

STS 51-D National Space Transportation Systems Program Mission Report

May 1985



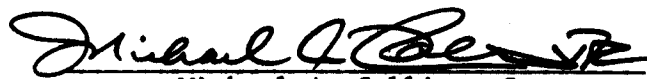
National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

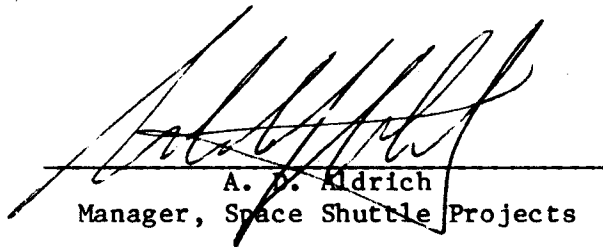
STS 51-D

NATIONAL SPACE TRANSPORTATION SYSTEMS PROGRAM

MISSION REPORT



Michael A. Collins, Jr.
Manager, Shuttle Data
and Evaluation Office



A. P. Aldrich
Manager, Space Shuttle Projects



Richard H. Kohrs
Acting Manager, National STS Program

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS 77058

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INTRODUCTION AND MISSION OBJECTIVES

The STS 51-D National STS (Space Transportation Systems) Program Mission Report contains a summary of the major activities and accomplishments of the sixteenth Space Shuttle flight and the fourth flight of the OV-103 vehicle, Discovery. This report also summarizes the significant problems that occurred during the STS 51-D mission. The problem tracking list is presented to provide a complete list of all Orbiter problems that occurred. Six of the more significant problems are discussed in the Orbiter portion of the report.

The major objectives of the STS 51-D mission were to successfully deploy the SYNCOM IV-3/Unique and Telesat I satellites; and perform the planned operations of the CFES III (Continuous Flow Electrophoresis System) and the AFE (American Flight Echocardiograph) experiments. The sequence of events for this mission is shown in table I. The problem tracking list for the Orbiter is shown in table II at the end of the report.

MISSION SUMMARY

The STS 51-D mission, the fourth for the OV-103 vehicle Discovery, was launched on April 12, 1985. The final countdown proceeded very smoothly for the planned launch at 8:04 a.m.e.d.t. However, the launch was delayed 55 minutes at T-9 minutes because of weather conditions. Lift-off occurred at 102:13:59:05 G.m.t. from Launch Complex 39A at KSC (Kennedy Space Center) on April 12, 1985, and the mission was successfully concluded with a landing at KSC at 109:13:54:28 G.m.t. on April 19, 1985.

The crew for this sixteenth flight of Space Shuttle were Karol J. Bobko, Col., USAF, Commander; Donald E. Williams, Cdr., U.S. Navy, Pilot; M. Rhea Seddon, M.D., S. David Griggs, and Jeffrey A. Hoffman, Ph.D., Mission Specialists; and Charles Walker and U.S. Senator Edwin 'Jake' Garn, Payload Specialists.

The ascent phase was normal in all aspects. The SRB (solid rocket booster) head pressures and burn rates were normal with SRB separation occurring at the predicted time. All main engine and MPS (main propulsion system) parameters indicated repeatable performance. MECO (main engine cutoff) occurred at the predicted time. No OMS-1 (orbital maneuvering system) maneuver was used with the direct-ascent trajectory, and following the OMS-2 maneuver, the Orbiter was in the planned 160 by 245 nmi. orbit.

The first day's activities of STS 51-D were all completed very successfully. The Telesat satellite deployment activities were satisfactory with deployment occurring at 102:23:38:38 G.m.t. The OMS-3 separation maneuver was performed as planned, after which the perigee kick motor firing of the satellite was monitored using the television camera attached to the RMS (remote manipulator system). No anomalies that would impact the successful completion of the flight occurred during the first day.

