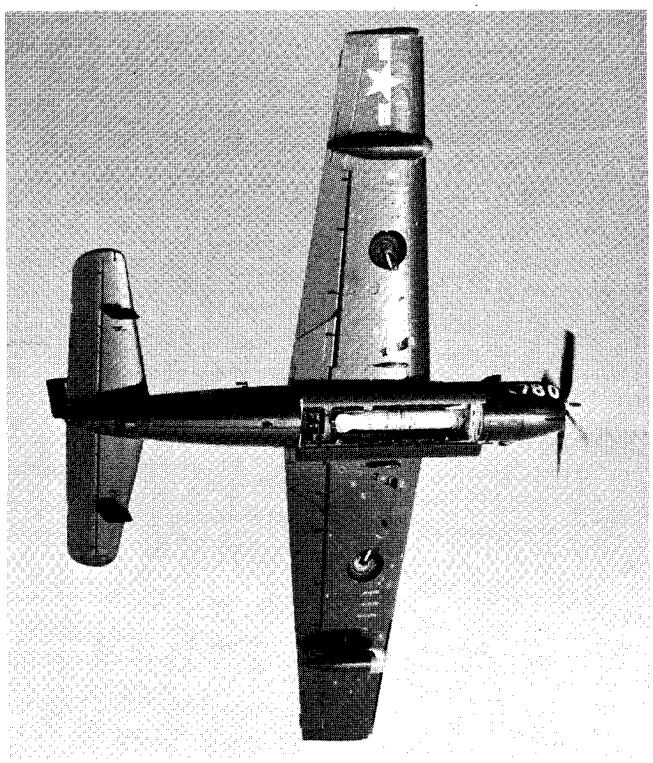
# NAVAL AIRCRAFT

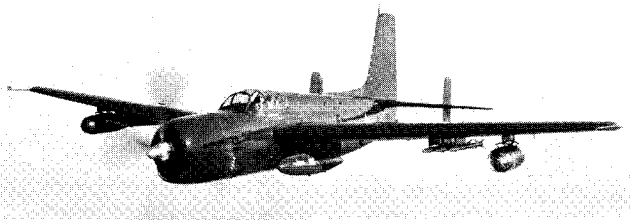
# Guar

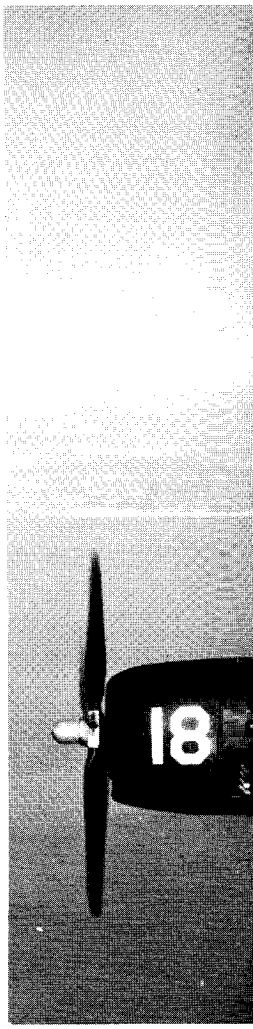
The Grumman-built *Guardian* was originally conceived as a torpedo bomber to replace the famous TBF *Avenger*. The prototype was ordered in early 1945 as the XTB3F-1, but shortly after its first flight, the following December, it was decided to revise the basic design and assign the aircraft an antisubmarine role.

