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ARMY AIR FORCES
MATERIEL ~~COMMAND~~ COMMAND

MEMORANDUM REPORT ON

P-63A-1 Airplane, AAF No. 42-68868

Date 15 February 1944

SUBJECT: Effect of Fixed Wheel Fairing on the
High Speed and Demonstration Dive of
the P-63A-1 Airplane.

SECTION Flight

SERIAL No. Eng-47-1710-A

Contract No.

Expenditure Order No. 430-114

Purchase Order No.

A. Purpose

1. To report the results of flight tests conducted at the Bell Aircraft Plant, Niagara Falls, New York, on the P-63A-1 airplane to obtain comparative high speeds resulting from the substitution of a fixed wheel well fairing for a retractable flipper landing gear door and to determine the effect of high speed dives on the fixed fairing installation. The comparative high speed tests were conducted on the airplane AAF No. 42-68868; the demonstration dive tests were conducted on the airplane AAF No. 42-68862.

B. Factual Data

1. The airplanes were equipped with V-1710-93 engines and four bladed, constant speed propellers of blade design No. A20-156-17. Powers reported are based on the Allison Division V-1710-E11 Engine Calibration, P-2372, dated 27 November 1943.

2. The dive test airplane, AAF No. 42-68862, was flown at a take-off gross weight at 7937 pounds with the c.g. at 25.7% MAC.

The high speed airplane, AAF No. 42-68868, was flown at a take-off gross weight of 8160 pounds with the c.g. at 26.5% MAC.

The dive test airplane, AAF No. 42-68862, was flown with all antennae in place, wheels and flaps retracted, wing guns removed.

The high speed airplane, AAF No. 42-68868, was flown with all antennae in place, wheels and flaps retracted and wing guns in place. All tests were flown with carburetor cold, mixture auto-rich, cooling flaps flush.

3. The dive test airplane, AAF No. 42-68862, was flown by the contractor's pilot, Mr. L. A. Shaver. The demonstration was witnessed for the contractor by Mr. R. T. Borchardt and Mr. R. H. Wheelock, and for the Materiel Command by Lt. Norman A. Krause, Flight Test Engineering Branch, Flight Section. The requirements for this demonstration are outlined in a Materiel Command IOM from the Chief, Production Engineering Section to the Chief, Flight Section, dated 7 February 1944.

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The requirements were to attain a calibrated indicated airspeed of 500 mph at no specific g's.

4. The maximum speed attained during the dive demonstration was 502 mph indicated airspeed or 524 mph calibrated indicated airspeed. The maximum g's obtained during the dive were +2.25 g and -2.0 g. A photograph of the V. G. recording is included in this report. No resulting effect was found on the fixed fairing installation. (See Appendix B, views 8 & 9).

5. High speed in level flight, at 3000 rpm, mixture auto-rich at 24450 ft. density altitude, cooling flaps flush. (See Appendix A, fig. 2).

Manifold Pressure " Hg.	Throttle	BHP	True Speed - mph		Gross Weight Lb.
			Flipper Door	Fixed Fairing	
52.0	W.O.	1115	411.0	408.0	7880
48.8	Part	1044	409.5	402.5	7810
45.8	Part	979	399	396.0	7750
42.8	Part	917	391.5	388.5	7700
39.8	Part	842	381	378	7650
36.8	Part	777	--	372.0	7610

6. For information on airspeed position error for the airplane 42-68868, see Appendix A, Fig. 1. Information on airspeed position error for the airplane 42-68862, may be obtained from the Fighter Branch, Production Engineering Section. The Kollsman type D-1 airspeed head was located on the wing chord center line, 30-3/4" from the leading edge and 42" from the tip.

C. Conclusions

1. It is concluded that the fixed fairing can be substituted for the flipper door with resulting loss of 3 mph at critical altitude, military power.

2. It is concluded that the fixed fairing can be subjected to diving speeds of 500 mph without damage to the structure.

3. It is concluded that the performance reported is representative of all P-63A-1 airplanes as the subject airplanes were representative of standard production in construction and finish.

