C05026121' Approved for Release: 2024/06/12 C05026121 Handle via BYEMAN NAVAL RESEARC Control System WASHINGTON, D.C. 20390 IN REPLY REFER TO: 5610-23:RDM:mab BYE-51904-70 1 marz 1970 TOP SECRET HANDLE VIA BYEMAN CONTROL SYSTEM From: Director, Naval Research Laboratory. Washington, D.C. 20390 Director, Program "C" NAVINTCOM-3 To:

Subj: Basic concept details and cost summaries for Mission 7106, 7107 during FY-70, 71 and 72

Encl: Ref:

(a) NRL ltr to Dir. Program "C" of 9 May 1969, BYE-51901-69

(b) NRL ltr to Dir. Program "C" of 19 May 1969, BYE-51902-69

(c) NRO msg 271713Z Feb 70 Cite WHIG-9976

(1) Tables 1 through 7 (one page each)

(d) NRO memo to Dir. Program "C" of 13 Feb 1970, BYE-12586-70

1. Background:

The concept for Mission 7107 was first submitted by the Naval Research Laboratory in February 1967 and was then modified by reference (a) and (b) in May 1969. These modifications have undergone an intensive study during the past three months by members of the staff at NRO, NRL and NSA. This intensive study culminated in a briefing on 24 April for the NRO Director and staff where it was agreed that NRL would prepare this statement of the FY-70 and FY-71 financial program along with the budget recommendations for FY-72 as requested in reference (d) and, in addition, NRL would develop a paper on the specifications (Detailed Design Goals) for Mission 7107 based on an eighteen (18) month development cycle. Due to the urgency of the budgetary information it is essential that this portion be prepared and submitted first. The detailed design goals paper is being prepared and will be submitted early in June and will reflect the USIB guidance for ELINT collection by overhead means through the time frame of 1974. In conformance with the demonstrated capability of the earlier POPPY Missions, the major emphasis proposed for Mission 7107 is to collect ELINT leading toward the early discovery and initial assessment of

radar emissions. In addition,

along with the selective geo-positioning (emitter location) capability combine to provide a high potential for

against targets of opportunity. At the same time, the capability exists for utilizing the long-life aspects of the collection system to provide Electronic Order of Battle (EOB) against previously identified and deployed weapon system radars on a worldwide basis.

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2. Brief preliminary technical description of Mission 7107 Options.

a. <u>General specifications:</u>

Due to the failure on 25 February 1970 of the command systems on two of the operational spacecraft of Mission 7106, it has become increasingly apparent that it is of the utmost importance that the schedule for Mission 7107 be accelerated to the maximum extent possible. The major concern lies in the potential for further loss of the remaining 7106 operational capability and with Mission 7105 being 35 months old it is nearing the end of its life expectancy. Should the overseas receiving and data processing complexes face a period without operational spacecraft, the personnel would lose their proficiency and, more important, they would be in a condition of poor operational readiness for any future mission. For these reasons all of the Options being considered in this paper have accelerated the launch schedule for Mission 7107. Several other specifications remain common to all of these options, such as the use of the old spacecraft (27" dia. multiface) structure, three axis gravity gradient stabilization and microthrusters on all of the spacecraft. It is anticipated that in all of the options the spacecraft will have considerably more redundancy in the belief that the type of failure experienced with 7106B and 7106D can be avoided. A much expanded command capability will also be available, allowing for more command options and operational versatility.

b. **ELINT** specifications:

ELINT collection coverage will be quite similar to that offered in reference (b) but will have benefited from the analysis of the data density studies of Mission 7106. Where two adjacent collection bands experience heavy data density in one and light data density in the other, the radar families in both bands have been studied so that a more equitable band-edge determination can be made for Mission 7107. In X-band the magnitron families appear now to be separated by only 60 MHz instead of the 120 MHz previously thought to be the case. It is now the design goal to have much narrower collection bandwidths in this extremely dense portion of the radar spectrum.

Several portions of the spectrum are equipped in all four of the primary spacecraft in order to maximize the intercept potential and increase to a maximum the time over target potential for these high priority portions of the spectrum. Every frequency from 154 to 10,500 MHz and from 14.6 to 14.9 GHz will be equipped in at least two of the spacecraft so that location analysis can be carried out on data received throughout this extremely wide frequency spectrum.

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In the ELINT data re-transmission systems, Mission 7107 will have three transmitter channels as compared to two channels used heretofore. This will allow the simultaneous use of twelve receiver systems in each of the spacecraft. This increase in the instantaneous data collection and retransmission capability provides the opportunity to deploy the spacecraft into orbits which will have

will have departed from the outgoing horizon of the ground station before arrives at the incoming horizon, thus increasing the Time

Over Target (TOT)

c. <u>Option #1:</u>

The major emphasis for this option is acceleration of the time schedule by using only systems which are either in-hand or those which have completed designs which are ready to be implemented. The ELINT coverage proposed for this Option #1 is given in Table 1. The schedule for launch of Mission 7107, Option #1, indicates the launch can take place in late October 1971, just 18 months after "go-ahead." This Option by its straight forward design and high degree of ELINT capability along with the minimum delay until launch combine to make Option #1 the most attractive option and the one which NRL strongly favors.

d. <u>Option #2:</u>

This Option has as its major difference from #1 the provision that the K-band coverage will be complete from 10.5 to 18 GHz. Other programs under the NRP will be covering portions of this spectrum up to about 12.4 GHz and Option #1 covers 12.5 to 15.1 and from 17 to 18 GHz leaving only the unique region of ELINT coverage for Option #2, the portion from 15.1 to 17 GHz (see Table 2). Intelligence indicates no known threat in this portion of the frequency spectrum.

