SECTION II - PERFORMANCE

For various reasons it has not been possible to carry out performance tests by B.A.C. pilots, the chief of these being that the only British aircraft available has unpressurised magnetos, priority for this modification having been given to the Service Squadrons. This precludes operation at the altitudes required for performance measurement.

However, the U.S. Navy Flight Test Section, at Patuxent River, have carried out extensive performance tests and their report is reproduced below, together with performance curves.

The U.S. Army also carried out brief performance tests at Wright Field, and a copy of their report is reproduced, following that by the U.S. Navy. Where applicable, the points obtained by the U.S. Army have been superimposed on the U.S. Navy curves. These show extremely good agreement.

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"Subj: Model F4U-1 Airplane - Performance Characteristics of.

1. This memorandum with its attendant enclosure is submitted in compliance with the request of the British Air Commission for information on the performance characteristics of the Model F4U-1 airplane.

2. Enclosure 1 consists of a series of performance curves on the model F4U-1 airplane No. 02155, when loaded as a normal fighter at a gross weight of 11,194 pounds. The series contains the following curves:

(a) Time to climb and rate of climb, at normal and at military* rated powers, plotted against standard altitude.

(b) Indicated brake horsepower required, at normal and at military* rated powers, plotted against true indicated airspeed.

(c) Indicated airspeed plotted against true indicated airspeed.

(d) Maximum speed, at normal and at military rated powers, plotted against standard altitude.

(e) Brake horsepower available, at normal and at military rated powers, plotted against standard altitude.

(f) Rate of climb at altitude as a function of cowl flap opening plotted against indicated airspeed.

* See table on page 19 for details of engine ratings.

/3. A

3. A summary of the performance characteristics of the Model F4U-1 airplane No. 02155, at a gross weight of 11,194 pounds, is presented as follows:

(a) Climb characteristics using best climbing speed, minimum cowl flap opening, and normal rated power.

(1) Rate of climb at sea level.....	2,200 fpm
(2) Rate of climb at airplane critical altitude in neutral blower (5,500 ft.)	2,160 fpm
(3) Rate of climb at airplane critical altitude in low blower (17,000 ft.).....	1,980 fpm
(4) Rate of climb at airplane critical altitude in high blower (21,200 ft.)	1,760 fpm
(5) Service ceiling (rate of climb = 100 fpm)	38,000 ft.

(b) Climb characteristics using best climbing speed, minimum cowl flap opening, and military rated power;

(1) Rate of climb at sea level	2,890 fpm
(2) Rate of climb at airplane critical altitude in neutral blower (700 ft.)	2,880 fpm
(3) Rate of climb at airplane critical altitude in low blower (15,400 ft.)	2,300 fpm
(4) Rate of climb at airplane critical altitude in high blower (21,200 ft.)	1,840 fpm
(5) Service ceiling (rate of climb - 100 fpm)	38,200 ft.

(c) Maximum true airspeed using normal rated power;

(1) At sea level	326 mph

/ (2)

(2) At airplane critical altitude in neutral blower (5,900 ft.).... 343 mph

(3) At airplane critical altitude in low blower (19,700 ft.) ..... 395 mph

(d) Maximum true airspeed using military rated power;

(1) At sea level ..... 348 mph

(2) At airplane critical altitude in neutral blower (1,400 ft.).... 352 mph

(3) At airplane critical altitude in low blower (17,800 ft.)..... 390 mph

(4) At airplane critical altitude in high blower (22,800 ft.)..... 295 mph

(e) Rates of climb at 5,000 feet, using military power and cowl flaps open:-

	ONE THIRD	TWO THIRDS	FULL
(1) At IAS of 120 kts	2,360 fpm	2,310 fpm	2,240 fpm
(2) At IAS of 140 kts	2,280 fpm	2,190 fpm	2,130 fpm
(3) At IAS of 160 kts	2,120 fpm	2,060 fpm	1,900 fpm

(f) Rates of climb at 15,000 feet, using military power and cowl flaps open;-

	ONE THIRD	TWO THIRDS	FULL
(1) At IAS of 120 kts	2,300 fpm	2,220 fpm	2,010 fpm
(2) At IAS of 140 kts	2,200 fpm	2,090 fpm	1,960 fpm
(3) At IAS of 160 kts	1,990 fpm	1,900 fpm	1,640 fpm