D. Recommendations

1. It is recommended that the fixed fairing be substituted for the retractable flipper when necessary.

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Attached:

Appendix A (3 pages)
Appendix B (7 pages)

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AIRSPEED CALIBRATION

PIC 3A-1 42-68868

NAVARA SPEED COURSE

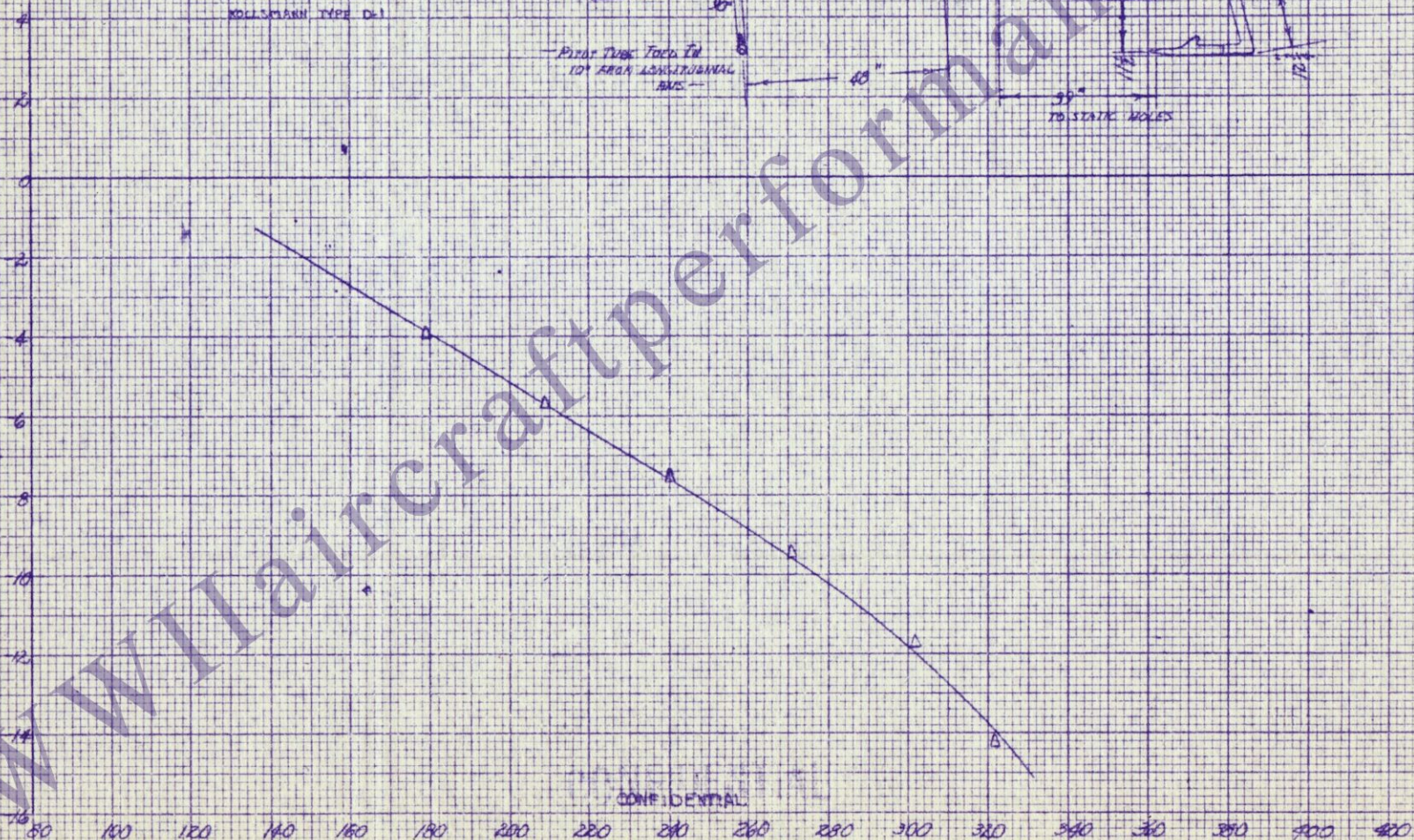
8140 LB W.T.O.