The schedule impact of providing ELINT coverage in these 15.1 to 17 GHz and 10.5 to 12.5 GHz bands will require an additional six months beyond that necessary for Mission 7107, Option #1 (18). Because the design for these collection systems has not even started they will be the pace-setting hardware development for Mission 7107 (24) or Option #2. It is the considered opinion at NRL that the additional development time is not worth the advantage of filling the gaps in the ELINT coverage spectrum from 10.5 to 18 GHz at this time.

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e. <u>Option #3:</u>

The major element of this option is that it has, for the first year, both the 18 and the 24 month schedules (Options #1 and #2 respectively). After one year, however, a management-decision would be made. It would be heavily dependent on the launch and operational success of other NRP resources during this one year period. The 24 month version of this Option would provide the same ELINT coverage as that of Option #2 given in Table 2. It would require NRL to assume the 18 month schedule and then in addition bring along the development of the additional K-band hardware so that it could be utilized if the management-decision was made for the 24 month schedule. The Naval Research Laboratory finds this option the least attractive of all.

3. <u>FY-70 Financial Program for the Naval Research Laboratory:</u>

Table 3 provides the monthly obligations experienced at NRL for Mission 7106 and 7107 during the first eight months of FY-70. This period was chosen since it is the most recent period for which the NRL Budgetary summaries are available. Below the monthly expenditure portion of Table 3 the summary of FY-70 funds available at NRL has been provided, showing the total FY-70 funds at NRL = \$8,300.0K.

Table 4 provides in standard format the FY-70 cost breakdown for the NRL Financial Program with the first eight months shown under the heading "Obligated" and the last four months listed under the two columns labled "Anticipated." Note that the estimate for item I-A for the final four months of FY-70 is \$1559.8K. This is unusually high because of the large amount of procurement for critical flight system hardware for the payloads which must be purchased before the end of June in order to meet the accelerated dates for launch of Mission 7107 using either option. This early expenditure (FY-70) reflects a compensating reduction in the payload electronic costs for FY-71, but it leaves a \$500.0K deficit in FY-70 funds available at NRL. Therefore relief in this matter is extremely urgent for either option that will be authorized.

4. FY-71 Budgetary Estimate for the Naval Research Laboratory:

The FY-71 Budgetary estimate for the NRL portion of Mission 7106, 7107 given in the figures of Table 5. Option #1 and Option #2 both support Mission 7106 in the same amount. \$154.0K.

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schedule of Option #1 the launch of Mission 7107 will occur in late October or early November 1971 and this requires that some of the long lead time items for the spacecraft electronic systems must be ordered in late FY-71. Conversely the Option #2 schedule places the launch of Mission 7107 six months further into FY-72 and, therefore,

Option #3 for FY-71 is given in the figures of Table 6 where only in the 18 month version Notice that the Ground Station, the Facilities and the Services costs for Options #1, #2 and #3 are identical for Mission 7107.

5. FY-72 Budgetary estimate for NRL:

The figures presented in Table 7 provide the cost estimates for Mission 7107 for both the 18 and the 24 month schedules of Options 1, 2 and $3\sqrt{3}$

6. <u>Summary:</u>

The Naval Research Laboratory will continue to carry out an orderly program of development of the ELINT collection satellite program from the 500 nautical mile altitude range in support of the National ELINT collection priority requirements. In addition, NRL will endeavor to develop the techniques and procedures for cooperative operations with the High Altitude Satellite programs for ELINT ALERT purposes. The design goals for the four primary and a fifth operational R&D spacecraft will be submitted early in June 1970. NRL firmly subscribes to the necessity for providing R&D opportunity with each POPPY launch so that vital future techniques and systems can proceed through their evolution toward flight-certification at the earliest possible time. The fifth operational spacecraft would be mounted on the Agena "Aft-Rack" where the P-11 normally is positioned in launch configuration. Note that the cost summaries provided do not include any cost estimates for the SAFSP effort for interfacing or launching these payloads into orbit.

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Because of the acceleration of Mission 7107, a large portion of the flight components procurement burden is being experienced in late FY-70 thus leaving an unfunded deficit of 500.0K for the remainder of this Fiscal Year. Notice that the Budgetary estimates for the next year (FY-71) have been relieved of this burden so FY-71 cost estimate is relatively lower.

There is no planned carryover of FY-70 funds into FY-71. However, should there be some uncommitted funds remaining it will naturally be added to the FY-71 program as the burden is shifted into the next fiscal year.

NRL strongly recommends that Option #1, with its 18 month development cycle, be authorized and that the FY-71 funds be made available at the earliest time possible.



