

STS-8 National Space Transportation Systems Program Mission Report

October 1983



National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

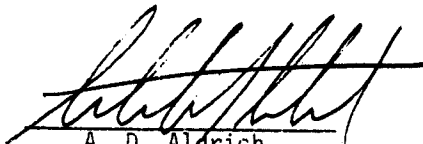
STS-8

NATIONAL SPACE TRANSPORTATION SYSTEMS PROGRAM

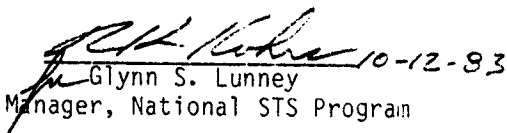
MISSION REPORT



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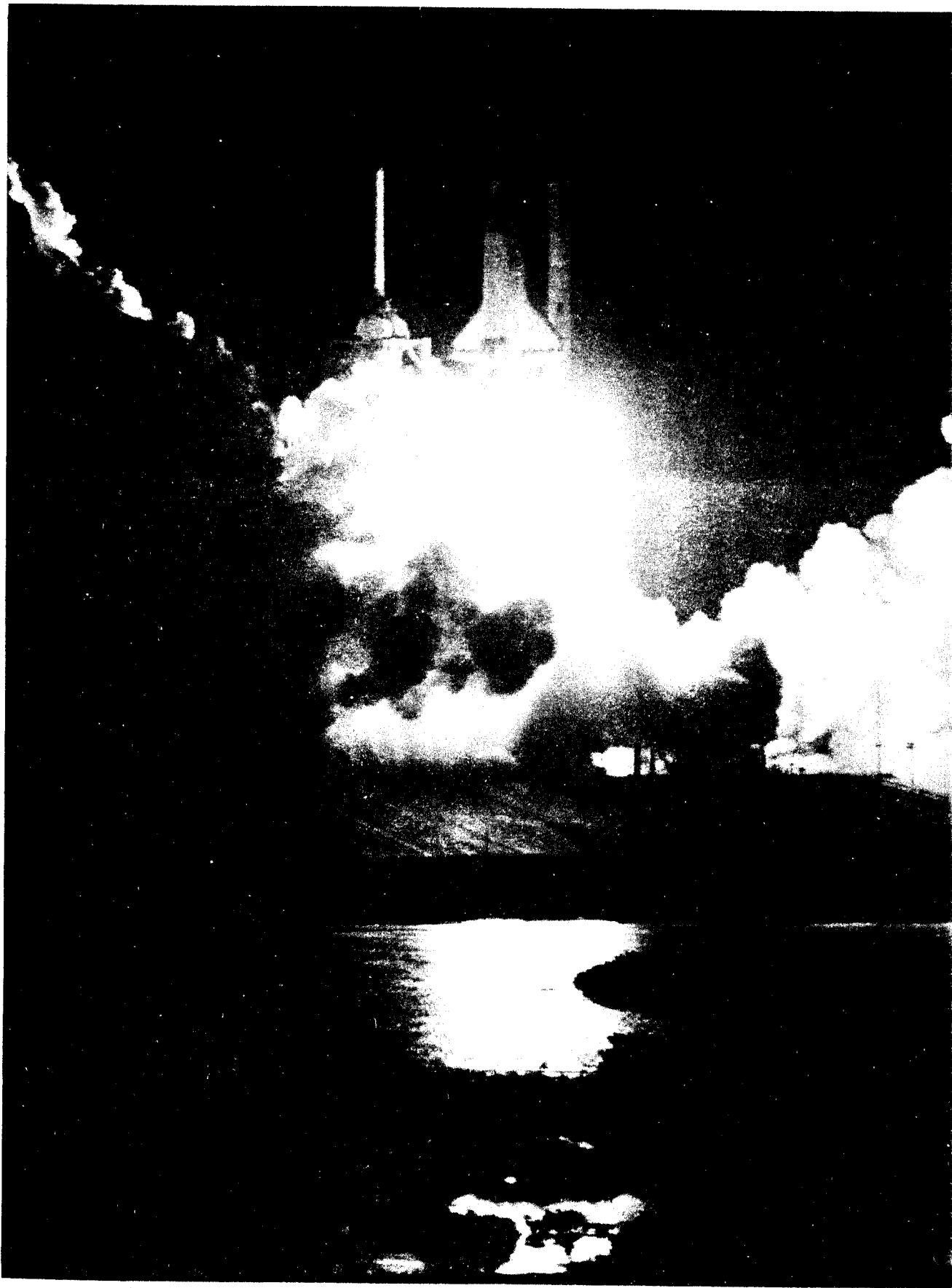
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October 1983



Night launch of STS-8.

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INTRODUCTION AND MISSION OBJECTIVES

The STS-8 National Space Transportation System Program Mission Report provides a summary of the major activities and accomplishments from this fourth operational flight, and third flight of the OV-099 vehicle, the Challenger. The vehicle has been returned to Kennedy Space Center where preparations have begun for STS-11. This report also summarizes the problems that occurred during STS-8, as well as providing a problem tracking list which is a complete list of all anomalies that occurred on STS-8. None of the problems encountered will have an effect on the STS-9 launch date.

The major objectives of this flight were to deploy the INSAT-1 satellite, perform CFES operations, exercise the RMS with heavy loads, and perform Shuttle/TDRS Ku-band tests.

The as-flown timeline for the STS-8 mission is shown in figure 1 at the back of the report. The problem tracking lists for the launch vehicle and Orbiter are contained in figure 2 at the rear of this report.

MISSION SUMMARY

The STS-8 flight was launched on August 30, 1983, at 06:32:00.009 G.m.t. (2:32:00.009 a.m., e.d.t.) at Kennedy Space Center, Florida, and landed at Edwards AFB, CA on September 6, 1983 at 12:40:42 a.m., p.d.t. STS-8 provided the first night launch and landing of the National Space Transportation System Program with the launch being delayed 17 minutes because of adverse weather (thunderstorms) in the launch area. The sequence of events for the STS-8 flight is listed in table I. The crew for this fourth operational flight was Capt. R. H. Truly, Commander; Cdr. D. C. Brandenstein, Pilot; Lt. Col. G. S. Bluford, and Lt. Cdr. D. A. Gardner, Mission Specialists; and W. E. Thornton, M.D., Medical Specialist. All 54 DTO's (detailed test objectives) and DSO's (detailed supplementary objectives) planned for the STS-8 flight were completed.

The ascent phase was normal in all respects as was the ET (external tank) separation, and the two OMS (orbital maneuvering system) maneuvers that placed the vehicle in the planned 160 nautical-mile circular orbit. The SRB's (solid rocket boosters) were recovered along with their parachutes and the ET impacted within the planned footprint.

The first day of the STS-8 mission progressed very satisfactorily with data being obtained on all planned DTO's. Experiment activities during this first day included running the first two samples on the CFES (Continuous Flow Electrophoresis System), activation of the first two samples in the incubator, and activation of the ISAL (Investigation of STS Atmospheric Luminosities) experiment.

The most significant failure of the flight occurred this first day when the no. 2 hydraulic circulation pump failed to start and exhibited an elevated temperature and an excessive current draw during start-up attempts. Adequate workarounds, as well as the higher temperatures maintained within the hydraulic systems, enabled the rest of the flight to be conducted without the no. 2 pump; consequently, its loss had no adverse effect on the mission.

Operations progressed satisfactorily during the second day with the most significant event being the on-time deployment of the INSAT-1/PAM-D satellite followed 15 minutes later by the planned OMS separation maneuver. The PAM-D and INSAT maneuvers required to place the satellite in the desired geosynchronous orbit were satisfactorily completed and satellite activation has been accomplished.

Experiment activities were as planned during the second day; however, one problem arose that required the crew to be awakened to correct. The telemetry link through the TDRS (Tracking and Data Relay Satellite) was lost for about 3 hours, resulting in the total loss of onboard telemetry data for this period. Crew voice communications were still available through other links, so one crew member was awakened to switch the data over to the S-band link.

During the third day, the crew began RMS (remote manipulator system) activities with the PFTA (payload flight test article). For the most part, all planned activities except for some of the communication link tests through the TDRS were completed. The TAGS (text and graphics system) was tested and failed after receiving five good pages during four separate transmissions. The RMS tests with the PFTA included unberthing, grapping, RMS/primary RCS (reaction control subsystem) interaction, control system evaluation, and direct drive unberthing and berthing.

The fourth day's activities were centered around the RMS and PFTA, and the TDRS S-band and Ku-band tests. The RMS/PFTA activities went well with all planned items completed, but the S-band and Ku-band/TDRS tests were not as successful. The primary problem appeared to be with the White Sands ground station software. The TDRS link was lost at least twice during the flight for extended periods of time because of White Sands ground station problems.

