~~TOP SECRET~~

55-7

HANDLE VIA
BYEMAN
CONTROL SYSTEM
TALENT-KEYHOLE
(PORTAL)

(S) NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

OFFICE OF THE DEPUTY DIRECTOR

DRO-F.5

16 April 1974

2

MEMORANDUM FOR: Director, National Security Agency

SUBJECT: 9 April 1974 NRP Executive Committee

Attached is a list of actions resulting from the subject meeting. Please note Item 12 which requires your initiatives and Item 7 which will be initiated by the NRO Staff in coordination with your office.

Robert D. Singel
Secretary
NRP Executive Committee

w/o Attachment
BYE-12797-74, Pages 2 & 3

S

BYE-12814/74 3 4

EARPOP HEXAGON GAMBIT

HANDLE VIA
BYEMAN
CONTROL SYSTEM

CLASSIFIED BY BYEMAN - 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 582 DECLASSIFY ON IMP DET.

~~TOP SECRET~~

TALENT-KEYHOLE (PORTAL)

CONTROL NO BYE-12814-74
COPY 3 OF ____ COPIES
PAGE ____ OF ____ PAGES

PROF-5

THE DIRECTOR OF CENTRAL INTELLIGENCE
WASHINGTON, D. C. 20505

BYE-111100/74
Copy 1 of 12

17 APR 1974

MEMORANDUM FOR: Director, National Reconnaissance Office

SUBJECT : 9 April 1974 EXCOM Meeting

1. The review you presented at EXCOM last Wednesday was especially helpful. Please pass on a "well done" to those involved.

2. Two key points surfaced during the session which I would like to re-emphasize. First, it would be helpful if in July we could review system trade-offs or resulting options not only in technical and money terms but also in terms of the intelligence gain and/or loss. EXCOM decisions must be made on the basis of output and requirements both in the near and long term as well as costs. Secondly, where new initiatives are to be considered, their costs should be clearly defined over time and coupled with associated processing and dissemination impacts.

3. My present views on the subjects outlined in Singel's memorandum follow:

a. HEXAGON Mapping Camera: I would appreciate a better assessment of the need for the extensiveness of mapping requirements implied by the camera buy proposed. Dr. Hall's points on this were well taken. Please get with General Graham, COMIREX, and the mapping people so that we can pin down this one on substantive grounds. In regard

BYE-111100/74 1

CLASSIFIED BY BYE-1
EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF E. O. 11652, EXEMPTION CATEGORY: § 5B(1), (2), (3) or (4) (circle one or more)
AUTOMATICALLY DECLASSIFIED ON
Impossible to Determine
(unless impossible, insert date or event)

Handle via BYEMAN-TALENT/KEYHOLE (PORTAL) Control Systems Jointly

to NRO funding, there is also a question over the use of "black" budget for mapping, given the pressure on intelligence dollars. I have not closed my mind on this point, but my general inclinations are that if these cameras are to be built for a substantive need of the Department of Defense, they should compete for dollars elsewhere in the Defense mapping budget. I therefore support your proposed action to explore with the DoD Comptroller alternative funding sources.

[redacted]

Handle via BYEMAN-
TALENT/KEYHOLE (PORTAL)
Control Systems Jointly

to change the earlier decision, in view of the overall budgetary situation, I concur in your proposed action contained in Singel's memorandum.

f. Fubini Committee: I will ask the Chairman of the Photo Mix Study to incorporate pertinent aspects of this study in his report to the EXCOM.

W. E. Colby

cc: Dr. Hall

Handle via BYEMAN-
TALENT/KEYHOLE (PORTAL)
Control Systems Jointly

HANDLE VIA
BYEMAN
CONTROL SYSTEM

(S) NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

PROF 5

7

OFFICE OF THE DIRECTOR

26 April 1974

VADM V. P. de Poix
Director
Defense Intelligence Agency
Washington, D. C. 20301

Dear Vince:

Thank you for your memorandum of April 13th outlining your planning actions for the July ExCom meeting. In response, I would like to present the NRO plans for this ExCom and request your support where applicable.

Regarding the HEXAGON mapping issue, the three key elements which will drive the options formulated are: requirements, collection resources (mapping camera and pan camera changes), and a funding source. In the mapping requirements area your review of the DMA requirements and recommendations to the COMIREX would be extremely helpful in better defining the requirements and priorities for which the NRO must assess the collection resource alternatives. In the area of a funding source (reference the April ExCom request), the NRO Comptroller in cooperation with ASD(I), is exploring external NRP sources of funding for potential follow-on mapping cameras and pan camera changes. In a recent memo, Mr. Colby emphasized the need to better define the extensiveness of the mapping requirements. He also questioned the use of NRP "black" funding and indicated that funding for mapping should compete for dollars elsewhere in the defense mapping budget if the cameras are to be built for a substantive need of the DoD.

V

HEXAGON EARPOP

HANDLE VIA
BYEMAN
CONTROL SYSTEM

CLASSIFIED BY BYEMAN - 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATEGORY 5B2 DECLASSIFY ON IMP DET.

