that time. After landing, fan separator 1 was activated and operated normally.

After OV-099 was ferried to KSC, the WCS (S/N 500) was removed and sent to the subcontractor where the fan separator was activated and operated normally. The fan separator 1 was removed and is currently undergoing failure analysis. Initial inspection revealed that waste liquid had accumulated during the flight in the area around the outside of the separator bowl, possibly causing flooding. It is suspected that this liquid accumulation was caused by an imbalance of the urinal and commode air flow pressures in the separator. This imbalance could be caused by recent design modifications which included larger and more streamlined urine plumbing. Similar evidence of liquid accumulation was found with the STS 51-J WCS, the first flight with the increased urinal air flow. If the same phenomenon occurs on subsequent flights, a fan separator 2 will be used. If this fails, a procedure has been developed to clear a flooded fan separator. If this is not successful, the crew can connect the urinal via a contingency hose to the cross-tie quick disconnect and dump directly overboard. In addition, individual urine collection devices are provided that will allow urine collection for 3 mission days. CONCLUSION: NONE pending failure analysis. CORRECTIVE_ACTION: Fan separator 1 of WCS S/N 500 was removed and is

currently undergoing failure analysis. The results of this activity will be tracked via CAR AD0506. A spare fan separator was installed in its place and the WCS unit has been installed for flight STS 61-C. Fan separator design improvements are being developed under the current JSC/GE WCS enhancement contract.
EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR JSC-EE-0617F	IFA STS-61A-V-15	C&T - Audio
None	GMT:		SPR	UA	Manager:
			IPR	PR	
					Engineer:

Title: Errant Voice Operation Of Wireless Unit In The Push-To-Talk Mode And Very Lightweight Headset Side Tone Problems. (GFE)

Summary: DISCUSSION: During Spacelab on-orbit operations, the MS-1 (mission specialist 1) experienced VOX (voice-operated) operation with the WCCU (wireless crew communication unit) "C" unit while operating in the PTT (push-to-talk) mode. The MS-1 then used the Commander's WCCU unit and operation was normal. There was no further mission impact.

In addition, the crew reported that the VLWHS (very lightweight headset) being used by the MS-1 lost both side tone and volume on the day before landing. Also, the Pilot's VLWHS side tone was reduced. The problem with the WCCU could not be duplicated during postflight investigations. The "C" unit was found to be slightly noisy and there was a slight drift in operating frequency. The frequency was re-tuned, the noise problem went away, and the unit passed acceptance test. The WCCU "C" unit was placed back in service. Postflight investigation of the MS-1 VLWHS showed that the microphone was clogged with a foreign substance - possibly food particles. The activation coil of the sound diaphragm for the earphone was defective in the Pilot's VLWHS. These headsets are off-the-shelf low-cost throw-away units and will be replaced with new units. The Pilot's VLWHS will be returned to the vendor for evaluation. CONCLUSION: The cause for the WCCU "C" VOX operation in the PTT mode is unknown. The loss of side tone and volume for the MS-1 VLWHS was caused by a foreign substance clogging the microphone. The reduction in side tone on the Pilot's VLWHS was caused by a defective activation coil. CORRECTIVE_ACTION: The WCCU "C" unit was re-tuned and placed back into service. The MS-1 VLWHS and the Pilot's VLWHS will be replaced with new units. The Pilot's defective unit will be returned to the vendor for evaluation.
EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	MET:	Problem	FIAR	IFA STS-61A-V-16	D&C - Panels
None	GMT:		SPR 30F008	UA	Manager:
			IPR	PR	
					Engineer:

Title: The Right-Hand Heads Up Display Data Was Distorted At Initial Power Turn-On. (ORB)

Summary: DISCUSSION: The symbology displayed on the right-hand HUD (heads up display) during initial power turn-on at entry was distorted and erroneous. The HUD power switch was cycled and normal symbology was displayed. The HUDE (head up display electronics) BITE bit was slow (39 seconds) to indicate good at the first power up. The BITE indicated good 3 seconds after the second power turn-on.