TABLE I.- STS-8 SEQUENCE OF EVENTS

Event	Actual G.m.t.
APU activation (1)	242:06:27:08
(2)	242:06:27:09
(3)	242:06:27:10
SRB HPU activation command (4)	242:06:31:32
MPS start command sequence (engine 3)	242:06:31:53
SRB ignition command from GPC (lift-off)	242:06:32:00.009
MPS throttledown to 69-percent thrust (engine 3)	242:06:32:24.6
MPS throttleup to 100-percent thrust (engine 3)	242:06:33:01.2
Maximum dynamic pressure	242:06:32:49.7
SRB separation command	242:06:34:05
MPS throttledown for 3g acceleration (engine 3)	242:06:39:50.3
Main engine cutoff (MECO)	242:06:40:42
External tank separation	242:06:41:00
OMS-1 ignition	242:06:42:41.9
OMS-1 cutoff	242:06:45:00.7
APU deactivation	242:06:46:14
OMS-2 ignition	242:07:16:51.7
OMS-2 cutoff	242:07:18:47.3
INSAT/PAM satellite deployment	243:07:48:54
OMS-3 ignition	243:08:03:54.2
OMS-3 cutoff	243:08:04:00.6
OMS-4 ignition	245:04:28:28.2
OMS-4 cutoff	245:04:29:05.6
OMS-5 ignition	245:05:13:24.8
OMS-5 cutoff	245:05:14:11.4
OPS-8 (flight control system) checkout	247:04:38:17
APU 1 activation	248:06:42:30
Deorbit maneuver ignition	248:06:47:30.2
Deorbit maneuver cutoff	248:06:50:01.0
APU 2 and 3 activation	248:06:57:31
Entry interface (400,000 ft)	248:07:10:24
End blackout	248:07:27:00
Terminal area energy management	248:07:34:23
Main landing gear contact	248:07:40:43
Nose landing gear contact	248:07:40:50
Wheels stop	248:07:41:33
APU deactivation completion	248:07:54:09

A cabin pressure leak was noted during this day's activities and was isolated to the waste collection system. The crew was able to manually control the cabin pressure at the desired level; consequently, this leak did not impact the overall flight accomplishments.

During the fifth day, three RMS test opportunity DTO/DSO items were completed. The RMS operated very satisfactorily again during all of its tests. Additional tests were conducted with the TDRS with acceptable results. The OPS 8 (flight control system) checkout with APU (auxiliary power unit) 1 was successfully conducted.

The final day of the on-orbit operations was spent making the final runs on some experiments, stowing for entry, and completing the remaining tests with TDRS.

Two potentially significant problems occurred during this final day. The first was the split of GPC (general purpose computer) 1 and 2 into a one-on-one configuration. A review of dumped data indicated that GPC 1 had a failure-to-sync which dropped one bit in CPU (central processing unit) register 1. Although GPC-1 was recovered for use, the computer was interchanged with GPC-4 in the redundant set configuration for entry. This placed GPC-1 in string 4, the least critical position.

The second problem that occurred involved IMU (inertial measurement unit) no. 2 and its failure to standby. The IMU was successfully realigned and incorporated back into the navigation set. The cause of this failure is being investigated.

The crew completed preparations for entry on the morning of the seventh day and performed the 139.5-second deorbit maneuver at 248:06:47:30 G.m.t. The entry was normal in all respects and all scheduled PTI (programmed test input) maneuvers were successfully performed. The Orbiter was guided to the first night landing of the National Space Transportation System Program at Edwards AFB, CA, at 248:07:40:42 G.m.t. (12:40:42 a.m., p.d.t). All systems operated properly throughout the entry, and the rollout distance was approximately 9200 ft with touchdown occurring at the 2800-foot point from the beginning of the runway.

VEHICLE ASSESSMENT

SOLID ROCKET BOOSTERS

The performance of the SRM's (solid rocket motors) was well within the specification limits. The evaluation shows that head pressures were higher than predicted by approximately 1.0 percent on the left SRM and 0.6 percent on the right SRM between 5 and 20 seconds. The propellant burn rate on both SRM's was as predicted. The action time was very close to predicted for both motors.

The deceleration subsystems on both SRB's performed satisfactorily and all parachutes were recovered. However, one of the redundant reefing line cutters from one main parachute did not function because of a lanyard failure. This did not impact the operation of the parachute. The left-hand flashing light failed prior to water impact and the right-hand light began flashing intermittently 26 hours after water impact. This did not adversely affect recovery operations.

EXTERNAL TANK

All prelaunch requirements were met. ET (external tank) separation and entry were as predicted and impact was within the footprint. Minor data variations in the ullage transducers were observed and are currently being evaluated. The TPS experienced only minor ice/frost buildup in waived areas.

MAIN PROPULSION SYSTEM

Liquid oxygen and liquid hydrogen propellant loading was completed satisfactorily. Purge requirements prior to and during loading were met. Aft compartment hazardous gas concentrations were well within limits. Prepressurization was performed as planned and prepressurization levels were reached within predicted times. Ullage pressures were maintained within the required control bands.

The engine start buildups and transitions to mainstage were normal. Engine operation and performance during mainstage appeared satisfactory. Mixture ratio and thrust values from the flight indicate repeatable engine performance. Power level throttling operation appeared normal. Engine shutdown was satisfactory with MECO occurring approximately 0.1 second earlier than predicted.

Liquid Oxygen Supply Line Failure

The postflight SSME inspection uncovered a failed liquid oxygen supply line to the ASI (augmented spark igniter) of the fuel preburner on engine 1. A 1/2-in. 300-degree section of the supply line stubout tube ruptured and/or is missing. Some bulging of the supply line above the failed section was noted. Data analysis shows the failure occurred during the engine shutdown transient. Line deformation has been noted on previous flights of existing engines.

ORBITER

The overall Orbiter systems operation was satisfactory with the system discrepancies discussed in the following paragraphs.

Hydraulic System 2 Circulation Pump Failure

At 242:09:08 G.m.t., hydraulic system no. 2 circulation pump failed to start. A second attempt to start after switching to the alternate dc bus (Main C) also resulted in a failure to start. The power to the pump was removed for the remainder of the flight and there was no effect on the mission.

Wireless Crew Communications Equipment Failures

Early in the mission, the Commander reported that he could not receive voice communications through his WCCU (wireless crew communications unit). Subsequent voice checks showed that his leg unit was transmitting okay. A failure isolation procedure showed that his wall unit "A" was not transmitting properly. Substitution of "E" wall and leg units restored communications.

Postflight, the crew reported that the "D" leg unit had loud continuous static in the walkie-talkie mode, but worked fine when hooked up to the wall unit. The "B" leg unit had static when away from the flight deck where the wall unit was located. The "E" unit was intermittent and noisy on the middeck. The "C" unit had no problem and the crew used 2 WCCU's in the walkie-talkie mode, one on the flight deck and the other on the middeck for the latter part of the flight.

Starboard Payload Bay Door Open A Status

At 242:08:00 G.m.t., approximately 2 minutes after the automatic payload door open sequence was initiated, the starboard payload bay door motor-1 door-open discrete indicated open while other instrumentation showed that the motor control relay was still powering the motor and driving the torque limiter. The motor control relay remained energized until the relay-open command was turned off at the completion of the payload bay door automatic open sequence. The starboard payload bay door opening was nominal in all respects. The door opening time verified two-motor nominal operation. The motor-1 open status indication was intermittent and reading low during the remainder of the mission. Both motors 1 and 2 open status are required to be high to satisfy the automatic door close sequence. Therefore, the payload bay doors were manually closed by the crew during entry preparations.

Manipulator Positioning Mechanism Indicated Improper Forward Deployment Position

At 242:13:16 G.m.t., one of two MPM (manipulator positioning mechanism) forward deploy indications (V54X0812E) continued to indicate "stowed" when the MPM was deployed. On flight day 4, however, the indication was normal during MPM deployment. There was no effect on the mission.

APU 2 Seal Cavity Drain Leak

At about 242:08:00 G.m.t., the APU 2 pump drain line pressure had dropped to 1 psia over a 24-hour period. This problem had been experienced on previous missions and, since the lower pressure still provided a positive pressure on the gearbox, there was no concern that fuel would leak into the gearbox. APU 2 performance was nominal for the remainder of the mission.

External Tank Liquid Hydrogen Gaseous Nitrogen Pressurization System Sensor Failures

During ascent between 223 seconds and 421 seconds elapsed time, the ET liquid hydrogen pressure sensor no. 1 (T41P1700C) indicated a constant pressure of 32.7 psia. Pressure sensor no. 3 (T41P1702C) indicated a constant pressure of 32.8 psia while pressure sensor no. 2 (T41P1701C) indicated pressure that ramped from 32.4 to 32.8 psia.

Overall ET ullage pressure, however, was maintained within the required control band (32 to 34 psia), and MPS performance was not affected.

Lower Right S-Band Quad Antenna Beam Selection Miscompare

At about 242:17:54 G.m.t., a lower-right S-band quad antenna position miscompare alarm occurred on system 2 when the GPC selected the aft beam mode. Additionally, telemetry indicated no aft/forward selection. After switching to system 1 electronics, the miscompare was still present and since S-band communications were maintained, the antenna beam position talkback was determined to be intermittent. The alarm was inhibited and the system 1 and system 2 beam switching performance was normal for the remainder of the mission.

Hydraulic System 1 Accumulator Pressure Drop

Approximately 30 hours into the mission, hydraulic system no. 1 accumulator pressure dropped below the FDA (fault detection and annunciator) limit of 1930 psia. The accumulator pressure was recharged twice using the circulation pump. Following the second recharge, the accumulator pressure remained in the normal range for the remainder of the flight.

Smoke Detector B in Avionics Bay 1 Tripped

The smoke detector B in avionics bay 1 intermittently caused smoke alarms, the first of which occurred at 243:13:57 G.m.t. The redundant smoke detector A in avionics bay 1 did not indicate that smoke was present. All nine smoke detectors in the crew compartment tested good, however, the circuit breaker to the avionics bay 1 B detector was opened to prevent erroneous smoke alarms. There was no further impact on the mission.

