

# **STS 51-I National Space Transportation System Mission Report**

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**October 1985**



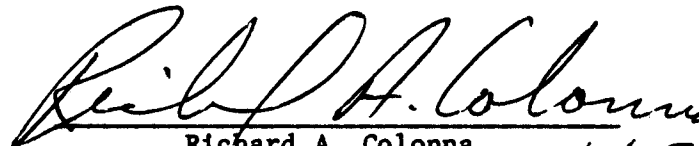
**National Aeronautics and  
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**Lyndon B. Johnson Space Center  
Houston, Texas**

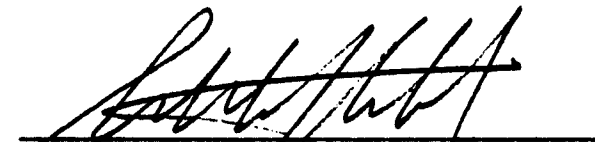
STS 51-I  
NATIONAL SPACE TRANSPORTATION SYSTEM  
MISSION REPORT



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## INTRODUCTION AND MISSION OBJECTIVES

The STS 51-I National STS (Space Transportation System) Mission Report contains a summary of the major activities and accomplishments of the twentieth Space Shuttle mission and the sixth flight of the OV-103 vehicle, Discovery.

The primary objectives of the STS 51-I flight were to successfully deploy the SYCOM IV-4/Unique, AUSSAT-1/PAM-D (Payload Assist Module-Delta Class) and ASC-1 (American Satellite Company)/PAM-D satellites, and perform the planned SYCOM IV-3 repair activities. The sequence of events for this mission is shown in Table I. The Orbiter problem tracking list is presented in Table II.

The crew for this twentieth mission of the Space Shuttle was Joe H. Engle, Col., U.S. Air Force, Commander; Richard O. Covey, Lt. Col., U.S. Air Force, Pilot; James D. A. van Hoften, Ph.D., John M. Lounge, and William F. Fisher, M. D., Mission Specialists.

## MISSION SUMMARY

The launch of the STS 51-I mission was initially scheduled for August 24, 1985. However, the launch was scrubbed because thunderstorms had formed and moved into the KSC (Kennedy Space Center) launch area. These storms subsequently resulted in over 1 inch of rain at the launch pad and several lightning strikes near the pad. The launch was rescheduled for August 25, 1985.

During the second launch attempt, at 237:11:06 G.m.t. (August 25, 1985), a GPC (general purpose computer) 5 bite fault occurred. GPC 5 contained the BFS (backup flight system) software. The BFS was reinitialized after the fault; however, 11 minutes later, the bite fault recurred. As a result, the launch was again scrubbed and rescheduled for August 27, 1985, to allow time to remove and replaced GPC 5.

The STS 51-I flight was launched on August 27, 1985, at 239:10:58:01 G.m.t. (5:58:01 a.m., c.d.t.) from launch complex 39A at KSC. The launch phase was normal in all respects and the vehicle was inserted into an 189- by 190-nmi. orbit at the conclusion of the OMS (orbital maneuvering system) - 2 maneuver. No OMS-1 maneuver was required, since a direct insertion ascent trajectory was flown.

The post-insertion activities were being accomplished satisfactorily until the AUSSAT sunshield port clamshell binding occurred and the clamshell could not be fully opened. The RMS was subsequently used to open the clamshell; however, it was necessary to reschedule the AUSSAT deployment from day 2 to day 1 during the descending node of orbit 5. This action also caused the rescheduling of the ASC deployment from the descending node of orbit 7 to the descending node of orbit 8.

The AUSSAT was deployed at 6:35:14 MET (mission elapsed time) and the ASC-1 was deployed at 11:09:33 MET. The PVTOS (Physical Vapor Transport of Organic Solids) experiment was operated during the sleep cycle.

The second day's activities included performance of run 3 and 4 of the PVTOS experiment, checkout of the LEASAT salvage electronic package, and charging of the RPU (remote power unit) batteries to be used in the repair operations.