TOP SECRET

CONTROL NO BYE-12901-74
COPY 1 OF 3 COPIES
PAGE 1 OF 2 PAGES

[redacted]

In regard to the future of P-11 payloads, we are currently investigating a number of alternatives which include the deletion of P-11 additive costs resulting from SIGINT Committee guidance and a reduction of flight schedule rates. I believe your joint effort with General Allen to assess the value of P-11s singularly or in relation to the information acquired by other SIGINT collectors will be a valuable input to the options which we formulate for the July ExCom issue. Such information should be made available through General Allen to the NRO by mid-June to permit incorporation in the NRP Director's Report.

[redacted]

NRO, CIA, NSA and DIA. Your contributions in this activity should help focus the requirements issue and enable us to properly define and prepare the July ExCom issue.

As briefed at the April ExCom, we also expect to address options for GAMBIT, [redacted] efforts. Your comments on any of these would be helpful.

Your support in the above program requirements area and value assessment is appreciated. I believe it will help us to more effectively present the issues for decision in July 1974.

J. W. Plummer

COMMITTEE ON IMAGERY REQUIREMENTS AND EXPLOITATION

8

20 June 1974

MEMORANDUM FOR: Director, National Reconnaissance Office

SUBJECT : Mapping Requirements

REFERENCE : D/NRO Memorandum BYE-12884-74, 14 May 1974

Attached as an interim reply to your request (reference) is the COMIREX summary statement of MC&G requirement which is in the process of final coordination and review. The draft has been available to your staff and I understand that it will meet your immediate needs related to the July EXCOM.

The review and validation effort on this summary of requirements has been productive and is now almost complete. It should be available in final form in the near future.

Roland S. Inlow
Chairman

S

BYE-2266/74 1

CLASSIFIED BY 007037
EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF E.O. 11652, EXEMPTION CATEGORY: § 5B(1), (2), (3) or (4) (circle one or more)
AUTOMATICALLY DECLASSIFIED ON
Date Impossible to Determine
(unless impossible, insert date or event)

BYE-2266/74
Copy 1

WARNING NOTICE
SENSITIVE INTELLIGENCE SOURCES AND METHODS INVOLVED

TOP SECRET

Handle via BYEMAN
TALENT-KEYHOLE
Control Systems

CONSOLIDATED STATEMENT OF MC&G REQUIREMENTS

I. Introduction

1. The military mapping community has used TALENT-KEYHOLE satellite photography in its production activities since 1960. With the aid of this photography, the Defense Mapping Agency (DMA) has produced about 53,000 different maps and charts out of a current requirement of 80,000 levied by the Unified and Specified Commands, the Military Services, and the Intelligence Community. These maps and charts have been produced at various scales for air, ground, sea, and space operations, intelligence, and military planning. The geodetic data produced by the military mapping community have provided the many thousands of accurate point locations needed for operation of strategic and tactical missile and air strike systems. At the present time, 95 percent of all photography used in military mapping applications is of satellite origin.

2. Satellite imagery requirements to support these various military mapping, charting, and geodetic production activities have several different aspects. They include coverage of various areas of the world by imagery of varying degrees of resolution and metric fidelity. Among the technical requirements that are satisfied in whole or in part by the current satellite systems is the derivation of specific levels of horizontal and vertical accuracy of targets and other map data -- both on a worldwide geodetic system, as well as on a more local basis. A summary of the current and projected status of the various technical and area coverage requirements is provided in the sections following.

3. The summary includes references to U.S. coverage requirements for both military and civil mapping purposes. The exploitation of satellite photography by U.S. civil agencies has been on a very small scale relative to military applications, but is increasing. Collection of imagery of U.S. areas has been primarily dominated by the principle of minimum interference with intelligence requirements, and although the U.S. civil technical requirements are mentioned, they are not driving factors for the NRP.

II. Accuracy Requirements [1/]

A. Driving Horizontal Accuracies

4. As indicated in Table 1, a technical objective of 85 feet (Circular Error -- 90% probability) with reference to the World Geodetic System is the driving future requirement for the horizontal accuracy portion of the military MC&G products. This technical objective, which would be in support of the Advanced ICBM (MX), would require repositioning all of the 2,400 Category I targets in the National Strategic Target Data Base (NSTDB). The NSTDB currently consists of approximately 24,000 targets, predominantly in Communist areas. At the present time, DMA has a major production effort under way to position the 2,400 Category I targets, plus some Category II targets, to the current requirement of 205 feet horizontal accuracy by early 1975. The present KH-9 mapping camera subsystem is generally exceeding this accuracy requirement. Table 2 indicates that the maximum horizontal accuracy with reference to map grid or to local datum is 40 feet for U.S. 1:24,000 line maps -- however, this figure is not a driving factor for the NRP. The next most rigorous current accuracy requirement with reference to map grid or local datum is 66 feet for the Deployable Point Positioning Data Base, which includes such specific applications as the Lance Missile and the calibration of Loran C and MSQ Radar, for the western border of the USSR, Central Europe, Korea, Southeast Asia, and Cuba.

B. Driving Vertical Accuracies

5. Driving vertical accuracies with reference to the World Geodetic System all relate to the National Strategic Target Data Base and are concentrated in the built-up Communist areas. Present validated requirements call for 95 feet vertical accuracy in the positioning of the Category I targets in the FY 76-79 period, and 95-300 feet for the remaining Category II targets after FY 75. The technical objective for the Advanced ICBM for FY 80-on is 75 feet for the Category I targets (see Tables 3 and 4).

1/ A detailed discussion of these accuracy requirements, which have been validated by DMA, is provided in COMIREX-D-15.2/27A, dated 7 February 1974.