(g) Rates of climb at 25,000 feet, using military power and cowl flaps open;

	ONE THIRD	TWO THIRDS	FULL
(1) At IAS of 120 kts	1,480 fpm	1,360 fpm	1,160 fpm
(2) At IAS of 140 kts	1,340 fpm	1,120 fpm	990 fpm
(3) At IAS of 160 kts	1,120 fpm	760 fpm	630 fpm

4. All available performance characteristics of the Model F4U-1 airplane which are not presented in enclosure 1 are tabulated as follows:

(a) Stalling speeds, airplane No. 02156 at a gross weight of 11,499 pounds:

(1) No power, clean condition..... 102.5 mph

/(2)

(2) No power, landing condition ..... 85.0 mph

(b) Take-off data, airplane No. 02158 at a gross weight of 11,190 pounds;

(1) True indicated airspeed at take-off 78.0 mph

(2) Take-off distance, zero wind..... 560 ft.

(3) Take-off distance, 25 knot wind.... 240 ft.

/s/ PAUL H. RAMSEY
Flight Test Officer

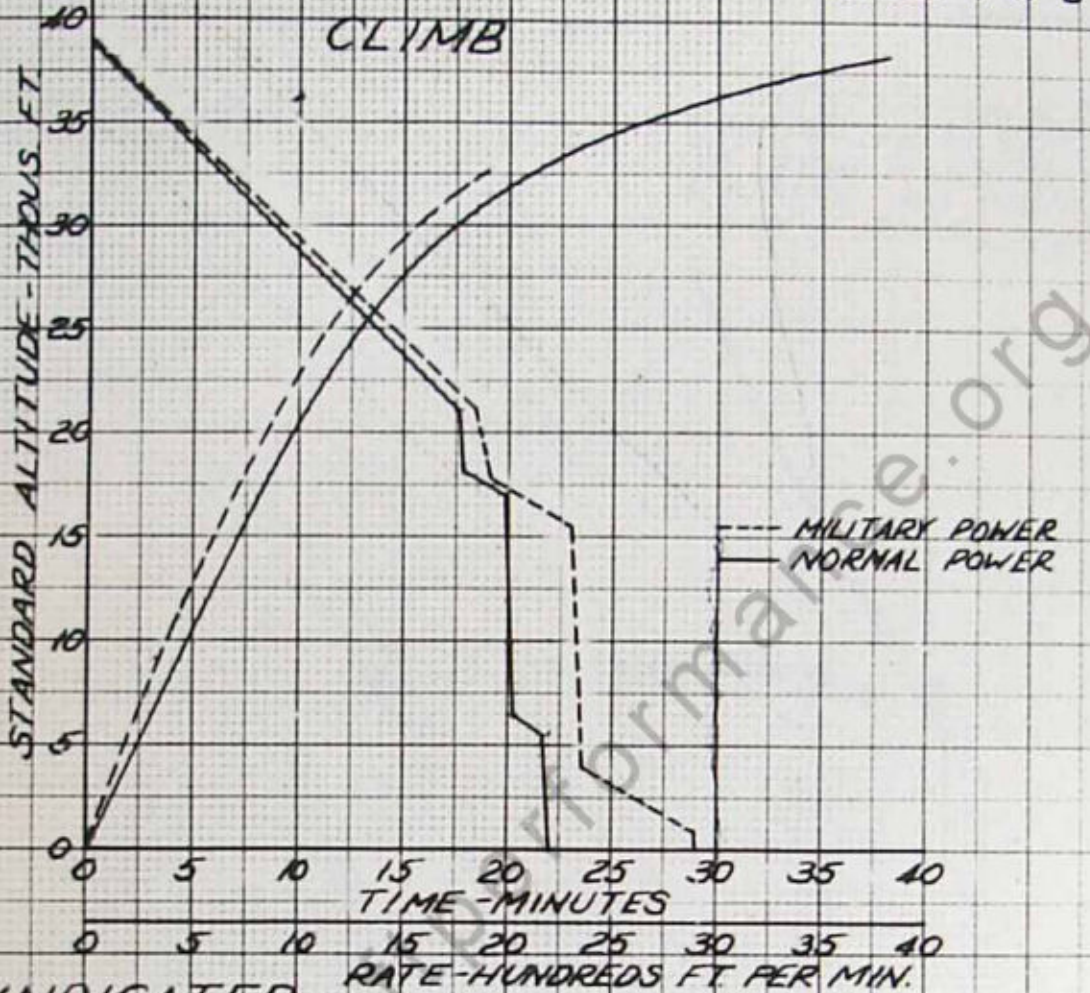
Encl,
1. Series of curves entitled, "Model F4U-1 Airplane No. 02155, Performance Characteristics, Normal Fighter, Gross Weight - 11,194 Lbs." (3 sheets)!

