DEPARTMENT OF THE AIR FORCE
OFFICE OF SPECIAL PROJECTS (OSAF)
PO BOX 92960, WORLDWAY POSTAL CENTER
LOS ANGELES, CALIFORNIA 90009

MEMORANDUM FOR THE DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Semiannual Program Report

Attached is the Program A Semiannual Program Report for the period 1 January 1984 through 30 June 1984.

RALPH H. JACOBSON
Major General, USAF
Director

1 Atch
Semiannual Program
Report, as of 30 Jun 84

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SEMIANNUAL PROGRAM REPORT

CONTENTS

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SEMIANNUAL PROGRAM REPORT

PROJECT 989

Program Manager: Lt Colonel Jon H. Bryson

Summary:

Three 989 satellites were operational during this reporting period. The average combined tasking level for the six month period was 233 minutes. Operation of RAQUEL IA continued with no new anomalies. On 14 Apr 84, URSALA III sustained a reoccurrence of an intermittent 8-20 db loss in DF pulse sensitivity for all bands. This problem appears to be similar to that which occurred temporarily in Nov 1977. Authorization to conduct real time transpond operations with URSALA III and RAQUEL IA at Oakhanger tracking station was received in late Dec 83. This authorization permitted more timely collection of the European area with older collectors which have little or no recording capability. URSALA IV, which sustained a failure on 2 Sep 83, remains non-operational. FARRAH I sustained a CMOS memory latch-up in its data handler buffer memory on 15 Mar 84. This resulted in the degradation of the reported geopositioning accuracy of the system when processed by the near real time processor (NRTP).

Processing of DF data was resumed on 16 Mar using the slower flight data processing system (FDPS) and acceptable geopositioning accuracy is being maintained. Modifications to the NRTP are being implemented. The failure is most probably due to a cosmic ray induced latch-up; but because of the prior data handler turn-on anomaly, power cycling of the data handler to clear the fault can not be attempted at this time. Operating with the fault increases the continuous power load which in turn reduces the effective tasking by 15 minutes per day. FARRAH II was launched on 25 Jun 84

and is currently undergoing a 60 day on-orbit engineering evaluation phase.

Development activities continued on LORRI II with the emphasis on payload level integration and test. 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 95th month on-orbit, supported approximately 34 minutes of tasking per day in the real time transpond mode. The mission of URSALA III is general search and operational ELINT in the 2-12 GHz region. URSALA III sustained a reoccurrence of an 8-20 db loss in DF pulse sensitivity in all bands. The symptoms of the loss match those of a similar anomaly in Nov 77. That anomaly corrected itself. An attitude control maneuver is being contemplated to change the vehicle's temperature and see if the loss can be eliminated. (Temperature was not identified as the source for correcting the anomaly in 1977.) Following the launch and on-orbit checkout of FARRAH II, URSALA III will be returned to on-orbit storage.

(2) Mission 7345/RAQUEL IA: RAQUEL IA, in its 75th month of operation, continues 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 is limited to two. An average of ten transpond segments per day were being completed with the Oakhanger transpond active. RAQUEL IA supports 20-50 minutes of tasking per day.

(3) Mission 7344/URSALA IV: The mission of URSALA IV is general search, operational ELINT and technical intelligence over the 2-12 GHz spectrum. URSALA IV, which is in its 63rd month on-orbit, sustained a failure on 2 Sep 83 and has been inoperable ever since. Repeated attempts to correct a load side short on the output of its payload B-box power supply have failed to correct the problem. Redundant supplies, variation in temperature and spin rate and switching of all possible switchable loads have been tried throughout this six month reporting period. With the launch of FARRAH II, routine status passes, which had been conducted every six hours since the failure occurred, have been suspended and the vehicle is now relegated to test vehicle status for the P-989 Mission Control Team.

(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 25th month of operation and is supporting approximately 106 minutes of collection per day. The vehicle is in a minimum sun condition and is expected to enter 100% sun on 18 August. When this occurs, it is anticipated that the level of tasking will increase to 200-215 minutes per day. On 15 Mar 84, FARRAH I sustained a latch-up in the data handler buffer memory. This latch-up affected the log A/B values from the payload which were used in geopositioning emitters. This anomaly, which appears to be cosmic ray induced, could be cleared by power cycling the data handler which has latch-up protection circuitry built in, but because of the data handler turn-on anomaly, this will not be attempted. Log A/B data is required by the Near Real Time processor (NRTP), but is not required by the Flight Data Processor (FDPS) in order to achieve the desired accuracy results. Processing and reporting of DF was resumed on 16 Mar 84. Changes to the NRTP to correct for this anomaly are presently being implemented. As a result of this anomaly, there is an increase of 80 ma

in the continuous load. This equates to an effective loss of 15 minutes per day of tasking. Battery capacity testing is continuing on a bi-weekly basis. These tests show that battery capacity is being maintained and is not degrading abnormally with time. Efforts to optimize the LVCO avoidance criteria and power model to permit the maximization of tasking is continuing.

b. Vehicles Under Development and Test

(1) Mission 7347/FARRAH II. The FARRAH II vehicle development and testing activities were completed during the reporting period. Systems level thermal vacuum testing was completed on 5 Mar 84. Magnetic moments testing was conducted at Ames Research Center 12-14 Mar 84 and flight readiness testing was completed in the late March timeframe. FARRAH II was mated with the host vehicle SV-19 on 4 May 84. Subsequently a host vehicle problem required that FARRAH II be demated. This was accomplished and FARRAH II was remated on 18 May 84. On 1 Jun 84, FARRAH II reached the launch base and was subsequently launched on 25 Jun 84.