WHIRLS & FLAPS UP

KOLLSMANN TYPE D-1



POSITION ERROR CORRECTION TO BE ADDED - mph



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INDICATED AIRSPEED - CORRECTED FOR INSTRUMENT ERROR - mph

FIG. 1

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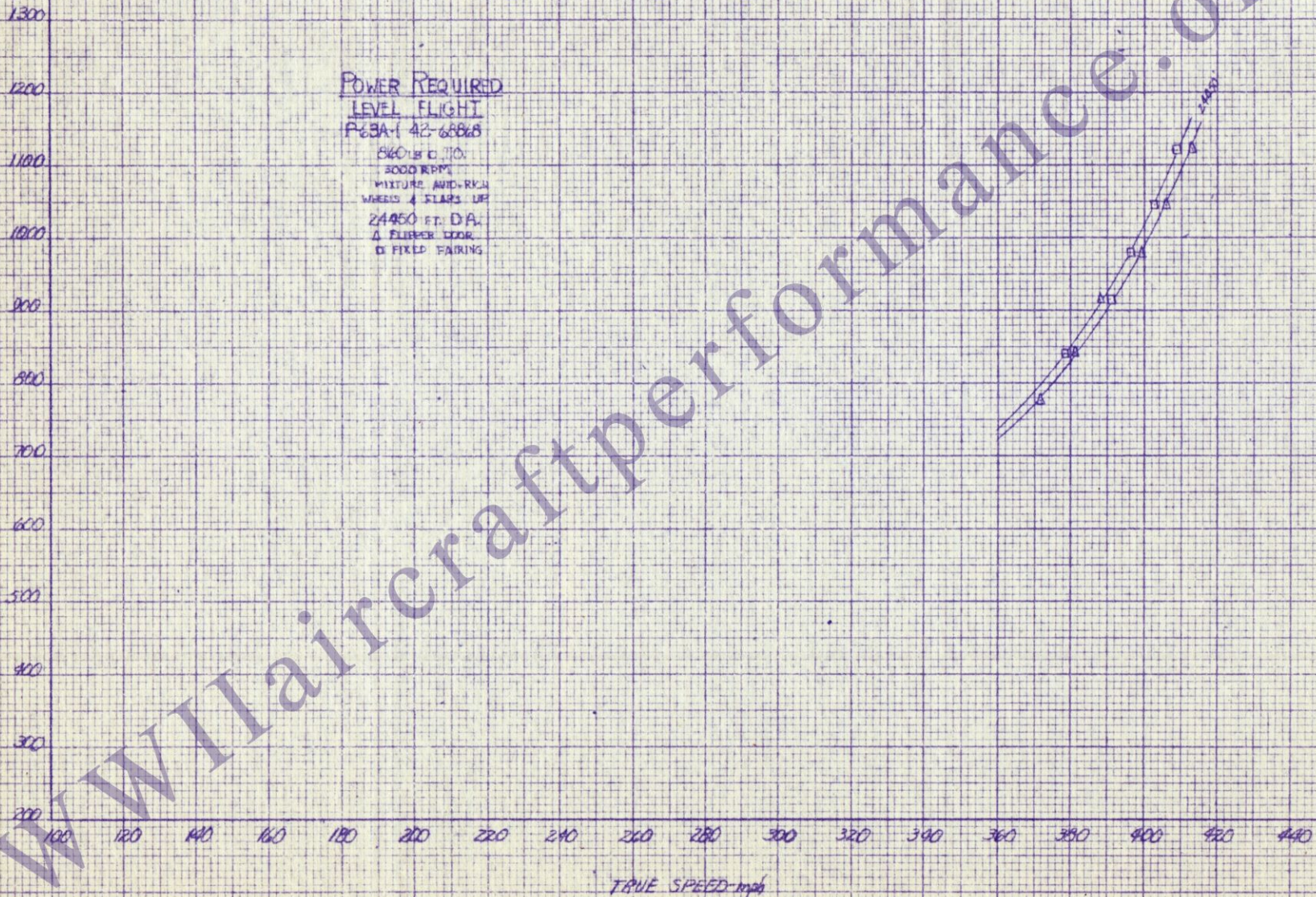
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POWER REQUIRED
LEVEL FLIGHT
P-63A-1 42-68868
8600 LB. O. W.
3000 RPM
MIXTURE AUTO-RICH
WHEELS & FLAPS UP
24450 FT. D.A.
A FLUMER DOOR
D FIXED FAIRING