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Band No.	Spacecraft 7107A & B	Spacecraft 7107C & D
1	154-165 MHz	200-350 MHz
2	165-200	350-450
3	550-815	450-550
4	815-970	815-970
5	1800-2100	970-1205
6	2100-2580	1205-1800
7 · · · · · · · · · · · · · · · · · · ·	2580-2680	1800-2100
8	2680-2800	2100-2580
9	2800-2930	4850-5250
10	2 930-3120	5250-5850
. 11	3120-3300	\$850-6725
12	3300-3600	7900-8600
13	3600-4050	8600-9100
14	4050-4850	.9100-9340
15	4850-5250	9340-9400 { 546
16	5850-6725	9400-9600
17	6700-7900	9600-10500
18	(A) 14.6-14.9 GHz (B) 14.6-14.9	(D)12.5-14.6 GHz
19	(A) 14.8-15.1 (B) 17.0-18.0	TOP-SEGNE
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			Option #2	(24 mos.)	• (•
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•	I. PAYLOAD (Develop Recurring)				
÷	A. Elect. Equip. (Data & TM)	\$ 195.7K		\$ 555.7K	то
•	B. Stabilization Systems	248.5		248.5	
•	C. Power Systems	154.8		154.8	
:	D. Control Systems	138.4		138.4	YE I
	E. Compat & Envir. Tests	157.0		157.0	X
•	F. Mech. Struct. & Fabrication	273.0		273.0	AN
	G. NRL Salaries & Overhead	1789.5		1739.5	0
	H. Misc. Material & Travel	928.8		845.0	Õ p
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	I. FACILITIES (Investment)				
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Ð		\$,573.0K		\$ \$73.0K	261
ľ	V. SERVICES (Operational)	•			
	A. Operational Field Assistance	\$ 715.0K		• \$ 715.0K	
l.	B. Computer Services	259.0	·	259.0	
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C. Power Systems		154.8			
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History through the prospective of the Designer of Mission 7104, 7105 and 7106 Collection and ground site systems.... Within the Security restraints of this meeting I will be glad to answer any questions on these Missions and if the detailss are beyond the capacity of my memory I shall endeavor to provide additional facts on the systems. It is essential that the manner and extent to which these systems alter or influence the data be understood by the analysis community. This is particularily true in the case of the initial assessments of an Unknown emitter so that its association with a particular Weapon System may be irrifutable. The USIB Collection and Processing Guidance which was promulgated in mid 1969 established the remainments that all known elements of a Weapon System be collected simultaneously along with portions of the spectrum where Unknow Emitters are situated. Then by Associative Analysis 14 comparing each of the parameters of the Knowns with these of the Unknowns, it will be possible to establish the relationship of the Unknown emitters with a Weapon System at the earliest opportunity."

llistory:

The first recorded intercept of the Signal which has been designated was made on 21 May 1965 using the 7104D collection platform, then in its 17th week of operational life. Again in July and September this signal was intercepted. These three reports were reviewed and because of the 32nd countdown of the Crystal results in the same PRF observed, the signal was placed into a "Friendly" capaçães" and the supervisory spersonel at the collection site and after another Mission (7105) was operationally deployed and in its 6th or 7th month of use.

Early 1963 the signal began to be reported in long intercents (13 minutes) in the data from _______ Because of the geometry of intercept the signal had to immenate fr m the area/North, of the Caspian Sea over to Tibet... certainly not "Friendly". However the analysis still assented that the signal was the 32^d countdown of the _______ Crystal and reporting was once again discontinued in May 1968....

For a period of about 14 months the signal remained unreported by the site personnel who acan all the virgin-tapes within a few days after initial in ercept. Only after the signal was written-up in ELT-60-69 as a signal initially intercpeted by another program was it reinstated into the Signal Of Interest (SOI) category where the site makes electrical reports and attempts geopositioning analysis.

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During the first month of reinstated SOI status the signal was reported at least 12 times and on nine of these occasions the anlysis for geopositioning was possible. This information is contained/the summary of events of the May 68 cancelation and the Sept 69 reinstatement of this signal as reported by the site in a primary collection facility for Missions 7104, 7105 and 7106.

THE FIRST GRAPHIC shows the intercepts and location analysis reported from this site during 15 minute observation time on 26 September 1969. It clearly shows that on the occasion when four ______emitters were intercepted with complex Stagger ratios there were at least three

signals present, also with complex pulse stagger intervals. All 7 of these emitters were located by/the forward area site and are subject so further certification, or substantiation. The association by time coincidence, close location and pulse stagger complexity all in the vacinity of Kordon is offered for your consideration and study, noting the SA-4 association of the emitter....

In order for you to assess the Occurrence Rate of this signal in the month of February 1970 the nest graphic was drawn.

Note the time period represents only 14 days in February 13 locations 4 of these were on the 11th of Feb.

Note the EMBA locations whith their distant Staggers.

The NEXT GRAPHIC is provided to show the complex beam structure and scan stagger modes.....

Note the difference between the two PRI's shown is only 60 usec. This data was observed in the third week of operational life of the 7106 Mission.

Note the Dual Frequency (Diversity) used.