CCTV Camera Failures

Camera "C" on several occasions did not respond to any commands after power up, however, recycling the power to the camera regained command capability. A similar problem was experienced with this camera during preflight checkout. The crew also reported that the zoom control was not consistent and that camera "C" appeared to be out of focus.

Camera "D"s video failed and troubleshooting procedures also failed to revive it. The RMS elbow camera lens assembly apparently had a loose component in the field of view. A metal circular ring or wire could be seen floating around behind the lens.

Text and Graphics System Failed

At approximately 245:00:52 G.m.t., the text and graphics system (TAGS) successfully received and reproduced five sheets, then stopped producing image data. An inflight test indicated that the developer was operative, but image data could not be produced. The unit was turned off and, since the teleprinter was available, there was no mission impact.

Ku-Band Antenna Failed to Respond to Commands

At 245:18:30 G.m.t., the Ku-band antenna did not respond to search and designate commands and the actual designated roll/pitch angles were widely separated. About 1 1/2 hours later, the anomalous condition cleared and the antenna operated normally for the rest of the mission.

Water Spray Boiler Lubrication Oil Overcool

Shortly after MECO (at 242:06:45 G.m.t.), WSB's (water spray boilers) 2 and 3 experienced a momentary "overcool". The temperature drop on WSB 3 was more pronounced than that on WSB 2. The lubrication oil temperatures of both units recovered to normal, but the unit 3 recovery was slower than unit 2. The lubrication oil control loop temperatures remained in the normal range for the remainder of the mission. Postflight inspection revealed that the WSB 3 orifice was missing and the orifices on WSB's 1 and 2 were loose.

RCS Thruster Deselection

At about 246:07:01 G.m.t., the RCS thruster L3D fuel injector temperature dropped below the RM (redundancy management) deselection temperature of 20° F and the thruster was deselected for the remainder of the flight.

At about 248:04:02 G.m.t., RCS thruster F3D oxidizer injector temperature dropped below 30° F and was deselected for the remainder of the flight.

Loss of these thrusters posed no problems for the mission.

WCS Leakage

Throughout the STS-8 flight, a higher than normal collector pressure was observed in the waste collection system when the system was vented to the vacuum of space. This corresponded to a cabin leak rate which varied from 1 to 2 lb/hr. The crew performed inflight troubleshooting which consisted of cycling the slider valve and cleaning the gate valve without success. At approximately 246:17:00 G.m.t., the crew initiated a procedure to close the vacuum vent valve during sleep periods and thereby minimize the leak and preserve consumables. The WCS leakage had no effect on the mission except for an increase in manual cabin repressurizations.

Supply Water Dump

At 243:14:56 G.m.t., the crew initiated a water dump, but the dump did not occur. The procedure used for performing the water dump and the corresponding valve configurations were verified as correct. One hour later, the water dump valve was recycled and the water dump began. Subsequent water dumps during the remainder of the mission were successful.

General Purpose Computers 1 and 2 Redundant Set Split

At approximately 247:08:00 G.m.t., GPC's (general purpose computers) 1 and 2 had a redundant set fail-to-sync; however, both GPC's stayed in the common set. A subsequent IPL (initial program load) for GPC 1 was successful and both computers operated in the redundant set for the remaining on-orbit operations.

String assignments were interchanged between GPC 1 and GPC 4 for entry and all computers operated normally through landing.

IMU 2 Failed Into Standby

At approximately 248:00:51 G.m.t., IMU 2 failed to the standby mode of operation. This function is not automatically sequence controlled. The crew reported that no actions related to IMU's had been taken to cause this anomaly. IMU 2 was reactivated, realigned, and reselected for redundant set operations and operated normally for the remainder of the mission.

Brakes

Orbiter braking was normal and the stopping distance was as expected. During brake disassembly, two retainer washer halves were found. The right outboard brake was found with 3 cracked retainer washers and one washer on the right inboard was also cracked.

Nose Gear Deployment Assist Thruster

The nose gear thruster piston was found on the runway approach approximately 7700 feet before the touchdown point. The piston had been sheared circumferentially from the actuator assembly. The nose gear deployed properly and no damage to the Orbiter occurred when the piston fell from the nose wheel well.

The Aft Motor Control Assembly No. 2 Relay Operation Status 2 Was Erroneous

Prelaunch data indicated erroneous status of AMCA (aft motor control assembly) no. 2 status bit 2. At 247:22:28 G.m.t. the status bit was again observed to be set erroneously, again with no detectable improper equipment operation. About 8 hours later, the indication returned to normal and remained proper for the rest of the flight. There was no mission impact, and the AMCA 2 will be investigated for potential cause. Troubleshooting at KSC could not reproduce the problem.

Right Aft ET Attach Bolt Hole Plugger

During postflight inspection, it was found that the right aft ET attach bolt hole plugger was jammed partially open by part of a frangible nut and a firing line connector. The purpose of the hole plugger is to minimize loss of debris through the aft attach bolt hole at ET separation. The probability of debris jamming the ET doors is remote with the hole pluggers reducing this probability even further. However, they are not a guarantee against the loss of debris. The ET door mechanisms are designed to be jam resistant and the doors can be recycled, if necessary, during the closing sequence. The ET door mechanisms operation was nominal for the STS-8 mission.

Thermal Protection System Assessment

The postlaunch debris walkdown found no Orbiter tile or tile pieces. The only identifiable debris was one Orbiter gap filler, one felt plug, and two scrap pieces of felt.

On orbit, the television camera on the RMS was used to perform a tile inspection and to view several tile test panels. The scans showed no significant damage and the tile test panels were unchanged.

Overall the TPS (thermal protection system) looked better after STS-8 than any previous flight. The launch impact damage to the lower surface was significantly less than any previous flights and no lower-surface tile will require replacement because of impact damage. However, four tiles on the OMS pod forward section, two tiles on the upper body flap and 1 tile on the right-hand aft RCS base region will be replaced because of impact damage. Very minor tile slumping occurred on three tiles behind the nose cap. The four AFRSI (advanced felt reusable surface insulation) test samples sustained no visual degradation. The fabric insulation around main engine 3 was breached with a tear about 3 feet in length, very similar to the occurrence on main engine 1 and 2 on STS-7. Instances of slight overtemperatures of AFRSI occurred along some locations on the left-hand OMS pod. The lower row of tiles on the inboard side of the outboard elevon slumped further (initially slumped on STS-7) and were breached in two locations on the left side. The left elevon was significantly worse than the right elevon, apparently because of several gap fillers dislodging which aggravated the heating. Tile slumping occurred on the leading edge lower access panel between panels 6 and 7. The AFRSI repairs on the outboard lower section of both aft RCS pods were degraded slightly. The nose cap and wing leading edge carbon panels did not have any visual degradation.

Object Observed on Video Following Payload Deployment

Approximately 19.5 seconds after deployment of the INSAT-1B satellite on STS-8, an object entered the field of view of the Orbiter payload bay television camera "D". This object appeared to have left the vicinity of the Orbiter payload bay and, either came in very close proximity to, or contacted the INSAT satellite and subsequently exited the television camera field of view. Since the INSAT satellite later experienced some problems in deploying its solar panels, this occurrence of a possible contact was considered to be a potential cause. As a result, a formal review board was convened with instructions to thoroughly investigate this occurrence and document the findings of the investigation board in a formal report. This report is JSC 19322, and entitled "STS-8 INSAT Incident Report."

Cabin Debris

The crew reported floating dust, debris, and various items during the early phase of the mission, and the amount of debris slowly built in magnitude during the flight. The various filters were cleaned on schedule. The cabin fan filters were cleaned three times with a blue-gray material being captured around the outside of the filters each time. The filters still had sufficient filtration capability. The night before entry, the debris in the cabin atmosphere became uncomfortable, particularly when the clothes bags were brought out and the resulting stowage activity for entry stirred up the dust. The dust was clinging to the CRT faces and panels which were wiped down before entry.

Odor from LIOH Cartridges

During prelaunch activities and the mission, the crew reported eye and throat irritation each time the LIOH canisters were changed. The canisters were changed on schedule with irritation occurring each time a change was made. Prelaunch, during canister change out on the middecks, the irritation was also observed on the flight deck. The irritant was not visible, but was assumed to be dust. The effect of the irritation was hacking and coughing. The crew used some quarantine masks that were on board, and wore them during cartridge change out and this resulted in the irritation being reduced. The masks were used each time a filter was changed for the remainder of the flight with no ill effects.

REMOTE MANIPULATOR SYSTEM OPERATIONS

RMS (remote manipulator system) testing during STS-8 was accomplished under DTO 503, "PDRS (payload deployment and retrieval system) Payload Handling Performance". The purpose of this DTO was to evaluate hardware-software and man-machine interface characteristics, confirm loaded RMS performance envelopes, verify ground-based simulations, and evaluate visual cues needed for payload handling. The DTO was accomplished satisfactorily using the PFTA as the test payload. The PFTA was designed by JSC (Johnson Space Center) for the specific purpose of verifying RMS performance when handling large payloads.

On-orbit testing was conducted on three separate days. Both of the PFTA grapple fixtures were used. Test conducted were as follows:

- a. Deployment and berthing demonstrations using RMS manually augmented and single-joint (direct) drive modes. These tests were accomplished using both direct and CCTV viewing with and without references to the RMS digital displays.
- b. Demonstration of the RMS auto mode; loaded and unloaded.
- c. RMS vibration damping tests with a large space structure
- d. Evaluation of the RMS control system performance was performed through a series of 26 separate tests with each grapple fixture. These tests were conducted to support math model validation of the various RMS simulators.
- e. Payload positioning sensitivity tests.

