FROM:
VANDENBERG AVE, CALIFORNIA, YV.2D

TO:
SPACE SYSTEMS DIVISION, LOSA, CALIFORNIA

SUBJECT: EIGHT-HOUR FLASH REPORT; VEHICLE EY.3-3/30-01A/499/1171

A. REASONS SUMMARY
VEHICLE EY.3-3/30-01A/499/1171 WAS LAUNCHED ON THE FIRST
ATTEMPT FROM VAFB COMPLEX 75-1, PAD 2, AT 1251:54.58
WST, ON 1 NOVEMBER 1987. THE PRIMARY LAUNCH OBJECTIVE,
TO PLACE THE ISA SATELLITE WITH PAYLOAD IN A NEAR-
ARGUS ORBIT, WAS NOT ACCOMPLISHED.

THE MISSION PROCEEDED SMOOTHLY WITH TWO HOLES IPOSED,
FOR A TOTAL OF EIGHT MINUTES, 420 SECONDS. BASED ON ITS
BEHAVIOR AT THIS TIME,
THE MISSION TERMINATED AT APPROXIMATELY 134 SEC. DUE
TO COMPLETE LOSS OF ATTITUDE CONTROL BY THE BOOSTER.

THE LOSS WAS PREDICTED BY A GRADUAL DEGENERATION OF
THE BOOSTER'S ATTITUDE CONTROL SYSTEM PERFORMANCE AS A
RESULT OF AN APPARENT ELECTRICAL MALFUNCTION.

DATE:
9
4
MONTH: YEAR:
12 87
ASSOCIATED WITH THE CONTROL SYSTEM DC POWER SUPPLY.

IT APPEARS THAT THE STATUS OF THE MISSILE WAS NORMAL THROUGHOUT THE FLIGHT; HOWEVER, SEPARATION AND SUBSEQUENT MISSILE EVENTS DID NOT OCCUR DUE TO LOSS OF THE MISSILE START AND SEPARATION ARMING.

III. MISSILE SYSTEM

PRELIMINARY VALUES OF SIGNIFICANT EVENTS REFERENCED

FROM 115.0 SEC AT INITIAL IMPACT:

- STRATEGIES INITIATED: 91.96 SEC
- EVIDENCE OF SEPARATION ON ACTUATOR POT VOLTAGES: 95 TO 100 SEC
- ACTUATOR MOTION REACHED SIGNIFICANT LEVELS AFTER 115.0 SEC
- THRUST AND VERTICAL MOTION REACHED SIGNIFICANT LEVELS:
  - 115.5 SEC
- ACTUATOR MOTION REACHED POSITIVE PEAKS (+10.8 V)
- COMPLETE LOSS OF CONTROL AS EVIDENCED BY SHARP TAIL YAW AND PITCH UP:
  - 134 SEC
- MECC AND YAW OCCUR SIMULTANEOUSLY AS A RESULT OF VIOLENT MANEUVER:
  - 137.3 SEC

LOSS OF ALT-2 TELEMETRY SIGNAL
III. RV-3 VEHICLE PERFORMANCE

RV-3 PERFORMANCE WAS UNSATISFACTORY IN THAT A LOSS OF ATTITUDE CONTROL RESULTED IN FLIGHT TERMINATION APPROXIMATELY 1 SEC PRIOR TO ANTICIPATED SEND.

DETERIORATION OF CONTROL BEGAN SLOWLY AT ABOUT 10 SEC., AS INDICATED BY LACK OF NORMAL RESPONSE OF THE VEHICLE TO GROUND GUIDANCE STEERING COMMANDS.

BY 14 SEC., YAW RATE SYMBS HAD REACHED TELEMETRY LIMITS (PLUS OR MINUS 2 DEG PER SEC) AND AT 154 SEC. THE VEHICLE BEGAN A SHARP YAW RIGHT AND PITCH UP MANEUVER, WHICH RESULTED IN THE SIMULTANEOUS CUTOFF OF THE MAIN ENGINE AND BOTH VERMIES AT 137.5 SEC. THE MODE OF ENGINE CUTOFF IS ASSUMED TO HAVE RESULTED FROM THE DISRUPTION OF ELECTRICAL POWER, CAUSED BY THE VIOLENT MANEUVER AND CONFIRMED BY MISSILE BATTERY VOLTAGE DROP TO ZERO AT THE TIME.

THE LOSS OF ATTITUDE CONTROL APPEARS TO BE ASSOCIATED WITH AN ELECTRICAL MALFUNCTION WHICH CAUSED A DEVIATION IN ACTUATOR POTENTIOMETER.
Excitation voltage readings at approximately 150 sec. The shift in pot voltage began gradually, then increased to a significant error just prior to the complete loss of control. The actuator potentiometer excitation voltages are derived from a control system dc power supply which rectifies 400 ac to obtain the plus and minus 165 vdc required for the flight control dc amplifiers. The 400 cps inverter output was confirmed to have been normal until loss of missile battery bus voltage at the time of micros.