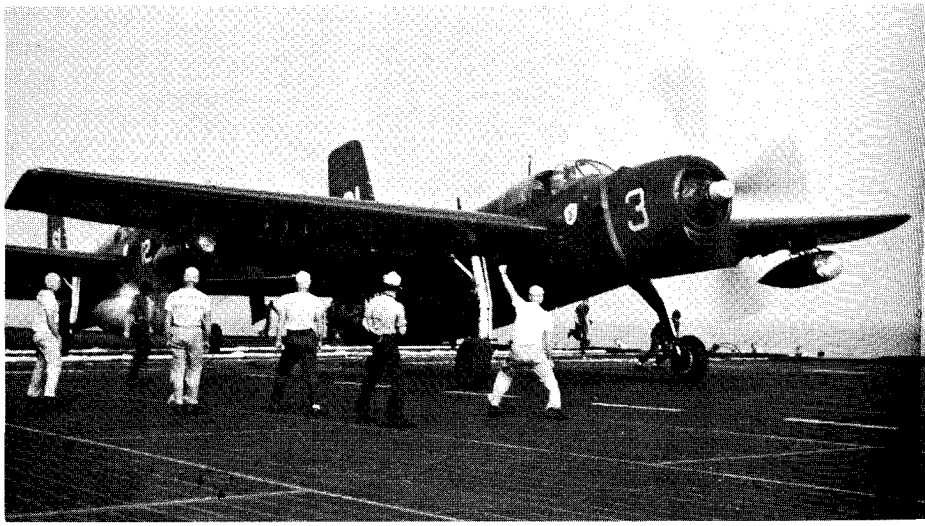
Production models were ordered in two configurations: the AF-2W search version and the AF-2S attack plane. Operating together, they formed a hunter-killer team, a system which had been developed in the late '40s using the TBM-3W and TBM-3S. The AF-2W, with search as its primary mission, was fitted with radar and ECM detection equipment. After detecting a hostile submarine, it directed an accompanying AF-2S onto the target. The AF-2S *Guardian* would then lay a sonobuoy pattern, if the submarine had submerged, in order to localize the target for attack with torpedoes or depth bombs. In the event an enemy submarine remained on the surface, the S version was equipped with a radar and searchlight for guiding its attack, in which 5" HVAR rockets could be utilized in addition to the other stores.

The first flight of the *Guardian* in production form took place in November 1949 with the first deliveries beginning in October 1950 to VS-25. The last *Guardians* were delivered in 1953 and the plane was soon superseded by the S2F-1 *Tracker* which combined the functions of both versions of the *Guardian* in one aircraft. Squadrons began exchanging their AFs for *Trackers* in 1954. During production, 156 AF-2Ws, 190 AF-2Ss and 40 AF-3Ss were built. In its day, the *Guardian* was the largest, single-engined carrier aircraft operating.







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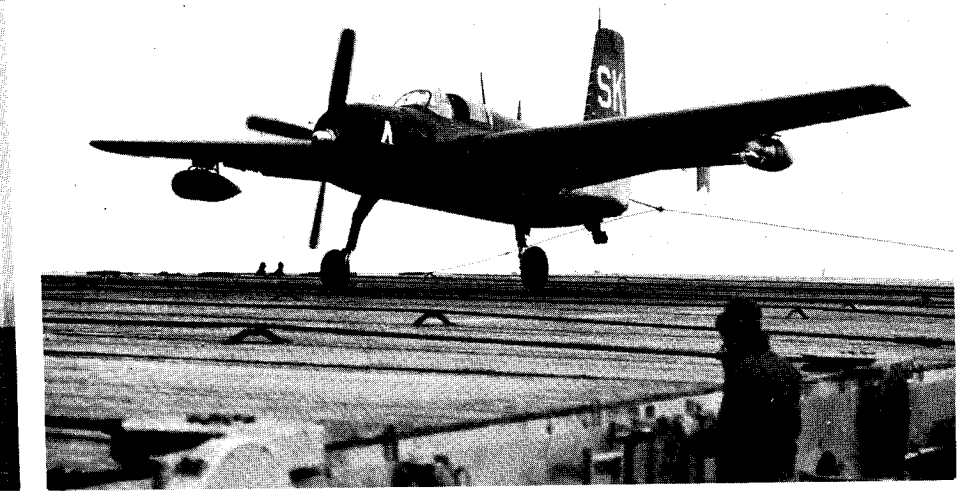
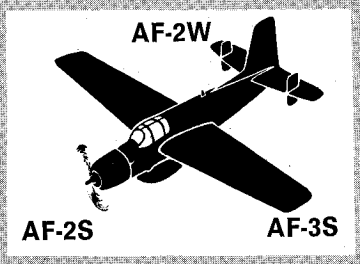
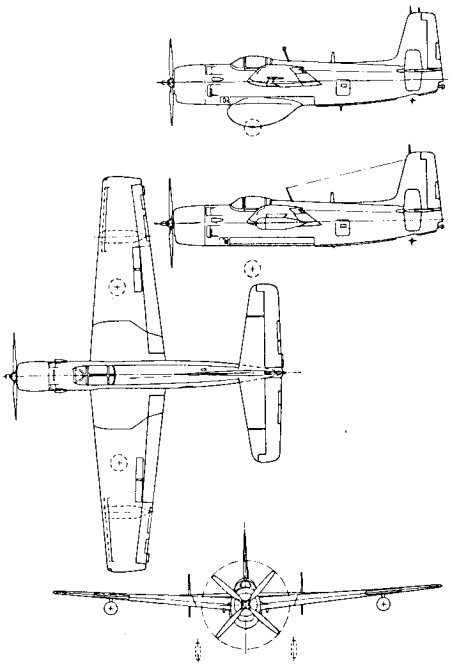



