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FINAL REPORT

BIT MISSION 7055

17 February 1965

SAFSS ~~540069-65~~

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 FINAL REPORT
 BIT MISSION 7055

1. ~~(S)~~ MISSION SUMMARY.

1.1 ~~(S)~~ Program Objectives.

As part of the over-all problem of determining the vulnerability of the Agena satellites to Soviet radar detection and tracking, the objective of the BIT program is to determine if and when the radar system associated with the signal [REDACTED] acquires and tracks the Agena vehicle. The BIT system, designed to fulfill this objective, covers the [REDACTED] frequency range from 154 to 162 Mc and accepts only those signals which have characteristics similar to [REDACTED]. On those signals which qualify, the system will measure frequency, PRF, and signal amplitude along with the time of intercept to enable an analyst to identify the signal characteristics and to estimate a geographical area within which the emitter is located.

1.2 ~~(S)~~ Mission Highlights.

The results of this mission show that the vehicle was neither detected nor tracked by the [REDACTED] emitter during the 198 orbit mission life. No signals were intercepted which qualified on the basis of pulse width and PRF. The only intercept made where the signal exceeded the 24-microsecond pulse width criterion occurred on orbit 70 when the vehicle was passing approximately 300 miles southeast of Sary Shagan. It is concluded that the signal does not represent a vehicle detection or tracking event. On orbit 89 two 5 rpm scanning signals were intercepted in the high level (PLD-A) channel while the vehicle was passing over the western part of the Mediterranean. It is believed that these events are intercepts of the [REDACTED] radar. The system response to the Signal Simulator showed that the BIT functioned properly during the entire mission.

1.3 ~~(S)~~ Flight Summary.

Vehicle Number	1608
Launch Date	15 January 1965
Launch Time	2100 GMT
Inclination	75 degrees
Apogee	246.6 nautical miles
Perigee	100.3 nautical miles
Period	90.6 minutes

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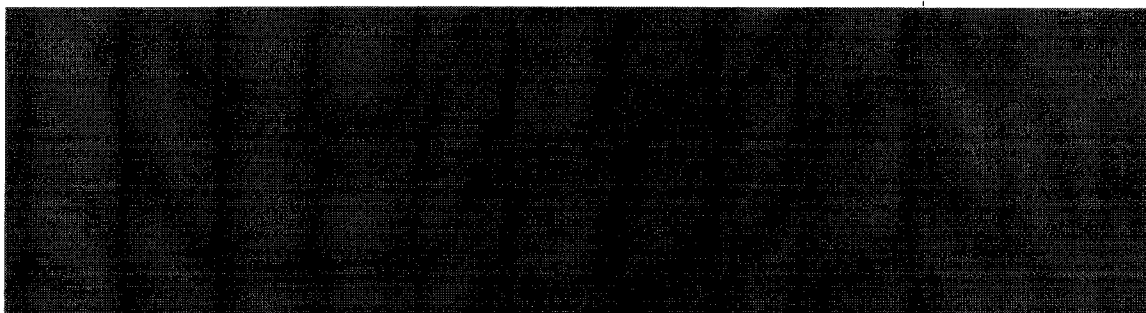
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The BIT system was programmed on during every orbit of the 198 orbit mission life while the vehicle was over the northern hemisphere with an emphasis on the coverage over Europe, the USSR and Asia. On 27 occasions, the unit was on throughout the period while the vehicle was over the southern hemisphere. Data were not recovered on readout orbits 164 and 167 because the vehicle was temporarily deactivated from orbit 158 to 174. Data from readout orbits 181, 183 and 189 were also lost because the ground tracking stations failed to acquire the vehicle.

This system monitors the 151- to 162-Mc frequency range with a receiver sensitivity of -53 dbm. With the inclusion of the antenna pattern, the over-all system sensitivity varies from approximately -47 dbm at the horizon to -53 dbm looking straight down. Signals intercepted by the system are rejected by qualification circuitry if the pulse widths are less than approximately 24 microseconds and if the PRFs do not fall within the 95- to 101-pps PRF acceptance band or harmonics of this band. The system measures the amplitude, frequency, and PRF of those signals which qualify. If a signal has a power level at the receiver of -30 dbm or greater, it will also be fed into a high level channel which requires no qualification other than amplitude and which measures only the signal amplitude.

2.2 ~~(S)~~ Mission Results.2.2.1 ~~(S)~~ Qualified Intercepts.2.2.2 ~~(S)~~ Non-Qualified Intercepts.~~SECRET~~
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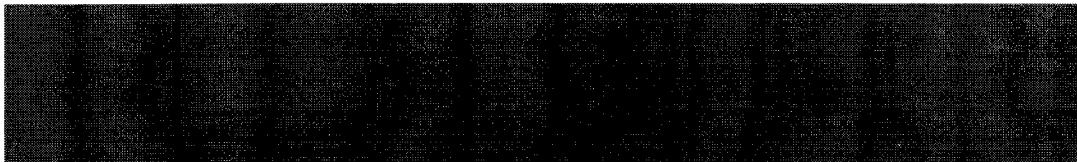
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2.2.2 ~~(S)~~ -- Continued.

