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UNITED STATES INTELLIGENCE BOARD

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OFFICE OF THE CHAIRMAN  
29 July 1969



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BYE # 108-69  
Copy No. 17 of 8  
*Series "D"*

MEMORANDUM FOR DIRECTOR, NATIONAL RECONNAISSANCE OFFICE

SUBJECT: Requirements for a Near-Real-Time Imagery Satellite System

1. The attached memorandum presents a statement of intelligence requirements for a near-real-time imagery satellite system as approved by the United States Intelligence Board on 24 July 1969 based on a report by the Committee on Imagery Requirements and Exploitation. Accordingly, these requirements are forwarded herewith to the NRO as formal initial guidance in defining and developing such a system, together with the further requests contained in paragraph 7 of this report.

2. In approving these requirements, however, the Board recognized that there are other SIGINT and imagery systems being considered or developed and that each of these candidate systems could entail significant acquisition costs. Consequently it should be noted that the value of a near-real-time system must also be related to the value of current capabilities or to other candidate systems. As recommended in the report, these USIB approved requirements may have to be adjusted as the feasibility and cost implications are identified and assessed and as a total NRP plan is developed.

3. As you know, this USIB statement was prepared in anticipation of consideration of this subject at the forthcoming EXCOM meeting.

Richard Helms  
Chairman

Attachment  
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Attachment  
USIB-D-46.4/30  
(COMIREX-D-13.7/6)  
16 July 1969  
Limited Distribution

MEMORANDUM FOR: United States Intelligence Board

SUBJECT: Requirements for a Near-Real-Time  
Imagery Satellite System

- REFERENCES:
- a. USIB-D-46.4/29, 16 June 1969,  
Limited Distribution
  - b. USIB-D-46.4/28, 13 June 1969,  
Special Limited Dissemination
  - c. USIB-D-46.4/3 (COMIREX-D-13.7/4),  
5 January 1968, Limited Distribution
  - d. Memorandum for Holders of  
USIB-D-46.4/3, 21 March 1969,  
Limited Distribution

1. This memorandum is in response to the USIB directive to COMIREX (reference a) to prepare a statement of intelligence requirements for a near-real-time imagery satellite system for USIB consideration pursuant to the exchange of correspondence between the Deputy Secretary of Defense and the Director of Central Intelligence (noted in reference b).

Background

2. In February 1968, the USIB noted a COMIREX study (reference c) that pointed out the desirability of developing a multi-purpose imagery reconnaissance system capable of contributing vital information applicable to strategic warning/indications and capable of collecting

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information of value to current intelligence, search, and surveillance tasks. The COMIREX study was transmitted to the NRO by the USIB with the request that the NRO evaluate the study and report to USIB on the feasibility and approximate cost of a collection system which would meet the objectives outlined therein. In March 1969 the NRO provided a summary of the current state of development of key components of a near-real-time system and listed a number of areas which required more specific guidance from USIB (reference d). A CIA study completed in June 1969 was briefed to USIB on 11 June (reference b) and circulated to the USIB on 16 June (reference a). This study followed up the earlier USIB and NRO papers and concluded that the potential value of a multi-purpose near-real-time system was sufficiently demonstrable to warrant issuance of initial formal requirements and the prompt movement toward appropriate system definition.

3. The studies in references a and c both concluded that cost-effectiveness considerations would require development of a multi-purpose system that would be used against a wide variety of existing and potential intelligence problems. The referenced studies show that an appropriately configured near-real-time imagery system will be able to contribute significantly in determining enemy capabilities and vulnerabilities and to the following:

- a. Analysis of crises and other fast-breaking events.
- b. Strategic warning/indications.
- c. Target surveillance and activity analysis.
- d. Current intelligence reporting.
- e. Support of military operating commands and contingency planning, to include tactical applications preceding and during periods of active warfare.
- f. Monitoring arms limitation or disarmament agreements.

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4. Intelligence always has needed an imagery satellite system that would be continuously on orbit and capable of providing photography of a target within hours. In that sense the present requirement is long standing, but it is only now that technology affords the opportunity of fulfilling it. Ultimate system characteristics will, of course, govern the extent of its multi-purpose applicability to various roles. Such a system should afford opportunities for savings through reductions in, or even elimination of, other collection systems. For example, a system which meets design characteristics specified in paragraph 6, below, will be able to satisfy a significant segment of the USIB surveillance requirements currently programmed for HEXAGON and GAMBIT coverage. Some requirements now levied on SIGINT satellite systems may also be satisfied. A continuing review with NRO will permit identification of the most beneficial areas of requirements trade-off.

