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TALENT KEYHOLE/ BYEMAN
CONTROL SYSTEM
HEXAGON
CORONA
GAMBIT

~~US~~ NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

OFFICE OF THE DIRECTOR

July 26, 1968

MEMORANDUM FOR THE DEPUTY SECRETARY OF DEFENSE

SUBJECT: Review of HEXAGON Requirements by the USIB Committee
on Imagery Requirements and Exploitation (COMIREX)

On July 1, 1968, there was issued COMIREX Paper D-11.1/2 dealing with revalidation of the requirement for the HEXAGON system. The issuance of this paper was no doubt stimulated by the recent questions raised by the Bureau of the Budget (BOB) regarding the validity of the requirement for the HEXAGON system, although the question had been under internal consideration within the USIB and its committees before the BOB formally raised it.

The paper is apparently not intended for formal approval by the USIB at this time. It is addressed to the Chairman of the National Intelligence Resources Board (Adm. Taylor). However, many new or radically modified concepts regarding satellite photographic reconnaissance requirements are expressed in this paper, and for this reason it is worth noting the substance of its contents.

You may recall that the original USIB requirement which led to the HEXAGON system was not strictly a requirement for collection, but in contrast to virtually all other USIB requirements, in this case system characteristics were specified. Although we would now attempt to discourage (or perhaps even to reject) such an approach to requirements, and, in the current relationship between the USIB and the NRO, such a requirements statement would probably not be promulgated by the USIB, the requirement for HEXAGON has remained on record, with minor modifications, substantially as originally stated. An implied decision to proceed with the HEXAGON system was incorporated

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in the DOD/CIA Agreement of August 11, 1965 (again a very unusual procedure) and subsequently this decision was ratified by the NRP ExCom in a final decision to proceed with full development.

The HEXAGON requirement, as originally stated, was for a system with at least the swath width of CORONA and the resolution of the older GAMBIT (KH-7). I believe, although I am not aware of an explicit statement on this point, that it was thought that HEXAGON would be capable of replacing both GAMBIT and CORONA for both the search and surveillance tasks. Subsequently, when the follow-on GAMBIT (KH-8) became operational, it was realized by the USIB that there were many surveillance targets which could not be adequately covered by a system with the resolution of the older GAMBIT (nominally 2.0-2.5 feet resolution at nadir). Therefore, the notion that HEXAGON could completely replace both GAMBIT and CORONA was quietly dropped. Instead, it was reasoned that HEXAGON could cover a large number of surveillance targets, thereby reducing the number of GAMBIT missions required annually. Because HEXAGON will not fly initially before October 1970 (FY 1971) and for some time after that will probably not be completely reliable, no numerical tradeoffs between GAMBIT and HEXAGON have been worked out as yet. The NRO has initiated the appropriate tradeoff studies; however, in our view, program and budget decisions on this issue will not be appropriate until the FY 1971 budget formulation cycle.

The most recent COMIREX paper on the justification for HEXAGON, in effect, presages a radical change in the statement of requirements for satellite photographic reconnaissance. This change (and it remains to be validated by the USIB) is indicated in the following sections taken verbatim from the COMIREX report:

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"2. Analysis of information derived from current satellite systems has been a significant factor in the determination of Bloc military capabilities and in the development of a sound intelligence basis for the formulation of U. S. national policy and the structuring and deployment of U.S. military forces and weapons systems. We find ourselves in a period in which our high resolution KH-8 system* is functioning reliably and is permitting the production of a large and increasing volume of excellent quality intelligence. During this same period the KH-4 is producing improved resolution, although this improvement is still far short of the resolution that the KH-9 system is intended to provide. If these current satellite systems are judged against the currently approved collection requirements which were established in the context of current systems capabilities, it is clear that they have performed well and that they have the growth potential to meet a substantial future increase in the same type of requirement. The currently approved statements of requirements, however, have tended to stress intelligence needs for:

- a. Search of large areas with medium resolution and wide swath to detect suspicious activities.
- b. Follow up photography with high resolution, to identify the nature of the activity.
- c. Surveillance coverage of large numbers of specific priority targets by high resolution, narrow swath photography.