Table 1
DRIVING HORIZONTAL ACCURACIES FOR MC&G PRODUCTS
With Reference to the World Geodetic System

Required Accuracy (Circular Error - 90% Probability)		Product	Geographic Areas
		Strategic Missile Support	
		National Strategic Target Data Base	
450-1,000'	FY 74-75	approximately 2,400 Category I Targets	"Built-Up" Communist Areas
205'	FY 76-79	"	"
205-1,000'	FY 76-79	approximately 21,600 Category II Targets	"
*85' (part of a total G&G CEP of 100-165' to support MX)	FY 80	approximately 2,400 Category I Targets	"
		Manned Bomber Support	
450'	FY 73-74	Short Range Attack Missile (SRAM) Radar Fix Points	"Built-Up" Communist Areas
*205'	FY 75 on	"	"

*Technical objective. Figures that are not asterisked are validated requirements.

Table 2
DRIVING HORIZONTAL ACCURACIES FOR MC&G PRODUCTS
With Reference to Map Grid or Local Datum

Required Accuracy (Circular Error - 90% Probability)	Product	Geographic Areas
**40'	1:24,000 Line Maps	U.S.
	Deployable Point Positioning Data Base	
66'-72'	Lance Missile MSQ Radar Calibration	Western border of USSR, Central Europe, Korea, SE Asia, Cuba
82'	1:25,000 and 1:50,000 line maps	Europe, North Africa, Middle East, Coastal Areas of Soviet Far East and of PRC, USSR and PRC Land Borders, SE Asia, Cuba, Iceland, Brazil
215'-218'	Loran C Calibration *TERCOM	Communist Areas
333'-420'	1:200,000 Air Target Charts 1:250,000 Joint Operations Graphics	Worldwide

*Technical objective.
**For information only -- not a driving requirement for the NRP collection assets.

Table 3
DRIVING VERTICAL ACCURACIES FOR MC&G PRODUCTS

With Reference to World Geodetic System

Required Accuracy (Linear Error - 90% Probability)		Product	Geographic Areas
		Strategic Missile Support	
		National Strategic Target Data Base	
300'	FY 74-75	approximately 2,400 Category I Targets	"Built-Up" Communist Areas
95'	FY 76-79	"	"
95-300'	FY 76-79	approximately 21,600 Category II Targets	"
*75'	FY 80	approximately 2,400 Category I Targets	"
		With Reference to Mean Sea Level	
		Manned Bomber Support	
300'	FY 74	SRAM Radar Fix Points	"Built-Up" Communist Areas
*95-150'	FY 75 on	"	"
100'	FY 74 on	Mini-Bloc, Penetration Route Analysis for Manned Bomber Support	Communist Areas

*Technical objective.

Table 4
DRIVING VERTICAL ACCURACIES FOR MC&G PRODUCTS
With Reference to Map Grid or Local Datum

Required Accuracy (Linear Error - 90% Probability)	Product	Geographic Areas
**5'	1:24,000 Topographic Maps	U.S.A.
*20' over 10 n.m.	TERCOM	Communist Areas
33' over 20 n.m.	1:25,000 and 1:50,000 line maps	Europe, North Africa, Middle East, Coastal Areas of Soviet Far East and of PRC, USSR and PRC Land Borders, SE Asia, Cuba, Iceland, Brazil
	Deployable Point Positioning Data Base	
54-66'	Lance Missile MSQ Radar Calibration	Western Border of USSR, Central Europe, Korea, SE Asia, Cuba
82'	1:250,000 Joint Operations Graphics 1:200,000 Air Target Charts	Worldwide

*Asterisked item is a technical objective.
**For information only -- not a driving requirement for the NRP collection assets.

6. Extremely rigorous vertical accuracies of 5 feet -- and even 2.5 feet -- with reference to map grid or local datum have been identified for various U.S. civil and mapping requirements such as engineering surveys, floodplain mapping, disaster surveys, and other large scale maps. However, these requirements are not driving factors for the application and design of NRP satellite systems, and are mentioned for information only. The most stringent vertical technical objective applicable to NRP systems is 20 feet (Linear Error -- 90% probability) over ten nautical miles with reference to map grid or local datum for TERCOM in the Communist areas. The most rigorous currently validated requirement is 33 feet over a distance of 20 nautical miles for the 1:25,000 and 1:50,000 military topographic maps for parts of Europe, the Middle East, China, the North African coast, and Southeast Asia. Other military MC&G requirements for the Deployable Point Positioning Data Base, such as the Lance Missile and MSQ Radar Calibration, require accuracies of 54 and 66 feet in various parts of the world peripheral to the Communist countries. Together, the 1:200,000 and 1:250,000 maps and charts call for a vertical accuracy of 82 feet on a virtually worldwide basis.

C. Equivalent Satellite Camera System Characteristics

7. DMA has translated these driving horizontal and vertical MC&G product accuracies into the satellite camera system characteristics indicated in Table 5.

III. Other Technical Requirements

A. Resolution Quality

8. Photo resolution requirements for MC&G purposes vary with the scale of the product. The most stringent requirements for ground resolution to meet content needs of military MC&G products is 6.5 feet GRD. For some selected civil applications, resolutions to as little as 1 foot GRD have been identified, but in themselves the latter should not be considered as driving factors for the NRP collection resources, because these highly specialized applications can generally be also satisfied by non-NRP collection sources.

