

UNITED STATES GOVERNMENT

*Memorandum*

TO : George M. Kavanagh, AGMR

DATE: June 9, 1966

FROM : Harold B. Finger, Director  
Space Nuclear Systems Division

SUBJECT: NASA STUDY OF NUCLEAR POWERED AIRPLANE SYSTEMS

This memorandum is in response to your request for a description of the work being done by NASA's Lewis Research Center on nuclear powered airplane investigations.

The work was started sometime ago as a result of discussions between Dr. Silverstein, Director of Lewis, and General Schriever of the Air Force, in which General Schriever indicated the potential future need for large subsonic aircraft for a variety of potential Air Force applications. He and Dr. Silverstein agreed that this airplane appeared like a good application for nuclear power and that a review of nuclear reactor technology, safety, shielding, aircraft configurations, etc. was appropriate to see if nuclear power could indeed be applicable and feasible. As a result, Wright Field and Lewis initiated in-house studies. Lewis has now extended its work outside through contract with various industrial groups.

The funds obligated or committed in each of the Fiscal Years 1965 and 1966 on this activity, supported by NASA, are close to \$500,000. Discussions are now underway between the Office of Advanced Research and Technology, Director of Aeronautics and Lewis to determine the appropriate level of support in FY 1967. None of the work being supported uses funds from the nuclear rocket or nuclear electric systems programs in NASA since I had specifically objected to the use of any of our funds for nuclear powered airplane activities. I have also over the past year and a half emphasized the need for a conscious decision in NASA on support of this work rather than permitting the work to be supported and increased without a clear justification and high level approval.

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Some of the work being conducted includes a safety evaluation to determine the possibilities of flying such an airplane safely and still economically. This study will include determination of the possibility for incorporating containment in the design. Several reactor concepts are being studied including a helium gas system based on ML-1, a liquid metal cooled fast reactor based on SNAP-50, and a helium cooled fast reactor based on the 710 reactor. Sample fuel element materials are being fabricated and evaluated to verify the adequacy of the fabrication process to meet the performance specifications called for. In addition, work is under way or being undertaken to determine shield weights and shield configurations appropriate to various of the reactor and aircraft concepts being studied.

I believe that this entire area will be carefully reviewed by the Office of Advanced Research and Technology before continuing at the level of activity established in previous years. I have emphasized the need for such a review and have suggested, if it is determined by NASA and the Air Force that there is a justification for proceeding, that discussions be held with the AEC to establish a cooperative activity in this area.

I should add that I am not supporting this work, that I see no strong justification for the work, that I do not see any reason to believe that the safety concerns could be feasibly overcome. I have, therefore, recommended stopping the work or at most continuing a very small (couple of man) effort in-house.

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