* High resolution coverage in this paper is defined as photography with a resolution range of [redacted] to five feet.

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In spite of the general adequacy of existing systems in meeting these stated requirements, unanswered intelligence problems exist and we anticipate that important problems will arise in the future which could be better solved, or solved only, by a capability to examine closely, collectively, and nearly simultaneously the entirety of large geographic areas with high resolution coverage. Such a capability would support the assessment of the deployment and inter-relationship of complex military systems and forces. Up to the present time we have not developed detailed requirements for such a system because of the lack of a capability to acquire such imagery by satellite. We recognized the potential need for such a system, however, when we generated the requirement outlined in reference a. above."

"3. It is particularly important to emphasize that our current requirements have been developed on the basis of current capabilities and those problems within the range of these capabilities. Thus, these requirements have not taken into full account such changes in collection needs as might result from unexpected changes in the military situation or from a skillful effort to employ camouflage or an agreement involving arms control and disarmament inspection. In addition, the Department of Defense, particularly in support of the Unified and Specified Commands, has requirements for high resolution coverage of many areas needed for timely contingency planning. However, current capabilities and national priorities for satellite and airborne systems have generally prevented satisfaction of these requirements."

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Backup information supporting this new statement of requirements is included in the COMIREX paper and covers such short-comings of current KH-4 and KH-8 coverage as the following:

a. Inadequate high resolution coverage by the narrow swath widths available from KH-8 of areas with many targets with resulting camera aiming conflicts. Some examples given are the Moscow and Leningrad areas and the launch facilities at Tyuratam and Sary Shagan.

b. Inability, with the current combination of KH-4 (CORONA) and KH-8, to effect timely location of unknown targets needing relatively high resolution for positive identification. Currently many targets first found by KH-4 require subsequent targeting by KH-8 for identification (not surprising, since this is the current requirements and operations concept). Particularly noted was the need for higher resolution than KH-4 to identify ground force installations.

c. Inability to detect on a timely basis overall changes in foreign military postures. It is stated that such assessments require concurrent relatively high-resolution coverage of geographically separated installations which are part of the same target system. Examples cited are ground force postures in the Western USSR, the Eastern European area and South China. The following quotation with respect to these examples is significant, "The KH-4 obtained extensive coverage of these installations but even the resolution provided by its improved camera system was not sufficient to enable the installations to be unambiguously categorized as belonging to artillery, armor, or infantry." Among other examples of this kind cited were the [REDACTED]

The [REDACTED] comments relate not only to the slowness of data return from satellites (which HEXAGON would not solve) but also to the deficiencies in KH-4 resolution as follows,

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"...because the mission on orbit during the [redacted] was a KH-4, the resolution obtained did not contribute significantly to establishing whether Soviet Ground Forces had concentrated along the [redacted]."

d. The inadequacies of present systems to police arms control agreements with very limited on-site inspection (if any). Reference is made to a recent ACDA study which indicates that HEXAGON would greatly improve policing capability with minimum on-site inspection.

e. The need for a capability to detect a possible Soviet deployment of a mobile land-based ICBM system. It is noted that present operational procedures with KH-4 and KH-8 would be ineffective against such a system since KH-8 follow-up of KH-4 indications would usually not be possible, the missiles being capable of movement between such coverages.

These new statements of requirements undoubtedly have some validity but a careful assessment of the value of satisfying some or all of them is obviously in order. The results would affect decisions not only on whether the HEXAGON system development should proceed, but also the composition of the whole satellite reconnaissance program either with or without HEXAGON. I believe that there should be a strong DOD input to such an assessment. DIA, of course, contributes to the COMIREX position on such questions. However, it seems to me that the DOD contributions would be very much stronger and more useful if the study of satellite photographic reconnaissance requirements which you directed on January 26, 1968, were available. I again recommend that action be taken to expedite completion of this study.

Alexander H. Flax

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