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13 October 1960

PROJECT CANESINTRODUCTION

The Project CANES satellite was successfully launched into orbit 22 June 1960. For a period of 3 months, until the intelligence channel died after 21 September 1960, NRL conducted a series of experimental missions, collecting a multitude of "S"-band signals from [] countries. (Although other bands could have been chosen for this R&D experiment, Project CANES covered "S"-band because the majority of [] radars is concentrated in this part of the spectrum.) During this time, twenty-two selected missions, grouped into specific phases, were successfully interrogated and recorded.



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CURRENT STATUS

On 20 September 1960, orbit 1282 was interrogated and the satellite failed to respond. However, during the two following programmed orbits, the ELINT system was successfully turned on. On 28 September, on orbit 1393, which commenced the next programmed series of interrogations, the satellite failed to respond to command.

An "all out" effort was made "around the clock" for a period of two weeks by a team of some ten experts to effect interrogation. These efforts were unsuccessful, in spite of the incremental variations of each of the interrogation signal frequency parameters and utilizing all other possible permutations and combinations in interrogation.

The ELINT data system consists of an electronic complex of some thirty-two transistor circuits. The failure of any one of these units would render the satellite inactive. Complete temperature, shock, vibration and vacuum tests were run on all components in the satellite and their reliability established as carefully as possible prior to launch.

The identification of the specific component which failed has not been possible. Little is known of the environment in which the satellite components operate, but the higher radiation levels and impact with micrometeorites are two suspected causes of failure in most satellite systems.

Future systems will incorporate the choice of two interrogation receivers in the satellite. Further component reliability studies for satellite employment are proceeding in laboratories throughout the United States and the results of these studies will be incorporated in future units.

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Though little chance of successful interrogation exists, a programmed effort will be made to continue to effect turn-on by a field unit.

A detailed study of the interdependence of the circuitry in the satellite is now being made, to insure improved reliability of future units and, barring complete failure of certain critical components, the predicted minimum life of one year should be realized.

ACCOMPLISHMENTS

The CANES "S"-band ELINT satellite, developed and instrumented as a simple, compact and economical (cost approximately one million dollars) intelligence collection platform by a Navy in-House team, demonstrated the feasibility of utilizing known techniques and employing existing service sites and personnel to collect vital ELINT data.

Successful interrogation and collection of extremely valuable electronic intelligence was obtained over the [] countries. The intelligence collected by the ELINT portion of the satellite was unique in its vast geographic scope and produced more "S"-band ELINT coverage than any other ELINT collection effort to date.

Project CANES has demonstrated that the "S"-band radiation environment existing deep inside [] territory can be determined by a satellite platform more effectively than by any other means now known. This method of collection virtually has no limitation in area or time in which it can be used.

By providing some of the actual ELINT material for study, Project CANES has performed a valuable service in pointing out the problems that will be encountered in the future for which analysis techniques and instrumentation must be designed.

In the unclassified cover for the CANES satellite, the solar radiation portion, which is still operating, a major scientific breakthrough in the analysis of the Van Allen Belt radiations was achieved. It is anticipated this portion of the satellite will continue to collect vital radiation data for some months.

ELECTRONIC INTELLIGENCE RESULTS

The following summarizes results of analysis thus far conducted on [] radar signals received:

1. Verification that Soviet radars are powerful and extremely numerous in "S"-band.
2. Detection of a new, apparently fixed-beam radar for the first time.

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3. Ability to intercept and identify unique radars previously detected.

4. Ability to detect and identify Soviet [redacted]

5. Interception and identification of many radars of known types [redacted]

6. Greater Soviet use of new type [redacted] radars.

7. Ability to detect [redacted] of Soviet [redacted] radars.

Future analysis of the signal data should develop the following information:

1. Presence or absence and basic characteristics of any new [redacted] high-power radars.

2. Utilization of known [redacted] radar types as a function of the following:

a. Time of day:

b. Day in the week:

c. Location made within a [redacted] radius in many cases.

4. Radar activity in remote Asiatic and European areas of the [redacted] not previously covered by any other collection platform.

5. Detection of new powerful types of radar [redacted]

It is envisioned that refinements in future satellite analysis techniques and read-out equipment ultimately will provide a complete and timely picture, on a continuing basis, of the [redacted] radar defense system, in the same manner as current weather information is promulgated. The intelligence value of such data is obvious in evaluating the strength and weaknesses of the [redacted] defense system.

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