P2V (P-2) NEPTUNE

By now most VP personnel in fleet squadrons hardly remember that there were ever anything but P-3s in Navy VP squadrons. However, for many years their predecessors never knew that there were any land-based patrol planes other than P2V/P-2 Neptunes.

The Neptune enjoys the distinction of being the only designed-for-the-purpose, land-based patrol plane to see wide, general Navy service. All others to see general Navy service, including today's P-3s, were derived from other types designed for other purposes. Both the P2V's predecessors, the PVs and successors (today's P-3s), were derived from commercial transport designs.

The Neptune traces its origins to Lockheed/Vega design studies starting in 1941 when the Navy first acquired land-based patrol aircraft. While types modified from other models served WW II needs, in 1944, two XP2V-ls were ordered, along with 15 production -1 models. These were designed to overcome the many problems of the redesigned types, providing ample space for crew and equipment, and adequate range in a straight-forward, twin-engine design. First flight of the initial XP2V-1 occurred on 12 May 1945. For the following 17 years, Lockheed's flight line was never without new P2V/P-2 aircraft.

Powered by two 2,300-hp Wright R-3350 engines, and featuring nose, dorsal and tail turrets, the XP2V-1 featured clean lines that were to continue throughout the P2V series, even though the aircraft was to grow all manner of electronic and other bumps, and the armament changed regularly.

The most famous Neptune was the *Truculent Turtle*, the third P2V-1, which set a world's distance record on 29 September to 1 October 1947, flying 11,236 miles from Perth, Australia, to Columbus, Ohio. Following initial trials, the first P2Vs went into service with VP-ML-2 in 1947. The -1s were followed by -2s with longer noses and no nose turrets, and subsequent -3s with improved engines. Both these models had variants, initiating a practice that continued throughout the P2V/P-2 series, which continues in the P-3s today. A special ASW (-2S) and ski-equipped (-2N) P2V-2s were followed by carrier, command transport and radar search (-3C, -3Z and -3W) versions of the P2V-3. While takeoffs from carriers were performed, using JATO assist, the Neptune never landed aboard a carrier.

After the initial aircraft, the -4s introduced the turbo-compound R-3350 engine, had APS-20 radar as a standard feature, and were fitted with tip tanks. P2V-5s were the first Neptunes to serve with foreign countries, and were followed later by other models. P2V-6s featured more flexible armament provisions and reduced-capability radar.

With the -7, the P2V reached its ultimate design. Westinghouse J-34s in wing pods added needed power, a MAD boom replaced the tail turret, nose armament was eliminated, and the pilot's cabin redesigned. Many of these features were retrofitted on earlier -5 and -6 aircraft as the Neptunes underwent successive modifications for fleet use and for special duties. This included some used by the Air Force as RB-69As.

By the time the last of 1,036 Neptunes were delivered in 1962, the designation of the P2V-7s had changed to SP-2H, and all guns were deleted. Subsequent special versions for Southeast Asia added OP-2E and AP-2H to the list of P-2 modifications. As the P-3s filled out the fleet squadrons, the P-2s continued to fill reserve and support mission roles. By the mid-Seventies the P-2s were being rapidly phased out.