The third day's activities were performed as planned with the SYNCOM IV satellite being deployed on time at 241:10:48:55 G.m.t. Orbiter attitudes and rates at deployment were essentially zero, and all SYNCOM operations following deployment were nominal. The PVTOS experiment failed to operate in the primary mode. Troubleshooting corrected the problem and all of the remaining samples were processed in the primary mode during the remainder of the flight. Other activities included the first two rendezvous maneuvers.

Day 4 activities included the third and fourth rendezvous maneuvers. The three EMU's (extravehicular mobility units) were successfully checked out and battery charging was completed. The EMU cryogenic oxygen pressures were increased 50 psia (850 to 900) to lengthen the possible duration of an EVA (extravehicular activity) by about 28 minutes.

The SYNCOM rendezvous was completed, and a 7-hour 10-minute EVA (extravehicular activity), the longest of the Shuttle Program, was conducted during the fifth day. Activities completed during the EVA included installation of the shorting plugs, safe-and-arm pins, and the SBU (Spun Bypass Unit). Also, the despun test access panel was removed, the remote power unit harness was mated, and the omni antenna was deployed. The final item to be completed during this first EVA was installation of the RPU cover plate. The EVA lasted about 45 minutes longer than planned and a second EVA was required to complete the satellite rescue task. All Orbiter subsystems continued to operate satisfactorily.

The sixth day was primarily devoted to performing the second EVA, which was about 4 hours 20 minutes in duration. During this successful EVA, the old PKM (perigee kick motor) cover was removed and the new cover installed, the safe-and-arming pins were removed, and the SBU timers were set. This successfully completed the work with the satellite, and the grapple bar was removed and the spin-up bar was installed. The satellite was oriented for spin up, the handling bar was removed, and the spin-up was accomplished resulting in a spin-rate of 2.7 rpm. The satellite was activated by ground command and good telemetry data were received.

The activities of the seventh day of the mission included repressurization of the cabin to 14.7 psia, RCS (reaction control system) hot-fire test, and flight control system checkout using APU (auxiliary power unit) 1. Also completed was a waste water dump and the cabin equipment stowage in preparation for entry.

After completing the final entry preparations early on the eighth day, the 249-second deorbit maneuver was performed. Entry was normal in all respects. All of the planned PTI's (programmed test inputs) were accomplished, and this completed the accomplishment of this DTO (detailed test objective) for the Shuttle Program. A 185-degree HAC (heading alignment circle) maneuver was performed and the Orbiter landed at 246:13:15:43 G.m.t., on runway 23 at Edwards AFB, CA. Rollout required 6100 feet and was completed 47 seconds after landing. The postlanding inspection of the Orbiter showed the TPS (thermal protection system) and brakes to be in good shape.

All Orbiter DTO's assigned to STS 51-I were accomplished either completely or to a very high degree, with the exception of DTO 0325. This DTO (waste and supply water dumps) was cancelled because of the failure of the RMS primary mode of operation.

TABLE I. - STS 51-I SEQUENCE OF EVENTS

<u>Event</u>	<u>Actual time, G.m.t.</u>
APU activation (1)	239:10:53:10
(2)	239:10:53:11
(3)	239:10:53:12
SRB HPU activation command	239:10:57:33.5
MPS start command sequence (engine 3)	239:10:57:54.4
SRB ignition command from GPC (lift-off)	239:10:58:01
MPS throttle down to 70-percent thrust (engine 3)	239:10:58:26.3
MPS throttle down to 67-percent thrust (engine 3)	239:10:58:31.9
Maximum dynamic pressure	239:10:58:50
MPS throttle up to 104-percent thrust (engine 3)	239:10:58:55.6
SRB separation command	239:11:00:02
MPS throttle down for 3g acceleration (engine 3)	239:11:05:30.6
Main engine cutoff (MECO)	239:11:06:29
External tank separation	239:11:06:47
OMS-1 ignition	(Not performed)
APU Deactivation (3)	239:11:10:57
OMS-2 ignition	239:11:38:22
OMS-2 cutoff	239:11:41:25
AUSSAT deploy	239:17:33:15
ASC-1 deploy	239:22:07:34
SYNCOM IV deploy	241:10:48:55
FCS (flight control system) checkout - APU 1 activation	245:09:35:15
APU 1 deactivation	245:09:41:34
APU 2 activation	246:12:06:03
Deorbit maneuver ignition	246:12:11:01
Deorbit maneuver cutoff	246:12:15:10
APU 1 activation	246:12:32:22
APU 3 activation	246:12:32:22
Entry interface (400,000 ft)	246:12:45:20
End blackout	246:13:01:42
Terminal Area Energy Management (TAEM)	246:13:09:27
Main landing gear contact (LH)	246:13:15:43
Nose landing gear contact	246:13:15:51
Wheels stop	246:13:16:30
APU deactivation complete	246:13:33:30