#### Requirements

5. System definition and development should be based on a continuing exchange of views between USIB and the NRO to weigh and consider both the USIB's requirements and the NRO's development of a system capable of meeting them. As the feasibility and costs of various technical-engineering alternatives become clearer, the requirements will be reviewed in the light of technological developments and available trade-offs to insure the best possible results. The final formulation of requirements thus is envisaged as the product of a reiterative process.

6. Listed below are characteristics for a near-real-time system\* that meet intelligence needs and which are believed, on the basis of present knowledge, to be feasible. The characteristics include elements which the NRO indicated (reference c) should be considered in future guidance:

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\*The term "system", as used in this paper, is intended to encompass the sensor satellite or satellites, the related data link, and the ground-based equipment needed to make the initial transformation of electrical signals into imagery.

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1/a. Image Quality. In general terms, the image quality should be equivalent to that obtained from the later KH-7 missions. In terms of resolution, the reconstructed imagery should achieve two-foot resolution at nadir.

1/b. Ground Area Imaged. At a minimum, the ground area imaged at nadir should be at least three by three nautical miles. This format will accommodate approximately 85 percent of the targets in the present COMIREX deck. In addition, if feasible, a stripping mode or equivalent should be available to provide opportunities to conduct limited search.

1/c. Continuity and Target Access. A near-real-time system must be on orbit continuously and when fully operational should be able to provide daily access to all COMIREX targets in the Communist countries. As a general guideline, the scale of the imagery at extreme look-angles should be degraded by no more than two-thirds the scale at nadir.

1/d. Imaging Capacity and Rate. A near-real-time system should be capable of returning between [ ] frames of imagery per day against the COMIREX target distribution. This requirement assumes most imagery will be monoscopic; however, some stereo coverage will be needed. The system should be capable of returning 15 to 20 frames of imagery per day against dense target concentrations such as the Moscow area, East Germany, North Korea, or the Tyuratam, Kapustin Yar, or Sary Shagan missile test centers.

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e. Reliability. After a near-real-time imagery system becomes an established source of intelligence information, a total interruption in the flow of imagery could seriously impair the total intelligence process. The system when fully operational should provide a high probability of having at least one imagery satellite on orbit and functioning at all times.

f. Imagery Delivery Location and Time. To assure timely support to the seat-of-government and national command authorities, initial interpretation and exploitation will take place in the [redacted] area. If it is technically and economically feasible, the system should be capable of delivering imagery to the ground and making some of it available for initial interpretation within one hour after sensing has occurred. This requirement is levied in recognition [redacted]

in synchronous orbits and by the employment of relatively rapid processing rates on the ground for at least selected targets. Further study will be needed to determine the means and timeliness of dissemination to other locations, keeping in mind the requirements of unified and specified commanders for the timely dissemination of selected imagery.

g. Tasking Response Time. It is desired that targeting response time be such that targeting on subsequent passes can, when necessary, be based on information read out from a previous pass on the same day. It is assumed, however, that the majority of targeting commands will be generated more routinely and transmitted to the imagery satellite several hours before collection is attempted.

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h. Data Transmission Security. Although the general mission of a near-real-time imagery satellite system will probably become known, steps should be taken to insure that unauthorized interceptors will be unable to reconstruct more than a small amount of degraded imagery. Because it imposes fewer system design penalties, physical denial of signals transmitting imagery is recommended as the means of insuring imagery return security. If physical denial cannot achieve an acceptable degree of security and it appears necessary to follow an encryption route, careful study of feasibility and cost should be undertaken. Targeting command data between the ground and satellites in the system should be secure.

i. Growth Potential. In choosing among design alternatives the NRO should favor concepts and hardware that will permit long run growth in terms of both the quality and quantity of imagery obtained, with the proviso that such growth potential considerations do not unduly delay the attainment of a near-real-time system.

7. It is recommended that USIB:

a. Approve these requirements for forwarding to the NRO as formal initial guidance in defining and developing a near-real-time imagery satellite system;

b. Request the NRO to indicate whether further detail or explanation is needed at this time;

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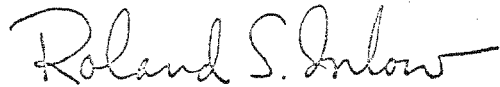
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c. Request that as NRO assesses the feasibility and cost implications of these requirements it identify and advise the USIB of those which, with minor modification, might permit either a significant reduction in cost or result in a major improvement in capability; and

d. Request that NRO and COMIREX inaugurate a periodic, perhaps quarterly, joint review of progress and actions to assure continuing coordination and understanding of areas of mutual responsibility.



Roland S. Inlow  
Chairman

Committee on Imagery Requirements and Exploitation

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