MODEL F4U-1 AIRPLANE NO. 02155
PERFORMANCE CHARACTERISTICS
NORMAL FIGHTER — GROSS WEIGHT = 11,194 LBS

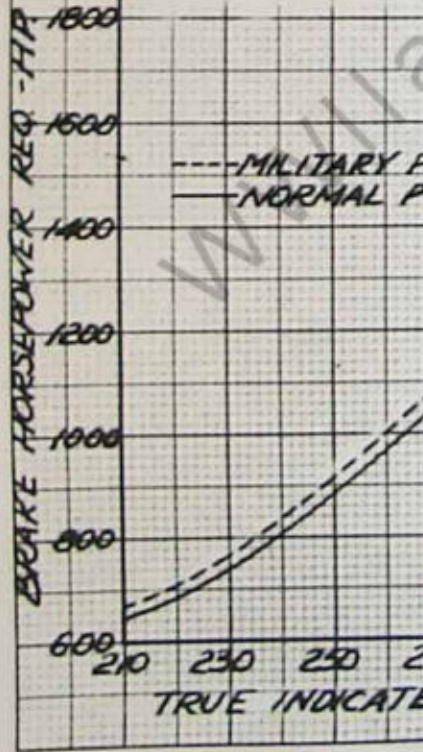
PTXT-54

SHEET 1 OF 3

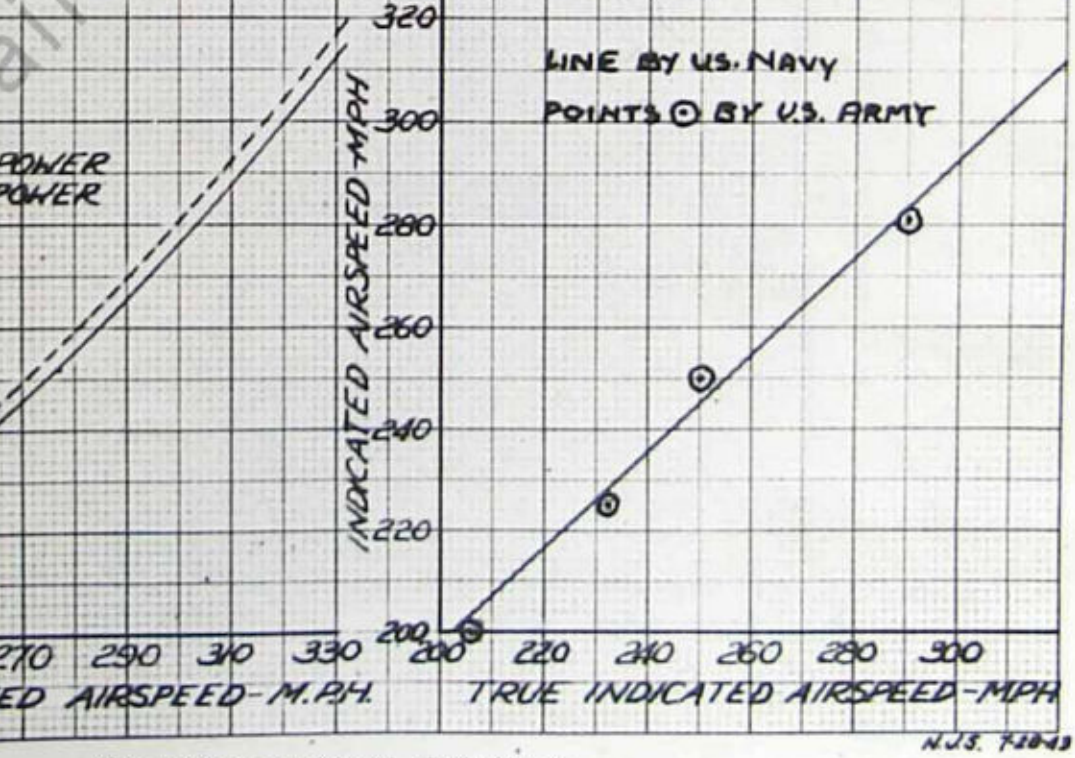
CLIMB



