as of 31 Mar 1973
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1 pg

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

REPLY TO ATTN OF: SAPSP-1

31 MAY 1973

SUBJECT: Quarterly Program Review

TO: DNRO (Dr. McLucas)

Attached is the Quarterly Program Review for the period 1 January 1973 through 31 March 1973.

SIGNED

DAVIS P. PARRISH
Colonel, USAF
Vice Director

1 Atch
Quarterly Program Review

QUARTERLY PROGRAM REVIEW

C O N T E N T S

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TOP SECRET

QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Brig Gen David D. Bradburn
Vice Director: Colonel Davis P. Parrish

1. Quarterly Summary of Operations

a. HEXAGON vehicle no. 5 was launched on 9 March. It was equipped with the Stellar Terrain mapping camera system in addition to the panoramic payload. Recovery of the first re-entry vehicle occurred on 21 March 1973.

b. Recovery of the re-entry vehicles from GAMBIT flight number 37 occurred on 4 and 21 January. There were no GAMBIT launches during this quarter.

c. [redacted] 25X1
The mission of Strawman vehicle number 4 (2737) was terminated on 23 March. Mission number 4421 (TRIPOS SOUSEA) was terminated on 23 January.

d. The following ELINT vehicles, launched in prior periods were still operational on 31 March 1973:

Vehicle Number	Name	(Months) Operational Life
7334	TOPHAT I	28
7339	MABELI	14
7338	URSULA I	8

2. Personnel:

On 20 January, Brigadier General David D. Bradburn replaced Major General Lew Allen, Jr. as the Director of SAFSP.

Handle Via [redacted]

QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Brig Gen David Bradburn
Project Director: Col Jack Simonton

1. Overview

a. During this reporting period, over 2,500 successful P-989 spacecraft readouts to the SCF tracking stations were accomplished. Three spacecraft are currently being tasked. They are:

FI NSN	NAME	PURPOSE	FREQUENCY MHZ	MONTHS IN ORBIT
[redacted]-23/7334	TOPHAT I	Map and copy tropospheric scatter communications links	450 - 1,000	28
[redacted]-24/7339	MUSELI	Precision power and polarization measurements on Soviet AEM/AES Radars	151 - 165 387 - 426 862 - 964 1,500 - 2,500	14
[redacted]-25/7335	UPSALA I	General Search and EOB	2,000 - 12,000	8

b. Five Project 989 systems are under development. They are:

FI NSN	NAME	PURPOSE	FREQUENCY MHZ	AVAILABILITY DATE
[redacted]-26/7342	UPSALA II	General Search and EOB	2,000 - 12,000	Feb 1973
[redacted]-28/7340	TOPHAT II	Map and Identify Tropospheric Scatter Communications Links	450 - 1,000	Feb 1974
[redacted]-29/7341	RAQUEL	General Search and Technical Intelligence	4,000 - 18,000	May 1974
[redacted]-31 IED	UPSALA III	General Search and EOB	2,000 - 12,000	1974
[redacted]-31 IED	UPSALA IV	General Search and EOB	2,000 - 12,000	Jan 1975

[redacted]

Handle Via [redacted]

2. Program Direction

a. There were no changes in program direction.

b. Vehicles under development require available funds through FY73 and 74 with completion in FY75.

c. URSALA III availability date has been changed to reflect delays resulting from the added capability to reject [redacted] and BIG MESH data. 25X1

3. Technical Status

a. Systems On-Orbit

(1) FV 4421 TRIPOS/SOUSEA

On 23 January 1973 (rev 15,036), the spacecraft Kill Plan was used to terminate operations. Subsequent attempts to communicate with the spacecraft confirmed that the system had indeed been terminated. TRIPOS/SOUSEA was launched on 20 May 1970. Its 32 month life established a 989 record. Over 4,500 system readouts were accomplished.

(2) FV 4427 ARROYO

Upon completion of the 90 day [redacted] sponsored test of Soviet reaction to a dormant system, FV 4427 was reactivated on 4 January 1973. At that time, the status of all systems was found to be unchanged by the three months of inactivity. Subsequently, ARROYO was once again turned over to the SCF as a Training and Check Out (TACO) system. 25X1

(3) FV 4423 TOPHAT I

Tasking of this system, now in its 28th month of operation, remains very heavy. Over 800 readouts of the system were accomplished during this reporting period. Data quality remains excellent. TOPHAT I contains three transmitters and three tape recorders. Since only one transmitter and one tape recorder are required, there are two spares. Presently, the two Watkins-Johnson transmitters are both excessively noisy, and all operations are being accomplished with the Conic transmitter. One of the three recorders experienced three separate periods of intermittent operation during February 1973 before an apparently final failure, which occured during the last week of March. The remaining two recorders have not experienced any problems.

