20 November 1968

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MEMORANDUM FOR: United States Intelligence Board

SUBJECT: Employment of Ultra Thin Base Film in the KH-4 System

1. A situation has arisen which may have some unfavorable impact on the fulfillment of USIB's search requirements and the potential for the employment of the KH-4 system against current intelligence objectives outside of the bloc during the first half of Calendar Year 1969. The factors in this situation are as follows:

a. The KH-4B system has achieved improved resolution over the KH-4A version. One of the consequences of the improved resolution, however, has been a reduction in the gross capability to cover area on the ground. Using Standard Thin Base film in both vehicles, the KH-4A system is capable of acquiring gross stereo coverage of 8.3 million square nautical miles per mission while the KH-4B system would have the capability to cover only 5 million square nautical miles. We have anticipated that this decrease in area coverage capability would be corrected in part by the use of Ultra Thin Base

1200 × 6 = 7200

140 × 6 = 840; 840 × .3 = 1.52

8.4 × .6 = 5.04

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film in the KH-4B system. The use of such film would increase the gross stereo coverage capability of the KH-4B to 7.9 million square nautical miles per mission. Increased days on orbit should permit this film to be used more effectively with the result that net coverage might even increase over that obtained by the KH-4A.

b. Mission 1105-1 flown from 5 November to 11 November was the first full KH-4B mission employing Ultra Thin Base film. The results of this mission, however, have revealed technical problems in the employment of the Ultra Thin Base film which resulted in varying degrees of degradation to portions of a large number of the frames of photography acquired by the mission. In some cases where the degradation occurred it did not interfere with the intelligence utility of the photography. In other cases the degradation affected quality of target coverage but did not interfere with the usefulness of the photography for search purposes. In a few cases the degradation was bad enough to make the photography useless for any intelligence purpose. The main concern to COMIREX is that, while overall degradation might not be great, it affected unpredictable targets and areas.

We would prefer not to have to use the Ultra Thin Base film until the technical problems are eliminated, but most of the film is adequate for search purposes and we would prefer to use it in spite of the degradation if the alternative were to be a serious under-fulfillment in the search requirement.

c. We have been informed by the NRO that it was originally planned to use the Ultra Thin Base film on Mission 1106, scheduled for launch in December 1968. In order to provide time to resolve the technical difficulties with the Ultra Thin Base film the NRO has revised its launch schedule and now intends to launch KH-4A Mission 1049 in December and to replace the Ultra Thin Base film in Mission 1106 with Standard Thin Base film with a view to launching it in late January or early February. Mission 1107, originally scheduled for launch in March, would be replaced by a KH-4A mission originally scheduled for later in the year. The net effect of the changes in the schedule proposed by the NRO would be to reduce the potential for gross stereo area coverage during the first half of Calendar Year 1969 from 24.5 to 21.6 million square nautical miles.

d. In view of the substantial fulfillment of the mapping task for which the KH-4 system has been used outside of the bloc on recent mission, the NRO has been employing only about ten percent of the KH-4 film outside of the bloc. Most of this coverage has been devoted to the Middle East. In spite of this concentration of available film on the bloc, we have been operating with a constant modest underfulfillment of the USIB search requirement. That requirement calls for coverage of about 80-90 percent of the built-up areas of the bloc each six months and approximately 75 percent of the underdeveloped areas annually. During the past year we have averaged about 73 percent on the underdeveloped areas and about 65 percent on the built-up areas. We are not aware of any unusual intelligence problem that has been caused by this underfulfillment of the requirement, but it has caused us to view with considerable concern anything which might cause further reduction in search coverage.

e. We have been informed by the NRO that they would take all possible operational measures to minimize the effect of the use of the Standard Thin Base film on

Mission 1106. It is possible that by spartan use of film outside of the bloc and tightened weather criteria in the employment of film within the bloc there might be no appreciable reduction in the useful coverage obtained against the search requirement. If, however, there are important current intelligence problems outside of the bloc requiring coverage and if weather opportunities are not favorable, we could experience some further reduction in our search coverage of the bloc.

2. It is the conclusion of COMIREX that the possibilities of a further serious reduction in search coverage during the first half of Calendar Year 1969 are sufficiently remote to make it unnecessary to require the use of Ultra Thin Base film in Mission 1106, and we concur in the desirability of the changes to the KH-4 launch schedule proposed by the NRO. COMIREX will be prepared to make further recommendation in this matter if future developments indicate a significant alteration to the situation described above.

3. It is recommended that USIB note that in unfavorable circumstances there might be some further shortfall in the fulfillment of the USIB search requirement during the first half of Calendar Year 1969