DEPARTMENT OF THE AIR FORCE
OFFICE OF SPECIAL PROJECTS (OSAF)
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LOS ANGELES, CALIFORNIA 90009

MEMORANDUM FOR THE DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Semiannual Progress Report

Attached is the Program A Semiannual Progress Report for the period 1 July 1983 through 31 December 1983.

RALPH H. JACOBSON
Major General, USAF
Director

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Semiannual Progress
Report, as of 31 Dec 83

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SEMIANNUAL PROGRESS REPORT

CONTENTS

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SEMIANNUAL PROGRESS REPORT

PROJECT 989

Program Manager: Colonel Paul F. Foley

Summary:

Three 989 satellites were operational during this reporting period. The average combined tasking level for the six-month period was 255 min/day. Operation of RAQUEL IA continued with no new anomalies during the period. On 28 Jul 83, URSALA III was reactivated to provide additional real time transpond coverage of the Caribbean and Central America areas. On 2 Sep 83, URSALA IV suffered a short on the output side of its payload B-box power converter. This fault prevents the power supply from fully turning on and renders the payload inoperative. FARRAH I, which sustained a Low Voltage Cut-Off (LVCO) on 26 Jun 83, had its tasking suspended until 6 Jul 83 while the system's power storage capacity could be assessed. On 6 Jul 83, operations resumed and tasking has steadily increased to approximately 120 min/day. FARRAH II availability has been changed to support a June 1984 launch in response to the latest NRO direction. The payload was delivered on 2 Aug 83. At present, the FARRAH II spacecraft is undergoing the first cycle of thermal vacuum testing after successfully completing vehicle level compatibility, baseline, acoustic, and pre-thermal vacuum testing over the August-December 1983 time frame. Development activities continued on LORRI II with the accomplishment of the W-Band (92-96 GHz) Preliminary and Critical Design Reviews and the LORRI II Ground Data Processing System Preliminary Design Review. The FARRAH III acquisition is proceeding on schedule.

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1. Specific Status

a. On-Orbit Spacecraft:

(1) Mission 7343/URSALA III: URSALA III, in its 89th month on-orbit, was reactivated on 28 Jul 83 to provide additional coverage of the Caribbean and Central American areas. URSALA III will be used for real time transponds only and is presently supporting approximately 20 minutes of tasking per day. URSALA III provides limited general search and operational ELINT support in the 2-12 GHz region.

(2) Mission 7345/RAQUEL IA: RAQUEL IA, in its 69th month of operation, continued to provide technical intelligence collection in the 4-18 GHz region. This vehicle has continued to operate satisfactorily, but because only one recorder remains operational, the number of recorder cycles per day has continued to be limited to three. An average of 10 transpond segments per day are being completed. Approximately 55 minutes per day of tasking are being supported by RAQUEL IA. On 16 Dec 83, authorization was received to conduct real-time transpond operations into the Oakhanger Tracking Station. With this approval, RAQUEL IA can now perform transpond operations using all of the supporting remote tracking stations worldwide and can now take full advantage of the vehicle's collection capabilities, especially over Europe, despite the failure of two of its tape recorders.

(3) Mission 7344/URSALA IV: The mission of URSALA IV is general search, operational ELINT, and technical intelligence in the 2-12 GHz spectrum. URSALA IV, which is in its 57th month on-orbit, sustained a failure on 2 Sep 83, when the payload B-box power supply failed to fully turn on. The vehicle had entered 100% sun on 25 Aug 83. This failure has resulted in the loss of all mission tasking capability. The cause of the failure is postulated to be a loadside short most probably in a harness or connector on the output side of the power converter output selection relay. URSALA IV is in 100% sun until mid to late January 1984. An attitude adjustment maneuver was performed on 15 Sep 83 to reduce the B-box baseplate temperature to 52 degrees F, the coolest temperature possible under 100% sun. The additional cooling did not eliminate the short. The next opportunity for further cooling will be when the vehicle exits 100% sun and it cools to approximately 35 degrees F. Status passes are presently being conducted every 6 hours to monitor the condition of the vehicle and a long term plan for continued attempts to clear the short is being developed. This plan will not be executed until the late January 1984 timeframe.

(4) Mission 7346/FARRAH I: The mission of FARRAH I consists of general and directed search, operational ELINT, and technical intelligence over the 2-18 GHz region. The vehicle is in its 19th month of operation and is supporting approximately 120 minutes of collection per day. The vehicle is in a minimum sun condition. As previously reported on 26 Jun 83, a Low Voltage Cut-Off (LVCO) occurred which turned off all of the subsystems connected to the switched bus, including the payload data handler subsystem which was subsequently turned on by a stored program command. Tasking was suspended until 6 Jul 83 while on-orbit tests were conducted to determine the useable operating capacity of the batteries. These tests, which were conducted semi-weekly, weekly and now biweekly over the

last five months, indicate that the battery capacity has not degraded abnormally, and is stable with time. The plan is to continue battery capacity tests on at least a monthly basis and to optimize the LVCO avoidance criteria and the power model to permit the maximization of tasking.

b. Vehicle Under Development and Test:

(1) Mission 73XX/FARRAH II: The FARRAH II vehicle development and testing activity continued during the reporting period. The FARRAH II spacecraft has successfully completed its data handling, bit error rate testing, and TEMPEST testing without the payload installed during July 1983. The payload and payload special test equipment delivery occurred on 2 Aug 83. The payload was integrated with the spacecraft on 23 and 24 Aug 83. The payload/spacecraft compatibility testing, software processing and analysis were completed over the 26 Aug to 21 Oct 83 timeframe. Baseline and vehicle level acoustic testing were completed during the 28 Oct-16 Nov 83 timeframe. From 17 Nov-13 Dec 83, the vehicle was moved to the thermal vacuum chamber where a test complex buildup and validation was accomplished and the pre-environmental functional tests were completed. On 14 Dec 83, system level thermal vacuum testing commenced. The completion of thermal vacuum cycle #2 and post-environmental functional tests and the conduct of magnetic moment tests is scheduled for mid-March 1984. Following this, flight readiness tests and premate operations are scheduled to support a 4 May 84 mate. Launch Operations Working Group activities have included the conduct of Flight Support tests in which the Satellite Test Center commanded the vehicle and processed the status telemetry. Data Handling Validation tests in which the remote tracking stations demonstrate their ability to receive and pass FARRAH II wideband data began in December 1983.

(2) Mission 72XX/LORRI II: The LORRI II pallet development activities continued with the EHF and VHF boxes completing baseline functional and integration testing. In addition, the W-Band (92-96 GHz) mainbeam search system completed a Preliminary Design Review and a Critical Design Review. Manufacturing of the various pallet subsystems has proceeded on schedule. The VHF and EHF antennas entered pre-environmental testing. The Ground Segment development got underway with the writing and approval of the Ground Segment specification and its associated subsystem specifications. A Ground Segment Preliminary Design Review was held in November 1983.

(3) Mission 73XX/FARRAH III: FARRAH III development and acquisition continues on schedule. On

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