The SYNCOM satellite was deployed at 103:14:58:22 G.m.t. as planned early in the second day's activities. The crew noted that the omni antenna on the SYNCOM IV did not deploy at the required time after satellite deployment. Further, the perigee kick motor firing that was to take place 45 minutes after deployment also did not occur. As a result, a special analysis team was formed to determine the status of the satellite and possible activities to activate it.

The normal mission activities of the third and fourth day were performed as planned. Analyses indicated that a switch lever on the satellite that activates the sequencer for the satellite may not have been activated completely during the deployment sequence. A decision was made to extend the mission two days and rendezvous with the satellite in an attempt to activate the switch lever. The crew were given instructions on the building of a "flyswatter" type device that would be attached to the RMS end effector during a contingency EVA (extravehicular activity) planned for the fifth day. All fabrication activities were completed, and a 3 hour and 1 minute contingency EVA, the first of the STS Program, was performed during which the two devices were attached to the RMS end effector.

On the day following the EVA, the planned rendezvous with the satellite was successfully completed. At least two satisfactory attempts were made to activate the switch lever, but the desired omni antenna deployment and subsequent perigee kick motor burn did not take place. The satellite remains in a 180 by 250 nmi. orbit.

All planned CFES and AFE experiment activities were completed. The crew completed all other activities required prior to entry, but the deorbit maneuver was delayed one revolution because of unsatisfactory weather rainshower in the landing area. The deorbit maneuver was satisfactorily performed at 109:12:44:25 G.m.t. The entry was normal in all respects, and all planned PTI's (programmed test inputs) following blackout were performed. After completing the HAC (heading alignment circle) turn angle of 237 degrees, the Orbiter was guided to a landing on runway 33 at Kennedy Space Center at 109:13:54:28 G.m.t. The rollout distance was 10430 feet and during the final few feet of rollout, the right inboard tire burst. The STS 51-D mission came to a successful conclusion at 109:13:55:31 G.m.t., when the Orbiter came to a stop. All of the planned DTO's (detailed test objectives) were completed.

TABLE I. - STS 51-D SEQUENCE OF EVENTS

Event	Actual time, G.m.t.
APU activation (1)	102:13:54:11
(2)	102:13:54:12
(3)	102:13:54:13
SRB HPU activation command	102:13:58:34.6
MPS start command sequence (engine 3)	102:13:58:58.4
SRB ignition command from GPC (lift-off)	102:13:59:05
MPS throttle down to 90-percent thrust (engine 3)	102:13:59:20.1
MPS throttle down to 65-percent thrust (engine 3)	102:13:59:34.2
Maximum dynamic pressure	102:13:59:58
MPS throttle up to 100-percent thrust (engine 3)	102:14:00:13.4
SRB separation command	102:14:01:12
MPS throttle down for 3g acceleration (engine 3)	102:14:07:02
Main engine cutoff (MECO)	102:14:07:57
External tank separation	102:14:08:16
OMS-2 ignition	102:14:42:20
OMS-2 cutoff	102:14:44:43
Telesat deploy	102:23:38:38
SYNCOM IV deploy	103:14:58:22
OPS-8 (flight control system checkout APU 3 activation)	106:16:24:22
APU 3 deactivation	106:16:32:28
APU 2 activation	109:12:39:27
Deorbit maneuver ignition	109:12:44:25
Deorbit maneuver cutoff	109:12:48:23
APU 1 activation	109:13:11:10
APU 3 activation	109:13:11:11
Entry interface (400,000 ft)	109:13:24:02
End blackout	109:13:37:37
Terminal Area Energy Management (TAEM)	109:13:48:00
Main landing gear contact (LH)	109:13:54:28
Nose landing gear contact	109:13:54:36
Wheels stop	109:13:55:31
APU deactivation complete	109:14:08:58

VEHICLE ASSESSMENT

SOLID ROCKET BOOSTER

SRB propulsion performance was normal and within specification limits, with propellant burn rates for both motors very near predicted values. SRB thrust differentials were within specifications throughout the flight. All TVC (thrust vector control) prelaunch redlines were met with ample margin. Analyses verified that the TVC subsystem operated normally.

