

COMMITTEE ON IMAGERY REQUIREMENTS AND EXPLOITATION

Mr. Plummer has seen.

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
Roland S. Inlow
Chairman

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CONSOLIDATED STATEMENT OF MC&G REQUIREMENTS

	Page
I. Introduction	1
II. Accuracy Requirements	2
A. Driving Horizontal Accuracies	2
B. Driving Vertical Accuracies	2
C. Equivalent Satellite Camera System Characteristics	7
III. Other Technical Requirements	7
A. Resolution Quality	7
B. Stereo Coverage	9
C. Obliquity Constraints	9
D. Time Sensitivity	9
IV. Area Coverage Requirements	9
A. Metric	9
B. Non-Metric Medium Resolution	16
C. Non-Metric High Resolution	21

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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.

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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.

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

<u>Required Accuracy</u> (Circular Error - 90% Probability)		<u>Product</u>	<u>Geographic Areas</u>
<u>Strategic Missile Support</u>			
<u>National Strategic Target Data Base</u>			
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	"
<u>Manned Bomber Support</u>			
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.

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

<u>Required Accuracy</u> (Circular Error - 90% Probability)	<u>Product</u>	<u>Geographic Areas</u>
**40'	1: 24,000 Line Maps	U.S.
	<u>Deployable Point Positioning</u> <u>Data Base</u>	
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.

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Table 3
DRIVING VERTICAL ACCURACIES FOR MC&G PRODUCTS

With Reference to World Geodetic System

<u>Required Accuracy</u> (Linear Error - 90% Probability)		<u>Product</u>	<u>Geographic Areas</u>
		<u>Strategic Missile Support</u>	
		<u>National Strategic Target Data Base</u>	
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

		<u>Manned Bomber Support</u>	
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.

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

<u>Required Accuracy</u> (Linear Error - 90% Probability)	<u>Product</u>	<u>Geographic Areas</u>
**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
	<u>Deployable Point Positioning</u> <u>Data Base</u>	
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.

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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.

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

<u>Item</u>	<u>Current</u>	<u>Possible Future</u>
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.

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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 $\frac{1}{2}$ collection efforts against the MC&G requirement for 37 million square nautical miles

$\frac{1}{2}$ USIB-D-46.4/50, COMIREX-D-15.2/23, dated 11 August 1972.

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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 square nautical miles of stereo, 90 percent cloud-free imagery was reaffirmed as valid for the longer term.