The next Graphic

Shows another frequency diversity signal with MPRI range of 100 usec In this instance there are 16 distinct PRI's used in a random fashion. Here the emitter at first glance may look crudely unstable but upon closer examination it is found that indeed it is very Stable and one of the Modern Radar's of the Future.

The last Graphic is presented to show the similarity between the Antenna Beam Charactocistics of (SA-4) and that shown in an earlier chart

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2. In conformance with the demonstrated capability of the earlier POPPY missions, the major emphasis proposed for Mission 7107 is to collect Elint leading toward the early discovery and initial assessment of ______ radar emissions. In addition, _______ along with the selective geo-positioning (emitter location) capability combine to provide a high potential for

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3. <u>Brief preliminary technical description of Mission 7107</u> Options.

a. General specifications:

Due to the failure on 25 February 1970 of the command systems on two of the operational spacecraft of Mission 7106, it is desirable that an accelerated option be provided for Mission 7107. The major concern lies in the potential for further loss of the remaining 7106 operational capability and with Mission 7105 nearing the end of its life expectancy. Should the overseas receiving and data processing complexes face a period without operational spacecraft, the personnel would lose their proficiency and, more important, they would be in a condition of poor operational readiness for any future mission. For these reasons all of the Options being considered in this paper have accelerated the launch schedule for Mission Several other specifications remain common to all of 7107. these options, such as the use of the old spacecraft (27" dia. multiface) structure, three axis gravity gradient stabilization and microthrusters on all of the spacecraft. It is anticipated that in all of the options the spacecraft will have considerably. more redundancy in the belief that the type of failure experienced with 7106B and 7106D can be avoided. A much expanded command capability will also be available, allowing for more command options and operational versatility.

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Several portions of the spectrum are equipped in all four of the primary spacecraft in order to maximize the intercept potential and increase to a maximum the time over target potential for these high priority portions of the spectrum. Every frequency from 154 to 10,500 MHz and from 14.6 to 14.9 GHz will be equipped in at least two of the spacecraft so thatlocation analysis can be

carried out on data received throughout this extremely wide frequency spectrum.

In the Elint data re-transmission systems, Mission 7107 will have three transmitter channels as compared to two channels used heretofore. This will allow the simultaneous use of twelve receiver systems in each of the spacecraft. This increase in the instantaneous data collection and retransmission capability provides the opportunity to deploy the spacecraft into orbits which will have

Time Over Target (TOT) and allowing the

c. Option #1:

The major emphasis for this option is acceleration of the time schedule by using only systems which are either inhand or those which have completed designs which are ready to be implemented. The Elint coverage proposed for this Option #1 is given in Enclosure (1). The schedule for launch of Mission 7107, Option #1, indicates the launch can take place in the second quarter of FY-72, just 18 months after "go-ahead". This Option provides straight forward design, and a high degree of Elint capability, and minimum delay until launch.

d. Option #2:

This Option has as its major difference from #1 the provision that the K-band coverage will be complete from 10.5 to 18 GHz. Other programs under the NRP will be covering portions of this spectrum up to about 12.4 GHz and Option #1 covers 12.5 to 15.1 and from 17 to 18 GHz leaving only the unique region of Elint coverage for Option #2, the portion from 15.1 to 17 GHz (see Enclosure (2)). Intelligence

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BYE 66341/70

indicates no known threat in this portion of the frequency spectrum.

The schedule impact of providing Elint coverage in these 15.1 to 17 GHz and 10.5 to 12.5 GHz bands will require an additional six months beyond that for Mission 7107 (Option #1). Because the design for these collection systems has not even started they will be the pace-setting hardware development for Mission 7107 (Option #2).

e. Option #3:

н^{с.}

The major element of this option is that it has, for the first year, the option to proceed with either the 18 or 24 month design (Option #1 and #2 respectively.) After one year, however, a management-decision would be required. The decision would include consideration of the launch and operational success of other NRP resources during this one year period. The 24 month version of this Option would provide the same Elint coverage as that of Option #2 given in Enclosure (2). It would require NRL to assume the 18 month schedule and then in addition bring along the development of the additional K-band hardware so that it could be utilized if the management-decision was made for the 24 month schedule.

4. FY-70 Financial Program for the Naval Research Laboratory:

Enclosure (3) provides the monthly obligations experienced at NRL for Mission 7106 and 7107 during the first eight months of FY-70. This period was chosen since it is the most recent period for which the NRL budgetary summaries are available. Below the monthly expenditure portion of Enclosure (3) the summary of FY-70 funds available at NRL has been provided, showing the total FY-70 funds at NRL = \$8,300.0K.

Enclosure (4) provides in standard format the FY-70 cost breakdown for the NRL Financial Program with the first eight months shown under the heading "Obligated" and the last four months listed under the two columns labeled "Anticipated." Note that the estimate for Item I-A for the final four months of FY-70 is \$1559.8K. This is unusually high because of the large amount of procurement for critical flight system hardware for the payloads which must be purchased before the end of June in order to meet the accelerated dates for launch of Mission 7107 using either option. This early expenditure (FY-70) reflects a compensating reduction in the payload electronic costs for FY-71, but it leaves a \$500.0K deficit TOP SECRET HARFOF BYEMAN CONTROL SYSTEM Control System $Page \frac{4}{5}$ of $\frac{6}{5}$

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in FY-70 funds available at NRL. Therefore relief in this matter is extremely urgent for either option that will be authorized.