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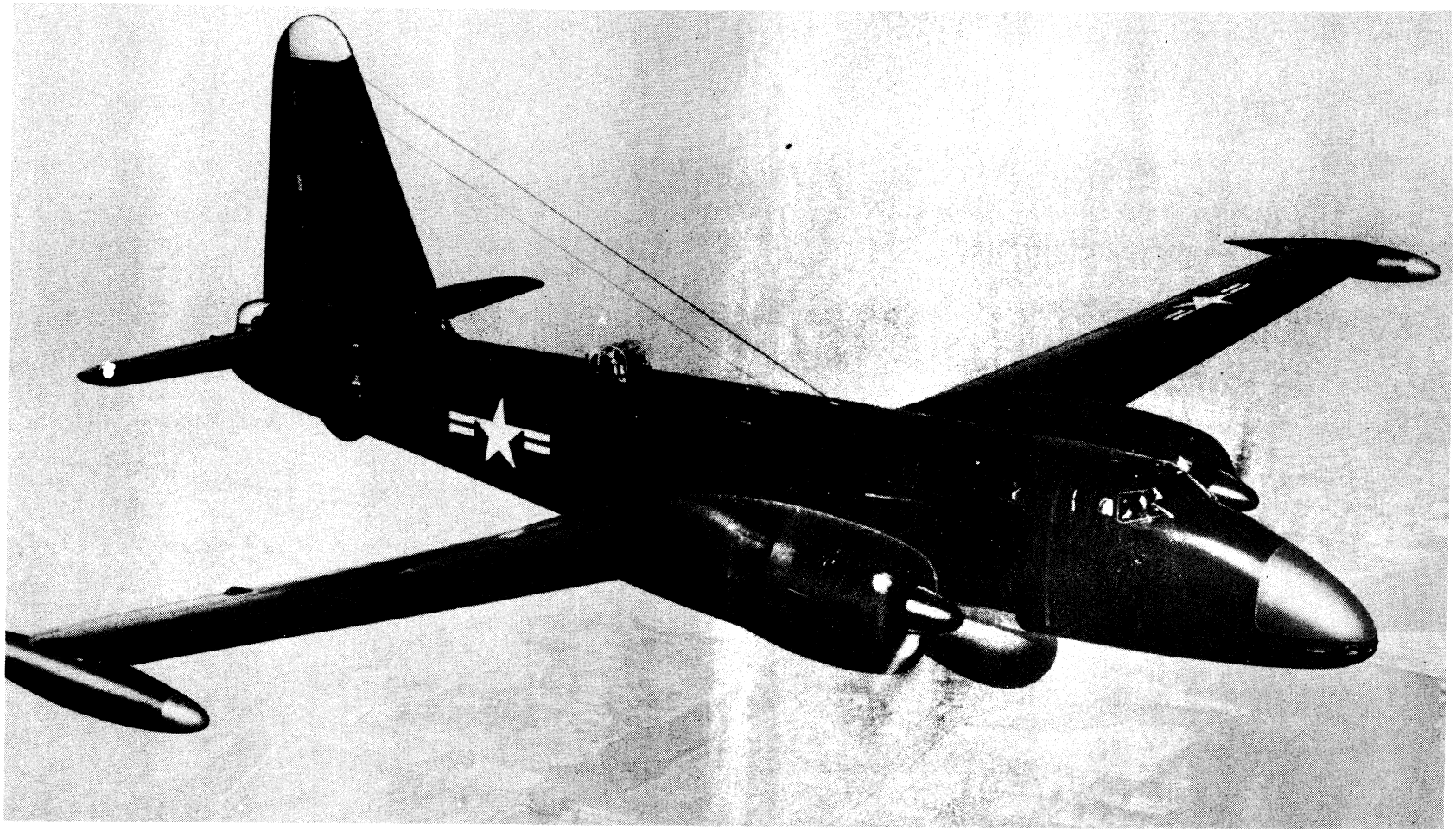

STANDARD AIRCRAFT CHARACTERISTICS

P2V-4 "NEPTUNE"