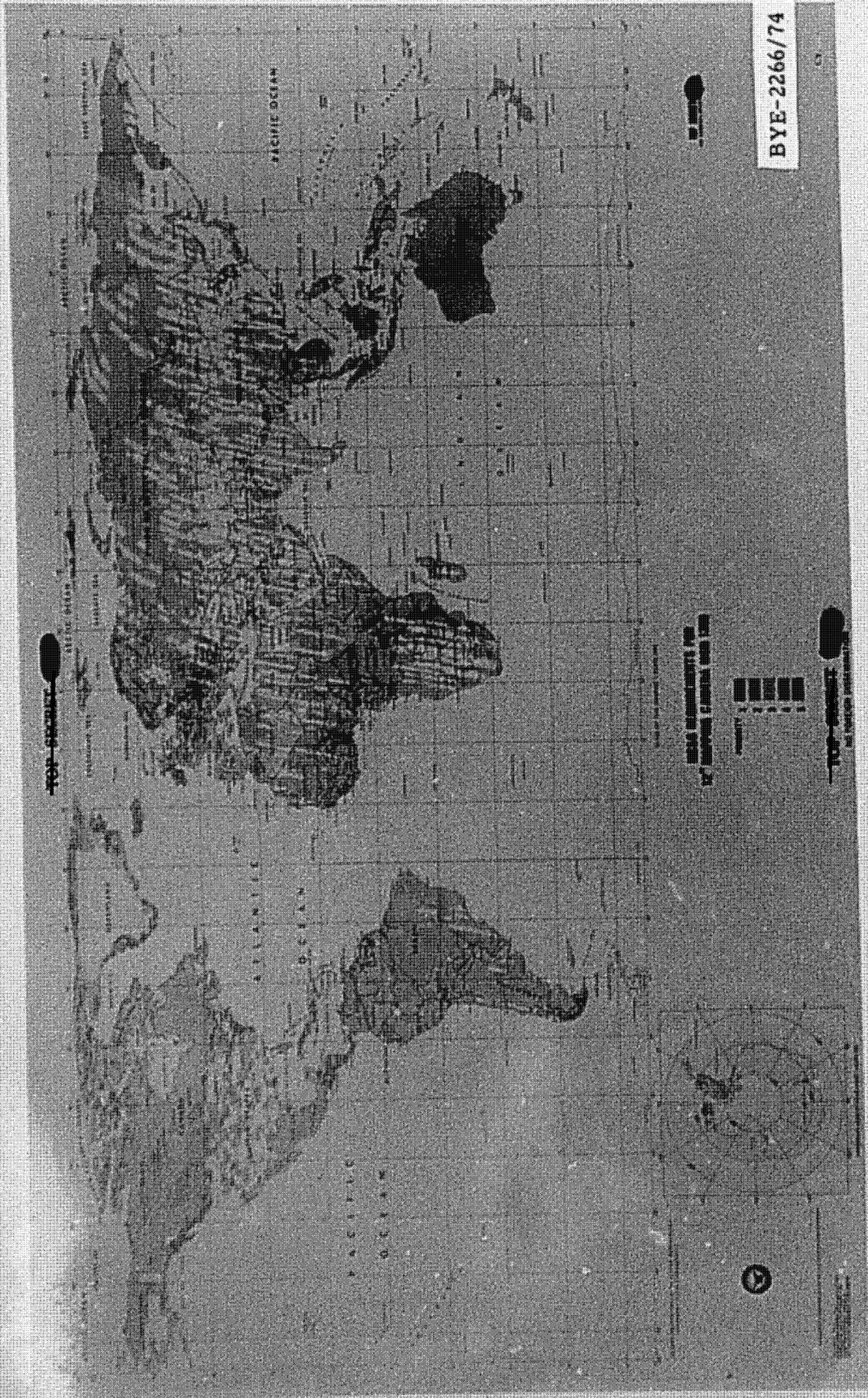
14. Current Status of Collection. Tables 6 and 7 summarize the current status of collection against MC&G metric requirements. They show in detail the current requirements divided by major world areas and by priority. The attached world map (Figure 1) shows the requirements specifically levied for Mission 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.

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FIGURE 1



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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)

	<u>Sino-Soviet Area</u>	<u>Eurasia (Outside Sino-Soviet)</u>	<u>Africa plus Sinai</u>	<u>North America incl. US</u>	<u>Latin America</u>	<u>Other**</u>	<u>Total#</u>
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.

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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

Priority	(Millions of Square Nautical Miles -- Based on WAG Cell Area)							Total*
	Sino-Soviet Area	Eurasia (Outside Sino-Soviet Area)	Africa (plus Sinai)	North America (including US)	Latin America	Other		
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.

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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 Require- ments 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***	<u>11.1</u>	<u>0.8</u>	<u>10.3</u>
Total**	33.0	16.0	16.9

*Based on DMA preliminary estimates on 1 April 1974 of 1208 require-
ments, 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.

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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.

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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

