CLASSIFIED MESSAGE

~~SECRET~~

ROUTING

[redacted]

DATE 19302 7 JUL 61

TO : DIRECTOR

FROM : [redacted]

ACTION: DPD (1-2-3-4-5-6-7-8-9-10)

INFO : S/C (11)

CK

TOR 21167 7 JUL 61

ROUTINE

[redacted]

TO [redacted] INFO [redacted] CITE [redacted]

REF: [redacted]

FROM [redacted]

VEHICLE 1107 PERFORMANCE ANALYSIS: THE LAUNCH AND FIRST 18 ORBITS OF VEHICLE 1107 WERE AS PREDICTED. ALL SYSTEMS OPERATED WITHI SPECIFICATIONS. FLUCTUATION ON THE 2 KC INVERTER VOLTAGE CAUSED SOME CONCERN DURING THE ASCENT PHASE BUT THIS IS BELIEVED TO HAVE BEEN A TM MONITOR ELECTRONIC CORD MALFUNCTION AS THE ELECTRONIC TUBE PLATE VOLTAGES WHICH ARE FED FROM THE 2 KC INVERTER WERE STABLE. BETWEEN PASSES 18 AND 22, AN ERROR HAD ACCUMULATED IN THE ORBITAL TIMER WHICH INDICATED THAT IT WAS RUNNING 68-71 SECONDS PER ORBIT SLOW. OBSERVATION INDICATED THAT THE ERROR PER ORBIT WAS FAIRLY CONSTANT SO AN ATTEMPT WAS MADE TO ADVANCE THE TIMER SUCH THAT IT WOULD INITIATE DUMP AT THE CORRECT TIME ON ORBIT NUMBER 33. THIS WAS ACCOMPLISHED BY RESETTING THE DEVICE AT APPROPRIATE TIMES. THE ATTEMPT WAS SUCCESSFUL AND THE DUMP SEQUENCE WAS INITIATED WITHIN 3 SECONDS OF THE CORRECT TIME ON PASS 33.

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THE RECOVERY SEQUENCE IS BELIEVED TO HAVE OCCURRED WITH ALL SYSTEMS WITHIN SPECIFICATION; THE CAPSULE IMPACTED APPROXIMATELY 200 MILES SHORT OF THE PREDICTED IMPACT POINT. THIS ERROR WAS NOT DUE TO EQUIPMENT MALFUNCTION, HOWEVER, AS IT WAS SUBSEQUENTLY DETERMINED THAT A PUNCH CARD ERROR IN CAPSULE WEIGHT WAS MADE FOR THE COMPUTER DETERMINATION OF THE DESCENT TRAJECTORY.

AFTER CAPSULE EJECTION THE AGENA AGAIN OPERATED WITHIN SPECIFICATION FOR AN UNDETERMINED TIME. THE VEHICLE HAD REORIENTATED FROM THE 51 DEG NOSE DOWN ATTITUDE FOR EJECTION BACK TO A HORIZONTAL ATTITUDE WITHIN RADAR RANGE OF [redacted] ON PASS 33. ALL PARAMETERS AT THIS TIME WERE NOMINAL.

RADAR CONTACT WAS AGAIN ESTABISHED ON PASS 38 BY [redacted] TRACKING STATION. THE FOLLOWING DISCREPANCIES WERE NOTED ON THIS PASS: A) THREE PHASE, 400 CYCLE VOLTAGE HAD DECREASED TO APPROXIMATEL 10 PERCENT OF THE RATED 115 VOLTS AND THE 3 PHASE INVERTER TEMP WAS HI B) HORIZON SCANNER OUTPUTS WERE ZERO AND HORIZON SCANNER TEMP WAS OUT OF TM BAND-HIGH. C) THE GYRO SPIN MOTORS APPEARED TO BE TURNED OFF (POWERED FROM THE 3 PHASE INVERTER). D) ATTITUDE CONTROL GAS WAS BEING USED AT AN EXCESSIVE RATE DECREASING FROM 1220 PSI TO 950 PSI DURING THE RADAR CONTACT. E) LINK II TELEMETRY WAS NOT OPERATING. BY PASS 39 THE THREE PHASE POWER WAS COMPLETELY GONE AS WAS SINGLE PHASE 400 CYCLE POWER (POWERING THE GYRO EXCITATION AND OTHER ITEMS IN THE ATTITUDE CONTROL SYSTEM). CONTROL GAS HAD DECREASED TO APPROXIMATELY 250 PSI. THE VEHICLE WAS HEARD (LINK I TM AND BEACON) FOR THE LAST TIME ON PASS 104.

