RIF003W/2-180362-80

6 MAY 1980

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P-989

SECTION I

CURRENT APPROVED PROGRAM

CLASSIFIED BY: BYE-1
REVIEW ON 5/6/2000

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P-989

1. Current Approved Program

a. Baseline

The Baseline P-989 Program consists of the development and launch of the multi-mission FARRAH low altitude SIGINT collection system. The initial FARRAH 1 launch is scheduled for March 1981. FARRAH combines the best collection features of URSALA and RAQUEL with significantly improved parametric measurement accuracy to continue to satisfy those aspects of the Technical Intelligence (TI), Search, and Operational ELINT Missions

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which are most effectively and economically accomplisned by low altitude ELINT satellites. P-989 will empnasize the following collection features:

(1) Broad geofrequency search at sensitivities which allow intercept of emitter sidelobes.

(2) Unique coverage of most of the 8 to 18 GHz range and full coverage of the 2 to 18 GHz range.

(3) worldwide target access.

(4) Intercept and rapid geolocation of pulsed and Continuous

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wave (CW) signals.

(5) Determination of radar lobing structure.

(6) Wideband pulse and CW predetection collection capability.

(7) Payload Pulse Code Modulation (PCM) data encryption.

(8) On-board data processing and operation with a remote.

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FARRAH 1 has a three-year build cycle which permits a launch in March 1981. The FARRAH 1 system includes 2 to 18 GHz frequency

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coverage, full monopulse geolocation, a 10 MHz bandwidth compressor, full payload PCM data encryption, and an on-board computer. FARRAH 2 launch is planned for March 1983, and the

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The bus design provides flexibility for ride sharing with shuttle launches from either the Eastern Test Range (ETR) or Western Test Range (WTR) and includes the necessary propulsion capability to inject the spcaecraft into an operational orbit of 400 nmi altitude,

The fund requirements for both FARRAH 2 and FARRAH 3 have increased since the last budget submission. This is a result of both our experience with

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the development of FARRAH 1 and the increase in inflation over that previously programmed. The FARRAH 3 estimate also reflects the results of development and STS transition studies conducted in the past year.

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2. Issues

The major issue affecting the P-989 Program is the need to transition the search and main beam technical intelligence missions to the Space Shuttle following the last launch of the Host Vehicle Program in FY 84. A related issue is

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whether or not the transition of the program forms the basis for ~~competetive~~ COMPETITIVE source selection. The requirements for these missions would be to complement the collection capabilities AM [redacted] /ELINT mix. The structure of the P-989 program after transition to the Space Shuttle would be to cost effectively use Space Shuttle launch opportunities, and to continue to provide a general purpose, quick reaction spacecraft which could accommodate a wide variety of payloads and antenna configurations to satisfy existing and future special purpose collection requirements.

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A second issue is whether to transition to the Space Shuttle with a satellite design that can also be launched from an expendable launch vehicle. A decision is needed prior to January 1981 in order to make appropriate trade-offs against performance and efficiently use the system definition money in FY 81.

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P-989

SECTION II

SUMMARY OF ALTERNATIVES & OPTIONS

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P-989

1. Summary of Alternatives

a. Alternative 1 - ~~Delay~~ Acquisition of FARRAH 3 [redacted] 25X1

This alternative delays acquisition of the STS Transition vehicle until FY 83. This results in near year savings, but causes a potential gap in coverage from predicted end of life for FARRAH 2 in March 1986 to projected launch of FARRAH 3 [redacted] 25X1

Increased costs in FY 84 and FY 85 result from the need to reconstitute the engineering and manufacturing capability that was disbanded due to the non

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optimum build schedule of FARRAH 3 in relation to FARRAH 2.

b. Alternative 2 - Delay Acquisition of FARRAH 3 [redacted] 25X1

This alternative remains within the current approved program in FY 81 and FY 82 and reduces the potential gap in coverage from predicted end of life of FARRAH 2 in March 1986 to projected launch of FARRAH 3 in [redacted] 25X1

c. Alternative 3 - Transition IMPROVED FARRAH to the Shuttle

This alternative transitions FARRAH to the Space Shuttle using an STS optimized bus of the same design as described in tne baseline program. It

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incorporates additional electric power generation to allow 12 hour/day operation of the payload and expands the propulsion system to allow injection of the spacecraft into operational orbits [redacted]

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[redacted]

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[redacted]

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d. Alternative 4 - Launch and Phase Improved FARRAH

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2. Summary of Options

PROGRAM OPTIONS

OPTIONS	TRANSITION CURRENT FARRAH	TRANSITION IMPROVED FARRAH	TRANSITION NEW COLLECTION
Opt 1 - Data Relay	X	X	X
Opt 2 - Reduced AFSCF Dependence	X	X	X