Table 5
Camera System Characteristics Related to
Military MC&G Accuracy Requirements
(Values* Given at 1 Sigma)

Item	Current	Possible Future
Mensuration/Calibration (micrometers)	10	10
Absolute Timing (milliseconds)	1	1
Relative Timing (milliseconds)	0.1	0.1
Attitude (Absolute in each axis) (arc seconds)	5	5
Attitude (relative in each axis) (arc seconds)	1	1
Orbit (feet)		
in-track**	90	30
cross-track**	60	30
vertical**	30	30

*In terms of current KH-9 operational altitudes.
**The 90-60-30 values are exceeded by the current MCS. Achievement of the 30-30-30 values is anticipated on Mission 1214.

B. Stereo Coverage

9. In areas where accurate ground survey data are not available, stereo tri-lap MCS photo coverage is required for precise positioning of points on the ground. Areas where accurate ground survey data are available include portions of the US and most of Europe. Stereo KH-4 or KH-9 panoramic coverage is also required to permit automated development of contour lines in areas where large scale topographic maps are produced. Monoscopic KH-4 or KH-9 pan coverage is acceptable for revision of metrically accurate but culturally out-of-date maps. However, stereo coverage from the KH-9 pan, the KH-8, or the KH-11 system is required for obtaining data on which to base radar reflectance patterns and for performing radar analysis for revision of Joint Operations Graphics (Radar) and Target Charts.

C. Obliquity Constraints

10. For high priority areas and those with hilly or mountainous terrain, MC&G requirements limit photo obliquity to 45°. In flat areas, and areas where only small scale maps and charts are required, photographs with obliquity of up to 60° can be used for MC&G purposes.

D. Time Sensitivity

11. Only when crises arise in areas where map coverage is insufficient and imagery is lacking is it necessary to levy special MC&G requirements with short deadlines. Normally DMA production planning procedures permit relatively long range advanced scheduling and increased collection priority of imagery required to meet map production schedules.

IV. Area Coverage Requirements

A. Metric

12. USIB - Approved. In 1972 USIB approved [1/] collection efforts against the MC&G requirement for 37 million square nautical miles

1/ USIB-D-46.4/50, COMIREX-D-15.2/23, dated 11 August 1972.

of once-over metric imagery coverage. This is essentially a worldwide requirement -- with the exception of certain ice-covered areas such as the interior of Greenland and Antarctica, and 1.2 million square nautical miles of the U.S. which are well surveyed and mapped. The 37 million total does include 1.6 million square nautical miles of the U.S., which is also a U.S. Geological Survey requirement.

13. The 37 million figure initially was subdivided into four general priority categories. Priority 1, for example, included the highly developed areas of the Sino-Soviet area and Western Europe. In September 1973 DMA re-prioritized the 37 million mile requirement into five categories. By utilizing a combination of existing KH-4B and KH-9 panoramic materials, and deferring production in low priority areas, DMA indicated that the collection of 11.0 million miles could be deferred temporarily -- that is, until after FY 78 -- with low risk[1/]. The original total requirement of 37 million suqare nautical miles of stereo, 90 percent cloud-free imagery was reaffirmed as valid for the longer term.

14. Current Status of Collection. Tables 6 and 7 summarize the current status of collection against MC&G metric requirements. They show in detail the current requirements divided by major world areas and by priority. The attached world map (Figure 1) shows the requirements specifically levied for Mission 1208 collection. This map shows by various colors the five levels of MC&G collection priorities. Priority 5 designates the approximately 11 million square nautical miles of temporarily deferred areas. The irregularly-shaped white strips within the colored areas indicate the amount of MCS coverage for military and civil MC&G needs satisfied prior to Mission 1208. Collection priorities reflect the current importance of the various areas to map production programs and may change from mission to mission.

15. Estimated 1978 Satisfaction Levels. Table 8, which is based on the May 1974 NRO simulation, shows the estimated coverage which can be achieved with the remaining nine MCS up to Mission 1216.

1/ Rationale contained in COMIREX-D-15.10/4, dated 24 September 1973.

Table 6
Current Collection Status
KH-9 MCS Requirements
Worldwide--Including Sino-Soviet Area and US
(Stereo, 90% Cloud-Free)

	(Millions of Square Nautical Miles)						
	Sino-Soviet Area	Eurasia (Outside Sino-Soviet)	Africa plus Sinai	North America incl. US	Latin America	Other**	Total#
USIB-Approved Requirements	10.2	5.5	8.7	5.3*	5.1	2.2	37.0
WAG Cell Areas	10.4	5.4	8.8	5.7*	5.5	4.0	39.9
Collected by End of March 1974 (Missions 1205-1207)	3.3	1.3	1.7	0.0	0.2	0.0	6.6
Balance--Current Requirement	7.1	4.1	7.1	5.7	5.3	4.0	33.3

*Excludes 1.2 and 1.3 million square nautical miles., respectively, which are well-surveyed and mapped areas of the US.
**Includes Australia/New Zealand/Oceania. WAG Cell Area also includes the US Zone of Antarctica and some additional areas, not included in USIB-approved requirements.
#Figures may not add precisely to these totals because of rounding.

