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SC 06780/62-KE-A

CENTRAL INTELLIGENCE AGENCY

8 June 1962

MEMORANDUM TO RECIPIENTS

The attached papers have been prepared for use by the Committee on NSC Action Memorandum #156, scheduled for Tuesday 12 June 1962.

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HANDLE VIA COMINT-TALENT-KEYHOLE CHANNELS

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SC
US-06780/62/KH-A-1

8 June 1962

MEMORANDUM

SUBJECT: Soviet Capabilities for Passive Countermeasures Against US Photographic Reconnaissance Satellites

1. The Soviets are clearly concerned over the present and future potentialities of various US satellite photographic reconnaissance systems, and may undertake passive measures to counter these systems.* Camouflage and deception are the main techniques available to the Soviets for this purpose.

2. First priority in any such effort would probably be given to protection of important Soviet military strengths. The only recent evidence of Soviet interest in this field relates to missile forces. Other important targets such as urban industrial areas, nuclear production and storage complexes, and military airfields, present far more difficult problems for camouflage and deception. However, concealment of small key elements may be attempted.

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* This paper is concerned only with capabilities of present US systems and takes no account of potential improvements in these systems.

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3. The most detailed description available of the camouflage and deception techniques which might be employed at fixed sites appeared in a classified Soviet military journal published in September 1961, which discussed, inter alia, passive countermeasures against aircraft and satellite reconnaissance. According to this article, camouflage measures include concealment through the use of natural environment, artificial materials, and dummy structures. Deception techniques mentioned include the use of simulated sites, decoy thermal objects, and special radar reflectors to divert attention to false targets. The article advocated use of camouflage to conceal construction activity as well as operational missile sites.

4. Except for crude attempts, detected several years ago, to camouflage one surface-to-air missile site in East Germany and a missile site in the Crimea, we have no evidence that any of these techniques have been employed to date. A change in the appearance of one Soviet MRBM site at Yel'sk between KENNEL missions of June 1961 and April 1962, initially suggested the possibility of camouflage. However, upon more detailed analysis, we have concluded that this change was caused by an increase in natural vegetation and by the greater shadow in the April 1962 coverage. The lack of any attempt to conceal roads, rail lines,

housing and support facilities at this and other sites or the main service road also weighs against the likelihood that deliberate camouflage has been attempted. We feel confident that none of the ICBM or IRBM sites observed in good-quality photography are dummies, and analysis of the whole body of KEYHOLE photography of missile sites has uncovered no evidence that any of them are dummies.

5. The chances of any large scale and successful concealment seem very remote at present in the light of our observation of numerous strategic missile complexes under construction, with normal construction progress observable in repeated coverage. These complexes are large and distinctive. They involve extensive installation of roads and support buildings as well as launchers themselves. In the case of ICBM complexes, extensive rail support is also installed. Complete concealment of missile complexes against overhead observation would be extremely difficult and expensive, and during the construction period, which lasts many months, virtually impossible. Thus, we do not believe that the Soviets could achieve much success by these means against KEYHOLE photography of the quality and frequency now being

obtained. For similar reasons, we do not believe the Soviets could effectively deceive us through the widespread construction of dummy sites.

6. We do not exclude future Soviet attempts to thwart US photographic intelligence collection and to compound targeting problems by the use of camouflage and deception. For the present, however, Soviet efforts to enhance the survivability of missile forces have taken other directions. Missile complexes have been dispersed widely over the USSR, launch sites have been separated by distances of 3-5 n.m., and surface-to-air missile sites have been deployed at ballistic missile complexes to provide protection against air attack and reconnaissance. Security measures have included concealment from ground observation and the imposition of strict communications security procedures. More urgent survivability measures are now indicated by evidence suggesting construction of hardened ICBM launchers and by attempts to reduce insertion times throughout the missile forces. No efforts at hardening MRBM/IRBM sites has been observed. In addition to the survivability measures already described the Soviets apparently are relying on the [illegible] launching positions to protect these forces.

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7. We conclude that for the next few years Soviet efforts to restore survivability of long range missile forces are more likely to emphasize the reduction of physical vulnerability and the improvement of operational capabilities than the widespread use of camouflage or deception. We believe it even less likely that the Soviets would attempt concealment of other major targets.

