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	5250	
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	5270	
	5280	
	5290	
	5300	
	5310	
	5320	
	5330	
	5340	
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To: T. B. Cook - 5200

From: Don B. Shuster - 9200

Re: The Potential Impact of Communications, Weather, and Manned Satellites Systems on High Altitude Nuclear Testing

At the last meeting of the Pacific Planning Board, Bob Brownlee mentioned a concern that the rapid growth of the number of active satellites might in a few years have a serious impact on the feasibility of nuclear testing at high altitudes. Following this conversation, I have devoted a little more thought and effort to the problem and in general conclude that there is a major reason for concern. At the current rate of growth of orbital systems of various kinds I am convinced that by 1970 it might be virtually impossible to conduct detonations above 100 kilometers. In the 30 to 100 kilometer regime stringent limitations on yield will probably be imposed and most certainly strong opposition could be expected to detonation of intermediate range yield hot X-ray devices at almost any altitude.

Here are some of the reasons:

1. The COMSAT Corporation is planning to have a six-satellite global communications network operative before 1970. These satellites will be synchronous and, therefore, one or more will be continually exposed to the outputs from a high altitude shot.
2. The Weather Satellite System, ESSA, will be fully operational in the year 1968 - 69 to provide worldwide weather coverage. These satellites are also planned to be located at synchronous altitudes.
3. In the year 1969 - 70 we can expect to have both DOD's MOL active at pretty vulnerable altitudes and in addition can expect a manned NASA astronomical laboratory using Apollo components and probably Soviet versions of the same thing.
4. The military's COMSAT program should also be operational in this time frame.
5. There are indications that the Soviets are planning their own satellite communications system starting in 1968.

INVENTORY

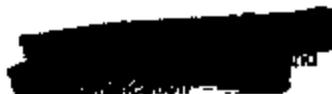
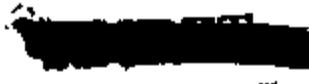
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6. Apart from the scheduled operational satellite systems there will continue to be launches by both the United States and USSR as well as France and Japan of "scientific satellites" for various purposes at various altitudes.

Although we may suspect that some of the Cosmos series are in truth reconnaissance vehicles, the Soviets piously claim that they are scientific programs and, therefore, could yell foul with great vigor in the event that they were exposed to radiation measurably above normal background. In most of these cases the actual effect of either the direct radiation from the detonation or the injected particles would probably be negligible, however, any accidental failures which closely followed a high altitude detonation could be construed by the owner, if they so desired, as to be caused by the shot.

A continuing study program should be initiated to determine the possible effects of the currently scheduled shots on satellites at various distances in order to determine the extent of the real hazard which might exist. In addition, a complete forecast of objects in orbit versus year from 1967 on should be made. I am convinced that the largest problem would be political and not technical and that there would be an intense pressure against any high altitude shot which would in any way expose any of the systems to above background radiation levels. I personally feel that this problem should be aired not only in the JEG but also in the JNTPG.

Don B Shuster

DBS:djm

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