All of the tests were satisfactorily completed. The crew indicated that the RMS performed very smoothly and responded as expected to the various control inputs.

PAYLOADS AND EXPERIMENTS

The STS-8 payloads consisted of the INSAT-1B/PAM-D satellite; the PFTA; the DFI (development flight instrumentation) pallet containing the Heat Pipe Experiment, the EOIM (evaluation of oxygen interaction with materials), and two DFI boxes containing postal covers; the CFES; ISAL (investigation of STS atmospheric luminosity); Incubator; RME (radiation monitoring equipment); twelve GAS (getaway special) canisters; and one student experiment. The following paragraphs summarize the satisfactory payload results from this mission.

INSAT/PAM-D Satellite

The INSAT-1B/PAM-D satellite was successfully deployed at the first planned opportunity at 243:07:48:54 G.m.t., within one second of the planned time.

The Orbiter altitude at deployment was within 1 nmi. of the planned 160 nmi. requirement, and the Orbiter attitude errors were less than 0.1 degree in each axis with respect to the planned inertial deployment attitude. The Orbiter vehicle rates at deployment were negligible.

The INSAT-1B/PAM-D firing was successfully initiated 45 minutes after deployment from the Orbiter. The INSAT-1B spacecraft signal was acquired by the Master Control Facility, Hassan, India, at the expected time. Ground commands were executed that separated the spacecraft from the depleted PAM stage and configured the spacecraft for transfer orbit operations. The spacecraft was placed in geosynchronous orbit by three apogee motor firings. The solar array, solar sail, and C-band/S-band antenna were deployed, the communications payload was activated, and checkout is now underway.

STS-8 Heat Pipe Experiment

The high capacity heat pipe experiment (DSO 0101) was successfully conducted early on the second flight day of STS-8. The heat-pipe startup transient took approximately 15 minutes, followed by stable operating temperatures that varied slowly in response to changes in the external orbital environment. The crew reported no problems in observing and recording the color changes in the liquid crystal temperature sensitive tape.

Prints of the 36 photos taken during the 2 1/2 hours of experiment operation have been evaluated, but because of a malfunction of the 35mm camera film advance, only 20 frames provide usable information. This represents approximately the first 1 1/2 hours of experiment observation. Transcripts of real-time crew observations will be used to supplement the photographic data.

Preliminary evaluation of results indicate that the steady-state performance of the heat pipe (documented only by crew observation) was slightly better than predictions.

Oxygen Interaction with Materials

An EOIM experiment was conducted to evaluate the low-earth-orbit exposure effects on materials. Such effects had been seen on earlier Shuttle missions and are presumably due to atomic oxygen which is the major constituent of the earth's atmosphere at low earth orbital altitudes. The experiment consisted of two parts: exposure of materials on two trays mounted on the DFI pallet and materials exposed on the top of one of the DFI canisters; and glow photography of strips of material mounted on the RMS. These samples were exposed during three exposure periods totaling 40 hours at the 120-nmi. orbital altitude. The glow photography was also taken at this altitude. In summary, the EOIM experiment and associated glow measurements were completed as planned. The experiments have been removed from the vehicle and a preliminary examination of the specimens was accomplished.

Continuous Flow Electrophoresis System

The fourth shuttle flight for the CFES was unique because it was the first CFES flight that carried living cells for electrophoretic separation.

All of the planned six CFES samples were separated inflight with no observable operational problems. Postflight analysis, however, showed a larger residual of cells remaining inside the spent CFES sample syringes than was originally anticipated. This manifests itself in smaller sample volumes and yields of cells to be used for scientific research. This is not considered a problem with the operation of the CFES, but may be a shortcoming of the design of the CFES equipment to handle and separate living cell samples.

From the scientific standpoint, all six samples are being evaluated by the principal investigators. The preliminary results indicated viability and that yields from all of the cells were approximately as predicted preflight. Histological testing is still being conducted on the separated cell fractions and it will require a longer period of time before specific scientific conclusions can be made on the separated cells.

Investigation of STS Atmospheric Luminosities

The ISAL experiment documented and gained additional scientific insight into the luminosity of the glow enveloping certain parts of the Orbiter. The experiment consisted of three parts:

- a. Observe and document spectral content of the glow on the Orbiter tail section;
- b. Measure the glow intensity during vernier thruster firing; and
- c. Determine the effect of glow phenomena from various tape materials mounted on the RMS.

The results of the ISAL activities are:

- a. At the 160 nmi. altitude, no data were collected because of a camera-pointing problem; and
- b. At the 120 nmi. altitude, all three parts of the experiment were accomplished and scientific evidence of the glow phenomena was recorded. The glow phenomena was observed with the naked eye for the first time at the 120 nmi. altitude.

Incubator-Cell Attachment Test

The ICAT (Incubator-Cell Attachment Test) was conducted without any problems. Preliminary data indicate that some degree of cell attachment does occur within minutes after mixing the microcarrier beads with the free cells. A significant degree of cell attachment and flattening on the beads had occurred by 3 hours after mixing (sample no. 2). Thereafter, cells had begun to spread and cover one-third to one-half of many of the beads by 14 hours after mixing. By 26 hours (sample no. 4), many beads were found with greater than one-half of their surface area covered by cells. Thus, the significant cell attachment appears to occur in the first 14 hours with normal spreading and growth thereafter. This was a significant improvement over the STS-7 cell attachment results carried out at ambient cabin temperature (approximately 24° C). On STS-7, most cells had not flattened out even by 33 hours at approximately 24° C as compared to 3 hours on STS-8 at 37° C.

A detailed analysis is underway to photograph the cells, and measure frequency distributions for free cells and attached cells during each sample time.

Micro-photographs will be taken of selected fields from each of four samples prepared from each culture. Some samples have already been taken to the ETH Institute in Zurich for electron microscopy of the cells on the beads.

Radiation Monitoring Equipment

During this flight, all scheduled activities of the RME (radiation monitoring equipment) were successfully completed. Three additional data runs were also completed which provide useful data to better define the radiation environment through which the Orbiter passed. Of special interest is the significantly higher gamma ray activity recorded each time the Orbiter approached the South Atlantic Anomaly. (Readings on the HRM-III jumped from a typical reading of 30 counts/sec to a high of 262 counts/sec upon deepest penetration into the region over the South Atlantic Anomaly). One HRM-III instrument anomaly occurred when no data were obtained on data take 4. After recycling the unit, it functioned properly, and the unit's battery was then changed for subsequent data takes.

Get Away Special Canisters

Twelve (12) GAS (get away special) canisters were flown, four of which contained active experiments that operated satisfactorily in flight. The remaining eight canisters contained postal covers.

The crystal growth of artificial snow (G-475) experiment successfully produced artificial snow in the zero-g environment. Video tape of the growth process was obtained.

The cosmic ray upset experiment (G-346) data were recorded and detailed analysis of the data are underway.

The ultraviolet sensitive film contamination payload (G-347) operated properly. The ultraviolet film is being analyzed for contamination effects.

The atomic oxygen erosion effects (G-348) used temperature-controlled quartz microbalances to measure mass losses or increases of carbon and osmium as a function of mission exposure time. Excellent data were acquired on the time variant atomic oxygen erosion.

Postal Covers

All postal covers stowed in the DFI boxes and the GAS canisters were removed and turned over to the U.S. Postal Service for postflight cancellation, distribution, and sales.

Student Experiment

The student experiment, biofeedback, was successfully conducted by mission specialist Dr. Thornton. Two separate sessions were completed during which the crewman's skin temperature, skin conductance, and electromyography (EMG) parameters were recorded. Preliminary postflight analysis has indicated that the three parameters were consistent with preflight training.

TRACKING AND DATA RELAY SATELLITE SYSTEM OPERATIONS

The TDRSS (Tracking and Data Relay Satellite System), although not officially operational, did support the STS-8 flight in a test mode. The TDRSS was scheduled to support 89 events/passes during the mission. The TDRSS, for various reasons, was unable to support 24 of these scheduled events. Of the remaining 65 events that were supported, 25 of these events were considered partially successful and 40 totally successful. A partial successful event was defined as one where the total pass may not have been supported or only one service (S-band or Ku-band) was successfully supported.

The most significant problems experienced during the mission were WSGT (White Sands Ground Terminal) computer instability and TDRSS/Orbiter S-band forward link lock.

Fourteen computer failures were experienced at WSGT. Computer recovery time in most cases resulted in the loss of the current or upcoming event/pass. The TDRSS/Orbiter S-band link was found to be highly dependent on antenna look angles. Marginal performance was encountered when look angles were off the nose and tail regions, as expected. However, there were a few occasions of good look angles in which TDRSS was able to maintain return link telemetry data (both low rate and high rate), but forward link lock could not be maintained.

TDRSS support of Orbiter Ku-band was excellent. There were a couple of minor ground configuration problems uncovered that have since been corrected.

DTO/DSO STATUS

The STS-8 flight crew were able to complete 54 of 54 of the DTO's and DSO's assigned to the flight. The crew indicated that there were no problems with the execution, data recording, or retrieval that will adversely affect achieving the end results.

In addition to the DTO's and DSO's assigned, the crew was able to perform two additional tests for DTO 0773, an item from the shopping list. This DTO involved two star tracker sunlit earth horizon limit tests which were successfully accomplished. Also, another test that concerned the ability of the star tracker to acquire a rendezvous target was accomplished. This test had not been formalized as a DTO because it was proposed so near to the date of the launch.

