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Approved For Release 2005/04/22 : CIA-RDP79B01709A000500030004-1  
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MCGWG-D-7/5

2 June 1966

MEMORANDUM FOR: COMOR Mapping, Charting, and Geodesy Working Group

SUBJECT: Mapping, Charting, and Geodesy Requirements for [redacted]

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1. The attached draft of mapping, charting, and geodesy requirements for covert satellite reconnaissance systems has been prepared by the Chairman. Present intentions are to place this draft on the agenda of the next Working Group meeting, which will be held on Monday, 13 June, at 1400. It is hoped that members will come prepared to submit corrections or additions as appropriate at that time.

2. Members will be advised of additional agenda items as necessary.



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Chairman  
COMOR MCG Working Group

Attachment:  
Subject paper

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Copy 1 DIA TCO [redacted]  
2, 3 DIA TCO [redacted]  
4, 5 Army TCO (Mr. Matthews)

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6, 7 Navy TCO (Mr. Wolf)  
8, 9 Air Force TCO (Mr. Eldridge)

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10, 11 CIA Member [redacted]

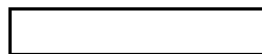
NRO review(s) completed.

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12 NRO ([redacted])  
13, 14 NPIC [redacted]

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15 State TCO (Mr. Moyer)  
16 NSA TCO [redacted]



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17 CIA COMOR Member  
18, 19 Ch/PWG

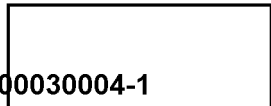
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downgrading and declassification

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MEMORANDUM FOR: United States Intelligence Board

SUBJECT: Mapping, Charting, and Geodesy  
Requirements for [Redacted]

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Introduction

1. Mapping, charting, and geodesy disciplines are currently being revolutionized as a result of:

a. Increasing U.S. needs for mapping, charting, and geodetic information in support of both existing and new weapons systems and other changing military requirements.

b. The receipt of large quantities of data from the [Redacted] KH-4, [Redacted] satellite programs that can be applied against these increasing requirements.

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c. The potential for achieving a significantly improved world-wide geodetic system by use of overt geodetic satellite programs [Redacted]

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[Redacted]

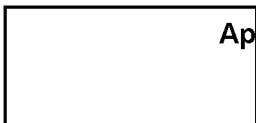
d. Technological advances achieved in the use of data derived from satellite programs.

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[Redacted]

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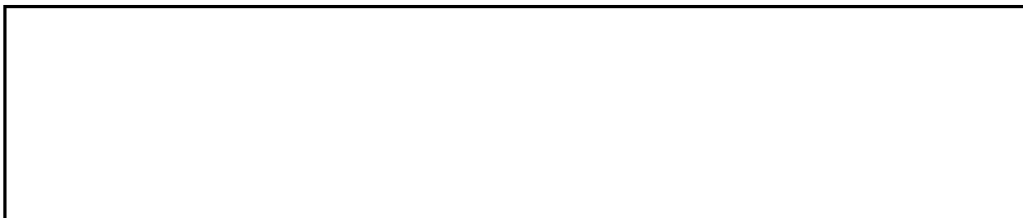


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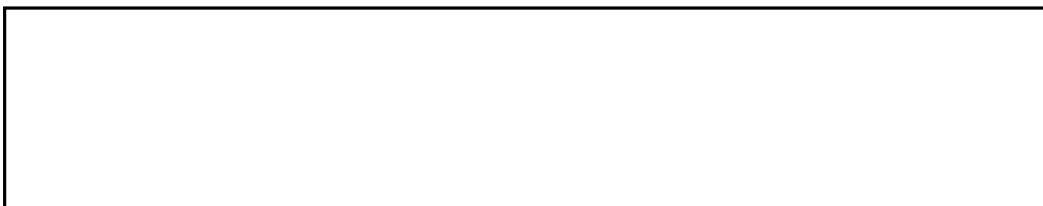
e. Substantially complete coverage of the Sino-Soviet bloc and approximately 9.4 million square miles outside this area that has been obtained by present satellite collection programs (Although this coverage can be used to produce maps and charts, its value is marginal in that it does not meet all mapping and charting accuracy criteria).