LOCKHEED

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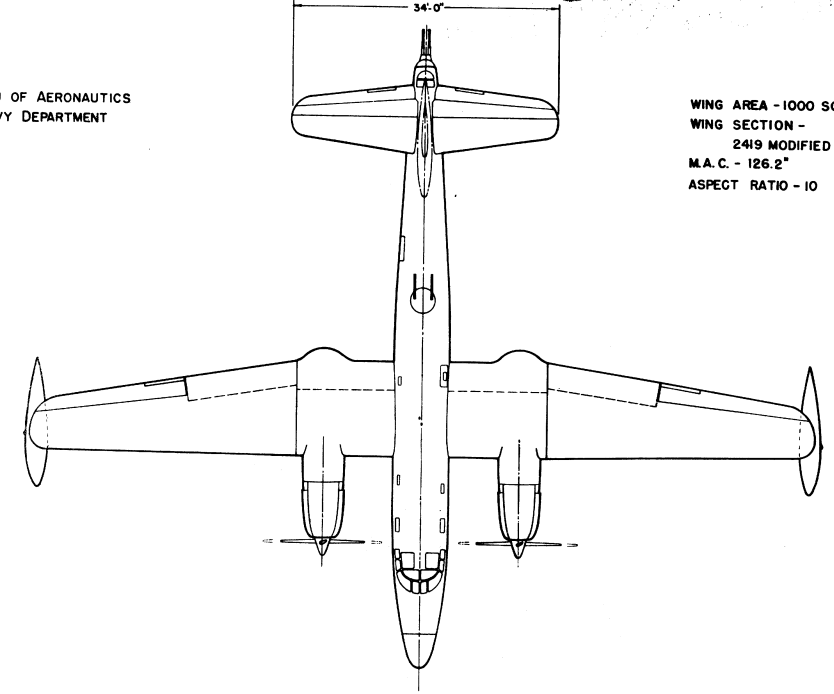
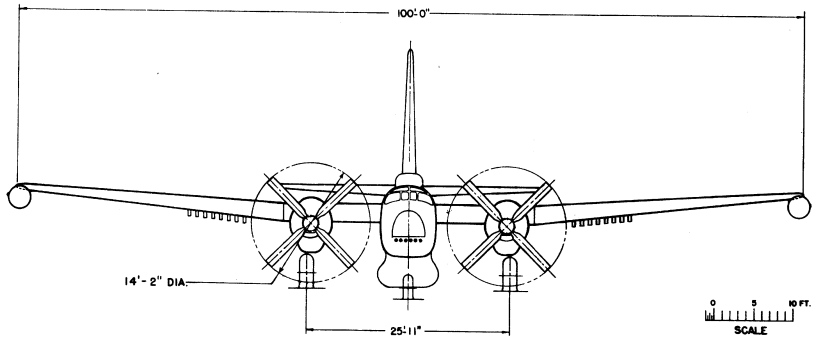
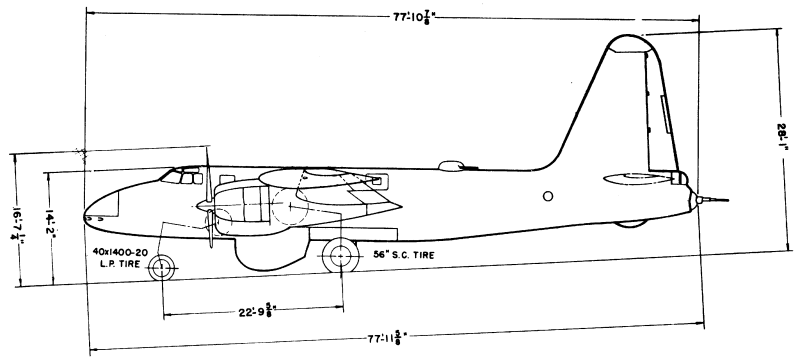
Standard Aircraft Characteristics NAVAER 1335A (REV. 1-49)