Table II lists the DTO's/DSO's that were planned for STS-8 and completed. Additional tests discussed previously are not reflected in the table.

TABLE II.- STS-8 DTO/DSO ACCOMPLISHMENTS

DTO no.	Title	Status
0114	OV-099 Cold canopy test	
0116	Crew module thermal evaluation	yes
0117	Middeck locker temperature survey	yes ^a
0204	Entry aerodynamic test no. 4	yes
0219	ET and SRB ascent performance	yes
0301	Ascent structure capability evaluation	yes ^a
0303	TPS entry heating evaluation	yes ^a
0305	Ascent compartment venting evaluation	yes ^a
0306	Entry compartment venting evaluation	yes ^a
0307	Entry structural capability	yes ^a
0311	POGO stability performance	yes ^a
0313	SRB recovery	yes ^a
0320	Elevon trailing edge heating evaluation	yes
0321	Crew compartment structure deflection investigation	yes ^a
0503	PDRS payload handling performance	yes
0602	Cabin atmosphere verification	yes
0702	S-band/TDRS communication link performance test no. 2	yes
0704	TDRSS navigation test	yes ^b
0710	Ku-band communications link performance test no. 2	yes ^b
0712	Ku-band communications and tracking performance	yes ^b
0717	Orbiter S-band and Ku-band/TDRSS operations proficiency test no. 2	yes ^b
0724	Ku-band side lobe detection	yes
0762	Orbiter-RMS dynamic interaction test	yes ^b
0771	On-board TACAN navigation	yes
DSO no.	Title	Status
0101	Heat pipe evaluation	
0301	Evaluation of oxygen interaction with materials	yes
0401	Validation of predictive tests and countermeasure for Space Motion Sickness	yes
0402	Cardiovascular deconditioning countermeasure assessment	yes
0403	Head and eye motion monitoring during ascent and entry	yes
0404	on-orbit head and eye tracking tasks	yes
0405	Acceleration detection sensitivity	yes
0406	Kinesthetic ability	yes
0407	Photographic documentation of body fluid shifts	yes
0408	Near vision acuity	yes
0409	Microbiology screening test	yes
0410	Audiometry	yes
0411	Simple mass measurement	yes
0412	Treadmill operation	yes
0414	Ophthalmoscopy	yes
0415	Tissue pressure - tonometer	yes
0416	Ambulatory monitoring with and without skeletal loading and other maneuvers	yes
0417	Inflight countermeasures for space adaptation syndrome with objective measurements	yes
0418	Eye-hand coordination	yes

^aData only DTO

^bTests were formatted in 19 test cases for execution

TABLE II.- STS-8 DTO/DSO ACCOMPLISHMENTS (Concluded)

DSO no.	Title	Status
0421	Verification of the middeck animal enclosure module	
0422	Anatomical observations	yes
0423	Study of inflight fluid changes	yes
0424	Evoked potentials demonstration	yes
0425	Intraocular pressure	yes
0427	Soft contact lens application test	yes
0432	Engineering test of carry-on incubator	yes
0433	Pre and postflight parallel swing tests	yes
0901	Documentary television	yes
0902	Documentary motion picture photography	yes
0903	Documentary still photography	yes

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/DOY	BETA MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE
24218132Z 2408	00012108/ 00110000	24212132Z 2408	242 GMT 36.8		AUGUST 20, 1993	SIS-8	RS FLOWM	9/21/83
FO 101								
MET 1800 17								
CDR	SLEEP	POST SLEEP RCT						
PLT	SLEEP	POST SLEEP RCT						
MS1	SLEEP	POST SLEEP RCT						
MS2	SLEEP	POST SLEEP RCT						
ORBIT								
CSTOR								
COVERAGE								
TORS								
TV								
DEORB								
MDR								
ATTITUDE								
NOTES:	<p> 0 D58 432 CARRY-ON INCUBATOR 0 D50 0408 NEAR VISION ACUITY 0 FC PURGE MTR ON 0 70MM/81 PAM DEPLT 0 MANUAL 0 16MM/81 PAM DEPLT 0 T-POP (NOSE FND) 0 D50 0408 NEAR VISION ACUITY 0 TV/82 INSRT DEPLY 0 TV/82 INSRT DEPLY 0 FC PURGE MTR OFF 0 TV/82 INSRT DEPLY 0 START TRACKING (MIL) 0 END TRACKING (MDR) </p>							

Figure 1.- Continued.

GMT (D:H:M)	MET (D:H:M)	CDT (D:H:M)	FD/DOY	BETR	MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. ORTE
20318132 / 244186132	081112100 / 002100100	243113132 / 24418132	02 / 243 GMT	37.8		AUGUST 31, 1983	STS-8	AS FLOWN	9/21/83
GMT 1243	FD 102	MET 1081							
CDR		SLEEP				POST SLEEP RCT		EXERCISE	EXERCISE
PLT		SLEEP				POST SLEEP RCT		POST SLEEP RCT	EXERCISE
MS1		SLEEP				POST SLEEP RCT		POST SLEEP RCT	EXERCISE
MS2		SLEEP				POST SLEEP RCT		POST SLEEP RCT	EXERCISE
DAY/NIGHT									
ORBIT									
ESTION									
COVERAGE									
YORS E									
TV									
DEORB									
MOR									
ATTITUDE									
NOTES:									

Figure 1.- Continued.

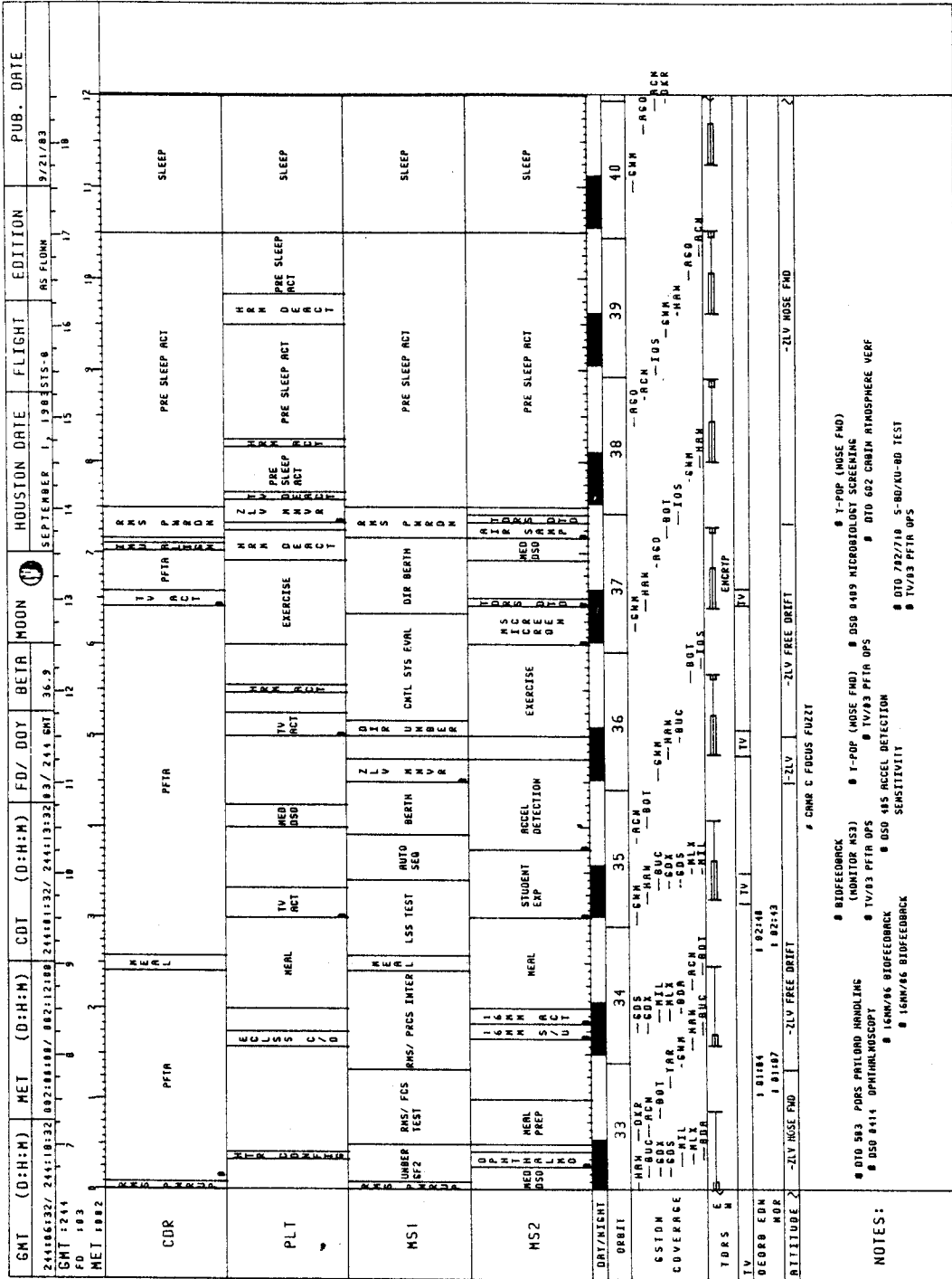


Figure 1.- Continued.