5. FY-71 Budgetary Estimate for the Naval Research Laboratory:

The FY-71 Budgetary estimate for the NRL portion of Mission 7106, 7107 _______ is given in the figures of Enclosure (5). Option #1 and Option #2 both support Mission 7106 in the same amount, \$154.0K. However only Option #1 ______ cost associated with it. This is necessary because under the schedule of Option #1 the launch of Mission 7107 will occur in late October or early November 1971 and this requires that some of the long lead time items for spacecraft electronic systems must be ordered in late FY-71. Conversely the Option #2 schedule places the launch of Mission 7107 six months further into FY-72 and, therefore, costs will not be experienced in FY-71 on this schedule for Option #2.

7. Summary:

The Director, Program "C" will continue to carry out an orderly program of development of the Elint collection satellite program in support of the National Elint collection priority requirements. The design goals for the four primary and a fifth operational R&D spacecraft will be submitted in June 1970. It is mandatory to provide an R&D opportunity with each POPPY launch so that vital future techniques and systems can proceed through their evolution provaded flight-certification

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Page 5 of 6Copy 5 of 7

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Control System

at the earliest possible time. The fifth operational spacecraft should be mounted on the Agena "Aft-Rack" where the P-11 normally is positioned in launch configuration. Note that the cost summaries provided do not-include any cost estimates for the SAFSP effort for interfacing or launching these payloads into orbit.

Because of the acceleration of Mission 7107, a large portion of the flight components procurement burden is being experienced in late FY-70 thus leaving an unfunded deficit of \$500.0K for the remainder of this Fiscal Year. Notice that the budgetary estimates for the next year (FY-71) have been relieved of this burden so FY-71 cost estimate is relatively lower.

There is no planned carryover of FY-70 funds into FY-71. However, should there be some uncommitted funds remaining it will naturally be added to the FY-71 program as the burden is shifted into the next fiscal year.

The Director, Program "C" strongly recommends that Option #1, with its 18 month development cycle be approved and that the FY-71 funds be made available at the earliest time possible.

L. W. MOFFIT

By direction

Copy to: Director, NRO Staff NRO Comptroller COMNAVSECGRU Director, NRL



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ELINT COVERAGE FOR MISSION 7107 (OPTION#1)

Band <u>No.</u>		Spacecraft 7107A ६ B	Spacecraft 7107C & D
1	•	154-165 MHz	200-350 MHz
2		165-200	350-450
3		550-815	450-550
4		815-970	815-970
5		4 1800-2100	970-1205
6		2100-2580	1205-1800
7		2580-2680	1800-2100
8	· .	2680-2800	2100-2580
. 9		2800-2930	4850-5250
10		2930-3120	5250-5850
11		3120-3300	5850-6725
12	: :	3300-3600	7900-8600
13		3600-4050	8600-9100
14		4050-4850	9100-9340
15		4850-5250	9340-9400
16		5850-6725	9400-9600
17		6700-7900	9600-10500
18		(A)14.6-14.9 GHz (B)14.6-14.9	(D)12.5-14.6 GHz

(A)14.8-15.1 (B)17.0-18.0



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	ELINT COVERAGE FOR MISSION 7107	(OPTION #2)
Band No.	Spacecraft 7107A & B	Spacecraft 7107C & D
- 1	154-165 MHz	200-350 MHz
2	165-200	350-450
3	550-815	450-550
4	815-970	815-970
5	1800-2100	970-1205
6	2100-2580	1205-1800
. 7	2580-2680	1800-2100
8	2680-2800	2100-2580
9	2800-2930	4850-5250
10	2930-3120	5250-5850
11	3120-3300	5850-6725
12	3300-3600	7900-8600
13	3600-4050	8600-9100
14	4050-4850	9100-9340
15	4850-5250	9340-9400
16	5850-6725	9400-9600
1.7	6700-7900	9600-10500
18	(A)14.6-14.9 GHz (B)14.6-14.9	(C)10.5-12.5 GHz (D)12.5-14.6
19	(A) 14.8-15.1 (B) 17.0-18.0	(C)15.0-16.0 (D)16.0-17.0
The states	ECRETANDOR	Enclosure (2)

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Monthly Obligation Rate for First 8 Months of FY-70

Month	Obligations x 1000	Cumulative Total x	1000
JULY AUG SEPT OCT NOV DEC JAN FEB	\$ 432.8K 1646.9 378.7 572.4 965.5 568.6 300.4 530.9	\$ 432.8K 2079.7 2458.4 3030.8 3996.3 4564.3 4864.7 5395.6	1000

Item No.		MIPR No.	Amount
I II III	- - - - - -	FN-2822-0-300 FN-2822-0-300 FY-69 Carryover	\$7300.0K 621.0 132.0
IV	TOTAL NI	Prior Year Adjustmer Credits RL Program, FY-70	nt <u>247.0</u> \$8300.0K

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D112 Enclosure (3) to BYE 66341/70