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Opt 3 - Improved Performance on FARRAH 4	X		
Opt 4 - Improved Main Beam ERP & Polarization (Polarimeter)	X	X	X
Opt 5 - Main Beam Collection Satellite	X	X	X
Opt 6 - Improved On-Board Processing	X	X	

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Opt 7 - On-Board Geolocation of Selected SOI	X	X	X
Opt 8 - Improved Interoperability	X	X	X
Opt 9 - Main Beam TI Pallet on HV 20	X		

a. Option 1 - Low Orbit ELINT Satellite Relay Capability

Cost IMBPS
2K INPUT PULSE RATE

This option provides modifications to the P-989 satellite [redacted]

[redacted]

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[redacted]

[redacted] of P-989 satellite commands and insertion of these commands into the [redacted] In addition, [redacted] will strip out P-989 mission data [redacted] and transmit it to Sunnyvale. Costs for modification to the [redacted]

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[redacted]

budget as AN OPTION.

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b. Option 2 - Reduced AFSCF Dependence

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c. Option 3 - Improved Performance on FARRAH 4

Upgrades are added to the current FARRAH transition (program baseline) of FARRAH 3 to improve its performance to that of improved FARRAH, effective with FARRAH 4 and subsequent.

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d. Option 4 -

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e. Option 5 - Main Beam Collection Satellite

This option provides a separate main beam collection satellite using either the MMS Mark II or components of [redacted] for the bus. The CW and pulse signals operating in the .1 to 18 GHz range and provide precision parameter measurements including a capability to measure emitter ERP to within plus or minus 3 db and polarization to within plus or mius 10 deg. Geolocation capability is provided over the .1 to 18 GHz frequency range.

[redacted]

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Costs shown assume continued operation of the [redacted]

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COST

Station to support FARRAH.

f. Opt 6 - Improved On-Board Processing

[redacted]
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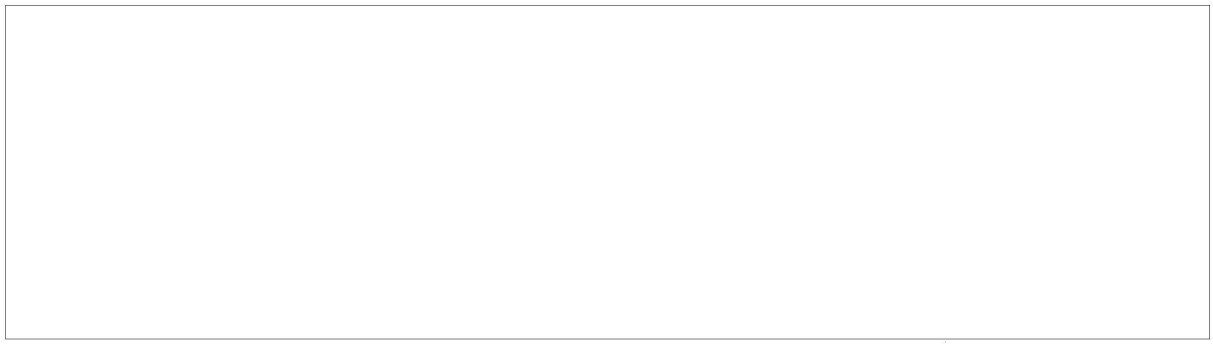

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COST

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g. Opt 7 - On-Board Geolocation of Selected Signals of Interest

This option is additive to Option 6 and provides an additional mode for the on-board processor. This mode allows on-board geolocation and direct reporting to Navy users of selected signals of interest.

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h. Opt 8 - Improved Interoperability

This option supports an effort to provide increased interaction between NRO SIGINT programs. The objectives of such interaction are improved cooperative tasking between programs, improved collection through the interchange of techniques and data bases, and improved timeliness of quality of support to users, both national and tactical. Specific efforts to be accomplished include a study to further define the means to accomplish these objectives and to evaluate the results of interoperability initiatives; display and data storage upgrades to permit the storage and display of operational ELINT data from other resources; to improve the timeliness of the response to operational changes and reduce dependence on

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the AFSCF; and MPOSS interoperability upgrades to permit improved interactive tasking

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i. Opt 9 - Main Beam TI Pallet on HV 20

This option provides a new pallet type mission to address precision emitter mainbeam Technical Intelligence requirements. Such a mission emphasizes precision power and polarization measurements of high priority threat weapon systems operating in the .150 to 2.0 GHz frequency range, a capability not available in any overhead collector. This pallet would launch on HV 20 in FY 84 and would have a mission duration of approximately 1 year. The NRO would fund the design, development, and build of the pallet hardware and a portion of the O&M.

The option requires FY 8[illegible] Study Funds to refine the host vehicle interface and the concepts for the pallet. This option assumes full approval to pro-

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ceed not later than January 1981 with procurement on a selected source basis.

INNOVATIVE APPROACHES TO THE PROJECT ARE BEING EXPLORED WITH THE OBJECTIVE OF REDUCING THE COST.

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