## VEHICLE ASSESSMENT

### SOLID ROCKET BOOSTERS

All SRB (solid rocket booster) systems performed as expected. The SRB prelaunch countdown was nominal with no problems noted. SRB ignition occurred at 5:58:01 a.m., c.d.t. on August 27, 1985. Performance of both SRM's was close to predicted values and well within the allowed envelopes. Propellant burn rates were near predicted values. Preliminary data indicate that the SRB separations occurred approximately 2 seconds earlier than predicted. The SRB recovery system appeared to perform nominally, and both SRB's were visually located by the recovery ship personnel.

### EXTERNAL TANK

All ET (external tank) systems and instrumentation performed as expected. No LCC (Launch Commit Criteria) violations were experienced and no significant ice/frost accumulation was observed. Prior to propellant loading, nose-cone temperature sensors 1 and 2 failed. The nose-cone purge temperature was controlled using the preplanned ground heater outlet temperature. There were no ET flight anomalies.

### SPACE SHUTTLE MAIN ENGINES

All SSME (Space Shuttle main engine) parameters appeared to be normal during the prelaunch countdown and compared well with prelaunch parameters observed on previous flights. Preliminary data indicated that SSME performance at start, mainstage, shutdown, and propellant dump was very good. The high pressure fuel turbopump and high pressure oxidizer turbopump temperatures were very close to predictions.

### MAIN PROPULSION SYSTEM

Overall performance of the MPS (main propulsion system) was excellent. Liquid hydrogen loading was performed as planned. Liquid oxygen loading had one flow stoppage as a result of high Orbiter inlet temperature that occurred during slow fill. Liquid oxygen and liquid hydrogen loads were very close to the inventory loads, and there were no hazardous gas leaks of any significance.

Ascent performance was normal. The actual chamber pressure levels (percent RPL) for all three engines were very satisfactory.

## ORBITER

### Backup Flight System Computer Failure

During the second launch attempt, at 237:11:06 G.m.t., a GPC (general purpose computer) 5 bite fault occurred. The BFS was reinitialized at 237:11:31 G.m.t. and 11 minutes later, the fault repeated. As a result, the launch was delayed for two days for replacement of the computer and performance of required inspections of the MPS low pressure fuel ducts.

### RMS Elbow Joint Failure in Primary Mode

At 239:14:12:05 G.m.t., the RMS elbow joint failed to respond to computer commands in the primary mode. All computer-supported modes were inoperative as was direct drive. The backup mode remained operational and the arm was used for the remainder of the mission in this mode. As a result, a decision was made to not perform DTO 0325 (Waste and Supply Water Dumps) which required the arm TV cameras to monitor the dumps. Also, monitoring of the deployed satellite PKM burns was not performed.

### Water Dump Nozzle Temperature Dropped Rapidly During Dump

During a supply water dump on flight day 2, the supply water nozzle exhibited a sharp temperature drop after about 4 minutes of dumping and the dump was stopped. However, the nozzle temperature continued to drop to 70 degrees F where it stabilized for a short period of time, then dropped to 58 degrees F where it stabilized for 90 seconds with the heater on. These two flat spots in the nozzle temperature profile are indicative of melting ice on the nozzle; however, two temperature cycle profiles ranging to 250 degrees F indicated that no ice was in contact with the nozzle.

A second supply water dump was terminated after 45 seconds because of a sharp drop in nozzle temperature. The sharp temperature drop is indicative of ice forming in close proximity to the nozzle. A third supply water dump was also terminated prematurely because of a rapid drop in the nozzle temperature.

### DETAILED TEST OBJECTIVES

All DTO's assigned to STS 51-I were accomplished either completely or to a high degree with the exception of DTO 0325 (waste and supply water dumps). The following DTO's required special test conditions or crew activity.

