

~~TOP SECRET~~HANDLE VIA  
COMINT- **BYEMAN-TALENT-KEYHOLE**  
CONTROL SYSTEMS JOINTLY~~(S)~~ NATIONAL RECONNAISSANCE OFFICE  
WASHINGTON, D.C.

OFFICE OF THE DIRECTOR

22 June 1977

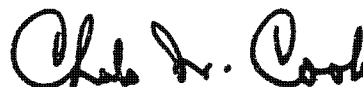
MEMORANDUM FOR THE POLICY REVIEW COMMITTEE (INTELLIGENCE)

SUBJECT: National Reconnaissance Program

The Director's Report to the Policy Review Committee (Intelligence) is forwarded. This document presents alternatives for consideration and issues for decisions at the July 1977 PRC(I) meeting.

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The Recommended Program will be forwarded separately.

Charles W. Cook  
Acting DirectorAttachment  
Director's Report

BYE-13000/77

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~~GAMBIT/HEXAGON/KENNEN/EARPOP~~  
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HANDLE VIA

**BYEMAN-TALENT-KEYHOLE**-COMINT  
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DECISION UNIT OVERVIEW  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

Goal:

To provide a continuing satellite reconnaissance capability to collect technical and operational ELINT.

Major Objectives:

To be responsive to the USIB "Guidance to the National Reconnaissance SIGINT Program (FY 77-81)" objectives by providing worldwide, general ELINT search and operational and technical ELINT collection. Specifically, the primary intelligence objectives are to provide general search and EOB data from emitter frequencies above 2.0 GHz and radar parameter measurement for frequencies above 8.0 GHz.

Current Method of Accomplishing the Major Objectives:

P-989 consists of a series of several independently-operating, low-orbiting (275-340 NM altitude) satellites.

All P-989 satellites are carried 25X1  
into orbit on HEXAGON. All are built within a basic payload package of similar weight and size. Individual satellites provide emitter geolocation, and may be operated in a store-and-dump mode, or transpond mode over preselected bands of frequencies.

Alternatives:

P-989 systems (URSALA/RAQUEL) are the only overhead ELINT systems providing high-sensitivity frequency coverage from 8-18 GHz. Though all overhead systems have mechanisms to redirect tasking within a short period, only the P-989 collectors have the ability to cover any area of the world. A future alternative is a concept for performing the aggregate low-orbit mission with an advanced satellite series which would utilize high-altitude satellite relay and operate

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with a single mission ground station. This alternative is currently being studied for implementation in the mid-1980s in consonance with the Post-1980 ELINT System Configuration Study, which is discussed in a Special Report.

Accomplishments:

The P-989 program has provided several "firsts" in overhead SIGINT collection. Among the most significant are:

1. The first SIGINT collection system with worldwide area coverage.
2. The first single-satellite system with each vehicle capable of providing data collection for geolocation of emitters and other emitter-parameter measurements.

Contractual activities have supported the continued operation of the P-989 vehicles currently on orbit and the definition of the next satellites. A Special Report describes the configuration of the next satellite, FARRAH.

In March 1978, RAQUEL 1A (R-1A) will be available for launch. The fabrication of an EHF (26-42 GHz) SIGINT Pallet, LORRI, has continued towards its planned launch in March 1980. URSALA 4 (U-4) has been available as a backup to U-3. P-989 satellites have provided intelligence support in field exercises to test the use of rapidly-processed satellite ELINT data. These exercises, Special Project GALLANT SHIELD in 1975; and Special Project BOLD EAGLE and USAFE exercise COLD FIRE in 1976 revealed that satellite-derived ELINT could provide a rapid reconnaissance capability which would aid in targeting in the tactical area of interest.

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DECISION PACKAGE SUMMARY  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

L1 (minimum)

Maintain R-1, R-1A, U-3 and U-4 operations, provide two additional satellites for one launch at least every three years, define an advanced system and change the frequency range of URSALAs from 2-12 GHz to 4-18 GHz starting with URSALA 5.

L2

Provide additional satellites for alternating operations of URSALAs and RAQUELS and provide an -compatible capability starting with U-6 in FY 85.

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L3

Provide PCM data encryption for RAQUELS and URSALAs.

L4

Provide on-board data processing for URSALAs starting with U-5.