BUREAU OF AERONAUTICS
NAVY DEPARTMENT

WING AREA - 1000 SQ. FT.
WING SECTION -
2419 MODIFIED & 4410.5
M.A.C. - 126.2"
ASPECT RATIO - 10







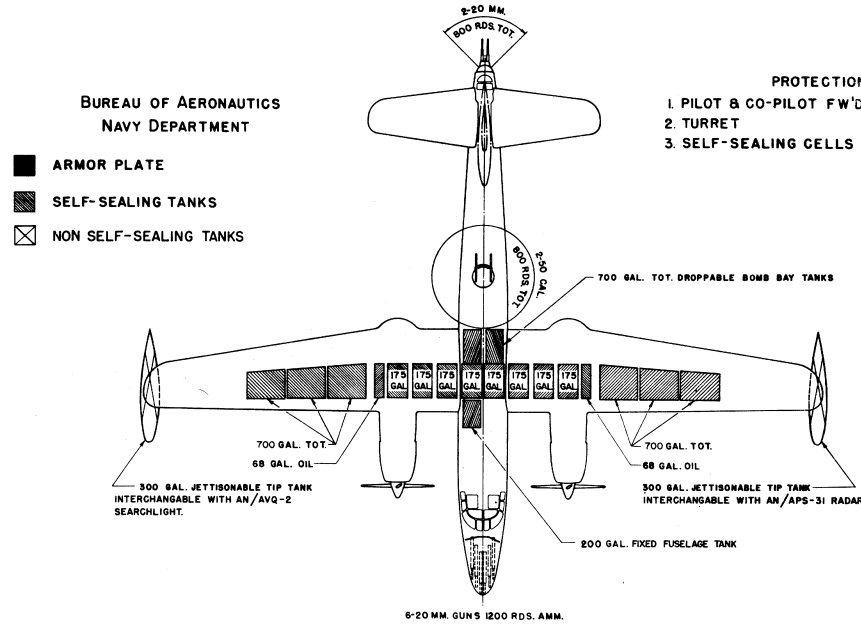
DESCRIPTIVE ARRANGEMENT

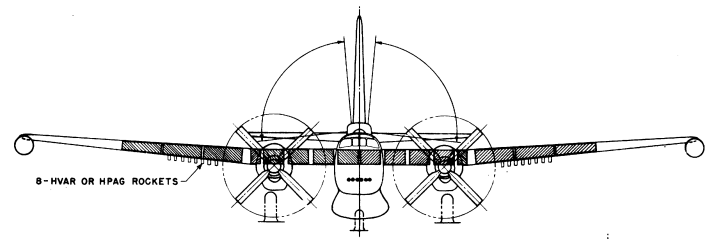
BUAER NO. 8513

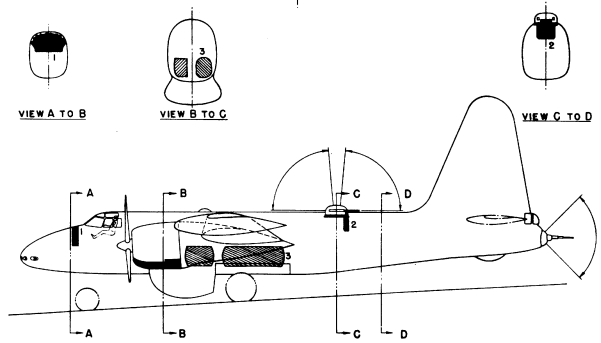
BUREAU OF AERONAUTICS
NAVY DEPARTMENT

- ARMOR PLATE
- SELF-SEALING TANKS
- NON SELF-SEALING TANKS

PROTECTION
1. PILOT & CO-PILOT F.W.D. 200 LBS.
2. TURRET 150 LBS.
3. SELF-SEALING CELLS 2500 LBS. EST.







ARMAMENT & TANKS

BUAER NO. 8514

Standard Aircraft Characteristics NAVAER 1335B (REV. 1-

UNCLASSIFIED

MISSION AND DESCRIPTION

The P2V-4 airplane is designed for use as a day and night land-based, anti-submarine, long range patrol airplane. Its secondary tactical missions are rocket attack, night torpedo attack, mine laying, bombing, and photo reconnaissance.

The P2V-4 was developed from the P2V-3, with strengthening of structure to permit operation at higher gross weights. Like the P2V-3, the P2V-4 has an all-metal semi-monocoque fuselage with wings of conventional two-spar dural construction.

It has a crew of seven, Fowler-type wing flaps with aileron droop, "varicam" stabilizer, thermal anti-icing of wing, tail surfaces and windshield, and 50 gallons of water for combat power. Propellers are fitted with electrical de-icing. A K-25 camera and D-1 flasher are carried. A right hand wing-tip nacelle carries a searchlight, or alternately a 300 gallon tip tank. A left hand wing-tip nacelle carries an AN/APS-31 attack radar, or alternately a 300 gallon tip tank. Eight rocket launchers are mounted under each wing and will accommodate the 5" HVAR or HPAG rockets. The first flight of the prototype was January 1948; first flight of the pilot model was September 1949; and entering service in March 1950.

DIMENSIONS

WING AREA	1,000 sq. ft.
SPAN	100' - 0"
LENGTH	78' - 0"
HEIGHT	28' - 1"
TREAD	25' - 11"
M.A.C	10' - 6"

WEIGHTS

Loadings	Lbs.	L.F.
EMPTY	41,549	
BASIC	44,000	
DESIGN	67,500	2.67
COMBAT	60,827	3.00
MAX.T.O	80,000	2.3
MAX.LAND	59,000	

All weights are calculated.

FUEL AND OIL

Gals.	No. Tanks	Location
2,800	4	Wing,S.S.
200	1	Fuse,S.S.
600	2	Wing, Tip
700	2	Bomb Bay

FUEL GRADE....115/145
FUEL SPEC.....AN-F-48

OIL

CAPACITY (Gals.).....136
GRADE.....1120
SPEC.....AN-O-8

ELECTRONICS

VHF & HOMING	AN/ARC-1A
TRANSCEIVER	AN/ARC-2
MF RECEIVER	AN/ARC-5
TRANSCEIVER	AN/ART-13
HF RECEIVER	AN/ARR-15A
VHF HOMING SYS	AN/ARA-8
SONOBUOY RECEIVER	AN/ARR-31
AUTO.D.F	AN/ARN-6
MARKER BEACON REC	AN/ARN-8
ALTIMETER	AN/APN-1
LORAN	AN/APN-4
RADAR BOMB EQUIP	AN/APA-5A
ASW	AN/APS-20,-20A
RADAR SEARCH	AN/APS-31
IFF	AN/APX-2,-2A,-6
PULSE ANALYZER	AN/APA-64A
SEARCH ANALYZER	AN/APR-9
SEARCHLIGHT	AN/AVQ-2