#### ENTRY AERODYNAMIC TEST (DTO 0235)

All PTI's were accomplished. This was the last in the series of basic aerodynamic data DTO's. There remains a series of forward RCS dump aerodynamic evaluation DTO's to be performed starting with STS 61-C.



WASTE AND SUPPLY WATER DUMPS  
(DTO 0325)

This DTO was cancelled because of the failure of the primary operational mode of the RMS, which was required to view the dumps. The tests will be moved to STS 61-A where practical.

WCS AIRFLOW MEASUREMENT  
(DTO 0327)

Two data takes were accomplished.

RADIATOR PERFORMANCE  
(DTO 0624)

Data were obtained in -ZLV +X velocity vector (head down, nose forward) during the first two sleep periods. The radiators were stowed during the first period and deployed during the second.

TACAN ON-ORBIT NAVIGATION  
(DTO 0780)

This DTO required that the Orbiter acquire TACAN stations and downlist the data to the MCC (Mission Control Center) to demonstrate that the MCC could generate a state vector. The DTO was considered highly successful. This was the last DTO in this series.

"DATA ONLY" DTO'S

The following DTO's required no special test or crew activity other than operation of the OI (operational instrumentation) and MADS (modular auxiliary data system) instrumentation and recorders. Postflight data are not yet available, but no instrumentation or recorder problems are known which affect these DTO's.

DTO 0301 Ascent Structural Capability Evaluation  
DTO 0307 Entry Structural Capability

PAYLOADS AND EXPERIMENT OPERATIONS

AUSSAT (AUSTRALIAN SATELLITE)

During post-insertion operations, the AUSSAT sunshield was commanded open at approximately 2 hours 2 minutes MET to accomplish the spacecraft health checks and the sunshield port clamshell did not fully open. It was determined that the clamshell structure had been deformed and was believed to be binding on the omni antenna bracket located on the top of the AUSSAT spacecraft. At 4 hours 17 minutes MET, the RMS was used to push the sunshield fully open. To avoid violating spacecraft and PAM (payload assist module) thermal constraints with

the sunshield open, the AUSSAT deployment was rescheduled from flight day 2, orbit 17D, to flight day 1, orbit 5D. Also, the ASC-1/PAM-D deployment was delayed one orbit from 7D to 8D.

The AUSSAT/PAM-D was deployed as replanned at approximately 6:35 MET. It was noted during pre-deployment operations that there was single motor operations for both the port and starboard restraints and the spin motors. The AUSSAT sunshield was not closed after deployment. To meet the PAM cradle avionics thermal constraints with the sunshield open, the heater duty cycle was increased and multiple temperature checks were taken. Because of the RMS elbow joint failure, the RMS camera was not used to monitor the PAM burn.

The AUSSAT AKM (apogee kick motor) firing occurred at 242:05:52:18 G.m.t. on Friday, August 30, 1985; and at this time, the spacecraft is on-station in geosynchronous orbit and operations are nominal.

#### ASC-1 (AMERICAN SATELLITE COMPANY)

The ASC-1/PAM-D satellite was successfully deployed at the backup opportunity of flight day 1, orbit 8D, at 11:09:33 MET.

The ASC was deployed in a 195- by 190-nmi. orbit that was the result of the AUSSAT separation maneuver. The ASC deployment attitude and rates were nominal. The PKM burn occurred as planned 45 minutes after deployment. Video monitoring of this burn was also not accomplished. The AKM burn occurred at 243:17:29 G.m.t. on Saturday, August 31.

At the time of this report, spacecraft bus tests have been performed and the spacecraft has been verified to be operating nominally. The solar arrays have been deployed and dual spin turn accomplished, placing the spacecraft in approximately the proper orbital attitude. At this writing, the spacecraft is at approximately 121 degrees, drifting at approximately 0.86 degree/day (orbital position is at 128 degrees). A spacecraft communication system test will be accomplished after the spacecraft arrives on-station. The satellite is expected to go into service in mid-October.

