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HISTORY OF THE AIR FORCE FLIGHT TEST CENTER

Edwards Air Force Base
California

1 January - 30 June 1961

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NARRATIVE

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AIR FORCE SYSTEMS COMMAND
United States Air Force

[redacted]

hours. The first flight was performed on 14 June 1961 under ARDC Test Directive 60-65.

A production F-104D sufficiently instrumented to obtain level flight performance data was used for this test. One of two standard direct current powered engine ignition systems was replaced by a high energy alternating current system to insure ground and in-flight starts under cold atmospheric and fuel temperature conditions. Also, two 175-gallon tip tanks were fitted to the aircraft to provide 1,012 gallons of fuel, and the main fuel control on the engine was modified slightly to meter the HTF 59-24 High Density Fuel.

Test results indicated a 14.6 percent or 110 nautical miles range increase by use of HTF 59-24. Maximum range was achieved by making a military power climb to cruise altitude of 30,000 feet and maintaining a speed thereafter of 515 knots. Range was 865 nautical miles with HTF 59-24 and 755 nautical miles with JP-4 under the same conditions.[62]

Avrocar Flight Evaluation

On 4 April 1960 and 9 June 1961, a limited qualitative evaluation was conducted on the performance, stability and control of Avrocar, U. S. Army VZ-9AV, at the contractor facility, Avro Aircraft Limited, Malton, Ontario, Canada. AFFTC personnel making the evaluation was First Lieutenant Wallace H. Deckert, USAF, project engineer, and Major Walter J. Hodgson, USAF, project pilot.

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62. FTC-TDR-61-62: F-104 High Density Fuel Range Test, Jan 1962, p. 12. SD P in Vol 3, this hist.

The Avrocar, a ground effect vehicle, was manufactured for the Army under USAF Contract AF 33(600)-3796. It was an unconventional aircraft with a circular planform. Take-off gross weight was 5,680 pounds which included 840 pounds of fuel and a pilot. Avrocar was powered by three Continental J69-T-9 engines each rated at 927 pounds static sea level thrust. Together, the engines acted as a gas generator to drive a centrally located turborotor. Air flowed from the turborotor through radial ducts and exhausted out through various combinations of annular nozzles and jets depending on the flight regime.

Avrocar was equipped with a focussing ring control system for hovering flight during the first evaluation on 4 April 1960. Modifications were undertaken in 1961 to add a separate control system for transition and high speed flight. The second evaluation on 9 June 1961 was performed to determine if the changes effected the aircraft in its hovering and low speed regime.

Deckert and Hodgson found the addition of a high speed control system produced an adverse affect upon performance and control of the avrocar during hovering and low speed flight.[63] Maximum airspeed dropped from 30 to 20 knots and ground cushion instability occurred at a lower height (anything over 1½ feet). When the avrocar was flown over irregular terrain and a large ditch during the test, there was some evidence of an underpowered condition and a major problem from recirculating debris

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63. FTC-TDR-61-56: Avrocar Flight Evaluation, Jan 1962, p. 12. SD Q in Vol 3, this hist.

(grass, dust, water, and sand). Correction of these problems along with modifications to the control system and the propulsion system was to be made before a ground effect transition into high speed flight could be demonstrated.

S-62A Helicopter Evaluation

From 19 through 21 September 1960, five test flights for a total 10 hours were flown with a commercial model S-62A helicopter at the AFFTC to determine its general flight characteristics. Mr. Kenneth R. Ferrell was project engineer and Captain Paul J. Balfe, USAF, was project pilot.

Manufactured by the Sikorsky Aircraft Division of United Aircraft Corporation, the S-62A was powered by a single General Electric T-58 gas free turbine engine. Basic weight of the aircraft was 5,032 pounds with a useful load capability of 2,468 pounds. The S-62A was essentially an improved amphibious, turbine powered model of the H-19 helicopter using many of the same dynamic components.

In the five flight ten hour test, AFFTC personnel found the S-62A possessed good flying qualities. Sideward and rearward flight characteristics were excellent. Controllability was acceptable about all axis and the plane was easy to fly. Major shortcomings in flying qualities were high pedal forces and poor dynamic lateral directional stability during climb.[64]

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64. Hq AFFTC-TR-61-8: Limited Stability and Control Evaluation of the S-62A Helicopter, Mar 1961, p. 15. SD R in Vol 3, this hist.