L5 (current)

Provide FARRAHs instead of additional URSALAs or RAQUELS to launch at least one every two years; PCM data encryption, a technical intelligence capability and bandwidth compression for FARRAHs and an STS/ELV-compatible F-3 in FY 85.

L6

Provide on-board data processing for FARRAHs.

L7

Study and fund protect a -compatible, advanced system with acquisition starting in FY 80 25X1 for a capability in FY 84.

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Package 1 of 7 (minimum)

DECISION PACKAGE L1  
NATIONAL RECONNAISSANCE PROGRAM  
P-989Activity Description:

Maintain R-1, R-1A, U-3 and U-4 operations, provide two additional satellites for one launch at least every three years, define an advanced system, and change the frequency range of URSALAs from 2-12 GHz to 4-18 GHz starting with URSALA 5.

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This</u>	<u>Cumulative</u>
			<u>Package</u>	<u>Total</u>
Activity	<u>17,300</u>	<u>22,500</u>	<u>32,400</u>	<u>32,400</u>
Total Obligation Authority	17,300	22,500	32,400	32,400

Five-Year Estimates:	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Activity	<u>32,400</u>	<u>19,900</u>	<u>18,700</u>	<u>27,900</u>	<u>21,700</u>
Total Obligation Authority	32,400	19,900	18,700	27,900	21,700

Short-term Objective(s):

To continue R-1A, U-3, U-4 operations, launch R-1A in March 1978, provide the EHF SIGINT pallet, LORRI, with a launch planned in March 1980, the acquisition of an additional satellite for a FY 81 launch, and activities associated with the definition of an advanced, low-orbit system.

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~~TOP SECRET~~Impact on Major Objectives:

This package provides for the continuation of the current configurations until an advanced collector is available.

Other Information:

The zero-funding implications for this program in FY 79 are that a new vehicle start would not be initiated in FY 78; the program would be terminated in FY 79 with the completion of U-3 operations.

This package does not provide for satisfaction of multiple ELINT collection objectives as does the current-level package. Continuation of the program at this level would not provide for developments which would exploit the full potential of one-satellite operations.

Launches must be coordinated with the HEXAGON program, and are dependent on the HEXAGON schedule.

Without an extension in URSALA frequency coverage from 12 GHz to 18 GHz there would be a major impact on requirements satisfaction.

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~~TOP SECRET~~P-989  
DECISION PACKAGE L1

FEATURES	ITEMS	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83
<ul style="list-style-type: none"><li>- Maintains the current system</li><li>- Provides two additional satellites for one launch at least every three years</li><li>- Changes the frequency range of URSALA from 2-12 GHz to 4-18 GHz starting with URSALA 5</li></ul>	U-3							
	R-1A							
	U-4							
	U-5/R-1B							
	U-6/R-1C							
	LORRI							
DOLLARS (IN MILLIONS)	ACTIVITY	17.3	22.5	32.4	19.9	18.7	27.9	21.7
	TOA	17.3	22.5	32.4	19.9	18.7	27.9	21.7

## LEGEND

◇ ACQUISITION DECISION

● START ACQUISITION

△ --- AVAILABILITY OR IOC

▲ LAUNCH OR FOC

— MISSION DURATION

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Package 2 of 7

DECISION PACKAGE (L2)  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

Activity Description:

Provide additional satellites for alternating operations of URSALAs and RAQUELs, and provide an -compatible capability starting with U-6 in FY 85.

25X1

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This Package</u>	<u>Cumulative Total</u>
Package L1	17,300	22,500	-	32,400
Activity	-	500	(1,600)*	(1,600)
Total Obligation Authority	17,300	23,000	(1,600)*	30,800

Five-Year Estimates:	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L1	32,400	19,900	18,700	27,900	21,700
Activity	(1,600)*	10,200	6,700	3,000	19,000
Total Obligation Authority	30,800	30,100	25,400	30,900	40,700

\*This package assumes change of URSALA frequency range starting with URSALA 5. Negative value results from procurement of R-1B, which is a duplicate R-1A without change to frequency range.

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Short-term Objective(s):

To continue the acquisition of R-1B for a March 1981 launch, fabrication of the EHF SIGINT Pallet, LORRI, with a launch planned in March 1980, Initiate contractual activities for the procurement of U-5 which is planned for launch in March 1982, and activities associated with the definition of an advanced, low-orbit system.