					C 05
		FY-70 (8 OBLIG	Months) ATED:	FY-70, (1a	st 4 Month N
BYI		7106	7107	7106	71(H
MAS					
SECRET EARDON N CONTROLL SAS Dentrol Sys	PAYLOAD (Develop recurring) A. Elect. Equip. (Data & TM) B. Stabilization Systems C. Power Systems D. Control Systems E. Compat & Envir. Tests F. Mech. Struct. & Fabrication	\$ 178.0K 39.8 6.1 33.1	\$ 497.3K 73.8 30.8		\$1558.8K 135.0 172.0 9.0
	G. NRL Salaries & Overhead H. Misc. Material & Travel	757.0	296.7 205.0	\$ 84.0K 65.0	595.7 194 2
		\$1386.9K	\$ <u>1103.6K</u>	\$ 149.0K	\$2664.
II. III.	GROUND STATION (Investment) A. Elect. (Rec. Record & Time) B. Antenna Systems C. NRL Salaries & Overhead D. Misc. Material Travel & Ship E. A-to-D Systems FACILITIES (Investment) A. Test Equipment & Facilities	\$ 490.4K 30.0 430.0 315.2 \$1265.6K \$ 254.0K \$ 254.0K	\$ 100.0K 20.0 150.0 \$ 270.0K \$ 183.1K \$ 183.1K	\$ 50.0K 135.0 65.5 100.0 \$ 350.5K	proved for Release: 2024/06/12 C05026121
IV. Enclosure BYE 66341/	SERVICES (Operational) A. Operational Field Assistance B. Computer Services	\$ 700.0K 177.6 \$ 877.6K	\$ 55.0K \$ 55.0K	\$ 100.0K 50.0 \$ 150.0K	<u></u> <u></u> <u>\$2754.7K</u>
70 70		\$5395 First 8 M	5.8K Months FY-70	\$340 Last 4 Mo	4.2K nths FY-70
* D 1 1	3 * J	Funds Avail	<u>FY-70 T</u> Lable FY-70=\$8	OTAL = \$8800.0K 300.0K Deficit	FY-70=\$500K



FY-71 Option #3 (18 or 24 Months)

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		7106	7107	18 mos. only)
HANDLI I.	PAYLOAD (Develop Recurring) A. Elect. Equip. (Data&TM) B. Stabilization Systems C. Power Systems		\$ 555.7K 248.5 154.8	-
	D. Control Systems E. Compat & Envir. Tests		138.4 157.0	· · ·
Contra Contra	F. Mech. Struct. & Fabrication G. NRL Salaries & Overhead H. Misc. Material & Travel		273.0 1789.5 929.0	
O CANAL II.	GROUND STATION (Investment)		\$4245.9K	
ONTRO BYEINA	A. Elect. (Rec. Record & Time) B. Antenna Systems C. NRL Salaries & Overhead	 \$ 52.0K	\$ 621.0K 63.2 813.7	
XS TC	D. Misc. Material Travel & Ship. E. A-to-D Systems	20.2 81.8 1.4	666.8	
STEM III.	FACILITIES (Investment)	\$ 154.UK	\$2104.7K	
•	A. Test Equipment & Facilities	 	\$ 573.0K \$ 573.0K	
IV. Bun	SERVICES (Operational) A. Operational Field Assistance B. Computer Services	*. 	\$ 715.0K 259.0K	
E 663		\$ 154 OK	\$ 974.0K	
*D1 41/70		FY-71 \$8311 FY-71 \$8111	L.6K Option #3 (1.6K Option #3 (18 mos.) 24 mos.)
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Approved for Release: 2024/06/12 C05026121 CHANNELS June 22, 1970 SECRET Real Mayo Having had a taste of the benefits of commenting on the NROsors requeements problem, I'd like to upplace going fus this next Gen. To some your equipit and time, course you two, and Les Hammasshow sit down with me for about half an hour pome day? Note be talking from the attached Jouque. PLEASE PUT PAPER IN MY FILL IN STILL AFTER

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HAVE SEEN.

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SECRET - HANDLE VIA TALENT-KEYHOLE CHANNELS

19 June 1970

MEMORANDUM TO MR. R. MAYO

Subj: USIB Guidance for Overhead Collection and Processing of ELINT

Ref : (a) TAB D of TCS-032-70, USIB-SC-10.9/43 of 5/11/70 (b) NRL (5614-230) BYE-51906-70 of 6/18/70

1. Reference (a) is the SORS statement of the current ELINT requirement, projected through 1974, together with background and guidance concerning collection and processing. Reference (b) is NRL's response to NRO's request for an estimate of Program C capabilities to satisfy the USIB requirements. In so doing the NRL paper attempts to explain our program and its technological approach as well as to suggest some of its potential. We may expect to hear more from this exchange; I hope we do.

2. I believe this is the first time NRL has been given such an opportunity by the NRO and NAVINTCOM. A similar opportunity for technical review of the USIB requirements (possibly through the SORS or SIGINT members) would seem to be in order and perhaps could be sought for the 1971 cycle.

3. Having in mind the fact that reference (a) is supposed to provide a basis for advanced planning (five-year period) and to at least reflect anticipated new needs, I'd like to offer some food for thought, geared to reference (a) format.