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SC 06780/62-KH-A-2

CENTRAL INTELLIGENCE AGENCY

OFFICE OF NATIONAL ESTIMATES

8 June 1962

SUBJECT: SOVIET CAPABILITIES TO COUNTER HOSTILE SATELLITES

THE PROBLEM

To assess Soviet capabilities to nullify the missions of US reconnaissance satellites -- with and without the use of nuclear weapons -- during the next year or so.

DISCUSSION

1. The Soviet leaders almost certainly perceive an urgent requirement to develop a capability to counter US reconnaissance satellites. They know the general objectives of US satellite programs and realize that they have substantial military uses. They may not know precisely what success the US reconnaissance satellite programs have had to date. However, extrapolation from U-2 photographic capabilities, combined with analysis of recent US open-source references

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to satellite programs and official statements of relative military strength, would have led them to conclude that the present US capability is significant. Therefore, although we have insufficient evidence to determine that the USSR is or is not developing an anti-satellite capability, we believe it almost certain that such a program exists.

2. We estimate that the Soviets recognize that a number of intercept techniques are feasible. The USSR now possesses essential components of intercept systems, such as radar and passive tracking facilities, missiles, and warheads from other systems. We believe that a relatively simple system could be developed with these components. It would be based on near vertical intercept shots following determination of the target satellite's orbit after a few passes. However, we would expect that the complex communications between tracking and control stations necessary to determining orbits, would have to be proved out by extensive practice prior to an actual intercept attempt. Such practice has not been identified in COMINT; nor is there certainty that it would be.

I. TRACKING FACILITIES

3. Although we have not identified a system for tracking non-Soviet satellites in intercepted communications, we have noted Soviet interest in passively tracking US satellites on a number of occasions. We believe that adequate radars and passive tracking facilities are available to enable the Soviets to determine within several miles the orbital parameters of US satellites within the first six passes. The capabilities of Soviet equipments are enhanced by the comparatively large radar cross sections and the radiating beacons of certain US satellites. Since these beacons could be eliminated at any time if desired, the Soviets cannot rely upon such factors for their anti-satellite system.

II. INTERCEPT VEHICLES

4. A relatively simple solution to the intercept problem is to launch a ballistic missile on a near vertical trajectory so as to intercept the satellite at or near apogee of the missile. The USSR could use an existing operational medium or intermediate range missile or the intercept vehicles probably fired on a number of occasions from Sary Shagan and Kamchatka against incoming target missiles.

For an early attempt, we believe that the Soviets would more likely use an MRBM or IRBM, which have proven reliability and large radii of action for the intercept.

III. WARHEADS

5. Conservative calculations indicate that the lethal radii of the various types of radiation produced by a nuclear burst in space are measured in tens of miles for weapons of medium yield. Therefore, to nullify a satellite with radiation, accuracy requirements would not be stringent. Accuracy requirements are even lower if the intention is to [redacted] or burn out the circuitry in a reconnaissance satellite. It is most likely that such intercepts would be attempted in uninhabited areas unless serious risks of retinal burns to populations are accepted. The USSR could also use a fragmentation warhead or a cloud of pellets, but the extremely high accuracy requirements would probably necessitate a number of intercept attempts after the satellite had been in orbit for a day or two. An intercept by fragmentation warheads need not become public knowledge, whereas use of nuclear warheads would almost certainly have international repercussions.

IV. CONCLUSION

6. At present, the USSR probably has the hardware and the know-how necessary for devising a method of intercepting a US reconnaissance satellite. However, we have no evidence that the Soviets have actually integrated the components for this purpose. They could have such a capability in being; if not it could be acquired soon. An early capability is more likely to require the use of a nuclear than a fragmentation warhead, although it would be difficult politically to use nuclear warheads repeatedly. As elements of the USSR's anti-ballistic missile systems are developed further, Soviet ability to counter hostile satellites will increase. The USSR will probably be able to intercept US satellites of current models within the next year or so. The odds favoring such an interception would diminish with the adoption of available countermeasures.