659TH AEROSPACE TEST WING, VANDENBERG AFB, CALIF.

TO: SPACE SYSTEMS DIV., 15A, CALIF.

SUBJECT: EIGHT-HOUR FLASH REPORT

SUMMARY


THE PRIMARY LAUNCH OBJECTIVES WERE NOT ACHIEVED DUE TO THE FAILURE OF A SLV-2A SOLID MOTOR TO PROVIDE THRUST, AND DUE TO LOSS OF ROLL CONTROL OF THE SLV-2A VEHICLE INITIALLY AT 61 SEC AND LATER AT 100 SEC. TERMINATION OF THE FLIGHT AND APPARENT DESTRUCTION OF THE VEHICLE OCCURRED AT APPROXIMATELY 127 SEC. PRELIMINARY DATA INDICATE THAT THE S-0IA VEHICLE REMAINED INTACT UNTIL ABUPT LOSS OF SIGNALS AT 220 SEC.

DATE: FEB 63

CLASSIFIED UNTIL DESTROYED

DD FORM 173 REPLACES DD FORM 173, 3 OCT 48, WHICH WILL BE USED UNTIL EXHAUSTED

L. SIGNIFICANT EVENTS
Preliminary values of significant launch events are:

- Liftoff (144000 sec): Zero
- Solid motor thrust decay (Nos. 1 and 3) (web-burnout): 28 sec
- Solid motor zero thrust (Nos. 1 and 3) (end of thrust tailoff): 40 sec
- Initial loss of roll control: 61 sec
- Solid motor jettison (Nos. 1 and 3): 71.3 sec
- Steering initiated: 92.1 sec
- Final loss of roll control: 100 sec
- Missile in booster: 127 sec
- VTS videotape radar loss: 219.2 sec
- VTS acquisition beacon loss: 219.2 sec
- VTS telemetry data loss (link 1): 219.2 sec
- VTS telemetry data loss (link 2): 219.2 sec
- VTS telemetry data loss (link 3): 219.2 sec
- SLV-4A link 1: TM loss: 132.5 sec
- SLV-4A link 2: TM loss: 274 sec

III. SLV-4A performance

The booster was not successful in achieving its objectives. Solid motor No. 2 did not ignite and did not jettison. And complete loss of control resulted in flight termination at approximately 274 sec.
6395th Aerospace Test Wg, Vandenberg Air Force Base, Calif.

The absence of thrust of solid No. 2 was evidenced by telemetry measurements of chamber pressure and heat rate and was supported by a visual heat pattern on the launch pad and also by trajectory characteristics. Evidence to support the conclusion that solid motor No. 2 did not jettison results from pertinent telemetry measurements and chase plane observation of only two solids separating from the main vehicle plus telemetry indications that Nos. 1 and 3 did jettison properly.

Roll control was lost twice due to externally applied roll moments which were beyond the control-torque capability of the vernier engines.

The initial loss of roll control, which was evidenced on roll rate and attitude error at approximately 61 sec., was preceded by maximum deflection of the vernier engines at 57 sec in response to existing roll control signals. By 62.9 sec., the roll rate had reached the telemetry bandwidth of 3 deg/sec. Roll rate in excess of 3 deg/sec existed for approximately 5.6 sec, then decreased to near-zero. The roll attitude change associated with this rate was at least 41 deg and raised the roll attitude gyro...
TO LOSE ITS PROPER REFERENCE. THUS, ALTHOUGH ROLL
CONTROL WAS REGAINED AT APPROXIMATELY 68.9 SEC, THE
ROLL ATTITUDE DEVIATION WAS SIGNIFICANTLY LARGE.

THE SECOND LOSS OF ROLL CONTROL OCCURRED AT 105.3
SEC AND WAS PRECEDED BY THE MAXIMUM DEVIATION OF THE
VERNIES IN RESPONSE TO PREVAILING ATTITUDE ERRORS.

IN GENERAL, TELEMETRY DATA INDICATED THAT THE 
ROLL CONTROL, AS WELL AS THE PITCH AND YAW CONTROL 
CHANNELS, APPEARED TO HAVE FUNCTIONED PROPERLY AND 
THAT THE LOSS OF ROLL CONTROL RESULTED FROM EXTERNALLY 
APPLIED ROLL MOMENTS WHICH WERE BEYOND THE CONTROL 
CAPABILITY OF THE VERNIES.

RTL STEERING, WHICH WAS INITIATED AT 98.1 SEC CONSISTED 
OF MAXIMUM PITCH AND YAW COMMANDS. THESE COMMANDS 
WERE REQUIRED BY PREVAILING TRAJECTORY ERRORS BUT 
WERE NOT EFFECTIVE IN REDUCING THE EXTREME ROLL
MOMENT DUE TO THE ADVERSE ROLL ATTITUDE OF THE
VEHICLE ACQUIRED DURING THE INITIAL LOSS OF CONTROL.

STEERING SIGNALS TEMPORARILY CEASED AT 105.3 SEC, BUT 
RESUMED AT SOMewhat LESS THAN MAXIMUM MAGNITUDE AT 
102.1 SEC. BY 111.8 SEC THE STEERING ORDER INCREASED
MIX
IT
NORM & 1 S AND

TO MAXIMUM AMPLITUDE WHERE IT REMAINED UNTIL DATA
CESSATION AT 127 SEC. DURING THIS INTERVAL THE PITCH
STEERING ORDER WAS INTENSE, INTENT.

A RELATION BETWEEN THE FAILURE OF SOLID MOTOR NO. 2
TO BURN AND SEPARATE AND THE LOSS OF ROLL CONTROL HAS
NOT BEEN ESTABLISHED AT THIS TIME.

