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ARMY AVIATION TEST BOARD FORT RUCKER ALA  
CONFIRMATORY TEST OF THE L-23F AIRPLANE. (U)  
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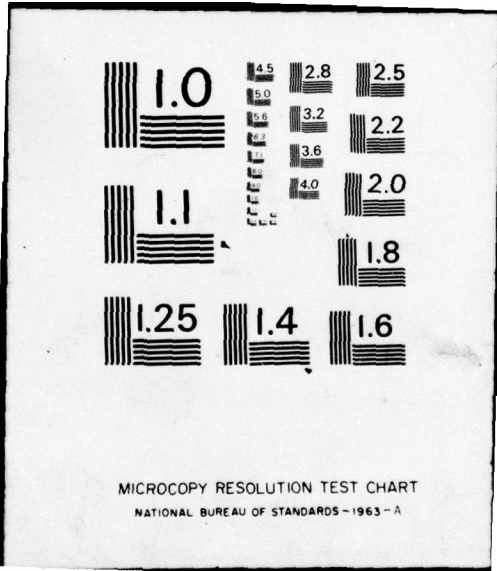
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UNITED STATES ARMY AVIATION BOARD  
Fort Rucker, Alabama

ATBG-DT-AVN-1861

8 Feb 1961

SUBJECT: Report of Test, Project Nr AVN 1861, Confirmatory Test of  
the L-23F Airplane.

TO: Commanding General  
United States Continental Army Command  
Fort Monroe, Virginia

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1. AUTHORITY.

a. Directive. Message, ATDEV-6, 795057, Headquarters, USCONARC,  
1 November 1960, subject: "Confirmatory Test of Production L-23F."

b. Purpose. To conduct a confirmatory test of the L-23F to  
determine:

(1) Whether the shortcomings reported during the service  
test of the L-23F Airplane have been corrected.

(2) Whether the design changes and modifications incorporated  
in the L-23F as a product improvement are suitable.

2. SCOPE. A confirmatory test of the L-23F Airplane (60-3462) was  
conducted by the US Army Aviation Board for approximately 57 flying hours.  
Tests were generally oriented toward a comparison of the current production  
L-23F configuration with that of the service test L-23F. A determination  
was made of the extent that shortcomings reported as a result of service  
test have been corrected. Changes in flight characteristics, performance,  
and capability for Army use attributable to increased gross weight were  
noted. Maintenance was performed with a view to determining significant  
difference in maintenance requirements as compared to the service test  
item.

3. BACKGROUND.

a. The army originally procured three model L-23F Airplanes  
which represented a manufacturer's sponsored product improvement of the  
Army's "off-the-shelf" L-23D. One of the original three models was service  
tested by the Aviation Board; some shortcomings, but no discrepancies, were

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observed. Subsequently, the Army procured additional L-23F's. Meanwhile, in addition to correcting some of the shortcomings reported as a result of service test, sufficient product-improvement items were incorporated to warrant a confirmatory test of the current production configuration.

d. Because of the short time allotted for confirmatory tests, evaluation of the anti-icing and de-icing equipment could not be accomplished. Therefore, CG, USCONARC, has directed that a separate evaluation of the anti-icing and de-icing systems be conducted in conjunction with the AO-1 icing-spray tests at Wright-Patterson AFB (paragraph 9h).

4. DESCRIPTION OF MATERIEL. The current production model L-23F (S/N 60-3462) tested by the US Army Aviation Board represents a product improvement of the original L-23F (S/N 58-1354). Following are significant changes:

- a. Takeoff gross weight has been increased from 7368 pounds to 7700 pounds.
- b. Additional space has been provided in the baggage compartment.
- c. A more accessible and larger oxygen supply has been installed.
- d. The instrument panel and sub-panel have been rearranged.
- e. The heater system has been redesigned to improve operation and safety characteristics.
- f. Improved brakes have been installed.
- g. A lightweight de-icing system requiring 3000 p.s.i. pressure for full recharge has been installed in lieu of the de-icing system currently employed on L-23D's.

5. TESTS. A comparison was made between the confirmatory-test L-23F and data reported as a result of the previous service test (Project Nr AVN 5858) with the following results:

a. Cabin Configuration.

- (1) The cabin configuration was improved as follows:
  - (a) A folding table was installed.
  - (b) A larger baggage area was provided.

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(c) Rear cabin windows were incorporated to provide more cabin light.

(d) Redesigned and more rugged window shades were incorporated.

(2) The increased capacity of the oxygen system and improved accessibility of the controls were considered satisfactory.

(3) The redesigned heating system was considered satisfactory.

b. Publications. The commercial manuals provided (operator's and maintenance) were unsuitable for Army use.

c. Flight Characteristics and Performance. This L-23F was flown through those regimes of flight to which the service-test L-23F was subjected except for flight in icing conditions.