Table 7
Remaining Requirement for KH-9 MCS Collection
Worldwide, Including Sino-Soviet Area and US
(Stereo, 90% Cloud-Free)

A. Requirement at End of Mission 1207

	(Millions of Square Nautical Miles -- Based on WAG Cell Area)						
Priority	Sino-Soviet Area	Eurasia (Outside Sino-Soviet Area)	Africa (plus Sinai)	North America (including US)	Latin America	Other	Total*
1	2.8	0.0	0.0	0.0	0.0	0.0	2.8
2	3.8	1.6	0.1	0.4	0.3	0.1	6.3
3	0.3	2.0	1.3	0.7	1.3	0.7	6.3
4	0.1	0.5	3.3	0.7	2.0	0.6	7.1
5**	0.2	0.0	2.5	3.9	1.6	2.5	10.7
Total*	7.1	4.1	7.1	5.7	5.3	4.0	33.3

B. Updated Requirement for Mission 1208**

1-4	6.7	3.4	2.7	4.7	4.4	0.4	22.2
5	0.5	0.7	4.4	1.0	0.9	3.5	11.0
Total*	7.2	4.1	7.1	5.7	5.3	3.9	33.2

*Totals may not add precisely due to rounding. These figures may not agree precisely with those in other tables.
**Figures for Mission 1207 priority areas do not agree with Mission 1208 priority areas because the DMA Area Collection Requirement Evaluation System reprioritizes all collection requirements before each mission.

Table 8
NRO Estimates of 1978 Satisfaction Levels
for KH-9 MCS Coverage
Worldwide -- Including Sino-Soviet Area and US
(Stereo, 90% Cloud-Free)

	(Millions of Square Nautical Miles)		
Priority	Outstanding Requirements as used in NRO Simulations*	May 1974 Simulations of Coverage by Missions 1208--1216	Remaining Requirement at End of 1216**
1	2.4	2.1	0.2
2	7.3	5.8	1.4
3	7.5	4.9	2.6
4	4.7	2.4	2.3
5***	11.1	0.8	10.3
Total**	33.0	16.0	16.9

*Based on DMA preliminary estimates on 1 April 1974 of 1208 requirements, which do not agree with those in the preceding table.
**Totals may not add precisely because of rounding.
***The deferred priority 5 requirements were given no weight in this simulation, hence the simulated amount collected -- obtained on a stringent non-interference collection basis to avoid return of unexposed film -- is very small.

16. This simulation assumed a continuation of two KH-9 MCS missions a year of 60 days each, of current film loads, and of the past record of success in launch and recover of missions. It is understood that the possibilities of increasing the MCS film load by 20 percent and of extending MCS mission life from the current 60 days to 90 days are being studied by NRO to determine whether the increased coverage obtained would warrant the expenditures for these modifications. Initial simulation results indicate the impact of these two measures will be rather limited.

17. This simulation shows that, by focusing collection only on Priority 1 through 4 requirements, which totalled 21.9 million square nautical miles, the remaining KH-9 missions would yield 15.2 million square nautical miles. This would leave a balance of about 6.7 million square nautical miles shortfall in the higher priority requirements. Of this shortfall an estimated 1.6 million square nautical miles is in the Sino-Soviet area.

18. The temporary deferral of 11.0 million square nautical miles of the original total of 37 million square nautical miles tends to reduce the collection efficiency of each MCS mission -- both because the total requirement decreases and the remaining areas become smaller and more fragmented.

19. Estimated Post-1978 Satisfaction Levels. The NRO-estimated post-FY 1978 shortfall of approximately 16.9 million square nautical miles requires metric coverage of various degrees of accuracy, some of which at present can be satisfied only by the MCS. Lower degrees of accuracy can be satisfied by the existing data bank provided by the already collected KH-4B materials. One alternative to preclude a gap in metric capability to meet the still-remaining requirement -- and to ensure having a metric capability to meet the potential increase in MX positioning accuracy requirement against Category I targets in Communist areas -- would be to obtain additional MCS. To fully satisfy the potential increased target accuracy requirement, an improved KH-9 vehicle positioning capability would also have to be available for these additional MCS. Other possible alternatives include the development of (1) a metric pan camera system, or (2) a metric capability for the KH-11 -- both of which must be demonstrated to be technically feasible.

B. Non-Metric Medium Resolution

20. USIB - Approved. The current USIB-validated KH-9 panoramic requirement is shown in Table 9. This requirement both extends the base of worldwide coverage begun in the KH-4 missions, and includes annual recoverage to update MC&G products. The collection parameters are for 90 percent cloud-free coverage, in stereo, taken at no more than 45° of obliquity for target clusters, and no more than 60° obliquity for the remaining areas. This requirement was not subdivided into priority areas; however, the compilations of pan requirements submitted for each KH-9 mission are prioritized.

21. These USIB-approved MC&G requirements exclude the high priority Sino-Soviet area since MC&G needs on this area are routinely satisfied by panoramic photography collected in response to Intelligence Community requirements. The standing KH-9 panoramic intelligence requirements provide virtually complete coverage every two years of the entire Sino-Soviet area and important areas of the Middle East.

22. Current Status of Collection. Table 10 summarizes the current status of collection against the USIB-approved KH-9 pan requirements for MC&G. This table excludes both the Sino-Soviet area and the most important part of the Middle East, for which MC&G requirements are fully met by standing intelligence requirements for periodic coverage. The following map (Figure 2) shows by various colors the four levels of MC&G collection priorities that were established for panoramic collection for Mission 1208.