(2) Mission 7242/LORRI II: The LORRI II pallet development activities continued with the EHF and VHF payload boxes entering system integration and testing. Initial functional testing is complete and system vibration test is in progress. The VHF antenna system is in post environmental RF testing. The EHF omni antenna has completed all testing. The EHF high gain antenna suffered a drive motor anomaly and is in repair. No schedule impact is anticipated. The W-band system is entering the integration phase of development. The Ground Segment Critical Design Review was completed and development is on schedule. Payload/Pallet integration is scheduled for October 1984.

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

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MEMORANDUM FOR THE DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Semiannual Program Report

Attached is the Program A Semiannual Program Report for the period 1 July 1984 through 31 December 1984.

RALPH H. JACOBSON
Major General, USAF
Director

1 Atch
Semiannual Program
Report, as of 31 Dec 84

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SEMIANNUAL PROGRAM REPORT

CONTENTS

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SEMIANNUAL PROGRESS REPORT

PROJECT 989

Program Manager: Lt Colonel Jon H. Bryson

Summary:

Three 989 satellites were operational during this reporting period. The average combined tasking level for the six month period was 515 minutes per day. Operation of RAQUEL IA continued with no new anomalies. URSALA III was returned to on-orbit storage with the successful launch and on-orbit checkout of FARRAH II. Authorization to conduct real time transpond operations with URSALA III and RAQUEL IA at Oakhanger tracking station was suspended on 13 Jun 84 due to security reasons with transponding unencrypted data to Oakhanger. URSALA IV, which sustained a failure on 2 Sep 83, remains nonoperational. FARRAH I sustained a CMOS memory latch-up in its data handler buffer memory on 15 Mar 84. This resulted in the degradation of the reported geopositioning accuracy of the system when processed by the near real time processor (NRTP).

Modifications to the NRTP have been implemented and acceptable geopositioning accuracy is being maintained. A FARRAH I tape recorder sustained an intermittent failure of the end-of-tape monitor which results in using the recorder in the analog (1:1) mode only. The 60-day on-orbit engineering evaluation phase for FARRAH II was completed and the system was released for operations on 24 Aug 84.

Development activities continued on LORRI II with the emphasis on payload level integration and test. 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 101st month on-orbit, was returned to on-orbit storage following the successful launch and on-orbit checkout of FARRAH II.

(2) Mission 7345/RAQUEL IA: RAQUEL IA, in its 81st month of operation, continues to provide technical intelligence collection in the 4-18 GHz region. This vehicle continues to operate satisfactorily, but because only one recorder remains operational, the number of recorder cycles per day is limited to two. An average of nine transpond segments per day are being completed. RAQUEL IA supports 20-50 minutes of tasking per day.

(3) Mission 7344/URSALA IV: The mission of URSALA IV is general search, operational ELINT and technical intelligence over the 2-12 GHz spectrum. URSALA IV, which is in its 69th month on-orbit, sustained a failure on 2 Sep 83 and is inoperable. Repeated attempts to correct a load side short on the output of its payload B-box power supply have failed to correct the problem. Redundant supplies, variation in temperature and spin rate and switching of all possible switchable loads were tried throughout this six-month reporting period. With the launch of FARRAH II, routine status passes, which were conducted every six hours since the failure occurred, were suspended and the vehicle is now relegated to test vehicle status for the P-989 Mission Control Team.

(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 31st month of operation and is supporting approximately 217 minutes of collection per day. On 15 Mar 84, FARRAH I sustained a latch-up in the data handler buffer memory. This latch-up affected the log A/B values from the payload which were used in geopositioning emitters. Log A/B data is required by the Near Real Time Processor (NRTP), but is not required by the Flight Data Processor (FDPS) in order to achieve the desired accuracy results. Changes to the NRTP to correct for this anomaly were implemented. As a result of this anomaly, there is an increase of 80 ma in the continuous load. This equates to an effective loss of 15 minutes per day of tasking. Battery capacity testing is continuing on a bi-weekly basis. These tests show that battery capacity is being maintained and is not degrading abnormally with time. Efforts to optimize the LVCO avoidance criteria and power model to permit the maximization of tasking is continuing.