(4) FV 4424 MABELI

Tasking of MABELI also remains very heavy. Over 1,[illegible] readouts were accomplished during this reporting period. The system is in its 14th month of operation. Two of the three tape recorders are operative. (The system required one tape recorder.) All four of the transmitters are operative. (The system requires two transmitters.)

(5) FV 4425 URSALA I

On 27 January 1973, an URSALA I payload anomaly occured. The Sum Video channel and the DF PCM data were lost [illegible] until 3 February 1973 when the anomaly dissappeared in apparent response to a spacecraft spin axis attitude maneuver. This maneuver was designed to cool the system by reorientation of the spacecraft with respect to the sun. The anomaly has not since reappeared. As a precaution, however, tasking is being limited, and the spin axis is being reoriented every two weeks to keep the system temperatures below those at the time of failure. These conditions will prevail until early May, at which time the system will exit 100% sun, and normal tasking may be resumed. On 22 March 1973, a second anomaly occured. At that time, and on two occasions since, short periods of anomalous operation of the channel 18 Voltage Control Oscillator (VCO) have been experienced. This telemetry channel transmits a 90 point commutator containing spacecraft health and status data. None of the three short duration failures have interfered with spacecraft operations. If the nature of this failure changes, becomes more frequent in occurrence, or longer in duration, it will be necessary to command in-the-blind, that is, without command verification. In addition, considerably less data concerning health and status will, of course, be available. Neither of these two restrictions is considered a serious threat against the success of future operations.

b. Vehicles in Process

(1) FV 4426 URSALA II

The System test sequence was completed in December 1972, and the spacecraft is ready for launch when required. Current planning is to (a) protect, as long as practical, against a mission 1206 launch (currently planned for mid-June 1973); (b) consider mission 1207 as the prime candidate; and (c) not discount the possibility of a deferral of launch until mission 1208.

(2) FV 4428 TOPHAT II

System development is proceeding on schedule and without incident. Payload delivery is scheduled in mid-July 1973 with a flight availability date in early 1974.

(3) FV 4429 RAQUEL

Fabrication of the RAQUEL system is also proceeding smoothly. Minor delays in piece part deliveries now being experienced are expected to eventually result in three to six weeks late delivery in the payload. If required, however, this slip could be recovered from the system test sequence such that the system will be available for flight in May 1974, as presently scheduled.

(4) FV 4430 URSALA III

As in the case of RAQUEL, late deliveries of piece parts and vendor provided subassemblies are jeopardizing the payload delivery schedule. Motorola is currently projecting a four to six week late delivery of the payload. This delay also could be recovered from the system test sequence to allow flight availability in May 1974.

(5) FV 4431 URSALA IV

Fabrication of the payload is proceeding without difficulty. Spacecraft assembly has not yet been initiated. Flight availability remains in January 1975.

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

REPLY TO ATTN OF: SAFSP-1

30 AUG 1973

SUBJECT: Quarterly Program Review

TO: DNRO (Dr. Mc Lucas)

Attached is the Quarterly Program Review for the period 1 April 1973 through 30 June 1973.

DAVIS P. PARRISH
Colonel, USAF
Vice Director

1 Atch
Quarterly Program Review

QUARTERLY PROGRAM REVIEW

C O N T E N T S

QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Brig Gen David D. Bradburn
Vice Director: Colonel Davis P. Parrish

1. Quarterly Summary of Operations

a. Recovery of re-entry vehicles from HEXAGON vehicle no. 5 occurred on 4 April (RV-2), 18 April (RV-3) and 11 May (RV-4). The Stellar Terrain was recovered on 20 April 1973.

b. GAMBIT vehicle no. 38 was launched on 16 May, with re-entry vehicles returned on 21 May and 13 June 1973. Vehicle no. 39 was launched on 26 June but failed to achieve orbit due to an Agena engine malfunction.