23. Estimated 1978 Satisfaction Levels. The extrapolation in Table 11 of pan collection by Missions 1208 through 1216 is based on the present allocation of about 8,000 feet of KH-9 pan film per mission for military MC&G, the current film rewind rate, a continuation of two KH-9 missions a year, and a continuation of the past record of success in launch and recovery of missions. This extrapolation would more than fulfill the remaining pan recoverage requirement. Whether or not the KH-4B covered areas are included in the first-time requirement, there would still be an estimated shortfall of about two million. Of course, a somewhat better collection performance could be achieved by additional allocations

Table 9
MC&G Requirements for
KH-9 Panoramic Coverage FY 1972-78
(Non-Communist Areas) 1/
(Stereo, 90% Cloud-Free)

	(Millions of Square Nautical Miles)			
	Military			
Fiscal Year	First Time	Re-coverage	Total	USGS*
1972	1.5	0.5	2.0	0.3
1973	2.0	3.0	5.0	0.3
1974	1.5	2.5	4.0	0.3
1975	1.0	2.0	3.0	0.3
1976	0.5	2.0	2.5	0.3
1977	0.3	1.5	1.8	0.3
1978	0.0	2.0	2.0	0.3
TOTAL	6.8	13.5	20.3	2.1
After 1978 (annual)		2.0	2.0	0.3

*As stipulated in the September 1971 USIB-approved requirement for annual collection of KH-9 panoramic coverage of up to 300,000 square nautical miles of territory of the United States (including Alaska and Hawaii) for USGS purposes, the NRO was requested to attempt to meet this requirement by programming KH-9 test coverage over the United States against the full USGS mapping needs to the greatest extent possible. Coverage needs not satisfied through these operations, however, are to be counted as elements of the overall MC&G requirements.

1/ USIB-D-46.4/50 (COMIREX-D-15.2/23), 11 August 1972.

Table 10
Current Collection Status
KH-9 Panoramic MC&G Requirements
for Non-Communist Areas
(Stereo, 90% Cloud-Free)

	(Millions of Square Nautical Miles)		
	Original Requirement	Area Collected by March 1974	Remaining Requirement
Military			
First Time, FY 1972-77	6.8	2.2*	4.6
Recoverage, FY 1972-78	13.5	7.4*	6.1
Subtotal	20.3	9.6	10.7
Civil			
First Time (FY 1972-78 at 0.3 million/ year)	2.1	0.7	1.4
TOTAL	22.4	10.3	12.1

*Includes KH-4B coverage of 2.0 million square nautical miles collected in FY 1972. This figure includes 0.5 of first time coverage and 1.6 of recoverage.

Table 11
Military MC&G
Estimated 1978 Satisfaction Levels
for KH-9 Panoramic Coverage
for Non-Communist Areas*
(Stereo, 90% Cloud-Free)

	(Millions of Square Nautical Miles)		
	First Time	Recoverage	Total
Current Requirement (March 1974)	4.6	6.1	10.7
Estimated Coverage, Missions 1208-1216 (to end of FY 1978)	2.2**	7.5**	9.7**
Remaining at End of FY 1978	2.4	0.0	2.4***

*Excludes the US.
**Based on average rate for Missions 1201 to 1207.
***Represents estimated shortfall in first time coverage.

of film for MC&G purposes. It is assumed that the remaining USIB-approved USGS requirement for first-time panoramic coverage of the U.S. will be essentially fulfilled by 1978.

24. Estimated Post-1978 Satisfaction Levels. After FY 1978 military MC&G panoramic requirements will consist of 2.0 million square nautical miles of recoverage annually of areas previously photographed to permit the revision of out-of-date maps and charts. Areas covered and their priority would vary from mission to mission depending on the revision cycle on maps and charts in each part of the world. It is assumed that MC&G needs for periodic recoverage of the Sino-Soviet area will continue to be met by intelligence requirements for coverage of this area. In addition, the post-FY 1978 requirement would include the shortfall of about two million square nautical miles of first-time coverage. On the basis of current collection rates, most of the 2.0 million square nautical miles of panoramic recoverage required annually for military MC&G requirements could be met.