The operational electrical and instrumentation system evaluation indicated that the ignition and separation pyrotechniques fired as planned. The recovery sequence was performed satisfactorily on both SRBs. All recovery pyrotechniques fired and recovery system reset was properly initiated. All location aids performed normally. All SRB OI (operational instrumentation) measurements performed properly throughout their required flight periods.

The SRB Thermal Protection System performed as predicted during ascent with little or no TPS acreage ablation.

The performance of the separation and recovery subsystems was normal. Nose cap ejection, frustum separation and nozzle jettison occurred normally on each SRB. All drogue and main parachutes were recovered.

EXTERNAL TANK

The ET (external tank) propellant loading was accomplished satisfactorily. There was no excessive ice or frost buildup. Flight performance was excellent. Entry was normal with the impact in the footprint as predicted. Tumbling was verified.

All ET prelaunch thermal requirements were met. TPS acreage performance was as expected for the existing ambient conditions. Skin and component temperatures during flight were similar to previous flights.

SPACE SHUTTLE MAIN ENGINE

All prelaunch purge operations were executed successfully. All conditions for engine start were achieved at the appropriate times.

All three SSMEs ignited properly. Buildup, mainstage and shutdown performance of all engines was within specifications. The SSME controllers provided proper control of the engines throughout powered flight. Main Engine 1 (Engine 2109) coolant liner pressures exhibited a slightly erratic behavior throughout mainstage; however, this parameter did not approach the redline, and had no adverse effect on operation of the engine.

Engine dynamic data generally compared well with previous tests, and no problems were identified.

All on-orbit activities associated with the SSME's were accomplished successfully.

MAIN PROPULSION SYSTEM

All pretanking purges were performed as planned. LO2 and LH2 propellant loading, prepressurization and pressurization systems performed satisfactorily for this flight. During loading, the LH2 ullage pressure was higher than predicted. This has previously occurred during other countdowns, and is apparently due to a high pressure in the H2 vent line to the facility burn pond. Coupled with a slightly lower than predicted LO2 load, this impacted the performance margin by approximately 1150 pounds. This was not significant for STS 51-D since adequate margin remained. Ullage pressures were maintained within the required limits throughout the flight.

MPS propulsion performance was satisfactory. Trajectory reconstruction indicated that the vehicle specific impulse was near the MPS assessment tag values. At MECO, LO2 residuals were 9200 lb, 976 lb more than predicted, and LH2 residuals were 2700 lb, 691 lb less than predicted.

Feed system performance was normal. LO2 and LH2 propellant conditions were within specified limits during all phases of operation, and NPSP (net positive suction pressure) requirements were met. Propellant dump and vacuum inerting were adequate.

MAIN PROPULSION SYSTEM DUMP DETAILED TEST OBJECTIVE

A MPS dump DTO (detailed test objective) was performed on STS 51-D to demonstrate a new dump procedure for TAL (transAtlantic) and RTLS (return to launch site) abort landings. The new abort dump sequencing has been implemented into the flight software for OI-7 (STS 61-C and subsequent) and may be performed manually for pre-OI-7 heavyweight landings such as STS 51-I. The new dump sequence inerts the 3300 lb of liquid oxygen and 70 lb of liquid hydrogen left after the existing TAL and RTLS abort dumps through the 8-inch diameter T-O umbilical fill/drain valves. This inerting improves the landing mass properties and eliminates a postlanding vertical tail/OMS pod overheating concern due to gaseous hydrogen venting/ignition. Analysis of the STS 51-D DTO indicates that residual liquid oxygen was reduced to less than 10 lb; liquid hydrogen was reduced to about 3 lb. Because of an analysis error, the STS 51-D liquid oxygen vent forces were much larger than expected, resulting in an unplanned 45-degree roll and greater than anticipated RCS (reaction