BRAKE HORSEPOWER
BASED ON ALLISON SPEC PL-1372



TRUE SPEED-mph

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FIG. 21

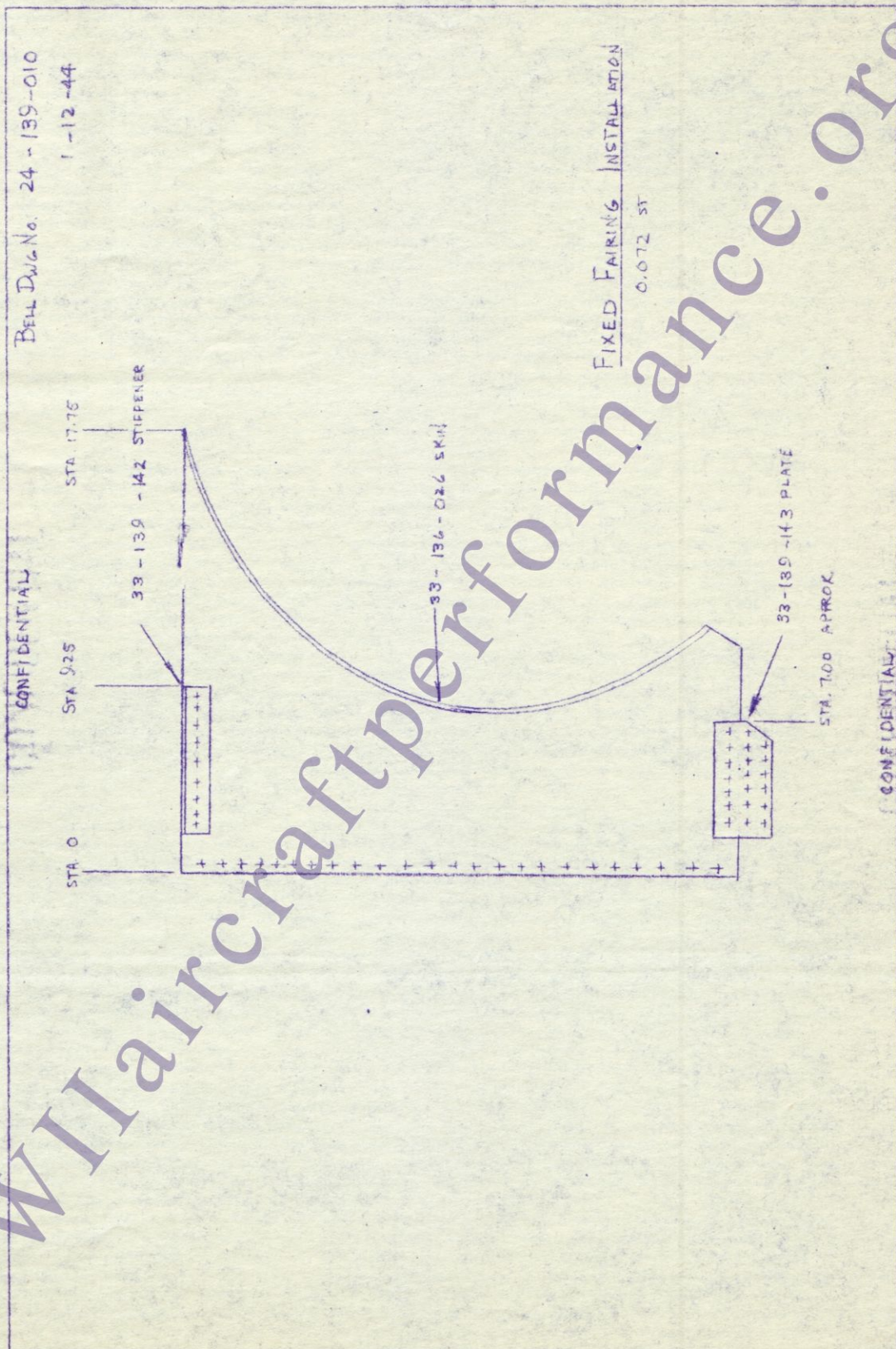


FIG 3

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APPENDIX B

PHOTOGRAPHS

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Wheels Retracted, Left
9. Fixed Fairing Installation, after Flight, (Page B-5)
Wheels Retracted, Right
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11. Fixed Fairing Installation, Right (Page B-6)
12. Airspeed Installation P-63A-1, 42-68862 (Page B-6)
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NO PHOTOGRAPHS AVAILABLE
FOR THIS COPY,