#### SYNCOM-IV F4

The SYNCOM-IV F4 spacecraft was deployed as planned on flight day 3, orbit 32D, at 241:10:48:55 G.m.t. (01:23:50:54 MET). At deployment the Orbiter attitudes were as planned and the rates were zero. The Post Ejection Sequencer functions occurred on time as visually verified by omni antenna deployment and spacecraft spin-up. PKM firing occurred at 45 minutes after deployment as verified by ground station acquisition and tracking. Seven liquid propellant apogee motor firings occurred over the next several days, resulting in successful placement of the spacecraft in geosynchronous orbit. Communications testing began on September 4, 1985 and it was subsequently determined that all communication with the satellite had been lost.

## LEASAT-F3 SALVAGE MISSION

The LEASAT salvage mission operations were initiated on flight day 2 with the unstowing and checkout of the SBU (Spun Bypass Unit), charging of EMU batteries, installation of the batteries in the RPU (remote power unit), and checkout of the RPU's.

As a result of the RMS elbow joint problem and the necessity to operate the RMS in backup mode, the salvage operations were replanned for two EVA's. The first EVA was conducted on flight day 5 and the second was conducted on flight day 6.

The EVA-1 salvage operations were successfully accomplished. This included the safing operations of separation lever stowage, installation of two umbilical shorting plugs, and installation of the two safe-and-arm safing pins. EVA-1 included the following:

- Removal and stowage of the theta = 135 degrees and theta = 90 degrees closeout plates and connector flight caps;
- mating SBU harness connectors, and SBU checkout at theta = 90 degrees;
- mating SBU connector and SBU plate and flight caps;
- mating RPU harness connections to spacecraft and the RPU;
- enabling RDU (remote decoder unit) relays and firing the omni-antenna squibs which released and deployed the omni-antenna.

Salvage operations were concluded for the day with the despun caps and closeout plate installations.

The EVA-2 salvage operations were also successfully accomplished. These operations included removal of the PKM nozzle cover and installation of the new PKM nozzle cover and associated temperature sensor, removal of the two safe-and-arm pins, power-up of the SBU and associated timers, removal of the grapple and handling bar, installation of the spin-up bar, and finally redeployment and spin up of LEASAT-F3. The calculated spin rate was 2.7 rpm. At a subsequent pass over Guam, the spacecraft was commanded to turn on the despun encoders and telemetry transmitter. This was successful and good telemetry data were received. Current status from LEASAT shows that the timer functioned properly on the spun side; the spacecraft is responding to commands; the batteries are on line and in good shape; there is no noticeable wobble in the spacecraft; and the spacecraft spin rate has been increased to 24 rpm.

## PHYSICAL VAPOR TRANSPORT OF ORGANIC SOLIDS

All nine of the PVTOS reactor cells were processed inflight. The order of processing the reactor cells was 1 and 5, 2 and 6, 9, 4, 8, 3, and 7. Some difficulty was encountered in processing cells 2 and 6 in the dual cell primary

operating mode (the primary operating mode permits all of the reactor cell engineering data to be recorded in the PVTOS computer memory system). After cells 2 and 6 had operated in the primary mode for 2 1/2 minutes, it automatically switched modes to the secondary mode of operation (basically the same as primary, but does not collect engineering data) and completed the processing of the two cells.

Previously, the reactor cells 1 and 5 had been processed almost to completion (4 hours and 31 minutes out of possible 5 hours maximum processing time) in the primary mode before automatically switching to the secondary operating mode.

Inflight diagnostics were performed on flight day 3 and it was concluded that a single sample, cell 9, should be run in the primary mode. This was successfully accomplished and it was subsequently decided that all remaining reactor cells should be processed similarly.

Postflight, after the PVTOS was turned over to the 3M team and returned to its home facility, troubleshooting the inability of the PVTOS to process in the dual cell operating mode was initiated. To date, no specific equipment or software problem has been identified which would prevent two cells from operating in the primary operating mode.