A similarly distorted display was witnessed during the HUD development testing and the cause was a defective low voltage power supply in the HUDE. The HUDE will be removed, replaced, and returned to the vendor for failure analysis. CONCLUSION: The most probable cause for the distorted heads up display was a failed low-voltage power supply in the HUDE. CORRECTIVE_ACTION: The HUDE will be removed, replaced, and returned to the vendor for failure analysis. The results of this analysis will be tracked via CAR 30F008. EFFECTS_ON_SUBSEQUENT_MISSIONS: None pending the results of failure analysis.

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** Postlanding	Problem	**FIAR**	**IFA** STS-61A-V-17	OMS/RCS
None	**GMT:** Postlanding		**SPR** 30F011	**UA**	**Manager:**
			IPR	**PR**	
					Engineer:

Title: Right OMS Engine Had Cracks In The Light Weight Engine Bell. (ORB)

Summary: DISCUSSION: Postflight inspection of the OMS engine showed 2 longitudinal cracks about 1 1/4 inches long on the mid weld. The cracks were located at the 10:00 and 1:30 o'clock positions as viewed from the rear of the engine. This engine bell had flown on 7 flights, experienced 1 abort and 2 FRF's for a total of 10 flexure cycles.

Cracks in light weight engine bells have been occurring due to nozzle distortion during main engine ramp up. (See STS-5-23A). The thickness of the nozzle material has been increased and the resulting "heavy weight" nozzles have been installed on OV-102 and on the right hand pod of OV-104. Careful inspections are conducted after each flight to assure engine bell integrity. CONCLUSION: Engine bell cracks are expected until all nozzles are replaced with the heavy weight design. Both pods installed on OV-102 and the right hand pod installed on OV-104 have heavy weight nozzles. CORRECTIVE_ACTION: The right OMS nozzle on OV-099 will be replaced with a heavy weight design. Careful postflight inspections will continue. EFFECTS_ON_SUBSEQUENT_MISSIONS: NONE

Tracking No	Time	Classification	Documentation		Subsystem
MER - 0	**MET:** 004:18:56	Problem	**FIAR**	**IFA** STS-61A-V-18	DPS
None	**GMT:** 308:11:56		**SPR**	**UA**	**Manager:**

IPR **PR**

Engineer:

Title: Payload Signal Processor Uplink Invalid Request Indication Was Received. (ORB)

Summary: DISCUSSION: At about 308:11:56 G.m.t., a PSP (payload signal processor) uplink invalid request indication was received 2 seconds after the GSOC (German Space Operations Center) sent a POCC (Payload Operations Control Center) command to the payload. This indicated that either an invalid uplink command field was sent or an output to an interface was busy. Command history data showed that there was no apparent problem with the command. The payload officer reported that the end item responded properly to the payload throughput command. This invalid request indication caused no mission impact.

Subsequent analysis of the SM (subsystem management) software showed that once the uplink invalid request flag (V92X1124X) is turned on, it will remain on even if a subsequent valid PL (payload) data load, or PL throughput command to the Spacelab is received. A subsequent valid PL data load or PL thorughput command to Spacelab will be sent to Spacelab even though this flag is on. If the uplink-invalid-request flag is on, the Spacelab uplink-reject flags may be used to determine the status of a Spacelab uplink. The uplink-invalid-request flag may be reset by issuing a valid time execute command, PSP configuration message, PL data load, a PL throughput command to the PSP, or a standard serial interface uplink. CONCLUSION: The SM software is in violation of SS-P-0002-580F (SM Level B) Section 4.10.2.1 which states "...this indication shall be reset when a subsequent PL data uplink is successfully processed." CORRECTIVE_ACTION: The SM software discrepancy is being tracked via DR 63070. An OPS note and waiver has been issued for the SM software discrepancy effective on all Spacelab flights before STS-61M. EFFECTS_ON_SUBSEQUENT_MISSIONS: None. Workarounds are available pending resolution of the software discrepancy.