c. The following SIGINT vehicles, launched in prior periods, were still operational on 30 June 1973:

Vehicle	Operating Life to Date (Months)
[redacted]	
TOPHAT I	31
MABELI	17
URSULA I	11

25X1

2. Briefings During Quarter

Personnel	Date	Place
Dr. Mc Lucas, DNRO	5 Apr 73	SAFSP
EXRAND Sub-committee of COMIREX	2 May 73	Satellite Test Center (STC), Sunnyvale
Maj Gen Lew Allen, Jr., Deputy to Director CIA for Intelligence Community	8 May 73	SAFSP

 as of 30 June 1973

QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Brig Gen David D. Bradburn
Project Director: Col Jack Simonton

1. Overview

a. During this reporting period, over 2,800 successful P-989 spacecraft readouts to the SCF tracking stations were accomplished. Three spacecraft are currently being tasked. They are:

FV/MSN	NAME	PURPOSE	FREQUENCY MHZ	MONTHS IN ORBIT
4423/7334	TOPHAT I	Map and copy tropospheric scatter communications links	450 - 1,000	31
4424/7339	MABELI	Precision power and polarization measurements on Soviet ABM/AES Radars	151 - 165 387 - 426 862 - 964 1,500 - 2,500	17
4433/7338	URSALA I	General Search and EOB	2,000 - 12,000	11

b. Five Project 989 systems are under development. They are:

FV/MSN	NAME	PURPOSE	FREQUENCY MHZ	AVAILABILITY DATE
4426/7342	URSALA II	General Search and EOB	2,000 - 12,000	Presently Available
4428/7340	TOPHAT II	Map and Identify Tropospheric Scatter Communications Links	450 - 1,000	Feb 74
4429/7341	RAQUEL	General Search and Technical Intelligence	4,000 - 18,000	Jul 74
4430/TBD	URSALA III	General Search and EOB	2,000 - 12,000	May 74
4431/TBD	URSALA IV	General Search and EOB	2,000 - 12,000	Jan 75

2. Program Direction

Funds not required in FY 73 for mission planning, RTS MODS and SCF MODS ($.3 million) were reprogrammed to spacecraft and payloads.

3. Technical Status

a. Systems On-Orbit

(1) FV 4421 TRIPOS/SOUSEA. This system was terminated on 23 January 1973 (Rev 15,036). The SPADAT prediction, as of 29 June 1973, is for this satellite to re-enter in April 1974. This system will be dropped from subsequent reports.

(2) FV 4427 ARROYO. ARROYO is being used by the SCF as a Training and Check Out (TACO) system. This spacecraft is currently being used to check out the new MADCOM command software.

(3) FV 4423 TOPHAT I. Tasking of this system, now in its thirty-first month of operation, remains very heavy. Over 900 readouts of the system were accomplished during this reporting period. Data quality remains excellent. TOPHAT I contains three transmitters and three tape recorders. Only one transmitter and one tape recorder are required to accomplish the mission. Presently all operations are being accomplished on the Conic transmitter as the two Watkins-Johnson transmitters remain excessively noisy. Of the three tape recorders aboard, one is fully operational, one has failed, and one has excessive wow and flutter affecting the low speed Pulse Code Modulation (PCM) processing. This tape recorder is being used only when absolutely required.

(4) FV 4424 MABELI. Tasking of MABELI, now in its seventeenth month of operation, remains very heavy. Over 1,200 readouts were accomplished during this reporting period. All four transmitters and two of the three tape recorders aboard are operative. On 17 March 1973, a payload polarimeter failure occured which impaired the capability of the receiver system to determine the polarization of emitter signals in Bands 1, 2, and 3. A new processing algorithm has been developed to determine an emitter's effective radiated power (ERP) without a phase measurement. The results so far indicate that the ERP measurements made on signals processed via the new algorithm compare very closely with those made on the same signals before the polarimeter failure. The average difference is 0.32 db. The new algorithm is based on calibration data taken before the MABELI launch

to provide a continuing system power measurement capability in the event of a polarimeter failure. On 16 June 1973, the polarimeter began functioning again. Three calibrations are now scheduled to determine if the polarimeter is functioning properly and/or to re-calibrate the system. On 7 May 1973, the sensitivity of Band 4 dropped 30 db, although significant, sufficient sensitivity remains to receive TRY-ADD main beam signals - the purpose of Band 4. Further analysis is continuing in both these failure areas with the present consensus being that MABELI remains a valuable collector.