(SEE NOTES)

POWER PLANT

NO. & MODEL....(2) R-3350-30W
MFR.....Wright
SUPERCH.....1 Stage, 2 Speed
PROP GEAR RATIO.....0.4375
PROP MFR.....Ham. Std.
NO. BL./DIA.....4/14'-2"
PROP DES. NO.....2J17C3-36S

RATINGS

	Bhp	@ Rpm	@ Alt.
T. O.	3,250	2,900	S. L.
COMB.	3,700	2,900	S. L.
	3,000	2,600	11,000
MIL.	3,250	2,900	S. L.
	2,550	2,600	15,400
NORM.	2,600	2,600	S. L.
	2,450	2,600	16,600

SPEC. NO. N-856

ORDNANCE

GUNS

No.	Size	Location	Rds.
6	20mm (M-24)	Nose	1,200
2	.50 cal.	Deck	800
2	20mm (M-24)	Tail	800

BOMBS & ROCKETS

Type	Size	Location	No.
Bombs	100#	Fuselage	6
Bombs	500#	Fuselage	6
or	1,000#	Fuselage	4
Mines	2,000#	Fuselage	2
Bombs	1,600#	Fuselage	2
Mines	Mk. 24	Fuselage	4
Mines	Mk. 34	Fuselage	4
Torp.	1,200#	Fuselage	4
A.R.	11.75"	Fuselage	2
HVAR	5"	Wing	16

FIRE CONTROL

Pilot.....Mk. 8-8
Turrets.....Mk. 18-6
MAX. BOMB CAP.....4,800 lbs.

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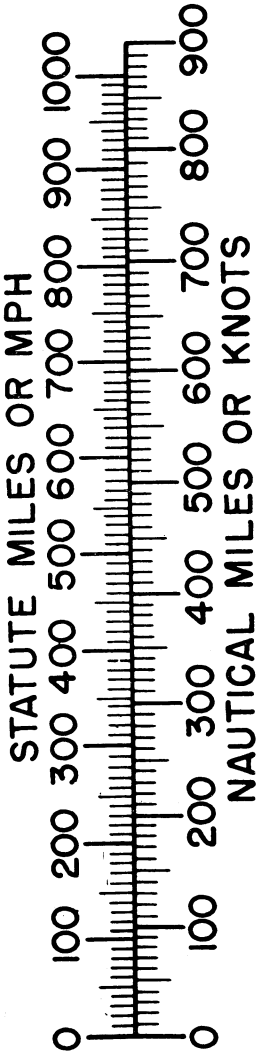


PERFORMANCE SUMMARY

LOADING CONDITION		(1) PATROL 4 Mk.-41 Torp.		(5) PATROL 4,000# Mines	(6) PATROL
TAKE-OFF WEIGHT	lbs.	72,500		72,500	72,500
Fuel (Fixed/Bomb-Bay)	lbs.	17,184/-		17,984/-	18,000/3,354
Bombs	lbs.	4,800		4,000	--
Wing/Power Loading (A) lbs/sq.ft; lbs/bhp.		72.5/14.8		72.5/14.8	72.5/14.8
Stall Speed--Power off	kn.	99.1		99.1	99.1
Stall Speed--Power off - No Fuel	kn.	84.4		83.6	79.9
Stall Speed--Power on	kn.	78.5		78.5	78.5
Maximum Speed/Alt (B)	kn/ft.	273/19,000		273/19,000	273/19,000
Take-off Distance, deck -- calm	ft.	2,290		2,290	2,290
Take-off Distance, deck kn.	ft.				
Take-off Distance, Airport	ft.	3,320		3,320	3,320
Rate of climb -- sea level (B)	ft/min.	1,100		1,100	1,100
Service Ceiling (B)	ft.	24,700		24,700	24,700
Time-to-climb 10,000 ft. (B)	min.	9.7		9.7	9.7
Time-to-climb 20,000 ft. (B)	min.	24.6		24.6	24.6
Combat Range/V av 1,500 ft.	n.mi/kn.	2,440/158		2,560/158	3,140/156
Combat Radius/V av (See Note) ft.	n.mi/kn.	(C) 975/158		(D) 1,330/156	(C) 1,255/156
Combat Endurance/V av 1,500 ft.	hrs./kn.	15.6/146			
LOADING CONDITION		(2) COMBAT	(3) COMBAT	(4) COMBAT	
GROSS WEIGHT	lbs.	60,827	60,827	60,827	
Engine power		Combat	Military	Normal	
Fuel	lbs.	10,311	10,311	10,311	
Bombs/Tanks		None	None	None	
Max. speed at sea level	kn.	264	256	239	
Max. speed/Alt	kn/ft.	288/13,500	286/17,700	281/19,000	
Combat speed/Alt	kn/ft.	269/1,500	260/1,500	243/1,500	
Rate of climb SL	ft/min.	2,390	2,030	1,510	
Ceiling for 500 fpm R/C	ft.	23,600	23,600	23,600	
Time-to-climb/Alt.	min/ft.	—	—	—	

