

7050

**SECRET**

14000 61490

**FLIGHT FAILURE**

APRIL 7, 1969

Declassified and Released by the NRO

In Accordance with E. O. 12958

NOV 26 1997

on \_\_\_\_\_

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FAILURE EVALUATION (FTV 1651/543)

FLIGHT HISTORY

19 MARCH

LAUNCH FROM VAFB SIC-3W

20 MARCH

ø 22 - 25

- o SATELLITE VEHICLE UNSTABLE
- o VEHICLE OSCILLATING IN PITCH & ROLL
- o VEHICLE YAWING 360° @ .5°/SEC
- o CONTROL GAS USAGE 10 TIMES NORMAL
- o GAS VALVE CLUSTER #2 TEMPERATURE INCREASED FROM 90° F TO 140° F

21 MARCH

ø 32

- o HORIZON SENSOR LEFT HEAD PREAMPLIFIER OUTPUT INTERMITTENT FOR 100 SECONDS MINIMUM
- o VEHICLE ROLL AND PITCH AXIS CONTROL ERRORS RESULTANT FROM FAILURE

21 MARCH

ø 34

- o 1ST BUCKET RECOVERY BY LIFEBOAT SYSTEM

21 MARCH

ø 50

- o 2ND BUCKET RECOVERY BY LIFEBOAT SYSTEM

23 MARCH

ø 57

- o VEHICLE STILL UNSTABLE. PROBLEM AND DATA COLLECTION COMPLETE

25 MARCH

ø 71

- o SATELLITE VEHICLE ORBITAL RE-ENTRY REPORTED

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EVALUATION

- VEHICLE UNSTABLE ( $\phi$  22 TILL RE-ENTRY) DUE TO GAS VALVE #6 OF G.V. CLUSTER #2 NOT RESPONDING TO COMMANDS
  - VEHICLE CYRO AND FLIGHT CONTROL OUTPUT DATA INDICATES G.V. #6 WAS ELECTRICALLY COMMANDED AND DID NOT RESPOND
  - CLUSTER TEMPERATURE DATA INCREASE CAUSED BY CONTINUOUS COMMANDING OF VALVE SOLENOID
    - TEMPERATURE INCREASE CONFIRMED BY GROUND TEST
  - VEHICLE DYNAMIC ORBITAL PERFORMANCE CAUSED BY G.V. #6 FAILURE TO OPEN
    - ORBITAL MOTION CONFIRMED BY ANALYTICAL EVALUATION OF CONTROL SYSTEM MODEL
  - DISASSEMBLY AND VISUAL INSPECTION OF EXISTING STERER GAS VALVES DETECTED WORKMANSHIP PROBLEMS
  - GROUND LIFE TEST OF FOUR G.V. CLUSTERS (THREE VALVES/CLUSTER) PROVIDED TWO FAILURES. VISUAL INSPECTION SHOWED FAILURE DUE TO MECHANICAL TOLERANCE BUILDUP AND WEAR IN PLUNGER AND ASSOCIATED BELLOWS AND PIN ASSEMBLY
- HORIZON SENSOR ANOMALY ( $\phi$  32)
  - LABORATORY TESTS VERIFY THE PROBLEM CAN BE REPRODUCED BY SCINTILLATIONS OF CRITICAL CAPACITORS WITHIN HORIZON SENSOR HEAD CIRCUITRY
  - CAPACITORS ARE COMMERCIAL GRADE KEMET CAPACITOR WITH HISTORY OF THIS TYPE OF FAILURE