(5) FV 4425 URSALA I. Tasking of this system, now in its eleventh month of operation, has increased. Over 700 readouts were accomplished during this reporting period. Since exiting [redacted] percent sun in early May, normal tasking has resumed with all subsystems operating satisfactorily. Further, the Channel 18 Voltage Control Oscillator (VCO) has performed without anomaly since 21 April 1973. Spacecraft temperatures are being monitored each readout and the spin axis is being re-oriented with respect to the sun as required to maintain system temperatures safely below those at the time of the payload failure on 27 January 1973. The spin axis is currently being re-oriented once every month.

b. Vehicles in Process

(1) FV 4426 URSALA II. The system is currently in ready storage. Direction was received on 28 June 1973 to launch this spacecraft on mission 1207. System revalidation and flight readiness preparations are scheduled to commence in August 1973 tracking to a projected November launch.

(2) FV 4428 TOPHAT II. System development is proceeding on schedule with a projected flight availability date of January 1974. Payload final acceptance tests commenced on 30 June 1973 with subsequent delivery to the prime contractor scheduled for 10 August 1973.

(3) FV 4429 RAQUEL. Design, fabrication, and assembly of the RAQUEL system is proceeding with delivery of the payload now scheduled for 15 January 1974. This delay of ten weeks has for the most part been caused by the late delivery of high-reliability

pieceparts, which has delayed the completion and test of key subassemblies. The AFPRO office at the prime contractor has been very active in this regard by invoking the program DX rating at critical sub-tier vendors. The payload contractor is now receiving high-reliability pieceparts on a first available basis.

(4) FV 4430 URSALA III. System development is proceeding on schedule. All payload electrical design is complete as well as breadboard system test. Subassemblies have been fabricated and are presently in test. Payload delivery to the prime contractor is now scheduled for 9 October 1973. This represents a delay of two weeks, resulting from the recent program decision to change the payload data bit rate from 32 kbps to 128 kbps and use 1 MHz tape recorders. There is as yet no impact on the spacecraft flight availability date of May 1974.

(5) FV 4431 URSALA IV. Fabrication of the payload for this system is proceeding without difficulty for delivery in March 1974. Spacecraft assembly has not yet been initiated. Flight availability remains in January 1975.

~~TOP SECRET~~

HANDLE VIA
BYEMAN
CONTROL SYSTEM

~~(S)~~ NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.

THE NRO STAFF

December 13, 1973

MEMORANDUM FOR DR. McLUCAS

SUBJECT: SAFSP Quarterly Program Review

At the right is General Bradburn's Quarterly Program Review covering activities from July 1, 1973 to September 30, 1973. The Summary Section and through to Section X, particularly the Overview and Program Direction portions, are an excellent summary of the status of the satellite projects and are well worth your reading. Section XII summarizes the Applied-Research/Advanced Technology projects. Significant studies completed include the UHR Study by EK, the Artificial Starfield Calibration design and fabrication, the UHR Optical Payload Study, and the Tape Storage Camera.

KEITH S. PEYTON
Captain, USAF

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BYEMAN

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[redacted] of 30 September 1973
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DEPARTMENT OF THE AIR FORCE 1 Page
OFFICE OF SPECIAL PROJECTS (OSAF)
PO BOX 92960, WORLDWAY POSTAL CENTER
LOS ANGELES, CALIFORNIA 90009

REPLY TO
ATTN OF: SP-1

SUBJECT: Quarterly Program Review

TO: DNRO (Dr. McLucas)

Attached is the Quarterly Program Review for the period 1 July 1973 through 30 September 1973.

SIGNED

DAVID [redacted]
Colonel [redacted]
Vice Director

1 Atch
Quarterly Program Review

[redacted]

QUARTERLY PROGRAM REVIEW

C O N T E N T S

QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Brig Gen David D. Bradburn
Vice Director: Colonel Davis P. Parrish

1. Quarterly Summary of Operations

a. HEXAGON Vehicle No. 6 was launched on 13 July 1973. Re-entry vehicles were recovered on 1 August 1973 (RV-1), 13 August 1973 (RV-2), 8 September 1973 (RV-3) and 25 September 1973 (RV-4). The Stellar Terrain Camera RV was recovered on 24 August 1973. Useful mission life was 74 days.

b. GAMBIT Vehicle No. 40 was launched on 27 September 1973 and all systems are performing to specification.