3. ~~(S)~~ SYSTEM PERFORMANCE EVALUATION.

3.1 ~~(S)~~ System Specifications.

A summary of the system specifications for the BIT system used on this mission is given below. A block diagram of the system is shown in Figure 1.

Minimum Detectable Signal	-53 dbm PLD-B -30 dbm PLD-A
Antenna Gain	0 db on axis (nadir) -6 db at ± 60 degrees (horizo.
Minimum Acceptable Pulse Width	24 microseconds
PRF Qualifier Acceptance Range	95 to 101 pps 189 to 202 pps (2nd harmonic)
RF Passband at -50 dbm	151.4 to 161.4 Mc

3.2 ~~(S)~~ System Performance.

With the exception of the Signal Activity Indicator, PRC-B, the BIT system performed as designed for the duration of the mission. Comparison of the system's response to the Signal Simulator during the mission with its response prior to launch showed that the system maintained its original calibration and sensitivity levels.

The PRC-B channel was saturated during the entire read-in duration on every orbit of the mission. There is insufficient information available to determine if it was due to a malfunction in the circuit

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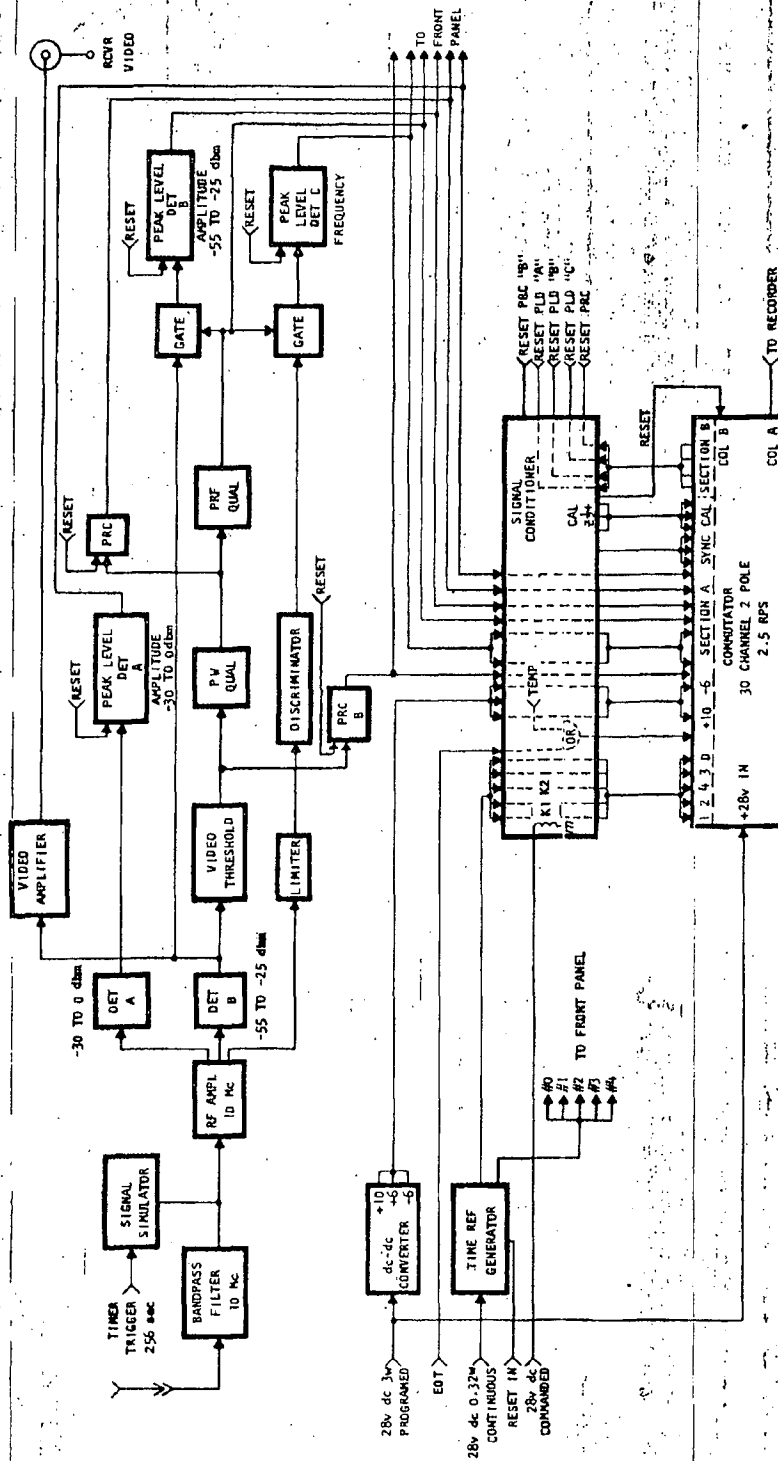


Figure 1

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3.2 ~~(S)~~ -- Continued.

itself or to an excessively noisy signal environment consisting of pulses less than 24 microseconds in duration. The operation of the circuit was similar to that on Mission 7053 with the exception that on this mission the channel was completely saturated and it did not react at all to the Signal Simulator operation. For this reason, it is suspected that the problem was due to a circuit failure rather than to a noisy signal environment.

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