No other abnormalities were noted in the other SLY-2 subsystems which appear to be related to the control problem.

SLY-2 loss of attitude control did not cause the vehicle to violate flight safety design criteria and no destruct commands were issued. Trajectory data indicate vehicle impact occurred approximately 340 nautical miles downrange.

IV. COMMAND GUIDANCE

Performance of the command guidance system was satisfactory.
WAS AT II TO 14 SEC WHEN A LARGE QUANTITY OF PATH-DOWN STEERING WAS ORDERED. TELEMETRY DATA REVEALS THAT A SMALL PITCH UP MANEUVER STARTED AT II.5 SEC DURING AN ABSENCE OF GUIDANCE PITCH STEERING ORDERS. THE VEHICLE RESPONDED TO GUIDANCE STEERING ORDERS FOR 10 MORE SECONDS IN A BLUDGEON MANNER. THEREAFTER TAN AND PITCH RATE-GYRO TRACES HAD LITTLE IF ANY CORRELATION WITH STEERING ORDERS. GUIDANCE SEEKED THE VEHICLE ACCELERATION AT MECO AND TRANSMITTED THE SI COMMAND WHICH IS ESSENTIAL BEFORE GOING TO SI SEPARATION COMMAND. ALTHOUGH SI AND STEERING ORDERS FOR THE SI-MA WERE TRANSMITTED, THEY WERE NOT EFFECTIVE BECAUSE ARMING HAD NOT BEEN EFFECTED.

GUIDANCE TRACKING DATA INDICATES THAT IMPACT OCCURRED AT AN ALTITUDE OF APPROXIMATELY 177 DEG AND AT A RANGE SOMEWHAT IN EXCESS OF 350 NM.

V. SI-MA VEHICLE PERFORMANCE

REVIEW OF PAYLOAD DATA INDICATES THAT THE STATUS OF THE VEHICLE SUBSYSTEM WAS NORMAL THROUGH FLIGHT TERMINATION AND THAT THE SI-MA REMAINED INTACT SUBSEQUENT TO THE DEVIANT MANEUVER OF THE B-52. IT ALSO APPEARS THAT DEPLOYMENT AND
SUBSEQUENT IN-MA EVENTS DID NOT OCCUR BECAUSE THE ABNORMAL NATURE OF MESS AND VICO DID NOT PERMIT EXCESS II-TIME STAND ON THE ARMING OF THE SEPARATION GEARBOX.

V. SPACE - GROUND COMMUNICATIONS

TELEMETRY DATA FROM ALL UNITS WERE SATISFATORY RECEIVED AND RECORDED.

VI. CONTINUE

THE COUNTDOWN WAS RESCHEDULED AT 2:43 PST AND PROGRESSED TO AP TOF WITH TWO HOLD IMPOSED. HOLD NO. 1 WAS IMPOSED AT 12:44 PST (T-34 MIN) TO PREPARE FOR STARTING THE TERMINAL COUNT AREA OF SCHEDULE BECAUSE OF EXPECTED INTERFERENCE FROM TRAMS DURING THE EASY PORTION OF THE SCHEDULED LAUNCH WINDOW. THE COUNTDOWN CLOCK WAS RESCHEDULED TO T-3 MINUTES AND THE COUNTDOWN RESUMED AT 12:49 PST. HOLD NO. 2 WAS IMPOSED AT 12:51 PST (T-1 MIN 50 SEC) TO AVOID ENTRY OF TRAMS FROM THE HAZARD AREA. THE

COUNTDOWN WAS RESCHEDULED TO T-4 MIN AT 12:55 PST. THE CLOCK WAS THEN ALLOWED TO RUN TO T-3 MIN.

(START OF PHASE VI) BEFORE RELEASE OF THE HOLD.
Leakage occurred at location B pad.

Additional problems and delays encountered were:

Tasks 1, 4, 5, 6, and 7 were conducted prior to Task 2 because of anticipated interference from another operation. This caused a delay of approximately 30 minutes.

In Task 1, the 50-0A T/M measurement 14-1-43 (low range guidance gas pressure) was found to be marginal.

But gas was added by the Air Force.

At approximately 0900 a technician was injured in a fall from an elevated camera platform.

During 50-0A tanking, it was necessary to send personnel to the pad to adjust an edge gas pressure regulator.

VI. Aerospace Ground Equipment

The ACE functioned satisfactorily to support checkout and launch of the vehicle. The only problem reported was an adjustment of a gas pressure regulator during 50-0A tanking.

IX. Pad Damage

Pad damage was normal, and the rehabilitation schedule can be maintained.