LMSD ANALYSIS INDICATED THAT THE MOST PROBABLE CAUSE OF THE ORBITAL TIMER ANOMALY WAS DUE TO A PARTIAL SHORT IN THE TIMER MOTOR CIRCUIT. THE MOTOR IS A SPLIT PHASE SYNCHRONIS HYSTERESIS MOTOR WHICH RECEIVES ITS POWER FROM THE PLUS 28 VOLT SYSTEM THRU AN OSCILLATOR. THE FREQUENCY OF THE OSCILLATOR IS CONTROLLABLE ON ORBIT BY GROUND COMMAND, AND THE FREQUENCY IS MONITORED THRU TM. FAILURE C THE OSCILLATOR AS A POSSIBILITY WAS DISCARDED SINCE THE FREQUENCY READOUT WAS CONSISTENT WITH THE COMMANDED FREQUENCY. IT WAS, HOWEVER NOT CONSISTENT WITH THE SPEED OF THE MOTOR. THE CIRCUIT USES A PHASE SPLITTING CAPACITOR TO FURNISH THE MOTOR WITH THE NECESSARY TWO PHASE FOR SYNCHRONIS OPERATION. LEAKAGE IN THIS CONDENSER IS A POSSIBLE MALFUNCTION CAUSE IN ADDITION TO THE SHORT MENTIONED BEFORE. TESTS CONDUCTED BY LMSD INDICATED THAT THE MOTOR COULD BE MADE TO RUN SLOW BY CREATING A 1000 OHM SHORT IN THE LEADS BETWEEN THE CAPACITOR AND MOTOR WINDINGS, DUPLICATING FLIGHT RESULTS.

THE 400 CYCLE INVERTER AND HORIZON SCANNER PROBLEMS ARE BELIEVED TO HAVE BEEN CAUSED BY THE HORIZON SCANNER MOTOR STALLING, HEATING UP AND SHORTING THROUGH THEREBY IMPOSING AN EXCESSIVE LOAD ON THE 3 PHAS INVERTER. POSSIBLE CAUSES OF HORIZON SCANNER MOTOR STALL ARE: A) CONTAMINATION OF GEARS OR BEARINGS BEFORE LAUNCH, B) CONTAMINATION OF GEAR OR BEARING IN FLIGHT, C) FUSION OF GEARS CAUSING FLAT SPOTS WHEN THE SCANNER WAS TURNED OFF DURING CAPSULE EJECTION. CONTAMINATION BEFORE LAUNCH IS POSSIBLE SINCE THE UNIT IS NOT HERMETICALLY SEALED. CONTAMINATION IN FLIGHT IS POSSIBLE SINCE SOME OF THE GEAR TRAIN IS EXPOSED TO THE CAPSULE RETRO ROCKETS EXHAUST DURING RETRO THRUSTING.

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FUSION PS CONSIDERED UNLIKELY SINCE DATA INDICATES THAT THE SCANNER OPERATED NORMALLY FROM PASS 33 TO THE PERIOD BETWEEN PASSES 37 AND 38 WHEN THE MALFUNCTION IS BELIEVED TO HAVE OCCURRED. EVIDENCE THAT THE HORIZON SCANNER WAS INDEED THE OFFENDING DEVICE IS NOT CONCLUSIVE. OTHER POSSIBILITIES WHICH MAY AGREE WITH FLIGHT DATA ARE BEING EXPLORED. CONTROL GAS DEPLETION IS A CONSEQUENCE OF THE 400 CYCLE POWER MALFUNCTION.

THE LINK II TM MALFUNCTION IS BELIVED TO HAVE BEEN CAUSED BY AN INADEQUATE FUSE TO THE EQUIPMENT BEING MONITORED BY THIS TM SET.

CERTAIN EQUIPMENT TEMPERATURES (OTHER THAN THE INVERTER AND SCANNER TEMP) DEPARTED SOMEWHAT FROM THE PREDICTED VALUES BEFORE LAUNCH. THESE WERE SMALL VARIATIONS, HOWEVER, AND ARE NOT FELT TO HAVE CONTRIBUTED TO THE DISCREPANCIES NOTED ABOVE.

END OF MSG