control system) propellant usage. The liquid oxygen fill/drain valves were opened while manifold pressure was still elevated after MECO. In an actual abort situation, liquid oxygen manifold pressure would be relieved for 30 seconds through the main engine oxidizer valves prior to fill/drain valve opening. This pressure relief function is exactly the same as seen on every previous standard MPS dump. A second MPS dump DTO using the revised sequence is being proposed for STS 51-F to demonstrate that dump forces are reduced to a manageable level.

ORBITER

Cryogenic Oxygen Heaters A and B Tank 1 Controller Automatic Mode Failure

At 102:14:03 G.m.t., about 3 minutes after launch, the oxygen tank pressures fell below 800 psia. The oxygen tank 1 B heaters were in auto mode and should have come on at 811 psia. Ten minutes after launch, the oxygen tank 1 pressure fell to 720 psia. Oxygen tank 1 A heaters were turned to auto with still no heater activation. At 13 minutes and 15 seconds elapsed time, the oxygen tank 3 A and B heaters were positioned to auto. The tank 3 heaters came on and supplied oxygen for the next hour of the mission.

At 102:15:20 G.m.t., troubleshooting was initiated to isolate the problem in the oxygen tank 1 A and B heaters. Oxygen tank 1 A and B heaters were positioned to on-manual, and the tank 1 heaters came on. The oxygen tank 1 heaters were managed manually during the remainder of the mission without impact.

Orbiter Right-Hand External Tank Door Latch Indications A and B Not Received

At about 102:14:19 G.m.t., subsequent to ET (external tank) separation, the Orbiter right-hand ET door latch indications A and B indicated off. During the initial closing sequence, the ready-to-latch and door-close indications were nominal. The latch motor continued to drive for approximately 48 seconds until the crew positioned the switch to off. Review of the motor current traces indicated that the motor started to stall with apparent actuation of the torque limiter after about 3 seconds. A normal latch motor closing time is 5.5 to 6 seconds.

A malfunction procedure was initiated subsequently to power the latch motor for 12 seconds. After 1 second, the proper latch indications were received, verifying the door-closed configuration. Power to the latch motor was then terminated.

Commander's Attitude Direction Indicator Attitude and Rate Error Needles Behaved Erratically

Upon first entry into MM (major mode) 201, the CDR's ADI (attitude direction indicator) experienced the following anomalies:

1. Roll error needle remained stowed all the time.
2. Pitch and yaw error needles oscillated at approximately 1 Hertz between the "stow" position and zero-error position.
3. Yaw rate pointer intermittently oscillated between the "stow" position and zero-error position.

These conditions existed for all ADI modes in both MM201 and MM202. The problem ceased shortly after entry into MM801 for FCS (flight control system) checkout and did not recur upon reentry to MM201. However, on day 5, the ADI anomaly repeated, and the crew powered the DDU (data display unit) off until entry. Throughout entry, the needles again oscillated until the Orbiter was on the ground. The crew reported that the needles showed no unusual movements while the Orbiter was stationary on the runway.

The Ku-Band Antenna Experienced Uncommanded and Erratic Motion

At about 103:09:30 G.m.t., the Ku-Band system experienced uncommanded motion in both the alpha and beta axis. Subsequent inflight troubleshooting procedures showed that the DA (deployed assembly) was not powered as evidenced by the TWT (traveling wave tube) operate-bit being low. This accounted for the erratic motion because the antenna rate sensor assembly, which receives its power from the DA LVPS (low voltage power supply), was also not powered. Without the required gyro rate data to the servo motor control electronics in the Ku-Band electronics assembly no. 1, the servo system is unstable.

Based on the assumption that the DA LVPS had experienced an over-current condition and the fault protection lockout logic had been activated, the Ku-Band system power was cycled to off to reset the logic. When the power was subsequently turned on, the system operated properly and continued to operate normally for the remainder of the mission.