Impact on Major Objectives:

An alternating URSALA/RAQUEL mix would, in addition to general ELINT search and operational ELINT collection, provide for technical ELINT collection. The primary impact on major objectives are potential coverage gaps. Coverage gaps of up to one year in technical ELINT collection and up to six months for the general ELINT search and operational ELINT collection are anticipated. Technical ELINT and additional frequency coverage from 12 GHz to 18 GHz will be provided.

Other Information:

This package does not provide both technical and general/operational coverage on a continuous basis as does the current-level package.

Launches must be coordinated with the HEXAGON program and are therefore dependent on the HEXAGON schedule.

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P-989  
DECISION PACKAGE L2

FEATURES	ITEMS	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	
<div>- Maintains the current system</div> <div>- Provides additional satellites for alternating operations of URSALAs and RAQUELS</div> <div>- Provides an <div></div> compatible U-6 in FY 85</div>	U-3	<div></div>							
	R-1A		<div></div>	<div></div>					
	U-4	<div></div>		<div></div>	<div></div>				
	R-1B	<div></div>	<div></div>		<div></div>	<div></div>	<div></div>		
	U-5			<div></div>			<div></div>	<div></div>	
	R-1C					<div></div>			
	U-6							<div></div>	
	LORRI				<div></div>	<div></div>			
DOLLARS (IN MILLIONS)	ACTIVITY	0	0.5	(1.6)	10.2	6.7	3.0	19.0	
	TOA	17.3	23.0	30.8	30.1	25.4	30.9	40.7	

25X1

LEGEND

ACQUISITION DECISION  
 LAUNCH OR FOC

START ACQUISITION  
 MISSION DURATION

AVAILABILITY OR IOC

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Package 3 of 7

DECISION PACKAGE L3  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

Activity Description:

Provide Pulse Code Modulation data encryption for RAQUELS and URSALAs with all payload digital downlink data to be encrypted.

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This</u>	<u>Cumulative</u>
			<u>Package</u>	<u>Total</u>
Package L2	17,300	23,000	-	30,800
Activity	<u>0</u>	<u>800</u>	<u>2,400</u>	<u>2,400</u>
Total Obligation Authority	17,300	23,800	2,400	33,200

Five-Year Estimates:	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L2	30,800	30,100	25,400	30,900	40,700
Activity	<u>2,400</u>	<u>2,600</u>	<u>1,400</u>	<u>1,200</u>	<u>500</u>
Total Obligation Authority	33,200	32,700	26,800	32,100	41,200

Short-term Objective(s):

Effective with the FY 78 contract start for the next satellite, to include encryption on the digital downlink.

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This package partially satisfies communications security (COMSEC) policy established by the DCI for future satellite system procurement but does not fully satisfy the intent of this policy, in that total COMSEC protection is not provided. That policy calls for COMSEC measures to be applied to command uplinks, telemetry downlinks, and mission-data downlinks of all satellite intelligence collection systems. This package does not provide for encryption of the command uplink, telemetry downlink, and analog-mission data downlink (RAQUEL).

The DCI policy applies to all system acquisitions placed on contract beginning in FY 79. This package provides an interim measure of protection to prevent compromise of the primary payload downlink data.

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Package 4 of 7

DECISION PACKAGE L4  
NATIONAL RECONNAISSANCE PROGRAM  
P-989Activity Description:

Provide on-board data processing starting with U-5, to provide compressed, processed data suitable for tape recording or narrow-band transponding for a read-out capability to support operational commanders directly.

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This Package</u>	<u>Cumulative Total</u>
Package L3	17,300	23,800	-	33,200
Activity	<u>0</u>	<u>1,700</u>	<u>4,500</u>	<u>4,500</u>
Total Obligation Authority	17,300	25,500	4,500	37,700

Five-Year Estimates:	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L3	33,200	32,700	26,800	32,100	41,200
Activity	<u>4,500</u>	<u>2,300</u>	<u>700</u>	<u>1,800</u>	<u>1,000</u>
Total Obligation Authority	37,700	35,000	27,500	33,900	42,200

Short-term Objective(s):

Effective with the FY 78 contract start for U-5, to incorporate an on-board computer for on-board data processing.