[redacted]

e. The following SIGINT vehicles, launched in prior periods, were still operational on 30 September 1973:

Vehicle	Operating Life to Date (Months)
[redacted]	
TOPHAT 1	34
MABELI	20
URSULA 1	14

25X1

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QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Brig Gen David Bradburn
Project Director: Col Jack Simonton

1. Overview

a. During this reporting period, over 2,200 successful P-989 spacecraft readouts to the SCF tracking stations were accomplished. Three spacecraft are currently being tasked. They are:

FV/MSN	NAME	PURPOSE	FREQUENCY MHZ	MONTHS IN ORBIT
4423/7334	TOPHAT I	Map and copy tropospheric scatter communications links	450 - 1,000	34
4424/7339	MABELI	Precision power and polarization measurements on Soviet ABM/AES Radars	151 - 165 397 - 426 862 - 964 1,500 - 2,500	20
4425/7338	URSALA I	General Search and EOB	2,000 - 12,000	14

b. Five Project 989 systems are under development. They are:

FV/MSN	NAME	PURPOSE	FREQUENCY MHZ	AVAILABILITY DATE
4426/7342	URSALA II	General Search and EOB	2,000 - 12,000	Nov 73
4428/7340	TOPHAT II	Map and Identify Tropospheric Scatter Communications Links	450 - 1,000	Feb 74
4429/7341	RAQUEL	General Search and Technical Intelligence	4,000 - 18,000	Aug 74
4430/TBD	URSALA III	General Search and EOB	2,000 - 12,000	May 74
4431/TBD	URSALA IV	General Search and EOB	2,000 - 12,000	Jan 75

2. Program Direction. Financial program remained as initially approved. URSALA II vehicle availability change is based on anticipated launch of host. Effort was initiated to obtain approval for and change computer systems from CDC 6600 to CDC Cyber 74.

3. Technical Status

a. Systems On-Orbit

(1) FV 4427 ARROYO. ARROYO is being used by the SCF as a Training and Check Out (TACO) system. This satellite was used for checkout of the new command software module MADCOMT. MADCOMT went operational on 5 September 1973 and is now being used by the remote tracking stations (RTS) for generation of all P-989 satellite commands.

(2) FV 4423 TOPHAT I. This system, now in its thirty-fourth month of operation, has set a new program operational longevity record, i.e., approaching completion of four times its design/incentive life of nine months. Data quality remains excellent; there have been no payload failures. TOPHAT I has three tape recorders aboard; only one recorder is required to accomplish the mission. Of the three recorders, one has failed and the other two are nearing the end of useful life. The expected life of a 150 KHz tape recorder is 2,500 readouts. Tape recorder one has exceeded 5,000 readouts, tape recorder two, 3,800 readouts, and tape recorder three failed at 2,231 readouts. The spin rate of TOPHAT I has decayed to 12 RPM. Unlike the new P-989 spacecraft, TOPHAT I has no spin makeup system. While it is not possible to accurately predict when TOPHAT's geopositioning data will no longer be useful due to its low spin rate, the intercept data is expected to remain useable through December 1973. To date, TOPHAT I has accomplished more than 12,000 successful readins and collected over 60,000 minutes of data.

(3) FV 4424 MABELL. Tasking of this system, now in its twenty-first month of operation, has been reduced to extend mission life. More than 800 readouts were accomplished during this reporting period. In conjunction with reduced tasking, it has been necessary to implement a temperature management program to minimize thermal stresses on the payload while the spacecraft is in full sun. The spacecraft will not exit full sun until 20 December 1973. The spacecraft continues to operate properly except for the loss of Band 4 sensitivity which occurred on 7 May 1973. A special calibration, to be performed in October 1973, will allow a better assessment of the Band 4 capability against TRY ADD mainbeam signals. The polarimeter, which failed on 17 March 1973 and began functioning again on 16 June 1973, continues to operate properly. Two of the three tape recorders aboard remain operational.