Right Main Landing Gear Inboard Tire Burst

The inboard tire on the right main landing gear burst 33 feet after the right inboard brake locked up at 20.6 knots ground speed 113 feet before the Orbiter stopped rolling. Eleven of the 16 cord layers were worn through before the tire burst.

Initial spin-up tire wear went through 2 cord layers at a nearby location along the tire centerline, and the left rib wore through 2 cord layers all around the tire. The spin-up and left rib wear was similar to the wear experienced on the other main landing gear tires. All 4 main landing gear tires have been removed and replaced.

Right Main Landing Gear Brakes Locked Near End of Rollout

The number 3 stator on both the inboard and outboard right MLG (main landing gear) brakes broke into several pieces causing both brakes to lock. The inboard right brake locked at 20.6 knots ground speed and 113 feet before the Orbiter stopped, and the outboard right brake locked for the last 5 feet of rollout. Brake-on velocity was 156 knots with a 5 to 6 ft/sec average deceleration rate during braking. A crosswind of about 8 knots, gusting up to 12, resulted in higher brake energy on the right brake while returning to and holding the runway centerline during rollout. Right brake energy was 41 million foot pounds for 48 seconds on each brake, while left brake energy was about 20.5 million foot pounds for 45 seconds on each brake. Hydraulic actuator package temperatures reached 290 and 150 deg F on the right and left brakes, respectively.

Left-Hand Outboard Elevon Damage

The outboard end of the left-hand lower outboard elevon incurred significant heat damage. Specifically, the outboard forward corner of the elevon lower honeycomb outer face sheet was buckled and delaminated and had two small burn-through holes. The outboard elevon lower leading edge tile carrier panel was completely melted under the outboard tile and a hole was melted in the elevon cove primary seal support plate.

All evidence showed the damage to be associated with the lower outboard carrier panel tile, which came out on the landing strip. The entry plasma flow entered the inboard gap of the outboard tile, progressed under the tile flowing outboard and eventually burned the tile attachment strain isolation pad, which allowed the tile to become loose. This then allowed more plasma flow under the tile, which resulted in the melting of the aluminum carrier panel, primary seal panel structure and elevon honeycomb outer face sheets as well as melting the two tiles aft and two elevon sidewall tiles.

PAYLOADS

TELESAT - 1

The Telesat satellite was deployed at 102:23:38:38 G.m.t., which was the planned time. All predeployment and deployment activities were completed satisfactorily. This satisfactory perigee kick motor firing was monitored from the Orbiter using the wrist camera on the RMS. The apogee motor was also fired successfully, and the Telesat is now parked in the planned geosynchronous storage orbit.

SYNCOM IV

The SYNCOM IV satellite was deployed at 103:14:58:22 G.m.t., which was the planned time. All predeployment activities as well as the initial deployment activities were completed nominally. However, the planned omni antenna deployment about 1 minute after the satellite was deployed did not occur. The expected spin up maneuver did not occur, and the perigee kick motor did not fire. As a result, the flight was extended 2 days so that a rendezvous with the satellite could be completed. Additionally, an EVA was planned to attach a "flyswatter" type device to the RMS end effector. This device was to be used in an attempt to activate the sequencer on the satellite. The rendezvous was completed satisfactorily, and two successful attempts were made to snare the switch lever, but the sequencer did not activate. As a result, the satellite is now dormant in a 180 by 250 nmi. orbit.

GETAWAY SPECIALS

Two GAS (getaway special) cannisters were flown, and these were the G035 Japanese experiment and the GSFC (Goddard Space Flight Center) G471 Thermal Branch experiment. The G035 experiment performed tests on surface tension, viscosity of fluids, and solids and alloy furnaces, and was activated and deactivated on schedule.