A. <u>INTRODUCTION.</u> The new category structure and priorities are undoubtedly an improvement, more realistic, but I question if they go far enough to recognize the increasingly important time factors in both strategic and tactical intelligence. Later parts of the texts are better in this regard (and will be noted later), but the front end of the paper is oriented too much to Scientific and Technical Intelligence and not enough to Command/Operational Intelligence. Tied to this same point, I believe, is the need to press for ELINT processing and production commensurate with the collection concerned. (Again the point is covered later in the text.)

HANDLE VIA TALENT-KEYHOLE CHANNELS

SECRET - HANDLE VIA TALENT-KEYHOLE CHANNELS

The intent behind the above line of comment will become more clear in the paragraphs which follow, I trust.

C. <u>SCOPE</u>. There are many recent indications that the balance of power is working against the U.S. as our allies grow farther away from us, the Soviets and the Chicoms become more advanced (the Chinese threat admittedly is more of a long range one except for their involvement in "wars of liberation"), and our own capabilities / are reduced. The need to husband resources and expend our military strength more efficiently may well press us to develop a greatly improved capability to monitor the military posture and readiness of major threats (like the USSR) and hot spots (like the Middle East). The present statement of scope does not support this sort of requirement very well, although such a capability should be well within the state of the art by 1974.*

It may be included in the present categories by implication, but is not "U.S. R&D support" another requirement? The work on the design and development of our own future forces and weapons systems is a separate problem from employing existing capabilities against present and near-term threats. Also we have the same kind of problem in the area of intelligence resources. Should these not be made more clear?

On ECM, recommend that either or both be consulted. Here again, if we become less strong in conventional forces and weapons, the dependence upon EW -- as upon intelligence -will severely increase. The text shows no recognition of such a contingency, and the present priorities do not adequately reflect it. (Did anyone in 5640 or 5650 check the Annex ECM columns?)

E. <u>RESEARCH AND DEVELOPMENT.</u> Because of the lead-times involved, R&D in reference (a) would have to be projected at operational activity well beyond the present -- and to some degree even beyond 1974. This section does not do justice even to the present stated requirements, much less to those to be expected in future. Should be one of the strongest sections, not weakest, also leave room for flexibility.

*Arms Control & Disarmament may exercise similar pressures on the intelligence community to develop measurements of normal levels and patterns of ELINT, detect and assess major deviations, etc.

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-SECRET HANDLE VIA TALENT-KEYHOLE CHANNELS

. Sec. II (EOB & Surv. Req.), D. PARAMETRIC MEASUREMENTS/INFOR-MATION TOLERANCES. As indicated above (e.g. under Introduction and Scope) the concept and development of the subject of EOB and Surveillance leaves something to be desired; for one thing, it is out of balance with other basic requirements and is not sufficiently forwardlooking. In view of the increasingly severe demands for rapid individual emitter identification and for related early warning and targeting data, this paragraph is much too casual. Nor would we be content to depend upon NRO and NSA to speak for the Services and the commands. Electronic Warfare R&D likewise cannot be supported by this kind of approach.

ANNEX on Weapon Systems Priorities, ¶ 3, p.1. Here again is a matter of increasing operational and technical importance apparently being dismissed without evidence of effort to improve the situation. It seems to me SORS should be seeking help and guidance in this area; meanwhile I shall make some informal technical checks on feasibility.

Worksheet on Naval Weapons, p. 16. It represents progress -real progress -- to have this problem finally recognized and listed. We have a long way to go, however, before we will be able to say that the Navy's ELINT/EW requirements are adequately covered, relative to others, and have been assigned reasonable priorities. To accomplish this will admittedly "take a lot of doing," both within the Navy and USIB.

None of the following comments is intended to detract from our appreciation to NAVINTCOM and NRO for the opportunity to see reference (a) and to comment on the potential Program C response. But it would be equally sensible and desirable to make a counterpart "technical" contribution to the SORS product (reference (a)) before the Navy signed off on it. As part of the planning and development of the NAVINTCOM Program Office, could we not include this dual task for the next USIB cycle?

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NOTES RELATIVE TO FY-70 Approved for Release: 2024/06/12 C05026121 am at NRL

Schedule: OP Secret

Our last letter B#-51901-69 in the basic letter states that two year development cycle can be realized only if the design concept is approved early so that long lead time items for 7107 can be started early...

With operational loss of 7106B and 7106D spacecraft and a realization that the other two spacecraft are also vulnerable to earlier than predicted terminal failure...it is Thus recommended that every method of accelerating Mission 7107 be considered. All operational aspects of the previous mission 7106 were considered to be satisfactory and its operational performance was found to be quite creditable so it is the model for the New Concept for Mission 7107...rather than the concept of Ref (a) May 1969.

^Using Mission 7106 as vehicle for the development of Mission 7107 provides several methods of considerable schedule acceleration:

Using the 7105/7106 27" Multiface spacecraft structure the tradeoff is obviously one of reduced volumn and power availability but at the advantage that the multiface structure is already in a high state of design evolution, having been used in two previous launches...