(4) FV 4425 URSALA I. Tasking of this system, now in its fourteenth month of operation, continues to increase over previous

reporting periods. Over 800 readouts were accomplished this quarter. On 18 September 1973, it was necessary to implement power management (reduced tasking) as well as continue with temperature management (spin axis control) in order to maintain system temperatures safely below those at the time of the payload failure on 27 January 1973. The need to exercise power management results from the spacecraft rapidly moving through a 96% sun condition. Normal tasking, without power management, will resume on 22 October 1973. All spacecraft subsystems have continued to operate properly except for two more intermittent operations of the CH 18 Voltage Control Oscillator (VCO), which occurred on 15 and 16 September 1973. This oscillator carries the spacecraft health and status telemetry. The intermittency appears to be temperature dependent in that these two anomalies occurred at the same system temperature as the three previously reported instances and has never appeared at either a higher or lower temperature. The Time Reference Generator (TRG), which jumped 1,200 seconds ahead on 2 June 1973, jumped ahead 240 seconds again on 13 September 1973. The TRG runs continuously from launch. Although a time jump has never occurred during bench testing, once having occurred on orbit, history shows that the TRG will randomly jump several times during the life of the spacecraft. The intercept data processors are aware of these jumps and have no problem recovering data as a result. URSALA I supported Navy operation RIMPAC on 14 - 19 September 1973. On one transpond pass intercept data was collected, relayed through an Interim Defense Communication Satellite (IDCSP), processed, and the product shipped to the user in less than one hour.

b. Vehicles in Process

(1) FV 4426 URSALA II. Direction was received on 28 June 1973 to launch this spacecraft on host vehicle 1207. System revalidation and flight readiness preparations commenced on 10 September 1973, approximately two weeks late because of a tunnel diode amplifier (TDA) problem in the payload. The suspect TDA has been replaced and the payload successfully retested and re-installed in the spacecraft. Flight readiness preparations are now proceeding on a success oriented schedule tracking to a 14 October 1973 mate and subsequent 7 November launch.

(2) FV 4428 TOPHAT II. System development is proceeding on schedule. Payload acceptance tests have been successfully completed and the payload was delivered to the prime contractor on 23 August 1973. The acceptance test data shows that the payload performance equals or exceeds that of TOPHAT I. TOPHAT II is currently in systems test at the prime contractor. Systems tests and flight readiness preparations are now tracking to a mid-March 1974 launch.

(3) FV 4429 RAQUEL. The spacecraft structure is presently in assembly. The completed spacecraft, less the payload and payload antennas, is scheduled to start system level testing in January 1974.

Assembly and integration of the payload system is in progress at the payload subcontractor's facility. All parts required to build the flight system have been received. Acceptance testing of the payload is scheduled to start mid-November 1973 with delivery of the payload to the prime contractor expected in late January 1974. All payload antennas have been assembled and are presently undergoing acceptance testing. Delivery of the payload antenna to the program is scheduled for February 1974. Integrated systems testing of the entire spacecraft system, with payload installed, will start in February 1974 with a planned flight availability of August 1974.

(4) FV 4430 URSALA III. System development is proceeding on schedule. All payload subsystems are through acceptance tests and there are no known technical problems or material shortages at this time. Final acceptance tests of the complete payload are scheduled to begin 1 October 1973 with payload delivery to the prime contractor planned for 8 November 1973. The contractual delivery date was 9 October 1973; however, this delay can be made up during spacecraft system tests and therefore no impact on the flight availability date is anticipated.

(5) FV 4431 URSALA IV. Fabrication of the payload for this system is 90% complete. Final payload acceptance tests are scheduled to start on 17 December 1973 with delivery of the payload to the prime contractor planned for 1 February 1974. The contractual delivery date for the payload is 18 May 1974 so assembly of the basic spacecraft will be the pacing item.

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

REPLY TO
ATTN OF: SAFSP-1

2 JAN 1974

SUBJECT: Quarterly Program Review

TO: DNRO (Mr. Plummer)

Attached is the Quarterly Program Review for the period 1 October 1973 through 31 December 1973.

