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

12 SEP 1975

SUBJECT: Quarterly Program Review

TO: DNRO/Mr. Plummer

Attached is the Quarterly Program Review for the period 1 January 1975 through 31 March 1975.

ORIGINAL
SIGNED BY
DAVIS P. PARRISH
Colonel, USAF
Vice Director

1 Atch
Quarterly Program Review

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QUARTERLY PROGRAM REVIEW

C O N T E N T S

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BYEMAN

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QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Maj Gen David D. Bradburn
Vice Director: Col Davis P. Parrish

1. Quarterly Summary of Operations

a. Two Reentry Vehicles (RVs) were recovered from HEXAGON Mission 1209 (launched 29 October 1974). RV-3 was recovered 31 January 1975, RV-4 on 7 March 1975.

b. There was no GAMBIT Mission activity during this period.

c. Previously launched SIGINT vehicles operational on 31 March 1975 were:

Vehicle	Mean Mission Duration (Months)	Operating Life To Date (Months)
[redacted]		
MABELI	9	38
URSALA I	15.5	32
URSALA II	15.5	15
TOPHAT II	23.2	11
RAQUEL I	24	5
[redacted]		

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2. Briefings During Quarter

a. The following people were briefed on SAFSP Programs:

(1) 24 January - Maj Gen Abraham J. Dreiseszun, Commander, Air Force Contract Management Division.

(2) 3 February - Brig Gen Jerome F. O'Malley, Assistant DCS/Plans, HQ SAC. He has additional duty as CINC SAC Representative to the Joint Strategic Target Planning Survey.

QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Maj Gen David D. Bradburn
Project Director: Col Philip N. Papaccio

1. Overview:

a. During this reporting period five P-989 satellites were operational. MABELI, now in its 38th month of operational life, continues to collect information on Soviet ABM radars. URSALAs I and II supported numerous Time Critical Reporting (TCR) operations including [redacted] 25X1
25X1
[redacted] RAQUEL I completed its initial dedicated 25X1
search in the 12 to 18 GHz frequency range and more emphasis is now being placed on directed Technical Intelligence (TI) tasks. RAQUEL I was also used to support the TCR collecting requirements already mentioned. TOPHAT continues to be used primarily for location and collection of the [redacted] signal. The active Program 989 on-orbit spacecraft were:

MISSION	NAME	PURPOSE	FREQUENCY (MHz)	MONTHS IN ORBIT
7339	MABELI	Precision power and polarization measurements on Soviet ABM/ AES Radars	151 - 165 387 - 426 862 - 964 1,500 - 2,500	38
7333	URSALA I	General Search and EOB	2,000 - 12,000	32
7342	URSALA II	General Search and EOB	2,000 - 12,000	15
7340	TOPHAT II	Map and copy communications links; Special [redacted] payload	450 - 1,000	11

MISSION	NAME	PURPOSE	FREQUENCY (MHz)	MONTHS IN ORBIT
7341	RAQUEL I	General Search and Technical Intelligence	4,000 - 18,000	5

b. Three Program 989 systems are under development. They are:

MISSION	NAME	PURPOSE	FREQUENCY (MHz)	AVAILABILITY DATE
7343	URSALA III	General Search and EOB	2,000 - 12,000	Apr 75
7344	URSALA IV	General Search and EOB	2,000 - 12,000	Oct 75
7345	RAQUEL II	Power Measurement and Technical Intelligency	1,500 - 10,000	Oct 77

2. Program Direction:

a. The approved program at the beginning of the quarter was $13.352M with an Undefined balance of $.683M.

b. During this period, WHIG 0460, March 1975, approved a transfer of $.500M Undefined to the Spacecraft and Payloads line (3020 BLACK) and $.040M from Undefined to the [redacted] line (3080 BLACK). The first reprogramming action was for retest effort on URSALAs III and IV, which was needed to protect a June 1975 launch option and maintain a six month back up capability. [redacted]

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c. These two actions increased the 989 approved program by $.540M with a corresponding decrease in Undefined. The FY 75 funding approved at the end of this quarter was $13.892M (12.287 BLACK and 1.605 WHITE) with an Undefined balance of $.143M.