TABLE II.- JSC OV-103 STS 51-I PROBLEM TRACKING LIST

JSC STS 51-I PROBLEM TRACKING LIST FOR OV-103 DISCOVERY FLIGHT 6		SEPT. 30, 1985	
NO.	TITLE	TIME, G.M.T.	COMMENTS
1	BFS COMPUTER FAILURE.	237:11:06	GPC BITE FAULT. RE-IPLED BFS AT 237:11:31 AND G. RAINES CAR 27F001
		237:11:42:20	FAULT REPEATED ABOUT 11 MINUTES LATER. LAUNCH CAR 27F001
		08/25/85	SCRUBBED. R&R GPC 5 AT KSC. FOUND 2 ALTERED CAR 27F002
		PRE-LAUNCH	NON-STORE-PROTECTED MEMORY LOCATIONS. SUSPECT A CLOSURE IN
			HARDWARE FAILURE IN GPC 5. PROCESS
2	TANK "A" WATER FLOW RATE TO GALLEY LOW.	PRE-LAUNCH	DRAIN FLOW DECLINED FROM 40 LBS/HR ON 8/24 TO 27 H. ROTTER
			LBS/HR ON 8/25. NORMAL FOR OV-103 WAS 170 DR 27F012
			LBS/HR. SUSPECT LV-9 SUPPLY VALVE RESTRICTION. CLOSURE
			CREW REPORTED ON ORBIT GALLEY WATER FLOW ABOUT IN PROCESS
			80 PERCENT. FOUND 1/4 BY 1/2 INCH PLASTIC PIECE.
			BACK FLUSHED LINE TWICE AND GOT GOOD FLOW RATE.
			FLY AS IS.
3	HYDRAULIC SYSTEM 3 ACCUMULATOR BOOSTRAP PRESSURE LOW.	237:08	SUSPECT TRANSIENT CONTAMINATION AS ON FLIGHT 4 OF J. WILTZ
		PRE-LAUNCH	OV-103, PROBLEM STS-51D-06. R&R UNLOADER VALVE. CAR 23F001
			REPLACE WITH UPGRADED VALVE AVAILABLE 10/01/85 AT CLOSURE
			KSC. IN PROCESS
4	INSTRUMENTATION:		CLOSURE
			IN PROCESS
A	SSME 2 GH2 OUTLET PRESSURE (V41P1260A) FAILED.	239:10:58:01	SENSOR FAILED OFF SCALE HIGH AT LIFT OFF. ALSO D. PREVETT
			FAILED ON OV-103 FLIGHT 5. REMOVE SENSOR AND CAR 24F002
			PLUG. FLY AS IS.
B	SSME 2 LH2 RECIRCULATION PUMP RPM MEASUREMENT (V41R1215A) FAILED.	08/25/85	PRESSURE, TEMPERATURE AND CURRENT DRAW NORMAL. P. COTA
		PRE-LAUNCH	PUMP OPERATION NORMAL. OV-103 WIRING UP TO PUMP CAR 27F006
			CHECKED OK. R&R RECIRC PUMP PACKAGE.
C	FUEL CELL 1 HYDROGEN FLOW METER (V45R0170) ERRATIC.	243:00:57	S69 FUEL CELL FAULT SUMMARY MESSAGE AT F. FLAUCHE
			243:07:18:23 DUE TO HIGH FLOW READING. SUSPECT CAR AC9809
			FAILED TRANSDUCER. REPLACE WHEN FUEL CELL RE-
			MOVED. FLY AS IS.