Davis P. Parrish

DAVIS P. PARRISH
Colonel, USAF
Vice Director

1 Atch
Quarterly Program Review

Handle Via
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Control System Only

QUARTERLY PROGRAM REVIEW

C O N T E N T S

Handle Via
BYEMAN

QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Brig Gen David D. Bradburn
Vice Director: Colonel Davis P. Parrish

1. Quarterly Summary of Operations

a. HEXAGON Satellite Vehicle No. 6 (SV-6), launched in July 1973, was deboosted on 12 October 1973 after 91 days in orbit. SV-7 was launched on 10 November 1973. This was the first HEXAGON SV launched under total SAFSP management. RE-entry Vehicles (RV's) were recovered on 24 November (RV-1) and 17 December (RV-2).

b. GAMBIT Mission 4340 was launched in the previous quarter on 27 September 1973. Recoveries were successfully accomplished on 11 October (RV-1) and 27 October (RV-2).

c. Program 989 Flight Vehicle (FV) 4426, the second vehicle in the URSALA series, was launched on 10 November 1973 aboard the HEXAGON launch vehicle. This satellite was declared fully operational on 20 November.

d. The following SIGINT vehicles, launched in prior periods, were still operational on 31 December 1973:

Vehicle	Mean Mission Duration (Months)	Operating Life to Date (Months)
TOPHAT 1	9	37
[redacted]		
MABELI	9	23
URSALA 1	9	17
[redacted]		

25X1

QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Brig Gen David Bradburn
Project Director: Col Jack Simonton

1. Overview:

a. During this reporting period, FV 4426, the second vehicle in the URSALA series, was successfully launched. This satellite was evaluated and declared fully operational in only ten days after launch, a new program record. In 1973, Program 989 satellites were tasked more than 16,000 times and collected over 1,300 hours of SIGINT data. During the last half of this reporting period, two-thirds of all URSALA satellite tasking was Time-Critical-Reporting (TCR) where processed intercept data was being routinely delivered to the NSA within six hours of collection. The URSALA satellites also played a very active role in coverage of hostilities during the Mid-East war. The four active on-orbit spacecraft are:

FV/MSN	NAME	PURPOSE	FREQUENCY (MHZ)	MONTHS IN ORBIT
4423/7334	TOPHAT I	Map and copy tropospheric scatter communications links	450 - 1,000	37
4424/7339	MABELI	Precision power and polarization measurements on Soviet ABM/AES Radars	151 - 165 387 - 426 862 - 964 1,500 - 2,500	23
4425/7338	URSALA I	General Search and EOB	2,000 - 12,000	17
4426/7342	URSALA II	General Search and EOB	2,000 - 12,000	1

b. Four Project 989 systems are under development. They are:

FV/MSN	NAME	PURPOSE	FREQUENCY (MHZ)	AVAILABILITY DATE
4428/7340	TOPHAT II	Map and identify Tropospheric Scatter Communi-cations Links	450 - 1,000	Feb 74
4429/7341	RAQUEL	General Search and Technical Intelligence	4,000 - 18,000	Aug 74
4430/7344	URSALA III	General Search and EOB	2,000 - 12,000	Aug 74
4431/7344	URSALA IV	General Search and EOB	2,000 - 12,000	Jan 75

2. Program Direction:

There were no changes in Program Direction during this reporting period.

3. Technical Status:

a. Systems On-Orbit

(1) FV 4427/ARROYO. ARROYO is being used by the Satellite Control Facility (SCF) as a Training and Check Out (TACO) system. This satellite was used in the checkout of the backup operations center at the System Development Corporation (SDC), Santa Monica, California. ARROYO was successfully controlled from the System Development Corporation through the Satellite Control Facility's remote tracking station in New Hampshire. The backup operations center at SDC would be used if the Satellite Test Center in Sunnyvale, California, were incapacitated.

(2) FV 4423/TOPHAT I. This system, now in its thirty-seventh month of operation (a new record for an SAFSP satellite), has successfully performed for more than four times its design incentive life of nine months. Data quality remains excellent and there have been no payload failures. The spin rate of TOPHAT I has now decayed to ten rpm. Since there is no spin make-up system on this spacecraft, spin decay will soon limit its useful life. Predictions of spin axis or attitude stability at very low spin rates are reliable for only four to six weeks. Therefore, TOPHAT I's useful life can be projected only through mid-February 1974, but may be months longer.