(1) Flight Characteristics. Flight characteristics did not differ significantly.

(2) Short Field Performance. Using data obtained from the Fairchild Flight Analyzer, it was determined that at a gross weight of 7700 pounds the takeoff performance distance over a fifty-foot obstacle was increased by approximately 200 feet over the service test results of the L-23F at a gross weight of 7368 pounds. This increase was attributed entirely to the increase in gross weight. This distance is approximately 200 feet shorter than the distance required by an L-23D at 7000 pounds gross weight under very similar test conditions.

(3) Cruise Performance and Service Ceiling. Cruise performance at various altitudes did not differ significantly. The service ceiling was determined to be approximately 26,800 feet density altitude at a takeoff gross weight of 7700 pounds as compared with 27,800 feet for the service test L-23F at a takeoff gross of 7368 pounds. Service ceiling was attained in each instance utilizing maximum rate of climb immediately after takeoff.

(4) Single-Engine Performance. The single-engine service ceiling at a takeoff gross weight of 7700 pounds was determined to be approximately 7400 feet density altitude as compared to a single-engine service ceiling of the service test L-23F of 11,000 feet at a take-off gross weight of 7368 pounds. No significant differences in single-engine flight characteristics were noted.

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d. Maintenance. Organizational maintenance during test was oriented toward determining significant differences from the maintenance reported for the service test L-23F. No maintenance other than organizational maintenance was required during test. No significant differences were found except that suitable ground servicing equipment is not available in the Army system to provide the 3000 p.s.i. pressure needed for full recharge of the de-icing system.

6. FINDINGS. Status of shortcomings reported in the service test of the L-23D and L-23F together with the shortcomings noted during this test are attached as an inclosure.

7. CONCLUSIONS. The following is concluded:

a. All shortcomings previously reported have not been corrected.

b. No discrepancies exist on the current production L-23F Airplane with the possible exception of the anti-icing and de-icing systems which have not been tested.

c. Previously unreported shortcomings exist on the production L-23F Airplane.

d. The design changes and modifications incorporated in the L-23F as a product improvement are suitable except for items 4, 5, 7, and 10, Section III, Inclosure 1.

8. RECOMMENDATION. It is recommended that the uncorrected shortcomings reported in inclosure 1 be corrected where technically and economically feasible.

9. REFERENCES.

a. Report of Test, Project Nr AVN 6456, "Service Test of L-23D Airplane," US Army Aviation Board, 7 December 1957.

b. Final Plan of Test, Project Nr AVN 5858, 23 April 1959, subject: "Service Test of the L-23F Airplane."

c. Final Report of Test, Project Nr AVN 5858, 12 October 1959, subject: "Service Test of the L-23F Airplane."

d. DF, CRD/H 14622, Chief of R&D, 19 October 1960, subject: "Testing of Production Model L-23F Airplane."

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- e. Message, ATDEV-6 795057, Headquarters, USCONARC, 1 November 1960.
- f. Letter, 9011-48, Beech Aircraft Corporation, 4 November 1960, listing modifications to L-23F airplane.
- g. Message, TCMAC-EL-23-01-01321, 19 January 1960.
- h. Letter, ATDEV-6 452, Headquarters, USCONARC, 12 January 1961, subject: "Evaluation of the L-23F Anti-Icing System."
- i. Letter, ATBG-DG, USAAVNBD, 12 January 1961, subject: "L-23F Airplane Instrumentation."

10. COORDINATION. This report has been coordinated with the US Army Aviation School.

1 Incl  
Findings

/s/ Jack L. Marinelli  
/t/ JACK L. MARINELLI  
Colonel, Artillery  
President

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## FINDINGS

### Section I

I. This section contains status of shortcomings reported in the service test of the L-23D (Project Nr AVN 6456) which had not been corrected on the service test L-23F (Project Nr AVN 5858).

<u>Shortcoming</u>	<u>Status</u>	<u>Recommended Action</u>
1. Although appreciably improved, the windshield defrosting system was not fully corrected.	This has been corrected on current production L-23F Airplanes	
2. Dependability of the fuel-quantity gauges was not improved.	Dependability of the fuel-quantity gauges has not been improved.	Provide accurate fuel-quantity measuring system.

### Section II

II. This section contains status of shortcomings reported in the service test of the L-23F.

<u>Shortcoming</u>	<u>Status</u>	<u>Recommended Action</u>
1. The present certificated gross weight of 7368 pounds for the L-23F Airplane does not permit the full utilization of the aircraft. No overload or alternate gross weight is provided.	Certificated takeoff gross weight has been raised to 7700 pounds for production L-23F Airplanes	
2. The L-23F is not equipped with windshield wipers.	Corrected on production airplanes.	
3. a. The L-23F installed oxygen system provides an excessive amount of oxygen to the crew,	Corrected on <u>all</u> L-23F Airplanes.	