3. Technical Status:

a. Systems On-Orbit

(1) Mission 7339/MABELI. The intermittent loss of predetection data in Bands 1, 2, and 3 (151 - 165 MHz, 387 - 426 MHz, 862 -

964 MHz) has continued since November 1974. Several suspect components and possible failure modes have been identified, with the most likely being an open solder joint on a teflon circuit board. The digital data are unaffected and the main mission requirement of power measurement of Sino-Soviet radars continues to be satisfied. Any attempt to correct this intermittency by thermal control would risk further deterioration of the payload and possible loss of the entire mission. MABELI, now in its 38th month of active mission life, is the second oldest operating P-939 spacecraft, surpassed only by TOPHAT I, whose mission was terminated in its 43rd month.

(2) Mission 7338/URSALA I. Collection by URSALA I averaged 32 minutes per day during this quarter despite a number of problems with the spacecraft and payload. One new problem has occurred in the payload monopulse geopositioning subsystem. To correct this intermittent problem, a software subroutine has been developed which recognizes invalid monopulse data, changes the geopositioning technique from the monopulse to the centroid method, and maximizes the useable data. The degraded battery limits the number of minutes available for collection, and the intermittent "no mod" problem at times delays the rapid reporting of data. Although the intermittent monopulse problem results in some degradation in emitter location accuracy, URSALA I has been serving a useful role by providing decreased revisit time in support of Time Critical Reporting tasks, especially in the Middle East and Southeast Asia.

(3) Mission 7342/URSALA II. URSALA II collection during this quarter averaged 122 minutes per day. On several occasions an intermittent loss of signal strength was experienced on the -Y telemetry antenna. This problem is similar to that experienced on URSALA I and MABELI. Data timeliness and data quality are not affected and URSALA II's health remains excellent. The URSALA III and IV software is now being used to process the data from URSALA I and II. This has provided several advantages including early operational demonstration of the URSALA III/IV software, increased timeliness, and improvement in geopositioning accuracy.

(4) Mission 7340/TOPHAT II. TOPHAT II continues in excellent health. In its 11 months on orbit, the system has provided over 373 hours of collection and averaged 16.6 readins per day. Its primary intelligence contribution is geolocation and copy of the [redacted] high interest, short duration signal. TOPHAT II also contributed to the COMINT mission by providing geolocations, frequencies, and activity indicators [redacted] The tasking of TOPHAT II, when in conjunction with the [redacted] has been implemented in an effort to locate additional ground-satellite communication terminals. 25X1 25X1 25X1

(5) Mission 7341/RAQUEL I. RAQUEL I has completed an initial 90-day search for new emitters in the 12 - 18 GHz frequency range. Tasking in this frequency range continues but at a lower level, against directed search targets and in support of Time Critical Reporting requirements. For example, RAQUEL I is tasked during conjunctions with the [redacted] in order to locate [redacted] and determine operating frequencies. Additionally, RAQUEL I is employed in deriving technical intelligence on specific directed search CW signals in the 4 to 10 GHz frequency range. Vehicle health remains excellent except for a recent failure in one of the redundant Attitude Control Systems (ACS) and the previously reported loss of sensitivity in Band 5 (10 - 12 GHz). Use of the remaining ACS has been prohibited pending completion of the failure analysis. During the three month period from January through March 1975, RAQUEL I provided 274 additional hours of collection, for a total of 446 collection hours since launch. 25X1

b. Systems in Process

(1) Mission 7343/URSALA III. The URSALA III spacecraft has been assembled and will undergo various system tests up to and including the Thermal Vacuum tests in preparation for a June 1975 launch on HEXAGON Mission 1210. The decision to launch may be made as late as launch minus 40 days (30 April 1975). However, assuming the continued good health and the present projected lifetime of URSALA II, the flight is not anticipated before the Spring of 1976 on HEXAGON Mission 1211.