The GSFC capillary pump loop priming experiment on/off relay could not be activated. Inflight troubleshooting could not isolate the cause of the relay activation problems. As a result, the GSFC experiment was not conducted.

CONTINUOUS FLOW ELECTROPHORESIS SYSTEM

THE CFES was operated very successfully throughout the STS 51-D mission. All samples were processed, and no contamination of the product was observed inflight. Also, the leak that was repaired during preflight operations did not reappear during flight.

PROPELLANT PARTITIONING EXPERIMENT

All operations of this experiment were successfully completed.

AMERICAN FLIGHT ECHOCARDIOGRAPH

The AFE experiment was performed very successfully throughout the flight. Data were obtained on four crewmembers each day, except day 4, plus data were obtained during 10.2 psi cabin operations.

SHUTTLE STUDENT INVOLVEMENT PROGRAM

Two experiments, the Corn Root Experiment (SE82-3) and the Fly Enclosure Modules (SE 83-3) were performed during the flight. The Corn Root Experiment was deactivated on schedule. The Fly Enclosure Module activities were performed on schedule, and the postflight analysis is underway.

TABLE II.- ORBITER PROBLEM TRACKING LIST

JSC OV-103 STS 51-L PROBLEM TRACKING LIST

MAY 31, 1985

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
1	CRYO O2 TANK 1 HEATER CONTROLLER AUTO MODE FAILED.	102:14:03	ONBOARD TROUBLESHOOTING FOUND TANK 1 HEATERS A AND B WORK IN MANUAL. USED TANK 2, 3, AND 4 HEATERS IN AUTO AND MANUAL HEATER PROCEDURES FOR TANK 1. R&R TANK 1 CONTROLLER AT KSC.	W. FRASER CAR 23F012 CLOSED 05/22/85
2	RIGHT ET DOOR LATCHES A AND B INDICATED OFF.	102:14:19	RIGHT ET DOOR READY-TO-LATCH INDICATORS 1, 2, AND 3 AND DOOR CLOSED INDICATORS A AND B SHOW CLOSED. THE MALFUNCTION PROCEDURE WAS PERFORMED AT 103:01:22:21 G.M.T AND THE CORRECT LATCH INDICATIONS WERE RECEIVED. T/S AT KSC FOUND THERMAL BARRIER PINNED BETWEEN DOOR AND SILL.	R. BALCIUNAS CLOSED 05/29/85
3	INSTRUMENTATION FAILURES:			CLOSURE IN PROCESS
A	APU 1 EXHAUST GAS TEMPERATURE 1 (V46T0142A) FAILED.	102:14:16	FAILED LOW JUST AFTER APU SHUTDOWN ON ORBIT. R&R AT KSC.	W. SCOTT CAR AC 7837
B	LEFT RCS THRUSTER L2D CHAMBER PRESSURE (V42P2550A) READ LOW.	ENTRY	READ ZERO DURING ENTRY AND THRU ROLLOUT. T/S AT KSC, R&R IN HMF.	G. GRUSH CAR 23F010
4	COMMANDER'S ADI (ATTITUDE DIRECTION INDICATOR) PITCH AND YAW ATTITUDE ERROR NEEDLES INTERMITTENT AND YAW RATE POINTER ERRATIC.	102:21:55	PITCH AND YAW ADI ERROR NEEDLES AND YAW RATE POINTER JUMPED FROM CENTER POSITION TO STOW POSITION. CHANGING DATA SOURCE HAD NO EFFECT. CDR ADI WAS NORMAL SHORTLY AFTER TRANSITION TO OPS 8 AND AFTER RETURN TO OPS 2 BUT WAS POWERED DOWN AFTER BECOMING ERRATIC AGAIN DURING DAY 5 SLEEP PERIOD ABOUT 108:06:27. R&R DDU 1 AT KSC.	S. MURRAY CAR 23F011 CLOSED 05/22/85

