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NAVAL RESEARCH LABORATORY  
WASHINGTON, D.C. 20390

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IN REPLY REFER TO:  
Code 4000/AB:hk  
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8 February 1971

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From: Director, Naval Research Laboratory, Washington, D. C. 20390

To: Director Program "C" (CAPT R. GEIGER), PM-16

Subj: Possible Interim POPPY Capability for Signals of Specific  
Naval Interest

Encl: (1) List of Early Warning Air Search Radars on major Soviet  
Surface Combatants

1. The purpose of this letter is to present a concept (and a contingency plan) to assure that a capability for space-based ocean surveillance is sustained in light of the reduced capabilities of Missions 7105 and 7106 and the approximately eleven months which will elapse before Mission 7107 will become fully operational. The concept was evolved with the goal of providing a relatively low cost, timely and effective system to meet ocean surveillance needs which would interface with present ground stations, thereby providing the potential capability for rapid deployment of dedicated ocean surveillance satellites at minimum cost.

2. The capabilities of the 7106 payloads have undergone serious degradation. While the 7105 payloads continue to perform quite well, it must be recognized that these satellites have been in orbit for a period that is considerably in excess of their design lifetimes and are showing signs of battery degradation. Furthermore, their on-board fuel reserve for position correction is low. The possibility must be faced that the 7105 payloads might fail catastrophically or they might suffer a steady but rapid loss in performance. The 7107 payload is scheduled for launch on 19 November 1971 and will require approximately 50 days post launch for orbit stabilization, etc. Realistically, 7107 will not be "on-line" until approximately 1 January 1972.

3. In the event of a total or partial failure of 7105, the U.S. would have little or no POPPY collection capability. This loss would be particularly unfortunate from the standpoint of the U.S. Navy's interest in emitters on Soviet surface combatants.

4. NRL has reviewed the circumstances outlined above and has prepared a contingency plan which could provide effective interim coverage of signals of high Navy interest for ocean surveillance. To minimize risk and cost, while maintaining an effective ocean surveillance capability, a simplified POPPY-type satellite system is proposed. Briefly, NRL would employ two existing satellites which are leftover from an earlier program. These satellites are approximately 20" diameter spheres, and a pair of such spheres can be stacked on a single SCOUT rocket. These spheres would be unstabilized. Stationkeeping would be accomplished by variable drag.

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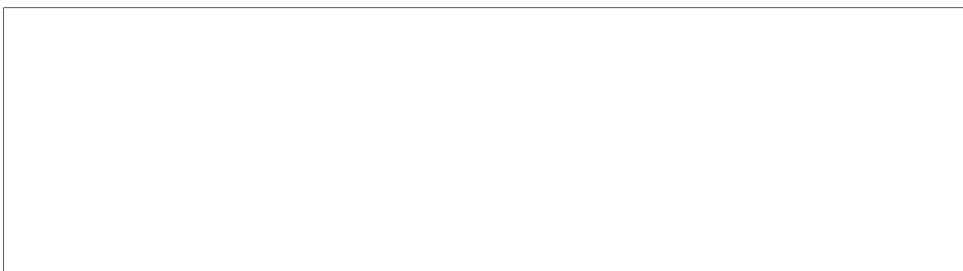
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All designs for components of these satellites either exist or are straight forward. No significant technical problems are anticipated. The components for these satellites exist in the sense that they would have to be borrowed from 7107 and reordered. RF hardware, command receivers, data transmitters, telemetry transmitters, and batteries would all have to be diverted from 7107. Given these constraints it would require approximately three months from the time of authorization to launch.)

5. A review of the early warning air search radars on major Soviet surface combatants reveals that these predominantly lie in two bands, vis.



Enclosure (1) shows a list of the major combatants on which these radars are deployed. Thus a satellite which receives only in the bands between .820 - .920 GHZ and 2.680 - 2.930 GHZ will be adequate to detect all presently deployed early warning radars on major Soviet surface combatants. These bands would of course not include [redacted] boats. Even such a limited POPPY capability would be of significant value to the U.S. Navy. All circuit components required for such a two-band POPPY system are on hand and could be assembled into a flyable configuration within three months of receipt of authorization. Scout Vehicles exist in an on-call status and would require approximately four months to prepare for launch. NRL believes that in addition to the costs of the Scout Vehicle (\$1.5 million), approximately \$700K would be required to prepare the satellites for launch.

6. Any decision to go ahead with an interim POPPY must be based on considerations of problems associated with:

- a. Possible slippage of 7107.
- b. Possible slippage of SR-10.
- c. Assignment of priority to take vehicle #179 from SSPO.

NRL believes that if an early decision were reached to go ahead with an interim POPPY, it could be accomplished with modest slippage in 7107. If

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the go ahead were given late in the 7107 cycle, then approximately three or four months of slippage in 7107 would occur. The costs associated with such a slippage are currently estimated (based on NRO-West Coast figures) as:

425K	per month (Dec)
500K	(Jan)
685K	(Feb)
935K	(Mar)

The costs associated with such a slippage would indeed have to be factored into any decision to go ahead with an interim POPPY. In addition to slippage which might result in the POPPY program, there would also be a serious impact on SOLRAD-10. In order to launch an interim POPPY, the Heat Shield and "E" section designed for SR-10 would have to be pre-empted. This might cause slippage in SR-10. The decision to pre-empt Scout Vehicle 179, which is on standby for the Director of Strategic Systems Project Office, would clearly require the concurrence of senior echelons of the Navy Department.

7. It is recommended that this proposal for an interim POPPY ocean surveillance capability be presented to higher authority for consideration. Should interest be expressed in further developing this concept, NRL is prepared to provide briefings and/or more detailed technical proposals.

8. NRL recognizes that 7107 has many missions to accomplish in addition to Ocean Surveillance. Nevertheless, in the event of a major crisis or confrontation with the Soviets, the U.S. Navy would be seriously hampered without any POPPY assets.



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