Trying to force the ELINT collection harwa**s**e systems into the multifade structure is likely to impose a severe penalty of volume...it may be found that the ELINT goals for 7107 will not fit into either the power or volume available in the 27" multiface structure. If this is the case the following Pecking order will be observed so that the most urgent capability is retained and the lest important is sacrificed to these restraints imposed by the old structure.

The Stored Command system can not be included in the Mission 7107 concept if it has to be flown in the old structure because of both power and volume restraints...However it is now more important than ever that the space and weight available on the AFT-RACK of the Agena be devoted to a POPPY R&D spacecraft

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1. BACKGROUND:

The concept for Mission 7107 was initially submitted by NRL in February 1967 and then modified by Ref (a) in May 1969. This latter concept while it was approved by Ref (c) has received considerable study for the purposes of potential acceleration due to the sudden and unexplained loss of the operational capability of two of the spacecraft from Mission 7106 experienced on 25 February. The study relative to the acceleration of Mission 7107 has been led by the NRO staff and has taken two at least two dominate directions for planning purposes, which are reflected ko as Options #I and #II, in the following costing estimates. In accordance with the guidance received both verbally from the NRO staff and the references above, the Naval Research Laboratory has summarized (1) the FY-70 financial program finanfial pfor both 8ption #, & #4, 4 4 (20)the Mission 7107. (3) The Mission 7107 for both options to the formation for the state of the state o

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The basis for the cost estimates for FY-71 (Options #I and #II) differ in two significant respects, the time schedule and the ELINT collection capability provided. Option #I very simply is the maximumzakimum which can be ready for the multiface for the earliest for lot date, wkizkxzakiz attained/using the existing/design for the spacecraft structure like that of Mission 7105 and 7106, and modelepoment effort for the ELINT systems, using only those which are in-hand or, used befor. Option #II is a relaxation of time necessary to add the ELINT coverage from 10.5 GHz to 18 GHz in order to satisfy one of the higher collection requirements levied against the NRP by the USIB guidance of Ref ().

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OUTLINE FOR BUDGET SUBMESSION FOR

APRIL 1970....

Two Options will be costed out and summarized: I= APPROVED Mission 7107 Concept II= Accelerated Mission 7107 Concept.

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C05026121 REF (a) NRL ltr to DIR PROGRAM C of XXXMAXXX 1969, BYE 51901-69. (b) NRL ltr to Dir Program "O" of ______1969 Bye (c) NRO msg approving Mission 7107 Concept. (d) NRO memo to Dir Program C of 13 Feb 1970 (BYE-12586-70)

1. Background:

In accordance with the guidance provided in the references $(\mathbf{x}\mathbf{x}\mathbf{x})$ above, the Naval Research "aboratory has summarized the FY-70 financial program, formulated recommendations for the Mission 7107 ["" programs for FY-71 and prepared the budget recommendattions for the NRL portion of the POPPY program for FY-72. These are included in enclosure (1).

The basis for the cost estimates for FY-71 are provided in enclosure (2), the

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opsection

The basis for the cost summaries which are included as enclosures to a modificiation of the initial proposal for this letter **HXE** is **KNEXERSKIFTERSKIFT** Mission 7107 which is now under preparation at the Naval Research Laboratory and which will attain the format and detail normally included in a statement of detailed Design Goals which is normally provided by NRL early in the development cycle for a new Mission.

In addition to the

The definition of Mission 7107 has been delayed and under severe evolution for the past four months so that at this time the best way to finalize and **max** clarify this effort is to develope a paper of "Detailed Design Goals" similar to that normally provided by the Naval Resemrch Laboratory at this point in each developement cycle for a new mission. Such a paper is now under preparation at NRL and is used an the basis for the cost extimates lprovided as enclosures to this paper.

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Secto OPTION

The concept for this option requires that all systems be designed at this time and that the maximum frequency coverage possible within the volumn and power consumption restraints of the older/structure similar to those of Mission 7105 and 7106. Thus this option will provide the maximum capability in the minimum time, using existing designs. The ELINT collection capability proposed is given in Table # 1. Notice that the complete spectrum is covered from xxx to 10,500 MHz with every portion covered in at least two spacecraft to facilitate geopositioning analysis throughout the entire spectrum. In addition there is also a band between 14.6 and 14.9 GHz where geopositioning analysis may be done and a single collection system in the 34. to 35. GHz range which is not equipped in two spacecraft and thus is a General Search type system with about 90° of azimuthal receiving antenna coverage. The 17.0 to 18.0 GHZ band with be available in time to be included also since it has been under development for a period of about 8 months.

OPTION # II: By definition this option requires the maximum of ELINT coverage but must include the entire spectrum from 154 to 18,000 MHZ, with the portion above 10,500 MHz being equipped in a single spacecraft only for General Search type coverage with limited aximutkax receivingantenna azimuthal coverage. The spacecraft structure must be the same as Option #I must with the same restraints of power available and volume the additional collection subsystems will impose a muck greater packing density and perhaps during the periods of minimum sum-light on the spacecraft it may curtail the operational use due to insufficient power. The collection systems 500 to 18,000 MHz region are only now being pluged density be the pacessettin

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items for this Option # TT
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