INDICATED HORSEPOWER REQUIRED



AIRSPEED INDICATOR CALIBRATION



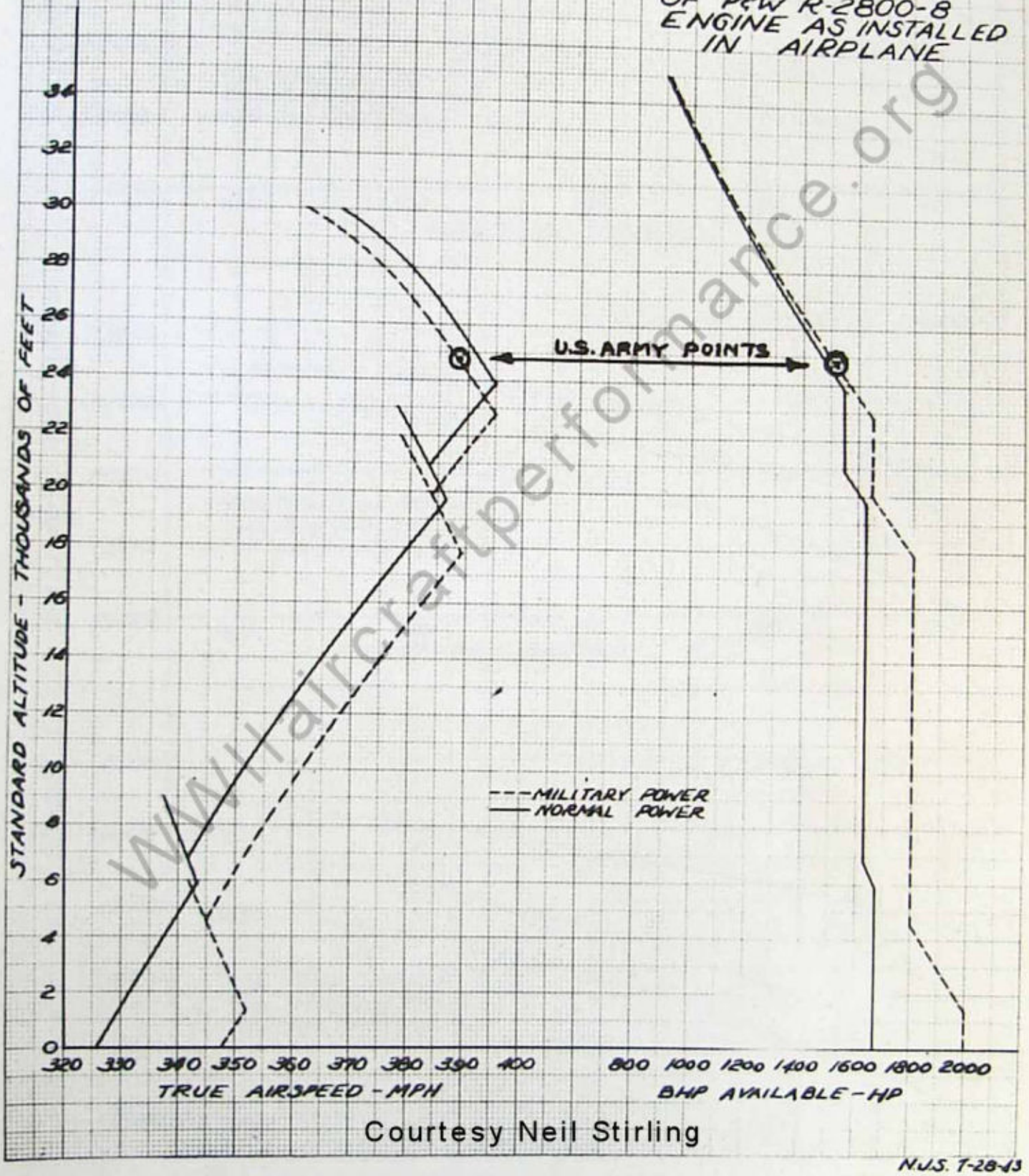
N.J.S. 7-18-43

Courtesy Neil Stirling

MODEL F4U-1 AIRPLANE NO 02155
PERFORMANCE CHARACTERISTICS
NORMAL FIGHTER GROSS WEIGHT=11,194 LBS.