9/21/83 STS-8

GMT (D:H:M)	MET (D:H:M)	EOT (D:H:M)	FD/DOY	BETA	MOON	HOUSTON DATE			FLIGHT	EDITION	PUB. DATE
						1	2	3			
24410132 / 245106132	00212100 / 003100100	24413132 / 24510132	03 / 244 GM	36.6		SEPTEMBER 1, 1983	1	AS FLOHM		9/21/83	
GMT 1244	FD 109	MET 0002									
CDR	SLEEP										
PLT	SLEEP										
MS1	SLEEP										
MS2	SLEEP										
DAY/NIGHT											
ORBIT											
ESTIM COVERAGE											
TORS											
TV											
DEORB EDM											
MOR											
ALTITUDE											
NOTES:	0 FILTER CLEANING 0 TV/RS ANIML ENL 0 16M/05 EXERCISE 0 16M/05 EXERCISE 0 D10 710 KU-80 COMH LINK 0 D10 710 KU-80/10R										

Figure 1.- Continued.

GMI (D:H:M)	MEI (D:H:M)	CDI (D:H:M)	FD/DOY	BEIR MOON	HOUSTON DATE	FLIGHT	EDITION	PUB. DATE	
246:18:32 / 246:18:32	084:12:08 / 084:12:08	246:01:32 / 246:01:32	05 / 246 GMI	34.5	SEPTEMBER 3, 1963	SIS-8	AS FLOWM	9/21/83	
GMT 1246									
FD 186									
MET 1804									
CDR	TV PRESS S ACT/CONF	MEAL P R R P	SHOPPING LIST & RETESIS	TV ACT M R R R	PRE SLEEP ACT ACT	PRE SLEEP/TAIL SLOM	PRE SLEEP ACT	SLEEP	
PLT	TV PRESS S ACT/CONF	MEAL U P P		TV ACT M R R R	PRE SLEEP ACT ACT	PRE SLEEP ACT	PRE SLEEP ACT	SLEEP	
MS1	TV PRESS S ACT/CONF	MEAL P R R P	DIR BERTH	TV ACT M R R R	PRE SLEEP ACT ACT	PRE SLEEP ACT	PRE SLEEP ACT	SLEEP	
MS2	TV PRESS S ACT/CONF	MEAL U P P	STUDENT EXP	TV ACT M R R R	PRE SLEEP ACT ACT	PRE SLEEP ACT	PRE SLEEP ACT	SLEEP	
ORBIT	65	66	67	68	69	70	71	72	73
TV	TV	TV	TV	TV	TV	TV	TV	TV	TV
DEORB EDM	1 00:55	TV	TV	TV	TV	TV	TV	TV	TV
ADR	1 00:56	TV	TV	TV	TV	TV	TV	TV	TV
ATTITUDE	KU-80	XLV PLBD MOUTH	-ZLV HOSE FWD						
	# F30 OXID LK	# L30 FUEL LK	# LOOSE OBJECT IN ELDM CAMERA						
NOTES:									

Figure 1.- Continued.

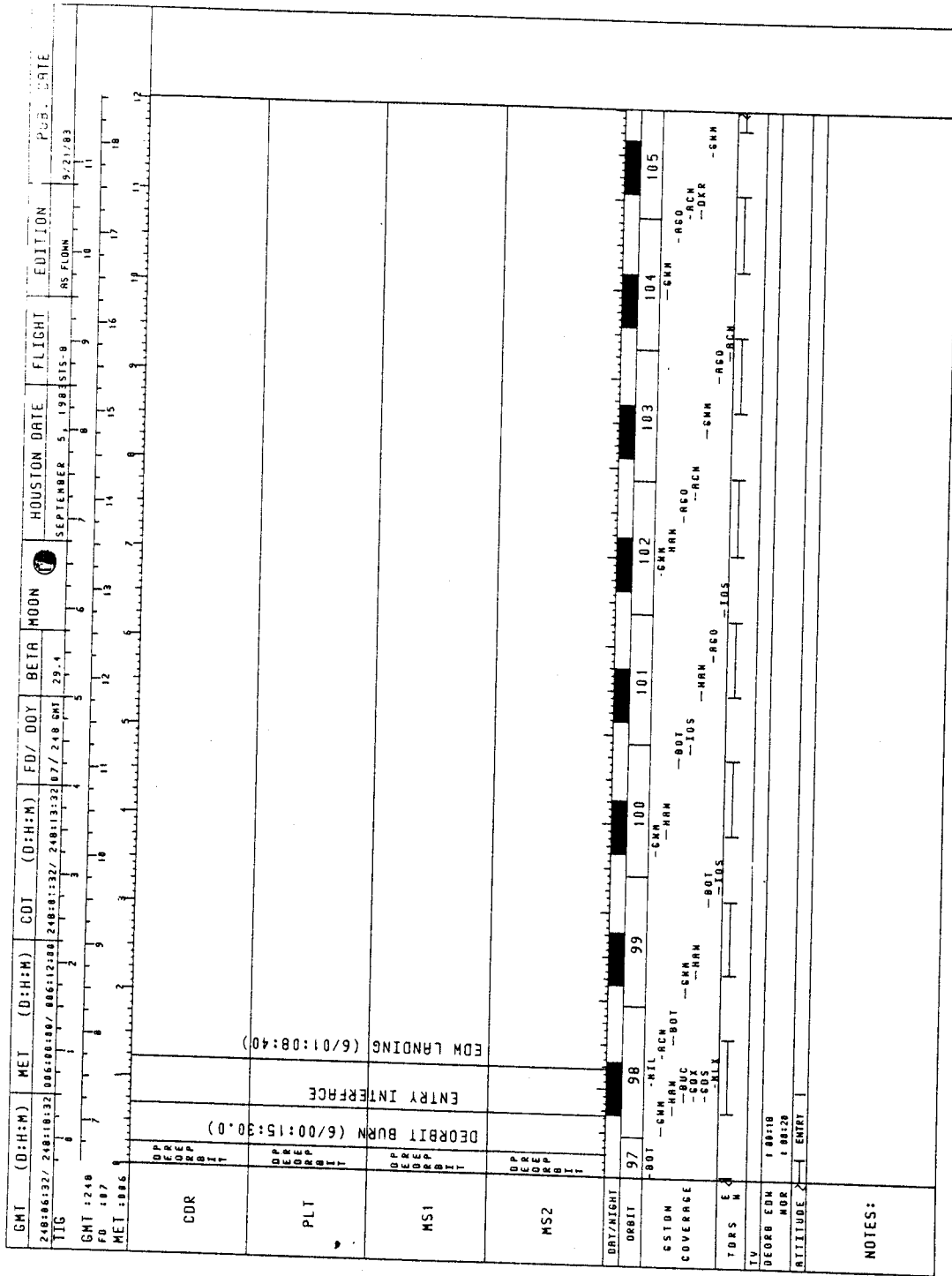


Figure 1.- Concluded.

JSC OV-029 STS-8 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. NGR.
1.	HYD CIRC PUMP 2 FAILED TO START.	242:09:08	HIGH CURRENT DRAW (27-105 AMPS) APPARENTLY HEATED UP THE FLUID (85 DEG F TO 231 DEG F) AND A PRESSURE INCREASE WAS NOTED IN RESERVOIR AND ACCUMULATOR IN SYSTEM 2. PROBABLE CIRC PUMP ELECTRONICS FAILURE. R & R.	L. JENKINS CAR 08F003 CLOSED 09/28/83
2.	WCCU WALL UNIT A FAILED AND UNITS B, D AND E WERE ROISY.	242:12:25	CREW SWITCHED FROM "A" UNIT TO "E" UNIT AND STOWED FAILED UNIT. REMOVED ALL UNITS AT EAFB. SQUELCH FAILED ON "A" WALL UNIT.	R. ARMSTRONG CLOSURE IN PROCESS
3.	STARBOARD PAYLOAD BAY DOOR OPEN A INDICATION LATE.	242:03:00	DOOR OPEN A INDICATION OCCURRED APPROXIMATELY 1 MINUTE AFTER DOOR OPEN B INDICATION. OPEN A INTERMITTENT. SUSPECT K54 INHIBIT CIRCUIT IN MID/MCA 1. K5C REPEATED PROBLEM. FAILED LIMIT SWITCH WITHIN ROTARY ACTUATOR. R&R.	R. BALCIUNAS R. HENDRIX CLOSURE IN PROCESS CAR 08F018
4.	RMS HPY DEPLOY SWITCH A ID NOT INDICATE DEPLOY.	242:13:16	FORWARD PEDESTAL SYSTEM 1 DEPLOY MICROSWITCH FAILED. ADJUST SWITCH MECHANICAL ACTUATION MECHANISM. RERIC PER SPEC. CAR 08F017.	R. WEST CLOSED 09/28/83
5.	APU 2 SEAL CAVITY DRAIN LEAK.	242:08:00	NO FLIGHT IMPACT; PROBLEM EXPERIENCED ON PREVIOUS FLIGHTS. STANDARD K5C PROCEDURE.	R. LANCE CLOSED 09/28/83

Figure 2.- STS-8 Orbiter problem tracking list.