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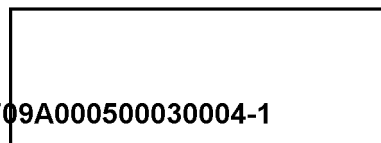


Requirements

2. Against this background of both extensive and changing needs and the fact that we have acquired and expect to acquire large volumes of data useful in meeting many of our anticipated requirements, it is necessary to establish current and future requirements for mapping, charting, and geodesy to be fulfilled by covert satellite collection systems. These requirements which relate directly to U.S. military needs insofar as they can be predicted through 1972 fall into two classes as follows:



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[Redacted]

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Furthermore, since these

missiles will employ low-angle re-entry warheads, target elevations throughout the Sino-Soviet bloc must be accurate

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[Redacted]

again relative to the

World Geodetic System. It is currently estimated that data

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derived from [Redacted] materials, which cover 44 million

square miles of the 56 million required, are providing

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It is further estimated

that by 1970, refined horizontal accuracies of [Redacted]

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feet can be compiled. These

accuracies will be possible through mathematical refinement

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combining the covert [Redacted] products with data from the

overt U.S. National Geodetic Satellite Program, with its

world primary triangulation network, plus necessary filling

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in on gaps in [Redacted] coverage

[Redacted]

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[Redacted]

[Redacted]

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Thus we

confidently expect that our geodetic requirements relative

to the World Geodetic System will be satisfied without

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[Redacted]

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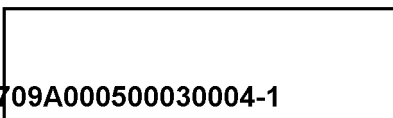


b. Mapping and Charting Requirements.

Horizontal and vertical control accuracies with 90 per cent assurance for maps and charts at various scales are set forth below:

	<u>Horizontal Accuracy</u>	<u>Vertical Accuracy (Including Datum Degradation)</u>
Large Scale Topo Maps at 1:50,000		
Medium Scale Maps at 1:250,000		
Medium Scale Charts at 1:200,000		
Photogrammetric Control Points Relative to Regional and Local Bases		
Significant Features		

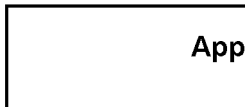
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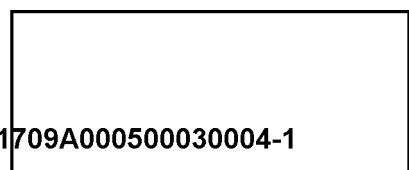
Justification for Accuracies and the Degree to Which Present Collection Systems are Meeting Requirements

3. The accuracies required for large scale topographic maps are commensurate with the capabilities incorporated in advanced-design tube artillery. These designs will assure that effective lethal fire is delivered on initial salvo if maps used to establish trajectories provide precise target and position data. Present reconnaissance systems are not meeting either the horizontal or vertical accuracy criteria. The improved KH-4, expected to be launched in July 1967, will provide accuracies meeting the horizontal requirement, and the

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4. The requirements for medium scale maps are based on their use as a substitute for large scale topographic maps in laying down tube artillery fire. Although medium scale maps are employed in many other different ways, none of their uses is as demanding in accuracy as the part they play as substitutes for large scale maps. Medium scale aeronautical charts require essentially the same accuracies as topographic maps of similar scale. The increased vertical accuracy, as compared with topographic maps, is needed to prepare radar predictions for all-weather, low level penetration of



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tactical and strategic aircraft.

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[Redacted]

5. Requirements for relative accuracies of photogrammetric control points relative to regional and local control have been established in order to permit the orderly production of contiguous maps and charts and to satisfy the accuracy requirements of weapons with ranges up to 500 miles. Present systems are meeting the horizontal accuracy requirement, and it is estimated that [Redacted]

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[Redacted]

Photographic Resolution and Accuracy of Significant Features

6. In addition to the requirements for horizontal and vertical accuracies listed above, map and chart production also requires that certain details, especially those relating to the height of man-made objects and to the height and shape of significant features, be portrayed accurately. Furthermore, it has been determined that a ground

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resolution of [Redacted] is sufficient for these details.