PTXT-55

SHEET 2 OF 3



Courtesy Neil Stirling

N.J.S. 7-28-43

MODEL F4U-1 AIRPLANE NO. 02155
PERFORMANCE CHARACTERISTICS
NORMAL FIGHTER GROSS WEIGHT = 11,194 LBS.
CLIMBING CHARACTERISTICS AT MILITARY POWER

PXT-56

SHEET 3 OF 3

RATES OF CLIMB AT 5000 FT.

RATE OF CLIMB - FT/MIN.

2400
2200
2000
1800

One third Cowl Flap
Two third Cowl Flap
Full open Cowl Flap

120 130 140 150 160

INDICATED AIRSPEED - KTS.

RATES OF CLIMB AT 15000 FT.

RATE OF CLIMB - FT/MIN.

2400
2200
2000
1800
1600

One third Cowl Flap
Two third Cowl Flap
Full open Cowl Flap

120 130 140 150 160

INDICATED AIRSPEED - KTS.

RATES OF CLIMB AT 25000 FT.

RATE OF CLIMB - FT/MIN.

1600
1400
1200
1000
800
600

One third Cowl Flap
Two third Cowl Flap
Full open Cowl Flap

120 130 140 150 160

INDICATED AIRSPEED - KTS.

N.J.S. 8-2-43

PRATT & WHITNEY R-2800-8 ENGINE

ENGINE RATINGS

The following table gives the ratings employed during the U.S. Navy Corsair performance tests:

Blower	Rating	H.P.	R.P.M.	Boost "Hg.	F.T. Height - Ft. (without ram)
Main	Take-Off	2000	2700	54	---
Main	Normal	1675	2550	44.2	5500
Main	Military	2000	2700	52.5	1750
Aux. Low	Normal	1620	2550	49.3	16500
Aux. Low	Military	1800	2700	53.9	15750
Aux. High	Normal	1550	2550	49.5	21750
Aux. High	Military	1650	2700	52.5	21000

ARMY AIR FORCES
MATERIEL CENTRE
MEMORANDUM REPORT ON

Fighter Single Engine F4U-1, Serial No. 02296

March 3, 1943

Subject: Flight Tests
Section: Flight
Serial No.: FS-M-19-1554-A

A. Purpose.

1. Report on performance tests of Vought-Sikorsky F4U-1 airplane at Wright Field. Airplane equipped with Pratt & Whitney two-stage R-2800-8 engine and a three-bladed constant speed propeller, blade design No. 6443A-21. Gross weight at take-off was 11,936 pounds. Landing gear retracted; wing flaps neutral; cowl, oil, and intercooler flaps neutral; carburetor cold; mixture auto-rich; six .50 caliber wing guns installed with ports covered with tape. Radio and antenna in place. Horsepowers obtained from power curve R-2800-8, -10, dated 8-25-41.

B. Test Results.

1. High speed in level flight at wide open throttle at 24,750 feet was 388.5 MPH at 2700 RPM with 1525 b.h.p. at 51.5 inches Hg. manifold pressure (Auxiliary stage high ratio).

2. Determination of airspeed indicator and altimeter installation errors.

Indicated Airspeed MPH	Indicator vs. Water Column MPH	Calibrated Airspeed MPH	Airspeed Installation Error MPH	Altimeter Installation Error At Sea Level (ft)
280	281	290	-9	-185
250	250	257	-7	-150
225	225	231.5	-6.5	-120
200	200	206	-6	- 90
175	175	180	-5	- 60

Prepared by NATHAN R. ROSENGARTEN, 1st Lt.A.C.

Approved by ERNEST K. WARBURTON, Col. A.C.
Chief Flight Test Branch

Approved by J. M. GILLESPIE, Col. A.C.
Chief, Flight Section