(3) FV 4424/MABELI. MABELI continues to intercept data from the large Soviet ABM radars. A special calibration operation was conducted during October 1973 to verify the capability of MABELI to measure the main beam power of Try Add signals. The results were positive and indicate that the satellite system has adequate margin to make accurate power measurements of Try Add main beam peaks in spite of a sensitivity loss in the 1,500 - 2,500 MHz band. The antenna problem which had necessitated special processing of Dog House signals has corrected itself during this reporting period. Dog House signals can now be processed normally. The polarimeter continues to operate normally with the exception of one readin in mid-December. Two tape recorders of the three on board are still operational, but they are degraded in regards to available readin capacity.

(4) FV 4425/URSALA I. URSALA I operated normally throughout this reporting period. A gradual deterioration in the frequency response of the 1 MHz tape recorders aboard has been detected. The cause is believed to be a long-term accumulation of tape oxide on the recorder heads; however, an in-depth analysis is underway to insure that the true cause is isolated. This deterioration has not yet affected the processing of the payload digital data. Power and spin attitude management for payload temperature control was discontinued on 22 October 1973 and should not be required throughout the remaining life of the vehicle. Normal tasking has resumed. URSALA I's spin axis is currently drifting towards a non-polar attitude. This will not only allow general search and EOB collection, but will optimize the vehicle's attitude for continued mapping of a new family of COMINT microwave emitters first detected by URSALA I in August 1973.

(5) FV 4426/URSALA II. URSALA II was launched on 10 November 1973. With two URSALA systems on orbit revisit times of two and eight hours can now be achieved. At present, URSALA II's spin axis is polar oriented to optimize collection against Time Critical Reporting (TCR) areas and Electronic Order of Battle (EOB) targets. URSALA II is operating nominally with no serious problems. However, the following minor anomalies have developed since launch. First, one horizon sensor has an anomolous sine wave imposed on its bipolar output. The alternate sensor is operating properly and is being used for mission tasking. The horizon sensor problem has now been duplicated in ground test, the characteristics of which are consistent with a voltage induced by the sensor spinning in the earth's magnetic field at particular latitudes. The suspect sensor appears to be hypersensitive to this interaction. An investigation is also in progress on a self-interference phenomena wherein the spacecraft's telemetry downlinks feed into the payload receivers during transpond operations. The transpond mode is used

for realtime recovery of spacecraft calibration data. A design deficiency has also been discovered in the URSALA II payload which adversely affects the ability of the system to measure multiple frequencies on a single emitter pulse. The problem arises because of greater sensitivity in the pulse frequency measurement (PFM) circuitry. This problem was not detected on URSALA I because its circuitry is not as sensitive. A software fix has already been implemented. The two URSALA satellites accomplished more than 14,500 minutes of collection during this reporting period. This take will significantly increase since URSALA II was launched midway through this quarter.

b. Vehicles in Process

(1) FV 4428/TOPHAT II. System development continues on schedule. All system level acceptance tests have been successfully completed and flight readiness activities will commence mid-January 1974. Spacecraft mate to the host vehicle, SV 1208, is scheduled for early February in support of a mid-March launch.

(2) FV 4429/RAQUEL. Assembly and integration of the payload system was completed in December 1973 except for final tests of the Pulse Frequency Measurement subsystem. Final acceptance testing at the payload subcontractor facility is now scheduled to begin in late January 1974. Much of the delay in the payload effort has been due to additional parts screening and subsystem level testing that has detected problems and failures early in the test cycle and required additional time to analyze, repair, modify, or redesign. Two of the payload antennas have completed final acceptance testing. The remaining seven antennas are presently in acceptance testing. Assembly of the spacecraft is 85% complete. Delivery of the payload to the prime contractor and start of integrated systems testing of the spacecraft is now scheduled for April 1974. Some overtime effort may be required during system level acceptance testing to meet the August 1974 flight availability date.

(3) FV 4430/URSALA III. All payload subsystems are through acceptance tests and there are no known technical problems or material shortages at this time. Final acceptance tests of the complete payload began on 16 November 1973 with payload delivery to the prime contractor planned for January 1974. The spacecraft flight availability date is now August 1974. FV 4429/RAQUEL, which has the same availability date, will be launched first if URSALA II is operational.

(4) FV 4431/URSALA IV. Fabrication of the payload for this system is complete. Final payload acceptance tests are

scheduled to start on 1 February 1974 with delivery of the payload to the prime contractor planned for April 1974. The contractual delivery date for the payload is 18 May 1974 so assembly of the basic spacecraft will be the pacing item.

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