(2) Mission 7344/URSALA IV. The URSALA IV payload was delivered to the prime contractor's facility in September 1974. The current launch strategy is to maintain the URSALA IV system available for flight within six months of the URSALA III launch. The anticipated flight is on HEXAGON Mission 1215 in the Fall of 1977.

(3) Mission 7345/RAQUEL II. A technical, cost, and schedule proposal for the RAQUEL II Power Measurement and Technical Intelligence Collection system was received from our prime contractor on 4 February 1975. After review of the proposal by NRO and NSA evaluators, several areas of system simplification were suggested to the contractor. Subsequently, a revised proposal was submitted on 31 March 1975. At this time the NSA and the NRO are in agreement on the system performance specifications and the contractor's proposal satisfies all our requirements. Contract award for the spacecraft and the in-line data processing system is anticipated in September 1975. Contract award for the off-line analysis functions will be postponed since the NSA is considering performing this function in-house.

c. Project TRESS. During this period, Project TRESS (Tactical Realtime ELINT Support System) was initiated. This is a multiphase

effort to develop and demonstrate a tactical ELINT capability. The initial effort is concentrated on the development of a capability to process URSALA data collected in the transpond mode within five to 15 seconds and report geopositioned signals of interest within 15 minutes. Initial hardware/software acceptance is anticipated during the first week in April. This realtime processing system will then be used to support exercise Gallant Shield during the latter part of April.

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REPLY TO
ATTN OF: SAFSP-1

26 SEP 1975

SUBJECT: Quarterly Program Review

TO: DNRO/Mr. Plummer

Attached is the Quarterly Program Review for the period 1 April 1975 through 30 June 1975.

ORIGINAL
SIGNED BY

DAVIS P. PARRISH
Colonel, USAF
Vice Director

1 Atch
Quarterly Program Review

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BYEMAN
Control System Only

TOP SECRET

QUARTERLY PROGRAM REVIEW

C O N T E N T S

25X1

QUARTERLY PROGRAM REVIEW

Overall General Summary

Program Director: Maj Gen David D. Bradburn
Vice Director: Col Davis P. Parrish

1. Quarterly Summary of Operations:

a. HEXAGON Mission 1210 was launched 8 June 1975. The first Reentry Vehicle was recovered on 24 June 1975.

b. GAMBIT Mission 4344 was launched on 18 April 1975. The first Satellite Recovery Vehicle was returned on 10 May, and the second recovered on 3 June for a total operational life of forty-six days.

[redacted]

d. Previously launched SIGINT vehicles operational on 30 June 1975 were:

Vehicle	Mean Mission Duration (Months)	Operating Life To Date (Months)
[redacted]		
MABELI	9	41
URSALA I	15.5	35
URSALA II	15.5	18
TOPHAT II	23.2	14
RAQUEL I	24	8
[redacted]		

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2. Briefings During Quarter

a. The following people were briefed on SAFSP Programs:

(1) 7 April - [redacted] both of the National Photographic Interpretation Center.

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QUARTERLY PROGRAM REVIEW

Program 989

Program Director: Maj Gen David D. Bradburn
Project Director: Col Philip N. Papaccio

1. Overview:

a. During this reporting period five P-989 satellites were operational. MABELI, now in its 41st month of operational life, continues to collect information on Soviet ABM radars. URSALAs I and II continue to support numerous Time Critical Reporting (TCR)

25X1

RAQUEL I was used to support many of these TCR collection requirements in addition to its primary role in providing ELINT Technical Intelligence on several high priority Soviet weapon systems. URSALA I, URSALA II, and RAQUEL I also participated in the Gallant Shield Joint Service exercise, which demonstrated the capabilities of low altitude satellites in a tactical operations role. TOPHAT continues to be used primarily for location and collection of the signal. The active Program 989 on-orbit spacecraft were:

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MISSION	NAME	PURPOSE	FREQUENCY (MHz)	MONTHS IN ORBIT
7339	MABELI	Precision power and polarization measurements on Soviet ABM/ AES Radars	151 - 165 387 - 426 862 - 964 1,500 - 2,500	41
7338	URSALA I	General Search and EOB	2,000 - 12,000	35
7342	URSALA II	General Search and EOB	2,000 - 12,000	18
7340	TOPHAT II	Map and copy communications links; Special payload	450 - 1,000	14