TABLE II.- ORBITER PROBLEM TRACKING LIST

JSC OV-103 STS 51-D PROBLEM TRACKING LIST

MAY 31, 1985

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
5	KU-BAND ANTENNA MOTION ERRATIC.	103:09:30	ANTENNA SCAN WARNING LIGHT INDICATED ERRATIC MOTION. 4 AMP CURRENT WITH TRIPPED FAULT DETECTION MPC 2 WAS COINCIDENT WITH TRIPPED FAULT DETECTION LOGIC OF LOW VOLTAGE POWER SUPPLY. ANTENNA MOVED FROM ABOUT ZERO TO -90 DEG IN BETA AND ABOUT 90 PLUS OR MINUS 30 IN ALPHA. POWER WAS CYCLED FROM STANDBY TO OFF TO ON, CLEARING THE CONDITION. THE ANTENNA WAS REDEPLOYED FOR RENDEZVOUS AND AND OPERATED NORMALLY. R&R AT KSC.	J. GRIFFIN CAR 23F008 CLOSED 05/22/85
6	HYDRAULIC SYSTEM 3 ACCUMULATOR RAPID PRESSURE DECAYS.	103:18:15 103:19:15 104:12:20 104:13:50	CIRC PUMP 3 WAS USED TO MAINTAIN ACCUMULATOR PRESSURE (V58P0367A) UNTIL FCS CHECKOUT. SEE PROBLEMS STS-41G-1, 41D-16 AND 17, 8-08 AND 7-06. 96 HR LEAK CHECK AT KSC GOOD. FLY AS IS.	D. HAINES CAR 23F001 CLOSED 05/22/85
7	APU 3 SHUTDOWN LOAD ABNORMAL.	102:14:15:29	SHUTDOWN LOAD WAS ABOUT 30 HP INSTEAD OF 10 HP. TURBINE SPINDOWN WAS ABOUT 4 SECONDS LESS THAN 7 SEC EXPECTED. APU 3 OPERATED NORMALLY FOR ABOUT 8 MINUTES DURING FCS CHECKOUT. POSSIBLE TVC ISOLATION VALVE BYPASS FAILURE BUT BYPASS OPERATED NORMALLY POSTFLIGHT. FLY AS IS.	W. SCOTT D. HAINES CLOSED 05/22/85
8	EV-2 BIOMED DATA INOPERABLE DURING EVA.	106:12:50 EVA	CHANGED COM FROM B TO A BUT NO JOY. EV-2 CREWMAN COULD NOT STICK SENSOR TO HIS CHEST. CREW PROCEDURES CHANGE, SHAVE AS REQUIRED.	J. LOGAN CLOSED 05/22/85
9	EV-2 COMMUNICATIONS FROM GROUND ONLY 25% UNDERSTOOD.	106:14 EVA	CHANGED COM FROM B TO A TO TROUBLESHOOT WITH NO IMPROVEMENT REPORTED. PILOT INCREASED VOLUME TO MAINTAIN GROUND COM TO ORBITER.	P. SHACK FIAR EE-607F CLOSURE IN PROCESS
10	PASS (PRIMARY AVIONICS SOFTWARE SYSTEM) CNC GPC ERRORS.	103:17:04:00 103:21:40:00 105:22:25:19	DURING TARGET TRACK MODE, SEVERAL CYCLE WRAPS WERE LOGGED IN GEK ORBIT MFE. AN ORBIT MID FREQUENCY EXECUTIVE (MFE) CYCLE OVERRUN WOULD OCCUR WHEN A PASS ELAPSED TIME EXCEEDED 159 MILLISECONDS. TWO STAR TRACKERS OVERLOADED COMPUTER. JSC ANALYSIS, TRACK ON SOFTWARE DR.	W. C. YOUNG CLOSURE IN PROCESS

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JSC OV-103 STS 51-D PROBLEM TRACKING LIST

