

A BRIEF HISTORICAL ACCOUNT OF THE IMPORTANT PHASES OF THE AIRCRAFT NUCLEAR PROPULSION PROJECT

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When the agenda for this symposium was prepared there was an active Air Force Program called the Aircraft Nuclear Propulsion (ANP) Project. This project offered the promise of producing an advanced system posing major problems affecting human factors of remote handling. Since that time, however, as many of you probably know, the project has been cancelled. Instead of cancelling this talk along with the project, it was decided that a very brief account of the history of the ANP project might be of interest.

The project began in 1946 and went through a number of phases. The first, which might be termed a feasibility study phase, was the Nuclear Energy for Propulsion of Aircraft or NEPA project with the Fairchild Engine and Airplane Co. as manager. The Lexington project of MIT also contributed to this phase which was terminated in 1950. This study phase concluded that nuclear propulsion was technically feasible, but that its achievement would take about 15 years and over 1 billion dollars.

The next phase was the initiation of reactor-engine development under the joint USAF-AEC, Aircraft Nuclear Propulsion program. The General Electric Company undertook the development of the direct cycle concept in which the engine air is heated directly by the reactor while Oak Ridge National Laboratory (ORNL) and Pratt and Whitney Aircraft Co. began the development of the indirect cycle concept in which the fission heat is transferred by an additional fluid from the reactor to radiators for heating the engine air. This phase had as one objective the flight testing of a direct cycle engine in a Convair B-36. In 1953, the experimental flight test program was cancelled, but the reactor-engine development programs were continued.

In 1954, the third phase was initiated with the establishment of a strategic weapon system project called WS-125A. This project was in answer to a requirement for a bomber having an all-nuclear, subsonic cruise and a chemically augmented, supersonic dash capability. Convair and G.E. were teamed to compete with Lockheed and Pratt and Whitney (P&W) for a design proposal. During this phase, considerable interest was generated in industry and a considerable amount of study was devoted to the weapon system aspects of the concept including the remote-handling problems. The WS-125A program was cancelled in 1956 bringing this phase to a close. Development work was continued on the direct cycle concept, but work on the circulating fuel reactor for the indirect cycle being done by ORNL and P&W was cancelled. Pratt and Whitney did continue under the AEC some material investigations for a new, indirect-cycle approach.

The fourth phase of the program consisted of the CAMAL weapon system design competition. Lockheed and Convair produced design proposals using the direct-cycle concept to meet the CAMAL requirement for a combination air-launched ballistic missile carrier and low-level attack aircraft. The airframe competition was won by Convair, but the Department of Defense rejected the CAMAL program in 1959. The engine development projects were continued with increased emphasis on the indirect-cycle approach.

The fifth phase might be termed the experimental aircraft approach utilizing the Convair NX-2 aircraft design which would be capable of serving as an airborne test bed for either a direct or indirect cycle power plant. The aircraft which were proposed would also serve to evaluate the military usefulness of nuclear propulsion. The rejection of this plan has been accompanied by a complete cancellation of the entire ANP program on March 28, 1961.