25X1

MISSION	NAME	PURPOSE	FREQUENCY (MHz)	MONTHS IN ORBIT
7341	RAQUEL I	General Search and Technical Intelligence	4,000 - 18,000	8

b. Three Program 989 systems are under development. They are:

MISSION	NAME	PURPOSE	FREQUENCY (MHz)	AVAILABILITY DATE
7343	URSALA III	General Search and EOB	2,000 - 12,000	Apr 75
7344	URSALA IV	General Search and EOB	2,000 - 12,000	Oct 75
7345	RAQUEL II	Power Measurement and Technical Intelligence	1,500 - 10,000	Oct 77

2. Program Direction:

a. The approved program at the beginning of the quarter was $13.892M with an undefined balance of $.143M. During this period WHIG 0632, April 1975, approved a transfer of $.143M undefined to the [redacted] line (3080 BLACK). [redacted] 25X1

b. The FY 1975 final approved program for the quarter and the fiscal year was $14.035M ($1.605 WHITE and 12.430 BLACK).

3. Technical Status:

a. Systems On-Orbit:

(1) Mission 7339/MABELI. Despite the several failures in the MABELI payload, this system continues to provide valuable intelligence collection against Soviet ABM related radar systems. The previous intermittent loss of predetection data in Bands 1, 2, and 3 (151 - 165 MHz, 387 - 426 MHz, 862 - 964 MHz) which started in November 1974 has further degraded, however. The digital data are unaffected and the main mission requirement of power measurement of Sino-Soviet radars continues

to be satisfied. Any attempt to correct this intermittency by thermal control would risk further deterioration of the payload and possible loss of the entire mission. MABELI, now in its 41st month of active mission life, is the second oldest operating P-989 spacecraft, surpassed only by TOPHAT I, whose mission was terminated in its 43rd month.

(2) Mission 7338/URSALA I. Collection by URSALA I averaged 61.3 minutes per day during this quarter despite several continuing problems with the spacecraft and the payload. The intermittent "no mod" problem, which occurs on approximately 50% of the Remote Tracking Station contacts, has resulted in both the delay of TCR and has forced the occasional dumping of routine data in order to provide tape recorder space for new TCR data.

URSALA I and URSALA II continue in support of both TCR and routine taskings. In addition, URSALA I and URSALA II supported the Gallant Shield Joint exercise where their data were processed at [redacted] in two ways: first, the normal TCR processing mode; and second, processed by the Real Time URSALA minicomputer processing system. 25X1

(3) Mission 7342/URSALA II. Collection by URSALA II averaged 128.1 minutes per day. One new problem has developed during this quarter. The monopulse DF data in one of the two required channels has become very temperature dependent, with the result that monopulse DF data is invalid at high spacecraft temperature, which occurs while the spacecraft is in 100% sun. Signals are now only geopositioned by the centroid method where the error ellipse is approximately twice the size of the error ellipse generated using the monopulse DF method.

(4) Mission 7340/TOPHAT II. TOPHAT II continues in excellent health. In its 14 months on orbit, the system has provided over 597 hours of collection. Its primary intelligence contribution is geolocation and copy of the [redacted] 25X1
TOPHAT II also contributed to the COMINT mission by providing geolocations, frequencies, and activity indicators [redacted] 25X1
[redacted] The tasking of TOPHAT II, when in conjunction with the [redacted] I satellites, has been implemented in an effort to locate additional ground-satellite communication terminals. 25X1

(5) Mission 7341/RAQUEL I. Collection by RAQUEL I averaged 192 minutes per day during this quarter. System health remains good with the exception of the previously reported loss of sensitivity in Band 5 (10 - 12 GHz) and the failure of one of the redundant Attitude Control Systems (ACS). While the failure in the ACS system was under

investigation, the attitude of the spacecraft was allowed to drift through a cross plane angle of approximately 45 degrees. The conclusion from the failure investigation was that a random failure of a power bus fuse probably caused the loss of the ACS. The remaining ACS system is functioning satisfactorily and will be used to maintain the optimum 55° North nadir pointing spin axis attitude.