On 16 Oct 84, tape recorder #1 experienced a failure of the end-of-tape (EOT) monitor. The EOT monitor controls the reset of the analog lockout relay (i.e., enables recorder to be operated in analog mode, 1:1). Analysis isolated the failure to the EOT monitor circuitry and data indicated no apparent mechanical problems. The tape recorder was returned to operations on 3 Dec 84 and experienced a successful EOT monitor reset on 4 Dec 84 which resulted in the recorder being taken out of service until 10 Dec 84 and then returned to service. The recorder is currently being used for analog data only (1:1 mode). The indications are that this failure is an intermittent problem which may be sensitive to temperature/voltage or contamination in a relay.

(5) Mission 7347/FARRAH II. FARRAH II was launched on 25 Jun 84 and entered the 60-day

engineering evaluation phase which was completed successfully on 24 Aug 84. FARRAH II on-orbit performance reflects the performance predicted prior to launch. During this period FARRAH II averaged 270 minutes of tasking per day and 20 tape recorder cycles per day. The only anomaly on FARRAH II was a delayed tape recorder readout. On 15 Sep 84, tape recorder #2 failed to readout when commanded. The recorder responded 302 seconds late with a normal readout. The recorder was then taken off-line while the anomaly was investigated. Following the failure analysis which determined there were no mechanical problems with the recorder, the recorder was returned to operations on 24 Sep 84. Since resumption of operations, the recorder has functioned without a recurrence of the problem. The delayed readout on FARRAH II is similar to a FARRAH I delayed readin which only occurred once.

b. Vehicles Under Development and Test

(1) Mission 7242/LORRI II: The LORRI II pallet development activities continued with the EHF, VHF and W-Band payload boxes completing all testing. The payload was delivered to the Prime Contractor in mid-December to begin integration into the pallet system and system test. All antennas completed environmental testing and are also ready for pallet integration and testing. The Ground Segment Critical Design Review was completed and development is on schedule. Payload/Pallet integration is scheduled for January 1985.

(2) Mission 73XX/FARRAH III: FARRAH III development and acquisition continue on schedule. The

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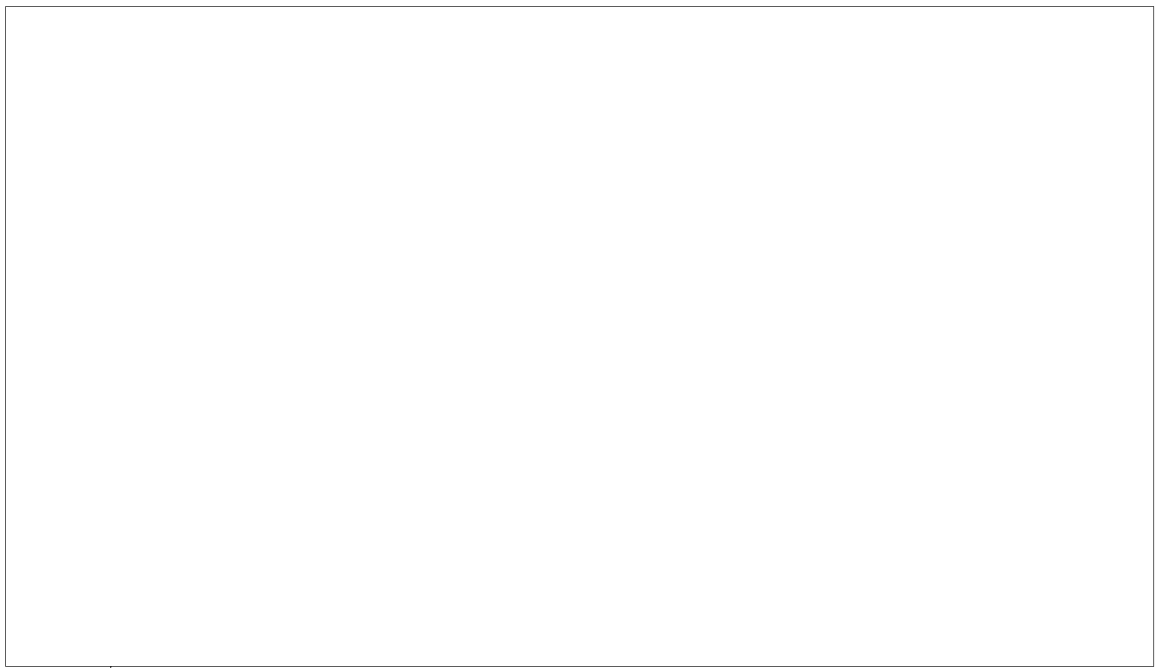

d. Transportable Mission Planning System (TMPS)

(1) During this reporting period, the program office initiated formal procurement action to provide a survivable, transportable mission planning (TMPS) capability. The TMPS shall be capable of planning and generating spacecraft tasking commands to support mission requirements, and to maintain spacecraft state-of-health during contingency operations resulting from increasing levels of conflict or natural disaster. Contract award is anticipated in April 85 with acceptance in Jul 87 and an initial operating capability of Jan 89.