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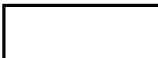
Timeliness of Photographic Collection

7. Since map and chart production is a very time-consuming process, it is essential that an adequate data bank of photographic coverage and regional and local photogrammetric positioning information be obtained well in advance of military contingencies that may arise anywhere in the world and could require the production of medium and large scale maps and charts on an emergency basis. *Even with much longer range reconnaissance* We are

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presently employing both the KH-4



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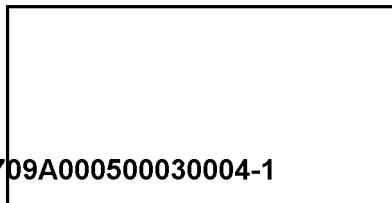


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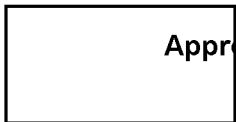
Suggestions for Future Research and Development

8. Opportunities to enhance efficiencies and ease in using data from satellite reconnaissance systems for mapping and charting have been discussed with NRO representatives, but design potentials are not clearly predictable at this time. A number of technical

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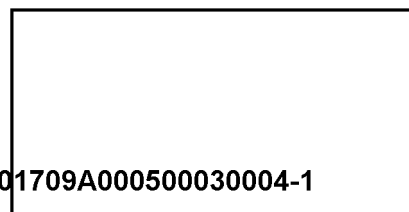


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proposals could be met in more than one way, although solutions might require certain trade-offs. Suggestions which we have submitted are as follows:

a. Inclusion of a six- or eight-inch focal length index (terrain) camera in the KH-4 or similar stereo panoramic system, with at least a three-inch focal length for the stellar camera, will provide an acquisition system capable of directly providing the precise geometry needed to meet all medium scale map and chart accuracy requirements. Since the six- or eight-inch focal length would not fulfill the accuracy requirements for large scale maps, possible ways to include a still longer focal length for the index camera should be considered.

b. In order to use a longer focal length index camera more efficiently in data reduction, improvements to present stellar index systems are required. Were these accomplished, more accurate determinations of vehicle attitude could be made. Modifications accomplished should permit vehicle attitude to be determined to within five arc seconds (one sigma).



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c. There are possible improvements which, if added to existing systems or incorporated into advanced systems, could make map production more efficient and would provide easier methods for direct incorporation of satellite data into finished maps.

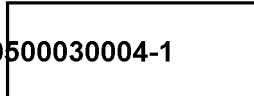
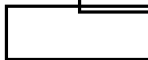
Recommendations

10. It is recommended that:

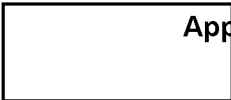
a. The NRO, <sup>even though</sup> because basic world-wide geodetic requirements <sup>will probably be</sup> ~~are being~~ satisfied <sup>by existing systems</sup> on an overt basis, respond further to geodetic requirements <sup>where</sup> only if covert systems can achieve accuracies greater than presently required and permit savings in other geodetic programs.

b. The NRO, in conjunction with technical representatives of the mapping and charting community, continue to study the problem of improving the cost-effectiveness of covert satellite photography in the production of maps and charts and to consider adoption of such improvements in system designs that do not result in <sup>are compatible</sup> detrimental effects on the <sup>with the</sup> primary intelligence mission performed by covert satellite reconnaissance.

*for obtaining mapping and photography for the production of maps & charts by*



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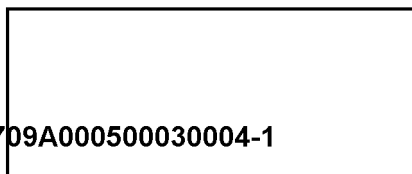
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c. Present efforts to obtain photographic material of non-denied areas for the mapping and charting data bank be continued with the present KH-4 and with the improved KH-4 when it becomes operational.

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