IV. S-01A PERFORMANCE

ALL S-01A VEHICLE SUBSYSTEMS WERE IN NORMAL STANDBY
CONDITION AT THE TIME OF FLIGHT TERMINATION AT 127 SEC.
The continuation of S-01A TELEMETRY BEYOND THIS TIME
INDICATED THAT THE S-01A VEHICLE REMAINED INTACT UNTIL
APPROXIMATELY 230 SEC AT WHICH TIME TELEMETRY CEASED
ABRUPTLY. THE TELEMETRY MONITOR OF THE D-TIMER INDICATED
TIMER START AT 229 SEC AND EVENT INTERPRETED AS SEPARATION
BACK-UP 232 SEC LATER. THESE INDICATIONS HAVE NOT BEEN
FULLY INTERPRETED BUT TEND TO SUPPORT THE CONCLUSION
OF CONTINUED INTEGRITY OF THE S-01A VEHICLE BEYOND THE
BREAK-UP OF THE ROCKET VEHICLE.
V. SPACE-GROUND COMMUNICATIONS

DELEMETER DATA FROM ALL LINKS WERE SATISFACTORY RECEIVED AND CORRECTED PRIOR TO THEIR COMPLETE LOSS AT THE TIMES LISTED IN TABLE 2 EXCEPT FOR A SHORT DROP-OUT OF AUHANS FROM 126.5 SEC TO 127 SEC.

VI. COUNTDOWN

A. THE FINAL COUNTDOWN WAS INITIATED ON SCHEDULE AT 1257 PST ON 18 FEBRUARY 1963 AND PROCEEDED TO STAND BY WITH ONE HOLD WHICH WAS IMPOSED AT T-15 MIN. FROM 1245 TO 1333. THIRTY FIVE MIN. OF THE HOLD WERE DUE TO AN IMSC OXIDIZER PUMP PROBLEM, THIRTEEN MIN. WERE DUE TO SPACE CLEARANCE, ADDITIONAL PROBLEMS AND DELAYS ENCOUNTERED WERE:

1. IN TASK 5, THE SIGNALS FROM DAC LINKS ONE AND TWO CHANNEL A WERE UNSATISFACTORY. THE SIGNALS LATER RETURNED TO NORMAL.

2. AT T-16 THE S-81A VEHICLE AND PAYLOAD WERE WITHOUT AIR CONDITIONING FOR 30 MIN. DUE TO A TRANSFER OF CN2 GAS SUPPLY TRAILERS.

3. THE S-81A PAYLOAD DVM-3 TIMING MODULE FAILED TO RESPOND TO ON-OFF REAL TIME COMMANDS.
NORMAL OPERATION WAS RESTORED WHEN THE S-01A POWER WAS CYCLED OFF AND ON.

4. AN LMSC PUMP FAILED TO OPERATE DURING OXIDIZER LOADING BECAUSE OF A DEFECTIVE RELAY IN THE PUMP CONTROL CIRCUITRY. CYCLING THE POWER OFF AND ON RESTORED NORMAL OPERATIBILITY.

The first countdown was initiated at 0355 PST, 27 February 1963 and proceeded to Task 12 when it was cancelled because of a problem in the solid booster circuitry which could not be resolved in time to permit launching within the launch window.

Investigation revealed that two connector plugs had been inadvertently interchanged. A complete recheck of the booster system was performed prior to start of the second countdown.

Additional problems and delays were:

1. The threads in a DAC PRIMACORD SEPARATION CHARGE COUPLING WERE DEFECTIVE, NECESSITATING REPLACEMENT OF THE COUPLING.

2. In Task 5, the S-01A TELEMETRY LINK 3 BECAME INOPERATIVE. REQUIREMENT FOR LINK 3 WAS WAIVED BY THE AIR FORCE.
RETURNED. THE TRANSMITTER WAS NOT REPLACED PRIOR TO THE SECOND COUNTDOWN.

3. THE HORIZON SENSOR TARGET SIGNAL WAS ABNORMAL. PERSONNEL SENT TO THE PAD DISCOVERED A LOOSE CONNECTION IN THE TARGET RECEP TACLE.

4. THE LAUNCH COMPLEX PUBLIC ADDRESS SYSTEM WAS DISRUPTED FOR 30 MIN. IN TASK 9, NORMAL OPERATION WAS RESTORED BY REPLACING AN AMPLIFIER.

VII. AEROSPACE-GROUND EQUIPMENT

THE AEROSPACE-GROUND EQUIPMENT FUNCTIONED SATISFACTORI LY TO ACCOMPLISH THE BOOSTER AND ORBITAL STAGE PRE-LAUNCH CHECKOUT.

THE FOLLOWING PROBLEMS OCCURRED DURING THE COUNTDOWN:

A. A RELAY IN THE CONTROL CIRCUIT TO THE LMSC PAD OXIDIZER PUMP FAILED TO ACTUATE DURING S-01A OXIDIZER LOADING. THE PROBLEM WAS RESOLVED BY CYCLING THE POWER OFF AND ON.

B. A DEFECTIVE AMPLIFIER DISRUPTED THE LAUNCH COMPLEX PUBLIC ADDRESS SYSTEM FOR 30 MIN. NORMAL OPERATION WAS RESTORED ON REPLACEMENT OF THE AMPLIFIER.

VIII. PAD DAMAGE

PAD DAMAGE LESS THAN ANTICIPATED, ALTHOUGH
GREATER IN THE LAUNCHER BASE AREA THAN ON SLV-3.
LAUNCHING: REPLACEMENT OF THE CABLES BETWEEN
THE LAUNCHER AND MATE WILL BE NECESSARY AS WELL AS
AIR CONDITIONING DUCTS AND LAUNCHER HYDRAULIC LINES.