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FIGURE 2

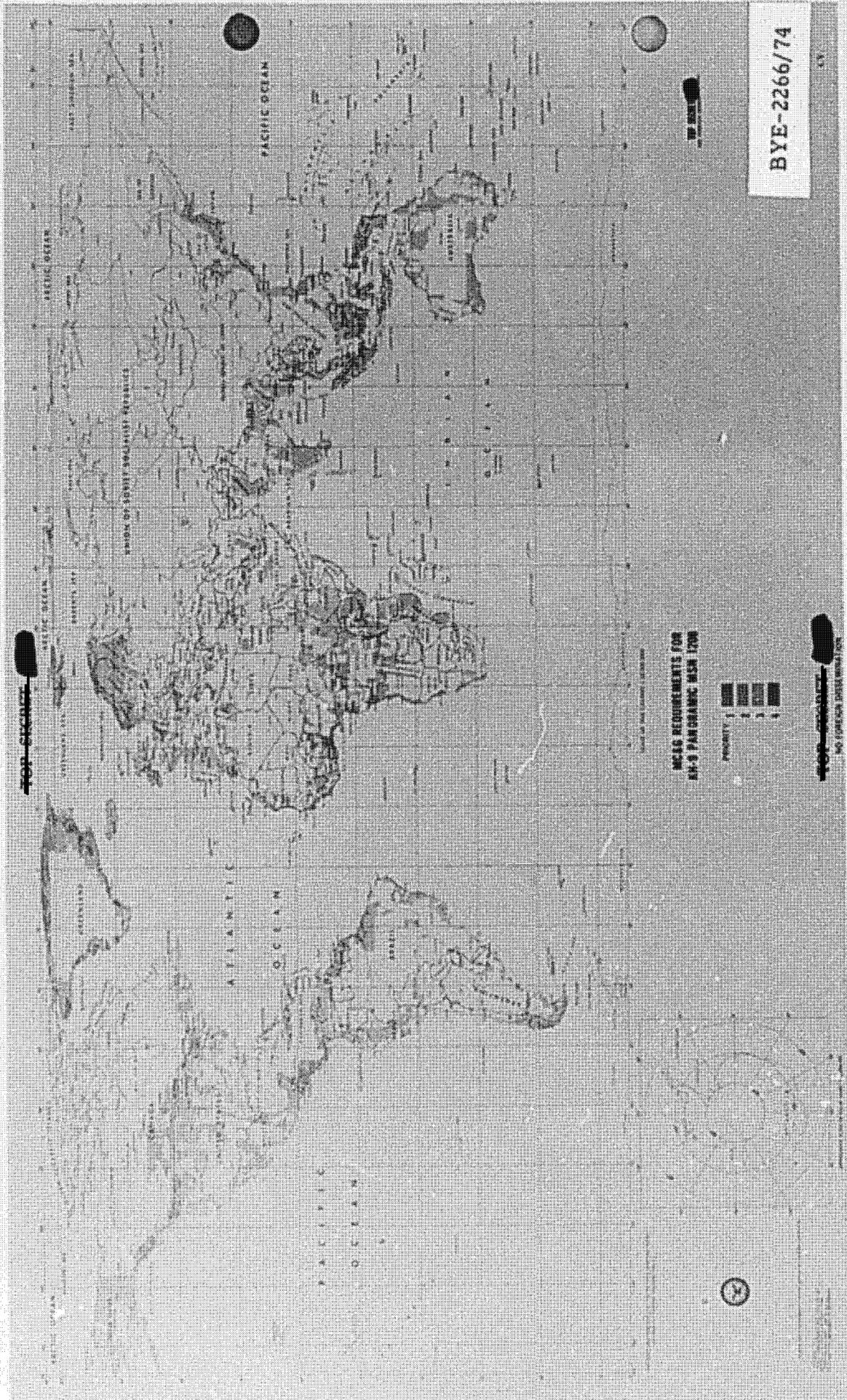


Table 9
 MC&G Requirements for
 KH-9 Panoramic Coverage FY 1972-78
 (Non-Communist Areas) ^{1/}
 (Stereo, 90% Cloud-Free)

(Millions of Square Nautical Miles)

<u>Fiscal Year</u>	<u>First Time</u>	<u>Military</u>		<u>Total</u>	<u>USGS*</u>
			<u>Re-coverage</u>		
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	<u>0.0</u>		<u>2.0</u>	<u>2.0</u>	<u>0.3</u>
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.

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

(Millions of Square Nautical Miles)

	<u>Original Requirement</u>	<u>Area Collected by March 1974</u>	<u>Remaining Requirement</u>
<u>Military</u>			
First Time, FY 1972-77	6.8	2.2*	4.6
Recovery, FY 1972-78	13.5	7.4*	6.1
Subtotal	20.3	9.6	10.7
<u>Civil</u>			
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 recovery.

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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)

	<u>First</u> <u>Time</u>	<u>Recovery</u>	<u>Total</u>
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.

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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.

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