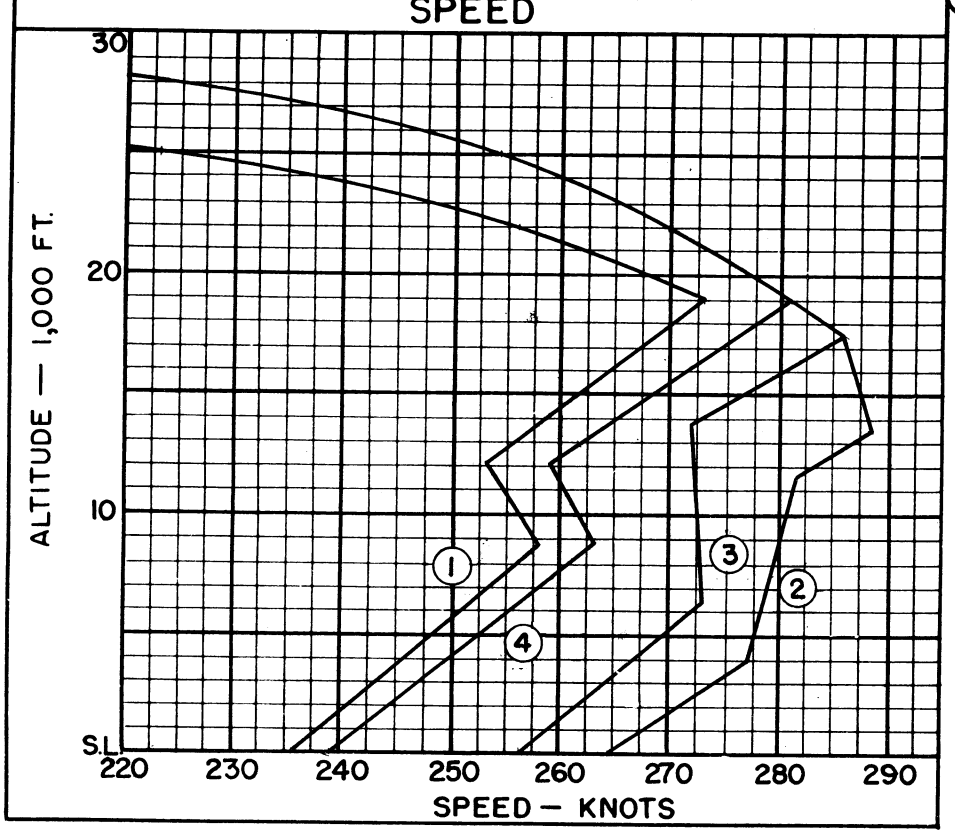
NOTES

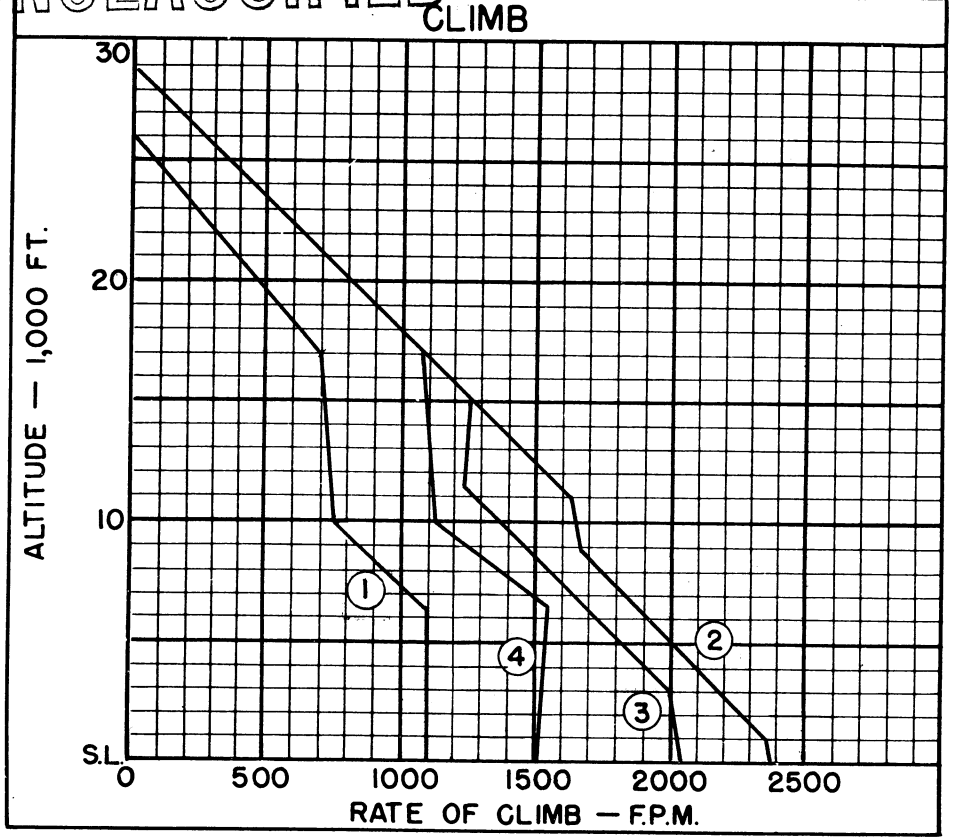
(A) BHP at Maximum Critical Altitude