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~~TOP SECRET~~Impact on Major Objectives:

This package enhances the operational ELINT collection objective by providing for real-time operational support to commanders by incorporating an experimental, narrow-band, data-read-out capability on URSALA for use with a real-time, intelligence-processing (RTIP) van deployed to selected areas where operational support is desired.

This package provides the opportunity to attain major improvements in operational support by transmission of satellite data directly to field units. It provides for significant contributions to a high-priority NFIB requirement which calls for tactical support to commanders.

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Package 5 of 7 (current)

DECISION PACKAGE L5  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

Activity Description:

Provide FARRAHs instead of additional URSALAs or RAQUELs to launch at least one every two years; Pulse Code Modulation data encryption, a technical intelligence capability and bandwidth compression for FARRAHs, and an  compatible with F-3 in FY 85.

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Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This Package</u>	<u>Cumulative Total</u>
Package L2	17,300	23,800	-	33,200
Activity	<u>0</u>	<u>1,800</u>	<u>3,000</u>	<u>3,000</u>
Total Obligation Authority	17,300	25,600	3,000	36,200

Five-Year Estimates:	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L2	33,200	32,700	26,800	32,100	41,200
Activity	<u>3,000</u>	<u>(4,000)*</u>	<u>3,700</u>	<u>(900)*</u>	<u>(6,500)*</u>
Total Obligation Authority	36,200	28,700	30,500	31,200	34,700

\*Negative values result from difference in phasing of procurement of FARRAH satellite.

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To continue the acquisition of F-1 initiated during FY 78 toward a March 1981 launch.

Impact on Major Objectives:

The current program stresses the unique capabilities of the P-989 satellites and provides one-satellite (FARRAH) satisfaction of those objectives which are most economically and effectively accomplished by low-altitude ELINT satellites. The FARRAH satellites will provide features such as 2-18 GHz frequency coverage, technical intelligence collection, 2 GHz instantaneous bandwidth, monopulse geolocation, pulse and CW intercept capability, extended command and power systems, and mainbeam antenna digital output bandwidth compression and encryption of the digital downlink. A description of the FARRAH configuration is included in a Special Report.

Other Information:

Launches must be coordinated with the HEXAGON program and are therefore dependent on the HEXAGON schedule.

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P-989

DECISION PACKAGE L5

FEATURES	ITEMS	FY 77	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83
<div>- Maintains current system</div> <div>- Provides three FARRAHs instead of additional URSALAs or RAQUELs with at least one launch every two years, including PCM data encryption, bandwidth compressor, and a technical intelligence capability</div>	U-3	—————						
	R-1A		▲—————					
	U-4	△-----		▲—————				
	F-1	◇●				△▲—————		
	F-2				●			△▲—————
	LORRI				△▲—————			
DOLLARS (IN MILLIONS)	ACTIVITY	0	1.8	3.0	(4.0)	3.7	(.9)	(6.5)
	TOA	17.3	25.6	36.2	28.7	30.5	31.2	34.7

LEGEND

◇ ACQUISITION DECISION

● START ACQUISITION

△----- AVAILABILITY OR IOC

▲ LAUNCH OR FOC

—————| MISSION DURATION

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Package 6 of 7

DECISION PACKAGE L6  
NATIONAL RECONNAISSANCE PROGRAM  
P-989Activity Description:

Provide on-board data processing for FARRAHs with an on-board computer to provide compressed, processed data suitable for taperecording or narrow-band transponding for a read-out capability to support operational commanders directly.

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This</u> <u>Package</u>	<u>Cumulative</u> <u>Total</u>
Package L5	17,300	25,600	-	36,200
Activity	<u>0</u>	<u>3,000</u>	<u>3,200</u>	<u>3,200</u>
Total Obligation Authority	17,300	28,600	3,200	39,400

<u>Five-Year Estimates:</u>	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L5	36,200	28,700	30,500	31,200	34,700
Activity	<u>3,200</u>	<u>2,500</u>	<u>1,700</u>	<u>1,900</u>	<u>2,000</u>
Total Obligation Authority	39,400	31,200	32,200	33,100	36,700

Short-term Objective(s):

Effective with the FY 78 contract start for the F-1 satellite, to incorporate an on-board computer for on-board data processing.

