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HANDLE VIA BYEMAN CONTROL SYSTEM

~~(S)~~ NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.

THE NRO STAFF

19 May 1967

MEMORANDUM FOR CHAIRMAN, CSWG

SUBJECT: Mission Description for SIGINT Mission 7320 (SAVANT)

Attached is the mission description for Mission 7320

OPERATIONAL CONCEPT

Mission 7320 is contained in a spin stabilized P-11 sub-satellite which will be launched into a nominal 300 nautical mile orbit by a THORAD-AGENA booster combination. The payload is designed to intercept and record pre-selected telemetry frequencies within the 60-240 MHz range. The planned launch date predicated on the launch of the primary payload is [illegible] June 1967. Mission life is expected to be six months. A nominal 6 collection revs per day will be available for operational tasking. A [illegible]able timer is incorporated in the vehicle allowing collection ov[illegible]ny area of the world. The data will be dumped at Vandenberg and [illegible] Hampshire. Other Air Force tracking stations will be used for co[illegible] and control as required.

It is requested that the SWG furnish the areas from which the telemetry signals are transmitted, to include but not limited to: a) the priority of these areas with respect to each other; b) suspected frequencies associated with each area, and c) time of day and day of the week signal activity is most likely to occur.

FOR HENRY C. HOWARD
Colonel, USAF
Deputy Director for
Satellite Operations
NRO Staff

Atch
Msn Description

cc: Chairman, COMOR w/o atch

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MISSION 7320 (SAVANT Mission Description)

MISSION OBJECTIVES:

The primary objectives of the SAVANT System are to receive, recognize and copy the [redacted] 25X1 25X1

SYSTEM DESCRIPTION:

A. Payload Antenna

The antenna is a planar logrithmic spiral. The frequency range of this antenna is 60 megacycles to 250 megacycles with a gain of 3db across the band.

B. Receiver System Description:

The SAVANT Flight System consists of a Receiver Subsystem, and a Processing Subsystem (See Figure 1).

1. Receiving Subsystem Description

The Receiving Subsystem consists of seven separate single-conversion superhetrodyne receivers with bandwidth of 2 MHz and center frequencies of 61 MHz, 66 MHz, 71 MHz, 76 MHz, 165.2 MHz, 181 MHz, and 240 MHz. Each includes a pre-amplifier, first local oscillator and first mixer. All receivers have a spurious-free dynamic range of 45 db for signal levels of -65 dbm or less.

2. Processing Subsystem

The processing system consists of two scanning channels. Each of the scanning channels consists of a first IF amplifier, stepped second local oscillator, notch filter, FM canceller, and second IF amplifier/AGC circuit. The second local oscillator is step-tuned to four frequencies in 500 KHz increments. The duration of each step is 1.75 seconds.

The notch filter and FM canceller circuits are part of the interference reduction circuitry and perform the functions of reducing the level of FM or TV audio signals appearing in or near the receiver passband.

The FM canceller is followed by the second IF amplifier which has a bandwidth of 500 KHz at the 3db down points. The second IF output is conditioned for both predetection recording and postdetection recording. Each predetection conditioner consists of a third local oscillator, filter AGC circuit and buffer amplifier. The predetection output range is from 350 KHz to 850 KHz. The postdetection conditioner consists of a detector, buffer amplifier, and gate. The postdetected range is from 1 KHz to 250 KHz.

The processing subsystem contains signal recognizers capable of recognizing the [redacted] 25X1 25X1

C. Modes of Operation:

1. Mode #1

In mode #1 the two scanning channels (in the processing subsystem) samples the seven receiver sub-system outputs as follows: One processing channel samples the outputs of the 181 MHz, 240MHz and 165.2 MHz receivers sequentially. The second processing channel samples the outputs of the 61 MHz, 66 MHz, 71 MHz, and 76 MHz receivers sequentially. The processors sequentially scan each receiver output in four 500 KHz steps. The dwell time for each step is 1.75 seconds. In case of a valid intercept, as determined by the signal recognizers, the frequency in which the intercept was made is noted and the scan completed. If in the process of completing the scan, another valid intercept is made, the processor returns to the receiver which is highest in the frequency ordering scheme (165.2 MHz, 240 MHz, 76 MHz, 181 MHz, 71 MHz, 66 MHz and 61 MHz), and locks-on for the remainder of the readin period. If the signal was recognized in only one of the four 500 KHz steps the processor returns to that step. If the signal is recognized in more than one step, the processor selects the step which has the highest probability of being closest to the center frequency. The remaining six receivers are then scanned sequentially by the remaining processor. If a valid intercept is made in any of the six remaining receivers, the scan is completed and the receiver with the intercept, highest in the frequency ordering scheme, is selected for recording.

2. Mode #2

Same as mode #1 except that the 181 MHz and the 61 MHz receivers are not scanned.

3. Mode #3

Same as Mode #1 except that the 181 MHz, the 61 MHz and the 66 MHz receivers are not scanned.

4. Preselect Mode #1

In Preselect mode #1 the two scanning processors are directed to any two receivers selectable by ground command. The processors step through their respective receiver outputs continuously. In case of a valid intercept in one or more of the four 500 KHz steps, as determined by the signal recognizers, the processor then locks on to the appropriate step as in mode #1.

5. Preselect Mode #2

Same as Preselect mode #1 except that individual 500 KHz steps of each of the processors is selectable by ground command.

6. Two options for outputs are available from the signal processors; a pre-detection output or an output of both pre-detection and post-detection video. A slight degradation of the recording occurs when the pre and post detection option is selected.

D. Tape Recorder:

The recorder used with the SAVANT Payload is a Leach 2-track recorder. The tape recorder characteristics are ± 3 db over the range of 1 KHz to 1 MHz. The dynamic range is 25 db with the linear input-output response. Readin/Readout time is a nominal 6 minutes. A second recorder is available as a backup recorder. One track of the tape recorder is allotted to each signal processor.

When the payload is in modes 1-3 or Preselect mode #1, the recorder may be started by either recognition or a preselected turn on time. If the system is in Preselect Mode #2 the payload recognition pulse is inhibited so a vehicle command is required to initiate a tape recorder readin.