b. Systems in Progress:

(1) Mission 7343/URSALA III. While the URSALA III spacecraft was in Thermal Vacuum test in early April, major problems were encountered with the transmitters, and the Thermal Vacuum test was terminated until good transmitters are available. With the continued good health of URSALA II, the launch of URSALA III is not anticipated before HEXAGON Mission 1211, scheduled for a late 1975 launch.

(2) Mission 7344/URSALA IV. The URSALA IV payload was delivered to the prime contractor's facility in September 1974. The current launch strategy is to maintain the URSALA IV system available for flight within six months of the URSALA III launch. The anticipated flight is on HEXAGON Mission 1215 in the Fall of 1977.

(3) Mission 7345/RAQUEL II. A revised cost proposal was received from the contractor on 31 March 1975 reflecting several system simplifications. Factfinding on the proposal was held on 24 through 27 June 1975. Subsequent to this, most of the major subcontracts were negotiated and a government position on the total system proposal has been formulated in preparation for negotiations. Contract go-ahead is expected to occur prior to September 1975 in order to support a December 1977 launch date.

c. URSALA Real Time Minicomputer Processing System. Both URSALA systems were tasked to support the Gallant Shield Joint Forces Exercise. During mid-April, the URSALA Real Time Minicomputer Processing System was demonstrated. This system directly supported the Gallant Shield Joint Forces Exercise with edited data shipped directly from [redacted] to Fort Bliss. The Minicomputer Processing System processed both the URSALA I and URSALA II data in near real time and provided processed and edited data within 15 minutes of the URSALA intercept. 25X1

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30 October 1975

MEMORANDUM FOR THE DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Quarterly Program Report

Attached is the Program A Quarterly Program Report for the period from 1 July 1975 through 30 September 1975. This report has been revised from the previous format to make it a more useful document, and comments on further improvements are solicited.

ORIGINAL
SIGNED BY

DAVIS P. PARRISH
Colonel, USAF
Vice Director, SAFSP

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SAFSP

QUARTERLY PROGRAM REPORT

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QUARTERLY PROGRAM REVIEW

SUMMARY

Program Director	Brig Gen John E. Kulpa, Jr.
Vice Director	Col David P. Parrish

1. Operations

a. HEXAGON Mission 1210, launched 8 June 1975, continued to operate successfully throughout the quarter. Reentry Vehicle (RV)-2 was recovered 29 July 1975; RV-3 was returned on 5 September 1975. Mapping camera film was recovered aboard RV-5 on 30 July 1975.

b. There were no GAMBIT missions operational during the quarter.

c. Previously launched SIGINT vehicles operational on 30 September 1975 were:

Vehicle	Mean Mission Duration (Months)	Operating Life To Date (Months)
[redacted]		
MABELI	9	44
URSALA I	15.5	38
URSALA II	15.5	21
TOPHAT II	23.2	17
RAQUEL I	24	11
[redacted]		

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QUARTERLY PROGRAM REPORT

Program 989 Project

Project Director: Col Philip N. Papaccio

1. Summary

a. During this reporting period five P-989 satellites were operational. MABELI, now in its 44th month of operational life, continues to collect information on Soviet ABM radars. URSALAs I and II continued to support several Time Critical Reporting (TCR) operations. KAQUEL I was used to support many of those TCR collection requirements in addition to its primary role in providing ELINT Technical Intelligence on several high priority Soviet weapon systems. TOPHAT continues to be used primarily for location and collection of the [redacted] signal. 25X1

b. Two P-989 satellites were under development during this reporting period. URSALA III has completed a preliminary Thermal Vacuum test and the spacecraft will be placed in storage after receipt of flight transmitters. The delivery schedule for URSALA IV is phased six months behind URSALA III.