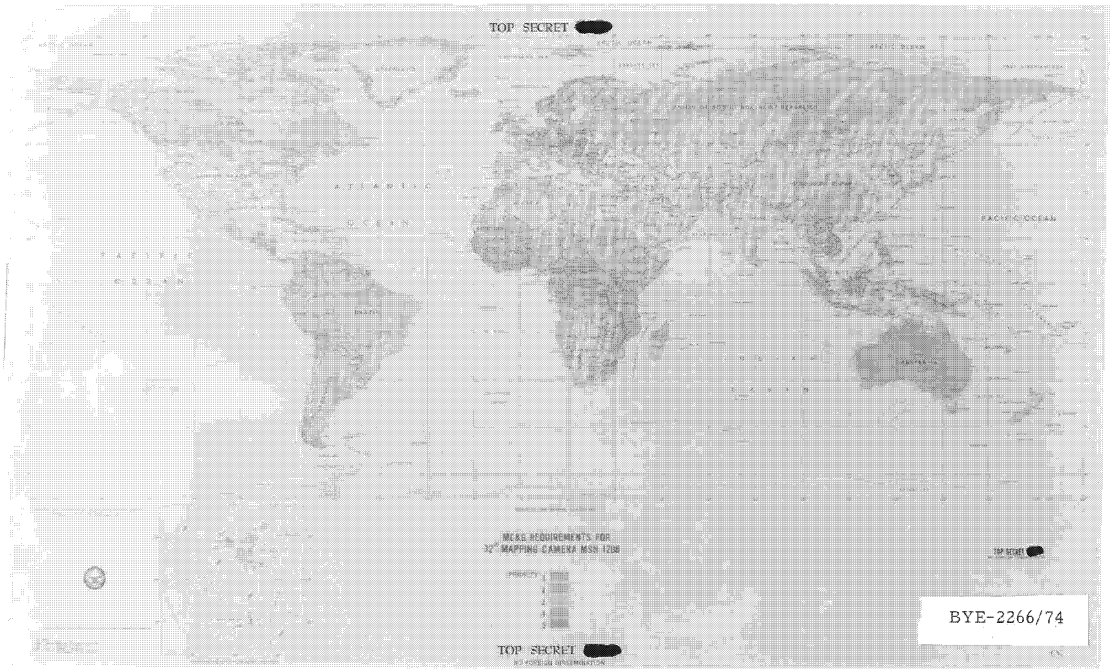
C. Non-Metric High Resolution

25. Military mappers have requirements for non-metric high resolution imagery of small areas such as is now provided by the KH-8 system. The imagery is used for compiling large scale products such as port and harbor charts, airfield information, and city maps. The original KH-8 military MC&G requirement totalled 3,176 targets scattered throughout the world as follows: Sino-Soviet area - 559; remainder of Eurasia - 1,078; North America - 107; South America - 483; Africa - 796; and Australia/Oceania - 153. Of this total the KH-8 missions from 1968 through October 1973 have collected imagery on 2,179 targets, leaving a remainder of 997 to still be collected. Only a very small percentage of the KH-8 capability has been used for military MC&G purposes.

26. On occasion such high resolution imagery has also been required for U.S. civil applications, but the total magnitude of these requirements has been even less than the military requirements.

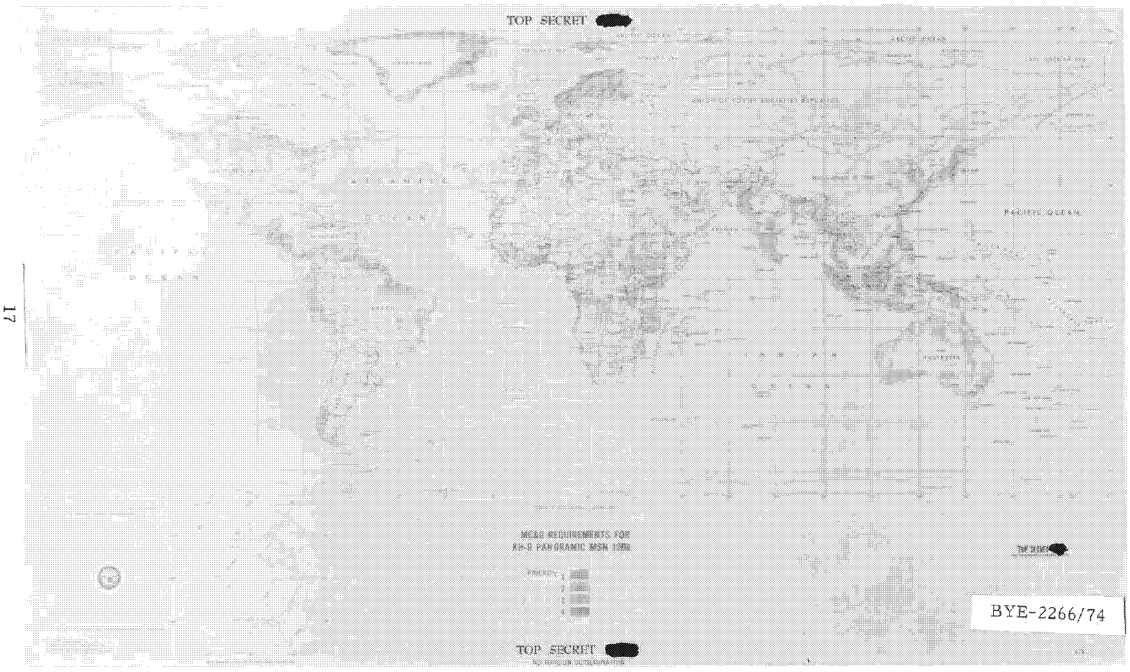
27. It is therefore reasonable to believe that the future collection results against these high resolution imagery requirements on small areas will probably continue to be highly, if not fully, satisfactory -- unless there is some unexpected marked increase in the level of requirements.

FIGURE 1



11

FIGURE 2



17

(9)

20 June 1974

BYE-18934-74 CY 1

SUMMARY OF THE STUDY OF PROGRAM 989

1. (S/E) Program 989 was studied in the context of SIGINT requirements and capabilities, including recent requirements, P-989 history, the current status, and the possible future of the program. The capabilities of P-989 systems were examined in some detail and were related to the capabilities of other programs to contribute to the satisfaction of requirements. Detailed information on the various missions past, present, and future was studied and program cost growth examined. A somewhat surprising conclusion of this study is that cost growth has been almost exclusively due to inflation. Thus the steady growth in program capability represents an improvement in program cost effectiveness.

2. (S/E) Four specific program options were considered in the study.

