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see chart on last page for summary

BACKGROUND PAPER ON
ARMS CONTROL SATELLITES

1. There is high-level interest in pursuing the concept of a dedicated satellite for SALT Treaty Verification, including a joint US/USSR development. This paper reviews several systems' options, their favorable aspects, impact on the NRP and recommendations. Additionally, some political considerations are addressed.
2. Stating the obvious, the best possible verification system is to use the combined products of all US reconnaissance satellites in the fulfillment of SALT verification requirements. This practice is presently being followed. Although technically feasible, a US proposal or program of a declared US verification satellite or a joint US/USSR verification satellite venture must be viewed as a symbolic political gesture for which the advantages and disadvantages must be carefully weighed prior to surfacing.
3. The systems options to be discussed are:
 - a. HEXAGON
 - b. HEXAGON - Combination

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c. A New System Designed to Provide Synoptic Coverage

d.

4. HEXAGON

a. The first option using HEXAGON photo data could provide the capability without delay. The resolution of the imagery could be degraded to provide about 5-foot resolution and by cropping the film the area coverage capability would not be revealed.

b. A HEXAGON marriage could provide large area, . It would not provide night time coverage, however, and hence would give little more capability than can be achieved with the present HEXAGON using normal plus IR film. The data from such a satellite would, if not degraded, expose the present NRP capability and would aid the Soviets in developing an optimized camouflage, concealment and deception program. The development of such a satellite would be expensive and provide little more capability than the present HEXAGON system.

c. The joint development of a new complex system to provide synoptic coverage and serve the mutual needs

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of both countries would be expensive and, if considered to be the US/USSR means of technical verification, would expose the rest of the NRP satellites to scrutiny and perhaps make them the target of Soviet political and physical attack as "espionage" satellites.



5. Probably the overriding considerations will be other than technical, however, and will now be discussed. The issues are:

- Requirements
- Soviet agreement vs on-site inspection
- Soviet perceptions
- Soviet Camouflage, Concealment and Deception
(CCD) Program

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- National Technical Means (NTM) Umbrella
- Technology compromise
- Stand alone capability
- Development costs

a. Requirements. There are presently no stated SALT verification requirements. The issues are usually brought up ad hoc to the SALT support group as a result of a photointerpreter observing unusual activity in an area indicating a potential SALT "breakout". This concern is then brought to the attention of the SALT verification panel. A standing set of requirements would be useful in determining the type and quality of the sensor for monitoring the treaty.

b. Soviet Agreement vs On-Site Inspection. The Soviets have not agreed to on-site inspection in the past and may not be receptive to a joint satellite inspection system to perform this function or to a jointly operated ground station either in the US or in their country.

c. Soviet Perception. A joint operation with the Soviets would reveal to them our perception of politically

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important targets in their country and allow them to either harden these facilities or disperse their functions.

d. Soviet CCD Program. A detailed knowledge of the capabilities and limitations of the verification satellite would allow the Soviets to develop an optimized camouflage, concealment and deception program.

e. NTM Umbrella. Mr. William Harris of Rand Corporation who conducted a verification study for ACDA states that the shield of legal protection for a verification satellite system will not be forged new but taken from other space-based systems which perform functions other than strictly treaty monitoring. For example, [REDACTED]

[REDACTED] KENNEN [REDACTED]

[REDACTED] if procured, may also not qualify as verification only satellites due to the indications and warning missions they can perform. Since the verification satellite would be clearly identified, the Soviets may feel justified in interfering with these other NRP satellites.

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f. Technology Compromise. Present estimates place the United States 10-15 years ahead of the Soviets in development of film and optical systems and in the technology required to develop an Any joint program would surely compromise some of these technology advantages and provide the Soviets an insight into present NRP operations.

g. Stand Alone Capability. It is very unlikely that a new unclassified system or the degraded HEXAGON imagery at 5-6 foot resolution would be sufficient to determine positively that a violation of the treaty had occurred. Higher resolution photographs and possibly other information from NRP satellites (COMINT,) might be required to verify the violation.

h. Development Costs. The cost of developing a verification satellite would probably be about \$500M with a recurring cost of about \$100M. Even if a verification satellite were mutually recognized, there is no guarantee that the Soviets, who are unwilling to allow on-site

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inspections, would allow us to photograph loading of ICBM sites which they presently do at night or that they would remove solid covers at submarine construction yards. The United States will still require better [redacted]

[redacted] The value of a verification satellite is, therefore, unproven while development and recurring costs are readily estimated and are extremely high.

5. Political Considerations

a. Unclassified (Declared) Verification Satellite

The symbolic value of "open skies" or a declared verification satellite could very well enhance the image of the United States to other countries. If, however, we use our most advanced technology, intelligence collection could be degraded by providing the adversary systems engineering, technology and operational concepts upon which cover and deception can be improved. If we do not use our best technology, the effectiveness of the verification mission will be degraded unless language is written into the agreement which allows the use of other NTMs for verification. Touting an unclassified verification satellite

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could lead to a public misconception that the verification satellite is the United States' means of verification, particularly if we continue to protect the existence and status of the other systems being used for verification. In effect, the symbolic satellite could eventually be construed as a mass deception to the US public and the world by the government of the United States.

b. Joint US Soviet Venture for a Verification Satellite.

It must be presumed that a joint venture involves coequal participation throughout the whole joint verification satellite system including development, launch, on-orbit operation, data retrieval, data processing and distribution. As in the case of a declared US verification satellite, the US would not divulge its best reconnaissance technology, techniques and operations concepts. Similarly, it must be expected that the Soviets would not expose their latest concepts, technology and techniques to the joint system. If such an agreement were to occur with a technologically limited system, treaty language would have to allow for verification support from other NTMs. This again could lead to the public misconception problem previously described. The Soviets and the US participants would both clearly understand the capabilities and

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limitations of a joint venture. A good Soviet position would be to limit verification to the joint venture system. The Soviets have the advantage of better conventional espionage opportunities to gather treaty verification information from our open society. A limited or degraded verification system would therefore benefit the Soviets.

6. On the following page is a qualitative chart comparing the usefulness of a verification satellite with the security impact on NRO systems.

7. In conclusion, it appears that the best product, the cheapest alternative and the least technical compromise would be achieved by using HEXAGON photography and degrading resolutions and hiding total system coverage. In addition, such an option could be employed immediately. The political implications of a joint program appear to be mainly negative, while only a modest capability to achieve the intended mission is possible at best. The vulnerability implications to the remaining NRP satellites also appears mainly negative since they are removed from the NTM umbrella.

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IMPLICATIONS OF A JOINT VERIFICATION
SATELLITE ON NRP SYSTEMS AND OPERATIONS

DECLARED OR JOINT
VERIFICATION SATELLITE

EFFECT ON NRP SATELLITE

- | | |
|---|--|
| <ul style="list-style-type: none">. Reduced Risk of Interference
(Less Vulnerable). Not Degraded by Cover/Deception
Concealment. Less Cost - No Security. Design to Requirements. Advantage of Joint Planning. Technical Exchange. Symbolic Partnership | <ul style="list-style-type: none">. Risk of Interference Same or Higher
Not a Declared Verification Satellite
(More Vulnerable). Cover - Deception - Concealment
Same or Stepped Up. Cost May Be Extracted From Present NTMS. Technology Loss - If State-of-the art
technology is used. Increased Insight into Operations and
Target Philosophy. United States has more to lose. No impact on NRO Systems
(See Political Considerations) |
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