2. Specific Status

a. On-Orbit Spacecraft

(1) Mission 7338/URSALA I. Operations continued restricted this quarter due to the intermittent downlink modulation. For both URSALA I and URSALA II, Time Critical operations were conducted in the Middle East. [redacted] 25X1 25X1 URSALA collection provided several intercepts of the [redacted] 25X1 25X1 25X1

(2) Mission 7339/MABELI. Normal operations continue with this system. Pre-Detection data continues to be intermittent and the Band 4 receiver still has degraded sensitivity.

(3) Mission 7340/TOPHAT II. One of the three tape recorders on this mission failed on 22 September. The remaining two recorders are supporting continued normal collection operations.

(4) Mission 7341/RAQUEL I. The Technical Intelligence (TI) receiver on RAQUEL I malfunctioned on 30 June 1975. The receiver failed to output either predetected, digital or analog data. A series of tests, conducted from 7 July to 29 July using both internal and external sources, has failed to identify the cause of the malfunction or any method which would allow operation of the TI receiver. As a result, the receiver must now be considered non-operational. Further tests will be conducted on a routine basis as environment or spacecraft conditions change. The system continues to provide digital data from both the pulse and CW search receivers.

(5) Mission 7342/URSALA II. Normal operations continue with this system. The centroiding method for geopositioning signals continues to be used due to the temperature dependent monopulse problem.

b. Vehicles in Test

(1) Mission 7343/URSALA III. URSALA III successfully completed the Thermal Vacuum test in early September using engineering transmitters. Delivery of production transmitters is scheduled for 10 October 1975. With the continued good health of URSALA II, the launch of URSALA III is not anticipated before HEXAGON Mission 1212, scheduled for launch in mid-1976. After installation of production transmitters, the system will be placed in storage.

c. Vehicles Under Development

(1) Mission 7344/URSALA IV. The URSALA IV payload has been delivered to the prime contractor. The Omni Video module was returned to the subcontractor for rework. Delivery of this module is scheduled for 9 January 1976. The current launch strategy is to maintain the URSALA IV system available for flight within six months of the URSALA III launch. The anticipated flight is on HEXAGON Mission 1214 in the Fall of 1977.

(2) Mission 7345/RAQUEL II. Preliminary design work on the RAQUEL II spacecraft continued at a low level during this quarter pending an Intelligence Community decision on whether to approve go-ahead on RAQUEL II or a repeat RAQUEL I. The RAQUEL II payload subcontractor has been tasked to design and breadboard several critical subsystems including the power meter and constant phase amplifier circuitry.

(3) Pallet Missions. The two experimental SIGINT pallet payloads, BARNACLE and ESE, which had been studied and conceptually

developed by SP-6, have now been transferred to [redacted] for the actual development of the flight system. One of these missions will be recommended by SORS for a November EXCOM decision. 25X1

(a) BARNACLE. This low power CW and Spread Spectrum mission would be scheduled for a launch in approximately October 1977 on HEXAGON Mission 1214. The present contractual effort is to formulate the complete payload system design, conduct critical subsystem fabrication, perform functional and environmental testing, and design the ground data processing system. In addition, the integration concept of the payload to the pallet is under study. At this time, the preliminary payload design specification and preliminary report on the integration implementation study have been delivered.

(b) ESE. This 18 - 42 GHz mission is tentatively scheduled for a launch in approximately September 1978 on HEXAGON Mission 1215. The schedule for the ESE contractual efforts is phased six months behind the corresponding BARNACLE efforts.

d. Other Hardware Development

(1) Minicomputer Processing System. This combined hardware and software development effort is aimed at developing the capability to do on-board processing for future Program 989 SIGINT missions. This effort has been primarily directed at providing methods to compress URSALA data. The present contractual effort is to improve the real time processing capability demonstrated during the Gallant Shield Joint Exercise. Additionally, this processing capability is being evaluated using both the data collected during the Gallant Shield exercise and actual intercept data. This latter category will include examples of complex signals that are typically hard to process. Currently, hardware and most software modifications to the minicomputer test bed have been completed, and initial processing and analysis of intercept data has begun.

[redacted] 25X1

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