TABLE II.- JSC OV-103 STS 51-I PROBLEM TRACKING LIST

JSC STS 51-I PROBLEM TRACKING LIST FOR OV-103 DISCOVERY FLIGHT 6			
SEPT. 30, 1985			
NO.	TITLE	TIME, G.M.T.	COMMENTS
D	APU 1 EXHAUST GAS TEMPERATURE (V46T0142A) FAILED.	ENTRY	READ OFF SCALE LOW. R&R AT KSC.
5	RMS ELBOW JOINT FAILED TO RESPOND TO COMPUTER COMMANDS IN PRIMARY.	239:14:12:05	ELBOW PITCH ARM BASED ELECTRONICS FAULT MESSAGE. J. PECK SERVO POWER AMPLIFIER 28 VOLT FAILURE INDICATION RMS 1319F AND ELBOW FAILED TO RESPOND TO COMMANDS IN SINGLE CLOSURE MODE. ELBOW JOINT OPERATED IN BACKUP. T/S FOUND IN PROCESS 2 BLOWN FUSES. SHORT FROM 28V POWER TO CHASSIS AT ELBOW SERVO POWER AMPLIFIER.
6	SUPPLY WATER DUMP NOZZLE TEMPERATURE (V62T0440) DROPPED TO 58 DEG F DURING POTABLE WATER DUMP.	240:09:46 242:09	DUMP WAS STOPPED. SECOND DUMP ATTEMPT TERMINATED H. ROTTER AFTER 1 MIN. WHEN TEMP DROPPED AGAIN. THIRD CAR 27F009 SUPPLY NOZZLE DUMP ON DAY 4 TERMINATED WHEN CLOSURE TEMP DROPPED RAPIDLY AGAIN WHILE RMS TV SHOWED NO IN PROCESS VISIBLE ICE. SUSPECT INTERNAL LEAK. SUPPLY WATER WAS DUMPED THRU THE EVAPORATOR AS REQUIRED. R&R SUPPLY WATER DUMP NOZZLE AT KSC. VENDOR REWORK OLD OV-099 NOZZLE AND RETURN AT KSC BY 11/1/85.
7	ANNUNCIATOR DISPLAY UNIT GPC#2 STATUS LIGHT INTERMITTENT.	240:21 ON ORBIT	GPC 1 VOTED FAIL ON DAY ONE; LIGHT WAS NOT T. LEWIS CLEARED AND WENT INTERMITTENT ON DAY 2. GPC 2 CLOSED OPERATION NORMAL. KNOWN CIRCUIT MARGIN PROBLEM 09/20/85 WITHIN CICU OP+AMP TURN-ON/TURN-OFF CIRCUITRY. FLY AS IS.
8	BFS OMS 2 OUT OF PLANE VELOCITY COMPUTATION 12.5 FPS HIGHER THAN PASS.	239:11:30	INITIAL SOLUTIONS AGREED. AFTER TARGET RELOAD, H. MOBLEY BFS SHOWED 12.5 FPS GREATER VGY WHILE OTHER CLOSURE COMPONENTS AGREED. ISOLATED TO CODING ERROR IN IN PROCESS BFS OPS#1 SOFTWARE. NO IMPACT ON OPS#3 DEORBIT COMPUTATION. SOFTWARE DR FOR NEXT RENDEZVOUS MISSION.

TABLE II.- JSC OV-103 STS 51-I PROBLEM TRACKING LIST

JSC STS 51-I PROBLEM TRACKING LIST FOR OV+103 DISCOVERY FLIGHT 6		SEPT. 30, 1985	
NO.	TITLE	TIME, G.M.T.	COMMENTS
9	FES TOPPING DUCT ZONE H HEATER B FAILED.	241:17:34	TEMPERATURE (V63T1800A) DROPPED TO 110 DEG F; "A" HEATERS ACTIVATED AND TEMPS RETURNED TO NORMAL. SEE PROBLEM STS+41D+01, OV+103 FLIGHT 1. WIRE SPLICE REPAIRED PRIOR TO STS 51-D. FOUND AND REPAIRED OPEN SPLICE AT THERMAL SWITCH.
10	FORWARD RCS THRUSTER FIF CHAMBER PRESSURE (V42PI541A) FAILED OFF.	243:07:23:03 241:17:11:30	READ 4 PSI WHILE TRIMMING RESIDUALS OF OMS+8 NSR BURN AND 12 PSI POSTFLIGHT. PC DID NOT RESPOND TO TWO FIRING PULSES ON DAY 3. SUSPECT PC SENSOR OR OX VALVE FAILURE. T/S AT KSC.
11	RIGHT OMS FUEL TANK ISOLATION VALVE "A" BARBER POLE.	245:09:02	VALVE OPEN MICROSWITCH FAILED ON OV+103 FLIGHT 1. SEE PROBLEM STS+41D+25. REPLACEMENT DELAYED UNTIL POD REMOVAL AFTER FLIGHT 6. R&R ACTUATOR AT KSC. REPLACEMENT HAS NON PIND TESTED SWITCHES.
12	GALLEY WATER FLOW DID NOT SHUT OFF.	244:13:23	CREW DISCONNECTED SUPPLY LINE QD TO STOP FLOW. AFTER QD WAS RECONNECTED WATER FLOWED UNTIL GALLEY POWER WAS CYCLED TO RESET CONTROL ELECTRONICS LOGIC. SEE PROBLEM STS+41C+25. R&R GALLEY AT KSC.
13	RIGHT OMS POD AFRSI STRIP LOOSE.	239:22:34 244:15:33	CREW REPORT AND EVA INSPECTION FOUND A 1 BY 10 INCH STRIP RAISED UP ABOUT 45 DEG ACROSS LEADING EDGE OF 2 AFRSI BLANKETS. POSTFLIGHT INSPECTION FOUND SUBSTRUCTURE GOOD. STANDARD TPS REPAIR.
14	HIGH PARTIAL PRESSURE OXYGEN IN CABIN AND ECLSS OXYGEN PRESSURES TRACKED CRYO PRESSURES.	240:22	CREW FOUND LEAK IN ELBOW FITTING OF BLEED ORIFICE. CREW TIGHTENED LOOSE "B" NUT AND LEAK STOPPED. ISOLATED ECLSS SYSTEM 2. ECLSS PRESSURES INTERNITENTLY TRACKED CRYO PRESSURES. LEAK CHECK AT KSC.

