WORKING PAPERS

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TO: [redacted] CC: [redacted] DATE: 4 September 1973

SUBJ: 989 Program Descriptions FROM: [redacted]

Per your request, attached are 989 program descriptions.

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989 Program

I. Introduction

The P-989 program is comprised of a number of low altitude (275 n mi) spin stabilized, polar inclination orbiting electronic signal collection systems, including associated ground data processing. Signals are detected, read in, recorded, and read out to SCF stations. Geopositioning is performed using either spinning pencil beam from parabolic antennas above 2 GHz and spinning interferometers below 2 GHz.

During the last ten years, more than thirty systems have been launched as subsatellites from a host vehicle. These subsatellites, including antennas, weigh from 350 to 600 lbs on orbit, depending on the mission. Each of these has fulfilled a specific national intelligence collection requirement current at the time of launch. These range from missile telemetry detection and radar Electronic Order of Battle determination in the 1963-1965 period, through ABM and conventional radar signal collection during 1965-1969, to the present day systems which have an extended range of capabilities as described below in Section II. Section III describes systems in development.

II. Present Systems

1. Top Hat I (Mission 7334). Launched in November, 1970, the Top Hat system weighs 340 lbs. and covers the 450-1,000 MHz frequency range using back-to-back pairs of antennas in a spinning interferometer arrangement, it geopositions and makes parameter measurement of an important class of troposcatter links. Location is provided to an accuracy of about [redacted] and up to 12 voice channels are broken out, recorded and played back after encryption. Ground data reduction is performed at the NSA. 25X1

2. Mabeli (Mission 7339). The Mabeli system, weighing 380 lbs., intercepts the main beams of a number of ABM related radars and makes [redacted] Launched in January, 1972, the Mabeli system covers 150-165 MHz (Hen House), 387-426 MHz (Dog House and Top Roost), 862-964 MHz (Big Screen) and 25X1

1500-2500 MHz (Try Add), with separate channelized antennas and receivers for each frequency range.

3. Ursala 1 (Mission 7338). Ursala provides a complementary capability [redacted] by geopositioning pulse and CW radars in the 2000-12,000 MHz frequency range to an accuracy of [redacted] The system uses two spinning pencil beams with 3 and 6 ft. parabolic dishes for this purpose, fed by dual mode flat spirals, to provide monopulse DF. Launch occurred July 7, 1972, and the system has been operating at full capability since then except for a temporary outage lasting one week, during January, 1973. System on orbit weight is 390 lbs. 25X1

III. Systems In Development

1. Ursala II. Ursala II, identical to Ursala I, will be launched as a subsatellite on Mission 1207 during November, 1973. It will complement the capabilities of Ursala I and reduce the average revisit time to any portion of the Northern Hemisphere from the present 12 hours (with Ursala I above), to 6 hours.

2. Ursala III and IV. These systems will provide added detection sensitivity and radar parameter measurement accuracy over the predecessor systems Ursala I and II. This, plus added redundancy, is accommodated in an expanded spacecraft with a weight of 600 lbs. The systems are planned for launch in January, 1975 and July, 1976 respectively, to fulfill a continuing need for radar EOB.

3. Top Hat II. A follow-on to Top Hat I, Top Hat II contains added redundancy for extended life, as well as an additional receiving system for a new important class of signals in the 450-1,000 MHz frequency range. The system launch is planned for March, 1974 on Mission 1208 and will weigh 360 lbs. on orbit.

4. Raquel. Raquel is designed to provide Technical Intelligence on pulse and CW radar signals in the 4,000-18,000 MHz frequency range. It uses spinning pencil beams created by three parabolic antennas (3, 3, 2 ft.) for detection and geopositioning. It has added capabilities over the Ursala systems in the overlapping 4,000-12,000 MHz frequency ranges in that CW signal modulation can be determined and the main beam scan characteristics can be detected. It has about 3 db added sensitivity over Ursala III/IV, but a degraded location capability of [redacted] Launch date is planned for November, 1974 on Mission 1209.

IV. Future Systems

Plans are now being formulated for follow-on systems to fulfill other missions in addition to those described above. Two of these are described below.

1. SAL Verification. This system will provide main beam power and other necessary measurements on pulse and CW radars in the 800-8,000 MHz frequency range. Used in conjunction with other overhead resources, these measurements will be used to verify the SAL treaty limits on peak and average power for ABM associated radars. 25X1

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