(B) Normal BHP

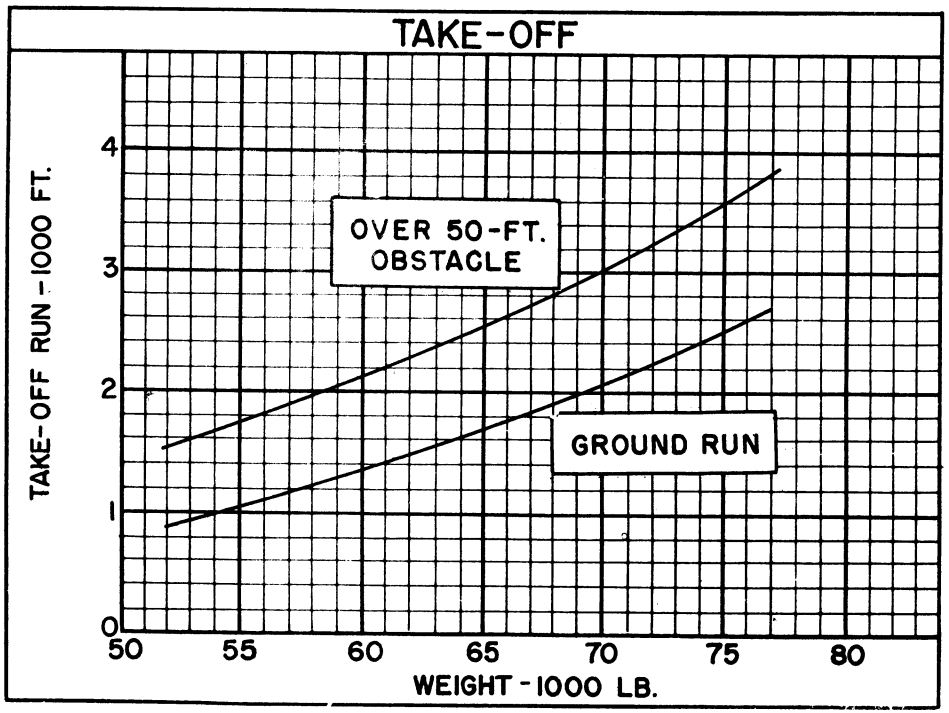
Performance is based on flight test of P2V-3 airplane.