TABLE II.- JSC OV-103 STS 51-I PROBLEM TRACKING LIST

JSC STS 51-I PROBLEM TRACKING LIST FOR OV-103 DISCOVERY FLIGHT 6		SEPT. 30, 1985	
NO.	TITLE	TIME, G.M.T.	COMMENTS
15	SSME 1 LH2 RECIRCULATION PUMP 1 CIRCUIT BREAKER TRIPPED.	236:05:14 08/24/85 PRE-LAUNCH	SWITCHED TO SECONDARY POWER AND ALL THREE RECIRC P. COTA PUMPS OPERATED NORMALLY. POST-LAUNCH TROUBLE- SHOOTING AT KSC DID NOT FIND THE PROBLEM. T/S CLOSURE COULD NOT LOCATE PROBLEM. R&R RECIRC PUMP 1, 2 & 3 PACKAGE. IN PROCESS
16	OIL SEEPAGE IN RIGHT MAIN LANDING GEAR WELL.	POST LANDING	SMALL QUANTITY OF OIL NOTED ON DOOR LINKAGE AND STRUT. SUSPECT OIL LEAK IN OLEO STRUT OR HYDRAULIC SYSTEM. ANALYSIS FOUND LEAK WAS HYDRAULIC OIL. VALVING MODULE INSPECTION FOUND NO LEAK. J. WILTZ CLOSURE IN PROCESS
17	STARBOARD PAYLOAD BAY DOOR CLOSED SLOW AND BULKHEAD LATCHES DREW MORE CURRENT.	ON ORBIT	DOOR TOOK ABOUT 10 MORE SECONDS TO CLOSE FOR DUAL MOTOR OPS THAN 56 SEC EXPECTED. HIGHER CURRENT INDICATED DIFFICULTY PULLING DOOR CLOSED LAST FEW INCHES. SEALS AND LATCHES OK. SUSPECT SEALS WERE COLD. N. JEVAS DR 27F010 CLOSURE IN PROCESS
18	LEFT OMS YAW PRIMARY ACTUATOR STOPPED MOVING.	DEORBIT	DURING DEORBIT BURN L & R ACTUATORS MOVED IN UNISON FOR 1 MIN 43 SEC, THEN LEFT YAW ACTUATOR DID NOT MOVE AGAIN. ANALYSIS INDICATED OPERATION NORMAL DUE TO VARIATION IN DEADBANDS. J. VERNON CLOSURE IN PROCESS
19	FORWARD PIECE OF ET ATTACHMENT PLATE HAD LEFT FORWARD BOLT MISSING.	IN FLIGHT	POSTLANDING INSPECTION FOUND 1 BOLT MISSING AND REMAINING 7 BOLTS LOOSE, 4 ON FWD & 3 ON AFT PIECE OF THE PLATE. SUSPECT BOLT DID NOT ENGAGE NUT PLATE LOCKING FEATURE. D. CURRY DR 27F011 CLOSURE IN PROCESS

PREPARED BY: /s/RJW  
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09/30 85  
DATE

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DATE