JSC OV-099 STS-9 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
6.	OPERATIONAL INSTRUMENTATION FAILURES:			CLOSURE IN PROCESS
A.	SSME 2 GH2 PRESSURIZATION OUTLET PRESSURE SENSOR (V41P1260A) FAILED.	242:06:38	SENSOR DROPPED OUT OFF SCALE HIGH AT T+403 SECONDS. ALSO OCCURRED ON STS-1, 2, 6, AND 7. MOVED FOR STS-3 AND SUBS. R&R AT KSC.	P. COTA M. BUCHANAN CAR 08F002
B.	R OMS POD FUEL TANK TEMPERATURE (V43T5315A) ERRATIC.	242:06:33	READING JUMPED FROM NORMAL 80 DEG F TO AS LOW AS 25 DEG F THEN BACK TO NORMAL. SAME PROBLEM ON STS-7. FLY AS IS UNTIL POD IS REMOVED. USE RIGHT RCS TEMPERATURES AS BACKUP.	C. HUMPHRIES
C.	SSME 2 LH2 INLET PRESSURE (V41P1209C) FAILED.	242:06:38:51	SENSOR FAILED OFF SCALE HIGH ABOUT T+495 SECONDS. OPERATING NORMALLY AT KSC, CONTINUE TROUBLESHOOTING. MDR.	P. COTA S. BAIRD CAR 08F010
D.	SSME 1 MFV DOWNSTREAM TEMPERATURE 2 (E41T1154A) FAILED.	242:06:37:53	SENSOR FAILED OFF SCALE HIGH ABOUT T+353 SECONDS. MDR. R&R AFTER ENGINE R&R.	P. COTA F. ROTRAMEL
E.	APU 3 GEARBOX LUBE OIL OUT TEMPERATURE (V46T0354A) BIASED.	ASCENT & ENTRY	LACED LUBE OIL RETURN TEMP (V46T0350A). SAME PROBLEM ON STS-6 AND 7. R&R SENSOR.	R. LANCE CAR 08F014
F.	ET ULLAGE PRESSURES LH2 1 (T41P1700C) AND 3 (T41P1702C) INDICATED CONSTANT PRESSURE AND LOX 3 (T41P1752C) READ LOW.	LIFT OFF 242:06:32	LH2 HELD AT 32.7 (#1) AND 32.3 (#2) FROM T+223 SECONDS TO ABOVE T+423 WHILE #3 (T41P1701C) VARIED BETWEEN 32.4 AND 32.85 PSIA. LOX #3 READ ABOUT 0.5 PSIA LOW. REMOVE AND REPLACE ALL 6 SIGNAL CONDITIONERS AS PLANNED. CHECK RESISTANCE.	D. PREVETT F. ROTRAMEL CAR 08F015
7.	ANTENNA MISCOMPARE FOR LOWER RT S-BAND QUAD AFT BEAM.	242:17:54	ALARM INHIBITED. MISCOMPARE BETWEEN GPC COMMAND AND LOWER RT S-BAND QUAD ANTENNA AFT BEAM DISCRETE (V74X7097E). R&R 4 QUADS AT KSC. INSTALL MODIFIED QUADS AS PLANNED WHEN AVAILABLE.	D. EGGERS CLOSURE IN PROCESS CAR 08F007

Figure 2.- Continued.

JSC OV-099 STS-8 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
8.	HYD SYS 1 ACCUMULATOR PRESSURE DROP.	243:12:11	ACCUMULATOR PRESS DROPPED TO 1700 PSIA. CDR STARTED PUMP. RAN FOR 1 MINUTE. PRESS RECOVERED TO 2230 PSI. SAR. PROBABLE CONTAMINATION IN UNLOADER VALVE. RECYCLE VALVE BEFORE STS-11.	D. HAINES CLOSURE IN PROCESS
9.	SMOKE DETECTOR B AV BAY 1 TRIPPED.	243:13:57	DETECTOR TRIPPED SEVERAL TIMES. ALL NINE SENSORS TESTED GOOD. CREW PULLED CB TO SENSORS AV BAY 1B AND 3A. REMOVE AND REPLACE AT KSC.	H. ROTTER CLOSURE IN PROCESS CAR 03F001
10.	PAYLOAD BAY TV CAMERA D LOST VIDEO AND CAMERA C FOCUS WAS FUZZY..	244:03:42	IN FLIGHT TROUBLESHOOTING NO JOY. REMOVE AND REPLACE AT KSC.	B. EMBREY CLOSURE IN PROCESS
11.	TAGS DID NOT REPRODUCE IMAGE DATA.	245:00:52	UPLINK SIGNALS WENT THROUGH BUT PRODUCED ONLY BLANK PAGES. INTEGRATED CIRCUIT FAILED IN VIDEO PROCESSOR. REMOVED AND RETURNED TO VENDOR.	R. RICHARDS CLOSURE IN PROCESS FIAR EE 0569F
12.	RVIS ELBOW TV CAMERA LENS HAD LOOSE PIECE FLOATING.	244:14:45	CONTINUED TO USE CAMERA FOR FLIGHT. REMOVE AND REPLACE AT KSC.	B. EMBREY CLOSURE IN PROCESS
13.	KU BAND ANTENNA DID NOT MOVE TO COMMANDED POSITION.	245:18:30	SYSTEM LOCKED AGAINST A STOP IN THE ALPHA AXIS RAISING TEMP 32 DEG F OVER 20 MINUTES. SYSTEM CLEARED ITSELF AND OPERATED NORMALLY. REMOVE AND REPLACE AT KSC AS PLANNED. ANOMALY NOT REPEATABLE.	R. FENNER CLOSURE IN PROCESS CAR 08F008
14.	WSB'S 2 AND 3 EXHIBITED ABNORMAL TEMP DROP 3 MINUTES AFTER MECO.	242:06:43	TEMPERATURE DROPPED ABOUT 50 DEG F. STARTED CORRECTING BEFORE SHUTDOWN ABOUT 242:06:46:30. #3 ORIFICE MISSING POSTFLIGHT AND OTHER TWO LOOSE. POSSIBLE IMPROPER TORQUE. REMOVE AND REPLACE CONTROLLER 3A.	D. HAINES CLOSURE IN PROCESS CAR 03F----

Figure 2.- Continued.

JSC OV-099 STS-8 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
15.	RCS JETS L3D FUEL AND F3D OX VALVE LEAKAGE.	246:06:48(L) 246:07:10(F)	L3D DESELECTED AT 246:07:01:03. F3D DESELECTED AT 248:04:02:41. L3D TEMP RECOVERED. R&R AT KSC REPLACE WITH OV-104 JETS.	C. HOHMAN CLOSED 09/28/83 CAR 08F004(L) CAR 08F005(F)
16.	WCS LEAKED CABIN AIR AND SLINGER LABORED.	244:13:56 & FLIGHT DAY 5	1 TO 2 LB/HR CABIN AIR LEAK. CREW REPORTED THAT SLINGER MOTOR BEGAN TO LABOR LAST 24 TO 36 HOURS. LEAK VERIFIED POSTFLIGHT. R&R AT KSC. COMMODE OUTLET VACUUM VALVE FAILED.	E. WINKLER CLOSURE IN PROCESS CAR 08F006
17.	WSB 1 GN2 PRESSURE REGULATOR RELIEF VALVE LEAK.	242:21:00	SYS 1 GN2 REC OUTLET PRESS (V59PO104) DECREASED 4 PSI IN 100 HOURS AFTER N2 ISO VALVE CLOSED. SAR. RECYCLE DURING COUNTDOWN. FLY AS IS. SAR.	D. HAINES CLOSED 09/28/83
18.	SUPPLY WATER DUMP DID NOT OCCUR.	243:16:35	SUPPLY TANK B WATER DID NOT DUMP WITH ALL DUMP VALVES OPEN. SUCCESSFUL DUMP DONE 1 HOUR LATER. NO ACTION AT KSC. JSC ANALYSIS.	E. WINKLER CLOSED 09/28/83
19.	GPC 1 & 2 FAIL-TO-SYNC.	247:08:00	GPC 1 ALTERED BIT IN CPU REGISTER-ONE CAUSED GPC 1 & 2 TO SPLIT. REMOVED AND REPLACED CPU AND IOP AT KSC.	P. SOLLOCK CLOSURE IN PROCESS CAR 08F009
20.	IMU 2 DOWNMODED FROM OPERATE TO STANDBY.	248:00:51:01	REALIGNED. RESELECTED AT 248:01:40:45. COULD NOT REPEAT AT FSC. FLY AS IS.	S. BACHMAN CLOSURE IN PROCESS
21.	OPS 2 RECORDER DATA OUTPUT DURING REWIND.	ON ORBIT	SAME PROBLEM AS ON OPS 1 LAST MISSION. NO IMPACT ON RECORDER OPERATIONS. R&R AT KSC WHEN REPLACEMENTS ARE AVAILABLE AFTER STS-11.	J. MELUCIN CLOSURE IN PROCESS
22.	BRAKE ON RIGHT MAIN GEAR LOST 2 WASHER HALVES.	POST FLIGHT DISASSEMBLY	FOUND 2 WASHER HALVES WHEN BRAKES WERE DISASSEMBLED FOR SHIPMENT. FOUND 3 CRACKED RETAINER WASHERS ON RIGHT OUTBOARD BRAKE AND 1 CRACKED ON RIGHT INBOARD. NEW BRAKES INSTALLED. FLY AS IS.	C. CAMPBELL CLOSURE IN PROCESS CAR 08F011

Figure 2.- Continued.