<u>Shortcoming</u>	<u>Status</u>	<u>Recommended Action</u>
thereby unnecessarily reducing the elapsed time oxygen is available.		
b. The location and configuration of the installed oxygen bottle do not permit aircrew access to the "on-off" valve during flight.	Corrected on current production airplanes.	
4. The 13 ampere-hour nickle-cadmimum battery presently installed in the L-23F Airplane does not have sufficient power to obviate the use of an APU during prolonged simulated field use.	This shortcoming still exists on current production airplanes.	Install a 22-ampere/hour capacity battery in lieu of the 13-ampere/hour.
5. The L-23F Airplane is not equipped with a speaker and microphone in the cockpit.	Provided on current production airplanes.	
6. The fore and aft seat adjusting handle is too short and difficult to locate.	Corrected on current production airplanes.	
7. The L-23F Airplane is not equipped with sun visors.	Corrected on current production aircraft.	
8. The power switches for the attitude and heading instruments are located on opposite areas of the instrument panel.	Partially corrected. Power switches have been relocated to appropriate area; however, one switch operates laterally rather than vertically.	Orient heading reference switch to operate vertically. UR has been submitted.

<u>Shortcoming</u>	<u>Status</u>	<u>Recommended Action</u>
9. The de-icer controls and gauge are not located adjacent to the propeller alcohol controls and gauge.	Corrected on current production airplanes.	
10. The emergency intercom switch can be improperly positioned due to marking, which results in unintentional air-to-ground transmissions.	Corrected on current production airplanes.	
11. Idle cut-off switches can be inadvertently cut-off when actuating the flap control lever.	Corrected on current production airplanes.	
12. The L-23F is not equipped with any device to assist in unfeathering the propellers, thereby facilitating an air start.	This shortcoming still exists	Equip the L-23F with accumulators in order that air starts can be accomplished quickly and easily without danger of fire from overpriming and to eliminate the possibility of burning out starters. (Suitable accumulators for the airplane are available from the manufacturer.)

### Section III

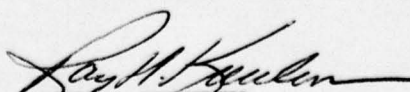
III. This section contains shortcomings noted during this test and not previously reported which are desired to be corrected as practicable.

<u>Shortcoming</u>	<u>Suggested Corrective Action</u>	<u>Remarks</u>
1. The commercial type manuals provided (operator's and maintenance) were unsuitable for Army use.	Procure appropriate TM's.	

<u>Shortcoming</u>	<u>Suggested Corrective Action</u>	<u>Remarks</u>
2. The integrated flight system and radio magnetic indicators (RMI) approved for Army command airplanes were not installed.	Configure all L-23F Airplanes in accordance with the recommendations of reference 9i.	
3. The latest Army-approved digital-tuned VOR's were not installed.	Install Army-approved digital-tuned VOR's in all L-23F Airplanes	
4. The shoulder harness control lock on the copilot's seat was positioned too high, resulting in an uncomfortable gouging of the copilot's left leg.	Relocate shoulder harness control lock to prevent gouging of leg.	UR has been submitted.
5. The lateral restraint safety feature of the shoulder harness installation in the cockpit was inadequate owing to a lack of harness guides on the upper seat backs.	Install shoulder harness guides on upper seat back of pilot's and copilot's seats.	UR has been submitted.
6. The airplane is not provided with alternate stabilized heading information.	Configure all L-23F Airplanes in accordance with the recommendations of reference 9i.	
7. Presently installed generators are unsatisfactory. Low speed cut-in generators which are interchangeable with the presently installed generators are available. In addition to providing generator output at normal ground operating	Install low-speed cut-in generators in all L-23F Airplanes.	UR has been submitted.

<u>Shortcoming</u>	<u>Suggested Corrective Action</u>	<u>Remarks</u>
<p>r.p.m. (750 as opposed to 1400 presently required), a weight reduction of 3.5 pounds would be effected and two reverse current relays would be eliminated by use of the low speed cut-in generators.</p>		
<p>8. On the installed AN/APX-44, the "pilot light," designed to indicate operation of the set, was not wired to the IFF control switch but was wired to the instrument light rheostat.</p>	<p>Rewire AN/APX-44 to provide proper operation of "pilot light."</p>	
<p>9. The manual control and stored compressed air portion of the de-icing system are considered unsatisfactory.</p>	<p>A self-contained actuation system with automatic controls be installed.</p>	
<p>10. The spring loaded windshield anti-icer toggle switch must be held to the "ON" position to operate.</p>	<p>Replace the spring-loaded toggle switch with a two-position toggle switch.</p>	<p>UR has been submitted.</p>

A TRUE COPY:

  
 RAY H. KREULEN  
 LTC, Inf  
 Executive Officer