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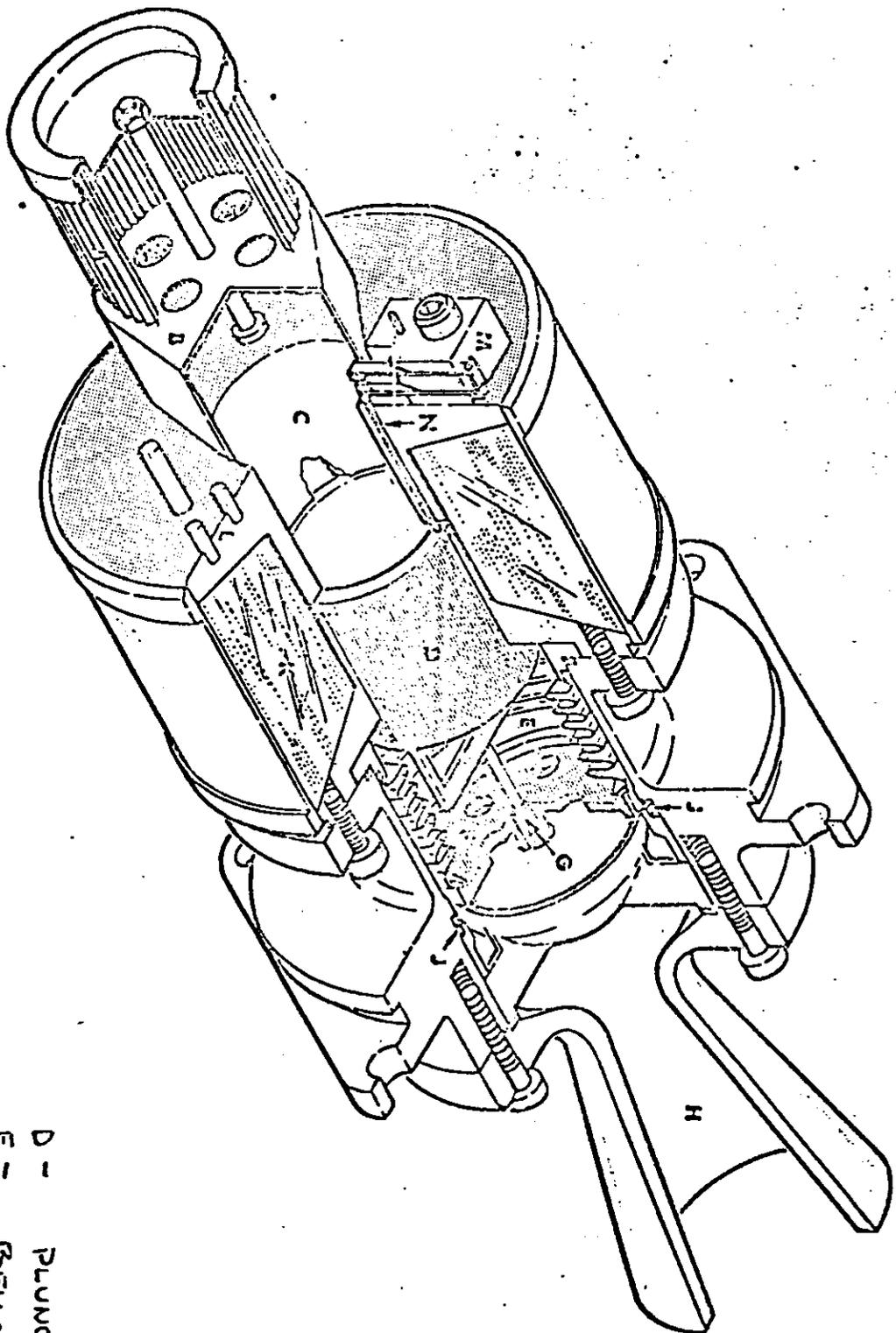
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CORRECTIVE ACTION

- GAS VALVE
  - SWEEP STOCK, KITS, AND VEHICLES FOR ALL STERER VALVES
  - REPLACE CRITICAL MECHANICAL PIECE PARTS
  - INCREASE SCOPE OF STERER MANUFACTURING COMPANY ACCEPTANCE TEST PROCEDURE (ATP) TO INCLUDE 100,000 CYCLE VALVE "BURN IN" TEST (LIFE CAPABILITY IS 1 MILLION CYCLES)
  - REVISE STERER PROCESS CONTROL PROCEDURES AND INSPECTION METHODS
- HORIZON SENSOR
  - RETROFIT BARNES HORIZON SENSOR SYSTEM CRITICAL CAPACITOR CIRCUITS WITH SCREENED AND "BURNED IN" CAPACITORS
  - REVISE MANUFACTURING PROCESS TO INCLUDE SCREENED PARTS ON SYSTEMS NOT BUILT

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Pneumatic Thrust Valve Cartridge (Cutaway View)

- D - PLUNGER
- E - BELLOW
- G - PIN

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