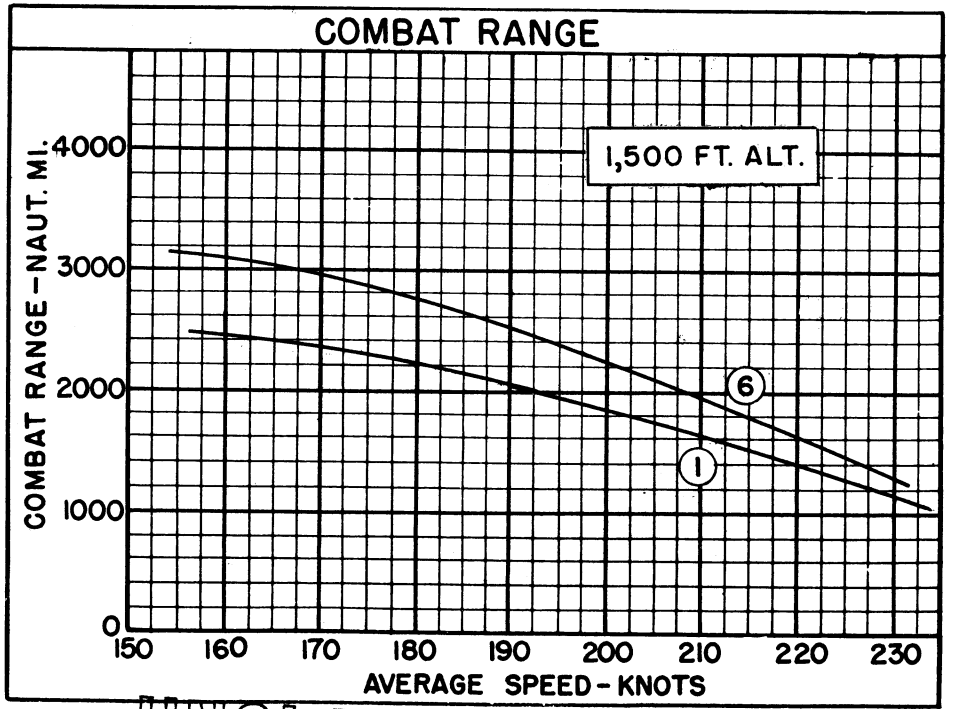
Combat range, radius and endurance are based on engine specification fuel consumption increased 5%.

Combat radius in Conditions (1) and (6) is based on ASW-1 problem; in Condition (5), on A-2 problem (modified).









◯ LOADING CONDITION COLUMN NUMBER

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Standard Aircraft Characteristics NAVAER 1335E (REV. 1-49)

NOTES

(C) GENERAL ASW PATROL PROBLEM NO. ASW-1

COMBAT RADIUS = 40% of combat range at 1,500 ft. altitude.

(D) ATTACK COMBAT RADIUS PROBLEM NO. A-2 (MODIFIED)

The attack combat radius problem No. A-2 has been modified to serve as a mining radius problem for reciprocating engined aircraft. The combat radius in Condition (5) is based on the following problem:

WARM-UP TAKE-OFF RENDEZVOUS	CLIMB	CRUISE-OUT	DROP or FIRE	COMBAT	CRUISE-BACK	RESERVE
Fuel for 10 min. nor. power sea level--all engines	to 1,500 ft. at Normal power, normal mixture	at 1,500 ft. at velocity for maximum range	expendable ordnance (No distance made good)	5 minutes at 1,500 ft. at combat power	at 1,500 ft. at velocity for maximum range	10% of initial fuel load
COMBAT RADIUS = CLIMB + CRUISE-OUT + CRUISE-BACK						

Single engine rate-of-climb at sea level, on military power, as follows:

Gross Weight, Lbs.	Rate-of-Climb, Ft./Min.
50,000	880
60,000	550
70,000	280

Water available for 11 minutes at combat power. All radii are reduced approximately 4 n. miles for each minute of combat power operation, and 5 n. miles for each minute of military power operation, at 1,500 feet altitude.

The same flight plan is followed in the determination of endurance as in that of combat range, except that the average speed used for maximum endurance is the minimum recommended speed.

All conditions: Rockets and rocket launchers not aboard. Sixteen Mk-9 rocket launchers installed decrease the range by 25 minutes.

Condition (1): Addition of sixteen 5" HVAR rockets and removal of two torpedoes (in order not to increase the take-off weight) decreases the range by about 100 minutes.

The first 26 P2V-4 airplanes will be delivered with R-3350-26W engines. The R-3350-30W engine will be fitted retroactively when available. With the R-3350-26W engines, range is decreased by about 13%.

All conditions: Performance is calculated with attached wing-tip nacelles carrying electronic gear.

The following Electronic equipment is to be service installed:

GROUND POSITION INDICATORS.....AN/APA-57,-81
IFF.....AN/APX-6
RCM DF.....AN/APA-69
RADIO RECEIVING SET.....AN/ARR-26
RADIO TRANSMITTING SET.....AN/ART-26