MAY 31, 1985

NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
11	TACAN 3 RANGE AND BEARING FAILED.	109:13:20(R) 109:42:45(B)	DID NOT SEARCH IN RANGE, READ ZERO. DID NOT LOCK IN BEARING, CONTINUED TO SEARCH. R&R AT KSC.	E. LATTIER CAR 23F006 CLOSED 05/22/85
12	RIGHT MAIN LANDING GEAR INBOARD TIRE BURST.	109:13:55:26	TIRE BURST JUST BEFORE STOP AFTER RIGHT INBOARD BRAKE LOCKED. R&R AT KSC. CAR 08F011.	C. CAMPBELL CLOSED 05/22/85
13	RIGHT MAIN LANDING GEAR BRAKES DAMAGED.	109:13:55:26	BROKE STATOR 3 ON BOTH INBOARD AND OUTBOARD RIGHT BRAKE AND LOCKED BOTH BRAKES JUST BEFORE STOP. CAR 08F011.	C. CAMPBELL CLOSURE IN PROCESS
14	LEFT OUTBOARD ELEVON TPS DAMAGED NEAR HINGE LINE.	IN FLIGHT	NEAR LEFT WING TIP, AN ELEVON LEADING EDGE TILE AND ADJACENT RUB PLATE FELL OFF AFTER TOUCHDOWN. LARGE PIECES WERE MISSING FROM 4 ADJACENT TILES ON ELEVON OUTBOARD SIDEWALL. REPAIRED AT KSC.	J. SMITH CAR 23F009 CLOSED 05/29/85
15	RIGHT RCS THRUSTER R2U OXIDIZER LEAK.	ON ORBIT	SMALL LEAK ON ORBIT DID NOT CAUSE DESELECT BUT KSC SNIFFED 50 PPM POSTFLIGHT. LEAK PROBABLY CAUSED BY CONTAMINATION. R&R AT KSC.	G. CRUSH CAR 23F003 CLOSED 05/22/85
16	CREW INTERFACE:			CLOSURE IN PROCESS
A	AVIONICS ACCESS PANEL R17 RETAINER FASTENERS FAILED.	ON ORBIT	CREW REPORTED ONE SCREW BROKE OFF AND THE HEX HEAD CRACKED ON OTHER SCREWS. CREW TURNED CRT 2 OFF.	J. GOODMAN
B	CREW SYSTEMS LOCKER MA16N DID NOT CLOSE PROPERLY.	PRE DEORBIT	CREW REPORTED ONLY ONE CATCH COULD BE ENGAGED DURING DEORBIT PREP.	F. McALLISTER
C	AIRLOCK DEPRESSURIZATION VALVE COVER DIFFICULT TO REMOVE.	ON ORBIT	CREW USED IFM VICE GRIPS TO FORCE COVER OFF FOR EVA. COVER WAS DIFFICULT TO REMOVE ON STS-51A BECAUSE LANYARD RING CAUGHT ON PANEL LIP.	J. O'KANE

TABLE II.- ORBITER PROBLEM TRACKING LIST

JSC OV-103 STS 51-D PROBLEM TRACKING LIST		MAY 31, 1985		
NO.	TITLE	TIME, G.M.T.	COMMENTS	RESP. MGR.
17	MPS LH2 MANIFOLD PRESSURE DECAYED.	ON ORBIT	POSTFLIGHT DATA ANALYSIS FOUND 46 PSIG AFTER OMS-2 DECREASED TO 29.5 PSIG IN ABOUT 36 MINUTES BEFORE VACUUM INERT. INSPECTED IN-LINE RELIEF VALVE AT KSC. NO MISSION IMPACT. FLY AS IS.	P. COTA CLOSED 05/29/85

PREPARED BY: /s/RJW
ROBERT J. WARD

05/31/85
DATE

APPROVED BY: /s/JEM
JOSEPH E. MECHELAY

05/31/85
DATE