A. A complete and immediate termination of the program.

B. A greatly reduced program which involves no new development starts, only the launch and operation of systems now approved.

S

C. A slightly reduced program which equates to starting development on one new system per year in addition to the launch and operation of systems now approved.

D. Continuation of P-989 at the current program level. In the context of estimated intelligence impact, this option differs from option C [redacted] The options were examined in detail in terms of potential funds to be released and potential impacts on intelligence collection capability.

3. (S/E) The capabilities lost if the program is terminated are sufficiently important to make that option unacceptable. Program termination would involve a substantial loss of capability to collect and geoposition pulse [redacted] emitters in the 2-18 GHz RF range, and would immediately reduce, by over half, the collection currently supporting the EOB update and would greatly reduce operational ELINT support on land based emitters. Also lost would be current support to sustained COMINT collectors and the worldwide MYNA capability.

4. (S/E) Under the option which involves no new development starts, there is no short term effect on capabilities because of the systems now under development (RAQUEL, URSALA III, and URSALA IV). The major impacts are on Technical Intelligence capability (beginning in FY-77) and on operational ELINT capability (beginning in FY-80). The Technical Intelligence capability is of the greatest concern since only low orbiting systems access emitter mainbeams with the frequency and variety of aspect angles required to make precision measurement of such parameters as polarization type, ERP, scan type, rate and limits, and beam dimensions. [redacted] Since these measurements are vital in support of analysis of emitter function and capability, and to the development of counter-measures the option of no new starts is unacceptable.

5. (S/E) The recommended option is to put P-989 on a one-new-start per year basis, with the FY-75 and FY-76 new starts

devoted to mainbeam Technical Intelligence. This reduction in new starts is more apparent than real since the program has been averaging well under 2 new starts per year in the recent past. The risk involved in this option is that it may be necessary to increase the program in FY-77 to start another URSALA system, or else delay a Technical Intelligence mission by one year. The decision regarding the need for another URSALA will be based on the support [redacted] there should be adequate information available in time to permit that decision.

---

* This assumption entails a slight change from current URSALA launch planning which requires that an URSALA system be available for the next host launch in the event of catastropic failure.

HANDLE VIA BYEMAN CONTROL SYSTEM

NATIONAL RECONNAISSANCE PROGRAM
Washington, D. C.

11 July 1974

NRP EXECUTIVE COMMITTEE

MEETING

Director of Central Intelligence Conference Room
Room 7D-64, CIA Headquarters
Friday, 19 July 1974
9 a.m.

References

1. Director's Report to the NRP Executive Committee, Volumes I and II.
   NRO BYE-13072-74, 10 July 1974

2. The Imaging Systems Mix Study (ISMS).
   IC Staff BYE-111181-74, July 1974

3. Mapping Requirements.
   COMIREX BYE-12884-74, 14 May 1974

4. DIA/SAC Imagery Panel Report
   BYE-2688-74, 20 June 1974

5. Intelligence Impact of a [redacted]
   SIGINT Committee BYE-083-74, 24 June 1974

6. The Effects of Weather on Near-Real-Time Systems.
   NRO BYE-13040-74, 5 July 1974

Agenda

1. Executive Report — Mr. Plummer

HEXAGON [ ] EARPOP

HANDLE VIA BYEMAN CONTROL SYSTEM

TOP SECRET
CLASSIFIED BY BYEMAN 1 EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 EXEMPTION CATE GORY 5B2 DECLASSIFY ON IMP DET

CONTROL NO BYE-13085-74
COPY 18 OF ____ COPIES
PAGE 1 OF 2 PAGES

2. Program Summary (Reference 1) — Mr. Plummer

   a. Revised Baseline/Changes

   b. FYDP Potentials

   c. Funding Outlook

   d. Decisions Required

3. Issues and Director's Recommendations (Reference 1) — Mr. Plummer

   a. Imaging Systems Strategy

   b. HEXAGON Mapping

   c. [redacted]

   d. [redacted]

   Source Selection — Dr. McLucas

   e. [redacted]

   f. [redacted]

   g. New Initiatives

4. Decisions Summary — Mr. Plummer

5. Adjournment

Robert D. Singel
Secretary
NRP Executive Committee

TOP SECRET

CONTROL NO BYE-13085-74
COPY ____ OF ____ COPIES
PAGE 2 OF 2 PAGES

July ExCom Agenda
BYE-13085-74, 11 July 1974

Distribution

1 Mr. Colby, DCI
2. Gen Walters, DDCI
3 Mr. Duckett, DDS&T
4 Gen Graham, D/DCI/IC
5 Mr. Clarke, AD/DCI/IC
6 Mr. Dirks, ODE
7 Dr. Hall, ASDI
8 [redacted] DDR&E
9 Adm. de Poix, D/DIA
10 ~~Gen Allen, D/NSA~~ Mr. McClary via [redacted] Office of OSD Comp
11 Dr. Hermann, NSA
12 ~~Mr. Hyland, State, INR~~ Gen Allen, D/NSA
13 [redacted], OMB
14 [redacted], OMB
15 Adm Geiger, Prgm C
16 Gen ~~Ben~~ Bradburn, Program A
17 Mr. Hyland, Director/INR/State
18 SS-7 STAR
19 Dr. McLucas

Working Copies

Plummer
Singel (2)
Cook
Kulpa
[redacted]
Hill
SS-3
4
5
6