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~~TOP SECRET~~Impact on Major Objectives:

This package enhances the operational ELINT collection objective by providing for real-time operational support to commanders by incorporating an experimental, narrow-band data, read-out capability on URSALA for use with a real-time, intelligence-processing (RTIP) van deployed to selected areas where operational support is desired. This package provides the opportunity to attain major improvements in operational support by transmission of satellite data directly to field units. It provides for significant contributions to a high-priority USIB requirement which calls for tactical support to commanders.

Other Information:

This package cannot be applied as an enhancement to packages below the current level, since it applies to FARRAH only.

Approval of this package would require a move to the front end of the HEXAGON vehicle because of weight/volume restrictions. Cost estimates do not provide for this move. Approval of HEXAGON packages (H3/H4) may preclude this move due to the addition of a fifth recovery vehicle.

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CONTROL SYSTEMS JOINTLY

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Package 7 of 7

DECISION PACKAGE L7  
NATIONAL RECONNAISSANCE PROGRAM  
P-989

Activity Description:

Study and fund protect an [ ] compatible, advanced system with acquisition starting in FY 80 for a capability in FY 84. 25X1

Resource Requirements: (Dollars in thousands)

	<u>FY 77</u>	<u>FY 78</u>	<u>FY 79</u>	
			<u>This Package</u>	<u>Cumulative Total</u>
Package L6	17,300	28,600	-	39,400
Activity	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Obligation Authority	17,300	28,600	0	39,400

Five-Year Estimates:

	<u>FY 79</u>	<u>FY 80</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>
Package L6	39,400	31,200	32,200	33,100	36,700
Activity	<u>0</u>	<u>4,000</u>	<u>5,600</u>	<u>6,700</u>	<u>28,100</u>
Total Obligation Authority	39,400	35,200	37,800	39,800	64,800

Short-term Objective(s):

Starting in FY 80 to provide fund protection for an advanced low-orbiting ELINT system in the mid-1980s and continue the effort of the definition study included in the minimum-level and current-level packages.

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~~TOP SECRET~~Impact on Major Objectives:

This package meets the program objective of developing an advanced, low-orbit system for operation in the mid-1980s, and provides for the design, development, fabrication, test, shuttle launch, and on-orbit checkout of the new satellite. It is in consonance with the objectives of the Post-1980 ELINT System Configuration Study.

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P-989

OTHER ACTIVITIES  
(Dollars in Millions)The following funds are provided by NSA for  operations.

3.3(b)(1)

NRP Decision Packages	Fiscal Years					
	<u>77</u>	<u>78</u>	<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>

L1 (Minimum) Provides SIGINT processing for the minimum NRP program.

NSA (SIGINT Processing)

7.8	8.4	9.2	9.6	10.5	11.5	12.3
-----	-----	-----	-----	------	------	------

L2 Provides additional data processing revisions associated with alternating procurements of URSALAs and RAQUELS

NSA (SIGINT Processing)

Increment

0	0.7	+0.4	+0.7	+0.5	+0.3	+0.5
---	-----	------	------	------	------	------

Total

7.8	9.1	9.6	10.3	11.0	11.8	12.8
-----	-----	-----	------	------	------	------

L3 (No additional funds required at this level.)

L4

NSA (SIGINT Processing)

Increment

0	0	0	0	+0.6	+1.0	+0.7
---	---	---	---	------	------	------

Total

7.8	9.1	9.6	10.3	11.6	12.8	13.5
-----	-----	-----	------	------	------	------

L5 (Current) Additional data processing associated with FARRAH satellites.

NSA (SIGINT Processing)

Increment

0	+1.1	+1.1	+1.6	+0.1	-0.3	0
---	------	------	------	------	------	---

Total

7.8	10.2	10.7	11.9	11.7	12.5	13.5
-----	------	------	------	------	------	------

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NRP Decision  
Packages

77                      78                      79                      80                      81                      82                      83

L6                      Additional data processing capability associated with on-board processing  
with FARRAH satellites.

NSA (SIGINT Processing)

Increment	0	0	0	0	+0.6	+1.0	+0.7
Total	7.8	10.2	10.7	11.9	12.3	13.5	14.2

L7                      SIGINT Processing funds to support an advanced P-989 system will be  
defined at a later date.

Current NSA Budget	7.8	8.9	9.9	11.0	11.2	11.9	12.6
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