JSC OV-099 STS-8 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
23.	NOSE STRUT THRUSTER PISTON FOUND ON RUNWAY.	POST FLIGHT INSPECTION	FOUND 7700 FEET BEFORE TOUCHDOWN ABOUT WHERE IT STROKED. EO MOD FOR STS-9 AND SUBS WITH DOUBLE SPRING.	T. GRAVES CLOSURE IN PROCESS FIAR EE 0055F
24.	POTABLE WATER DUMP LINE PRIMARY SYSTEM B THERMOSTAT (V62T0418) FAILED.	246:09	THERMOSTAT OPERATED IN OVERTEMP RANGE SAME AS ON STS-6 AND 7. CHECKOUT AT KSC VERIFIED BOTH B THERMOSTATS WORKING IN OVERTEMP RANGE. FLY AS IS.	G. WINKLER T. TAYLOR CLOSURE IN PROCESS
25.	MCA STATUS WORD INDICATED RELAY OUT OF POSITION.	PRELAUNCH & ON ORBIT	ISOLATED TO MCA 2. CLEARED BEFORE LAUNCH. REPEATED ABOUT FLIGHT DAY 6. R&R AT KSC.	R. HENDRIX CLOSURE IN PROCESS CAR AC6694F
26.	RIGHT FT ATTACH BOLT HOLE PLUGGER COCKED.	POST FLIGHT INSPECTION	HUNG UP IN BOLT CAVITY BY PART OF FRANGABLE NUT AND A PYRO CONNECTOR WIRE. NORMAL OPERATION MINIMIZES DEBRIS. FLY AS IS.	W. ROGERS CLOSURE IN PROCESS
27.	TPS DAMAGE.	IN FLIGHT	TILE DAMAGE ON OYS PODS AND BOTTOM FROM DEBRIS DURING ASCENT. AFRSI ON OHS PODS DAMAGED. SOME 3 HEAT SHIELD SEAL BREACHED. MELTING ON LEFT OB ELEVON LS TILES. FLOW THRU 2 PANELS WING LE CLOSEOUT TILES. NOSE LANDING GEAR THERMAL BARRIER BREACHED. FWD ROW OF TLE DAMAGED ON UPPER SURFACE OF BOTH OUTBOARD ELEVONS.	J. SMITH CLOSURE IN PROCESS
28.	DEBRIS OUT OF PAYLOAD BAY IMMEDIATELY FOLLOWING PAYLOAD DEPLOYMENT.	243:07	DEBRIS 12 IN. LONG WAS DEFLECTED BY SPACECRAFT. KSC PAYLOAD BAY INSPECTION FOUND NOTHING MISSING.	J. LOWE CLOSURE IN PROCESS
29.	CABIN DEBRIS.	IN FLIGHT	CREW REPORTED CABIN FAN FILTERS DID NOT REMOVE DEBRIS. DUST AND DEBRIS ON CRT'S AND ON LRU FILTERS. POSTFLIGHT DEBRIS NO WORSE THAN PRIOR FLIGHTS. IMPROVED CLEANING PROCEDURES AT KSC. MOD FAN FILTER FOR STS-12 AND SUBS.	J. WHALEN CLOSURE IN PROCESS

Figure 2.- Continued.

JSC OV-099 STS-8 PROBLEM TRACKING LIST

OCTOBER 05, 1983

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
30.	ODOR FROM LIQH CARTRIDGES.	PREFLIGHT & ON ORBIT	NEW CARTRIDGES HAD A PUNGENT, ACIDIC ODOR, AS REPORTED PREFLIGHT. FOUND LIQH DUST. VACUUM CARTRIDGES FOR STS-9.	J. WHALEN CLOSURE IN PROCESS CAR 08F016
31.	NTU ACCUNLATOR BITE INDICATIONS.	LIFT OFF 242:06:32:00	SAME PROBLEM AS ON STS-7. STARTED AT T-0 DUE TO NET RESET COMBAND WHEN PCM-MU REQUEST TIME COINCIDED WITH ROLLOVER OF NTU ACCUMULATORS.	D. CREE CLOSURE IN PROCESS
32.	WINDOW 4, RIGHT FRONT, PITTED.	INFLIGHT	PROBABLE METEOROID PIT ABOUT 0.007 INCH DEEP. LOCATED MIDWAY FROM TOP AND 5 INCHES FROM CENTER POST.	O. FIGG D. CURRY
33.	BARREL NUTS LOOSE ON MIDFUSELAGE FRAMES IN PAYLOAD BAY.	INFLIGHT	POSTFLIGHT INSPECTION FOUND FIVE LOOSE BARREL NUTS FROM KEEL BRIDGE FITTING ATTACHMENT LOCATIONS UNDER PAYLOAD BAY LINER. NUTS ARE HELD IN PLACE BY SPRING CLIPS.	A. LEVINE

PREPARED BY: /s/RJW
ROBERT J. WARD

10/05/83
DATE

APPROVED BY: /s/JEN
JOSEPH E. MECHELAY

10/05/83
DATE

Figure 2.- Continued.

MSFC STS-8 ANOMALY LIST

DATE: SEPTEMBER 21, 1983

NO.	TITLE	TIME, G.M.T	COMMENTS	RESP. MGR.
1.	ME-1 HPFTP TURBINE DISCHARGE TEMPERATURE DECAY	242:06:33	THE ME-1 HPFTP TURBINE DISCHARGE TEMPERATURE (CHANNEL B) DECAYED TO 1280 DEG R THEN RECOVERED AT T + 200 SECONDS. THE DATA SIGNATURE IS COMPATIBLE WITH A SENSOR PROBLEM. POST FLIGHT CHECKOUT SHOWS THE SENSOR TO HAVE A LOW INTERNAL RESISTANCE. THE SENSOR WILL BE REPLACED FOR THE NEXT FLIGHT. THE SENSOR WILL CONTINUE TO BE TESTED AT ROCKEYDYNE.	SSME R. BLEDSOE EE21
2.	ME-1 MEV SKIN TEMPERATURE MEASUREMENT FAILURE	242:06:37	THE ME-1 NUMBER 2 SKIN TEMPERATURE MEASUREMENT FAILED AT T + 355 SECONDS. POST FLIGHT TESTS ON SENSOR SHOW THAT THERE IS AN OPEN CIRCUIT AS INDICATED BY A MEGGER CHECK AND THE FAILURE WAS NOT DUE TO DEBONDING.	SSME R. BLEDSOE EE21
3.	ME-1 ASI LINE FAILURE	242:06:40	A COMBUSTION "POP" OCCURRED AT SHUTDOWN ON ME-1 (ENGINE 2017) IN THE LO2 ASI LINE OF THE FUEL PREBURNER. POST FLIGHT INSPECTIONS SHOW THE ASI LINE TO BE RUPTURED. AN INVESTIGATION IS UNDER WAY.	SSME E. JACOBS EE21
4.	HOLDDOWN POST BLAST CONTAINER SPLICE PLATE BOLTS EJECTED	242:06:32	THREE HOLDDOWN POST BLAST CONTAINERS ON THE LH SRB HAD SPLICE PLATE BOLTS THAT WERE EJECTED BUT RETAINED BY LOCKWIRE DURING THE HOLDDOWN NUT DETONATION. ONE BLAST CONTAINER ON THE RH SRB HAD FOUR BOLTS MISSING FROM THE SPLICE PLATE AND TWO BOLTS WERE EJECTED BUT RETAINED BY THE LOCKWIRE. ADDITIONAL LOCKWIRING IS BEING PROPOSED FOR STS-9.	SRB O. HARRISON EP15
5.	MAIN PARACHUTE REEFING LINE CUTTER FAILURE	242:06:39	ONE OF THE REDUNDANT REEFING LINE CUTTERS DID NOT FIRE ON THE LH SRB. POST FLIGHT INSPECTIONS SHOW THAT THE LANYARD WAS BROKEN AND THE PULL RING WAS BENT INDICATING A GREATER THAN 90 DEG PULL ANGLE. STATISTICAL ANALYSES SHOW THAT A LOW PROBABILITY EXISTS OF BOTH CUTTERS ON THE	SRB R. RUNKLE EP14

Figure 2.- Continued

MSFC STS-8 ANOMALY LIST

DATE: SEPTEMBER 21, 1983

NO.	TITLE	TIME, G.M.T	COMMENTS	RESP. MGR.
			SAME LINE FAILING AND THAT A MINIMUM DAMAGE WOULD OCCUR TO AN SRB WITH MULTIPLE FAILURES OF THIS TYPE.	CLOSED FOR STS-9
6.	FAILURE TO REMOVE RECOVERY AND DFI POWER AT IMPACT	242:06:40	POST FLIGHT INSPECTIONS REVEAL THAT THE RH SRB RECOVERY AND DFI POWER WAS NOT TURNED OFF AT WATER IMPACT. RECORDER DATA INDICATES THAT THERE WAS A MOMENTARY CLOSURE OF THE WATER IMPACT SWITCH. THE FORWARD IEA HAS BEEN RETURNED TO BENDIX FOR EVALUATION.	SRB J. ROUNTREE EE11
7.	ABNORMAL EROSION PATTERN OF NOZZLE NOSE RINGS	POST FLIGHT INSPECTION	POST FLIGHT INSPECTION REVEALED THAT THE LH SRB NOZZLE EXPERIENCED LARGER AREAS OF EROSION IN THE ABLATIVE LINER THAN HAD BEEN EXPERIENCED ON PREVIOUS FLIGHTS AND GROUND TEST MOTORS. THE RH SRB NOZZLE HAD ONE AREA OF OFF-NOMINAL EROSION WHICH WAS SIMILAR TO EROSION EXPERIENCED ON STATIC TEST MOTORS. THE NOZZLES HAVE BEEN RETURNED TO THIOKOL FOR EVALUATION.	SRB K. COATES EE11

Figure 2.- Concluded.