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DEPARTMENT OF THE AIR FORCE  
WASHINGTON

OFFICE OF THE SECRETARY

March 21, 1967

MEMORANDUM FOR SECRETARY BROWN

SUBJECT: Infrared Surveillance for Intelligence

General Stewart presented the Air Staff's study on an infrared surveillance satellite to collect data on the launch of Soviet ICBM and ABM, and, if possible, related events such as target re-entry and intercept. The capability was to be available as early as possible, hopefully within 12 -- 18 months. The study briefly compared medium altitude and synchronous altitude systems and selected the synchronous altitude system because it was feasible to accomplish the mission from synchronous altitude and continuous coverage could be provided.

There were several design options, each differing in the amount of area proposed to be covered. The most complex system would survey most of the Sino-Soviet area. The system covering the second largest area included an area 1400 by 400 miles, including Kapustin Yar, Tyura Tam and Sary Shagan. The designs for lesser area coverage were less attractive because the degree of simplification made possibly by a smaller area coverage was essentially insignificant.

SSD, assisted by Aerospace, presented results of analysis of the possibility of detecting high thrust, short burning time missiles without excessive false alarms. Their analysis, which appeared to be conservative, indicated that by broadening the infrared spectrum to encompass the range 2.68 to 2.97 microns (Program 461 now covers 2.68 to 2.73 microns), a high probability existed that we would observe launches of the GALOSH missile, using a supposedly pessimistic estimate of GALOSH characteristics. A considerable speed-up of sensor scanning rate as compared to Program 949 was necessary because of the shorter burning times of the ABM's as compared to ICBM's. The system was

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also estimated to have a quite high probability of detecting launches of a TALINN-type missile. The study illustrated a range of possible characteristics for this Soviet missile. Some bonus will be obtained because re-entry events would also be detected in some cases. The only feasibility data missing was on the intensity of cloud reflection of the sun's radiation in the enlarged spectral region which has been tentatively selected, although there were some limited test measurements. We have asked the Air Staff to determine how much and how long it would take to make these measurements from a U-2 which is now partially instrumented for this purpose. We are also arranging to have an expert consultant in infrared review Aerospace's calculations.

The down-link would use the SGLS which permits a bandwidth of 1 mc. The readout station is tentatively proposed to be at Guam, where it would fully utilize the existing facilities. Additional ground facilities might be needed unless another site were found. The payload would weigh 200 pounds, consume 165 watts, have a threshold sensitivity of 55kw/steradian at a 1/2 second scan rate. It would obtain 60 hits on an ICBM of the SS-4 type, 6 hits on the first stage of a GALOSH and 30 hits on the postulated second stage. It could be launched by an Atlas-Agena with a Burner II motor, or by a Titan IIIC. It was parenthetically noted that the sensor package for DODGE-M is far from optimal for intelligence collection. Further, the DODGE-M vehicle appears to be available later than would a vehicle specifically designed for intelligence collection.

The search for a spacecraft which could be made available in 15 -- 18 months narrowed down to a spacecraft being built by Lockheed for another program. The sensors would be cooled lead sulfide detectors, identical to those used in the 461 program. Approximately 600 detector cells would be needed in the design selected (1400 x 400 miles). Because Aerojet-General's capabilities are heavily occupied with Program 949, AFSC feels that Hughes is best capable of building the sensor. A combination of Hughes-Lockheed thus seemed to be the best and possibly only contractual arrangement which could yield an early capability.

We approved the use of \$200,000 previously released for further system design studies with a decision point for further development in about a month. The preliminary estimate of the costs for a three flight program is approximately \$100 million including launch vehicle and launch costs. Since the information, which such a system for intelligence collection would provide, overlaps to a considerable degree that which would be collected by a properly located backscatter radar, it is necessary to consider further the relative merits of each system and the unique contribution which would be made by this system in relation to its cost.

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