| | |
|---|---|
| Length | 43'5" |
| Height | 16'7" |
| Wing span | 60'0" |
| Power plant | P&W R-2800-48 |
| Horsepower | 2,300 hp at S.L. |
| Maximum speed | 238 kts. |
| Service ceiling | |
| AF-2W | 21,200' |
| AF-2S | 22,900' |
| Combat radius with two 150-gal. auxiliary tanks | |
| AF-2W | 525 nm |
| AF-2S | 525 nm |
| Detection equipment | |
| AF-2W | APS-20, APA-70, APR-9 |
| AF-2S | APS-31, searchlight, 16 sonobuoys |
| AF-3S | Same as 2S, plus MAD |
| Ordnance | |
| AF-2W | None |
| AF-2S | Maximum capacity 3,700 lbs., one torpedo or mine in the bomb bay, four 500-lb. bombs or depth bombs and six HVAR rockets on wing stations. |
| Crew | |
| AF-2W | Pilot, copilot, two radar operators |
| AF-2S | Pilot, navigator/bomb aimer, radar operator |



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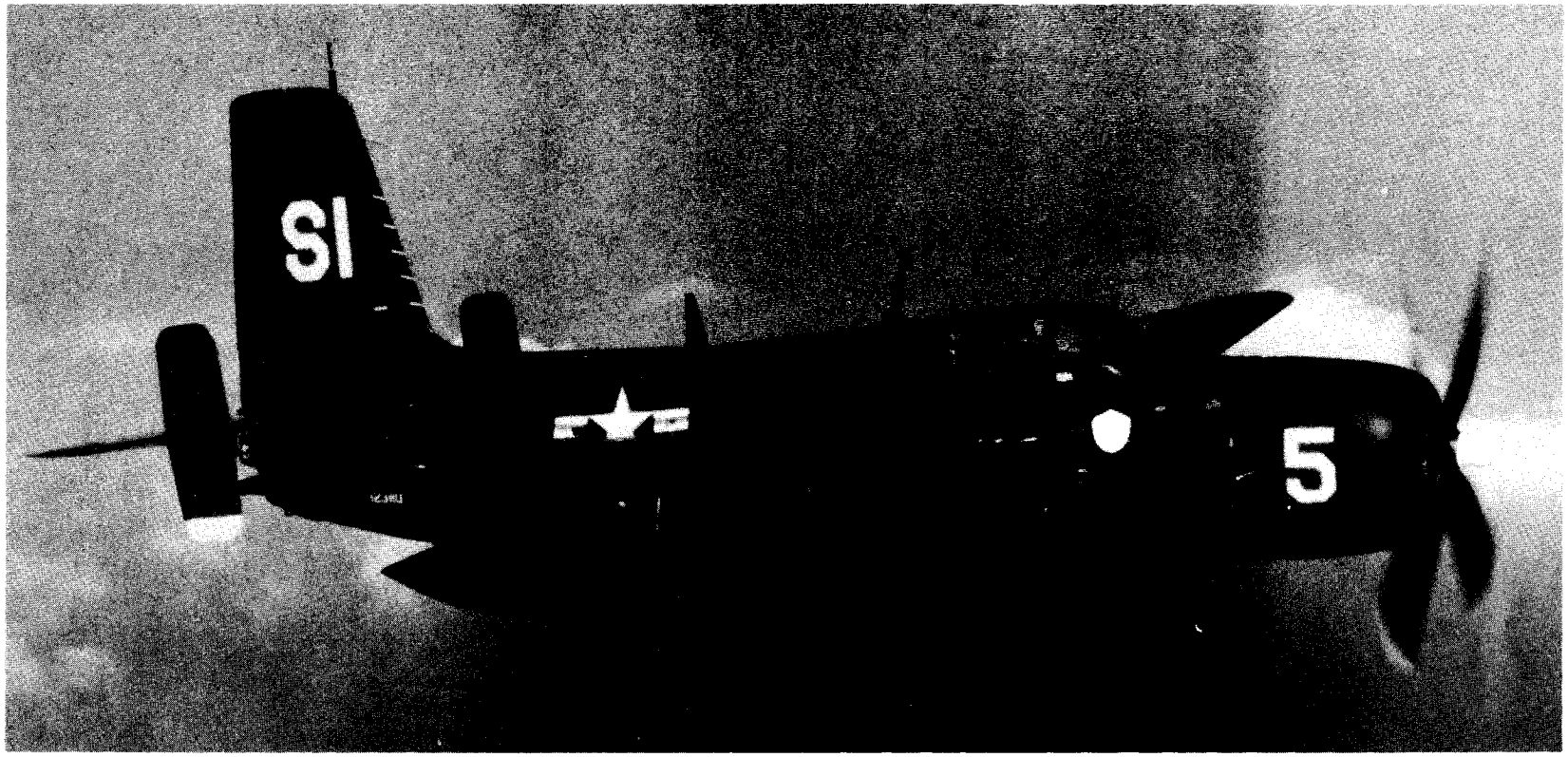


# STANDARD AIRCRAFT CHARACTERISTICS

# AF-2S "GUARDIAN"

GRUMMAN

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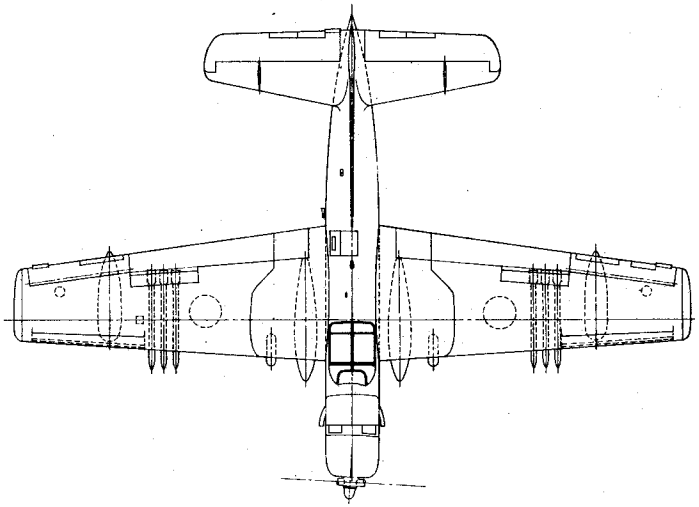
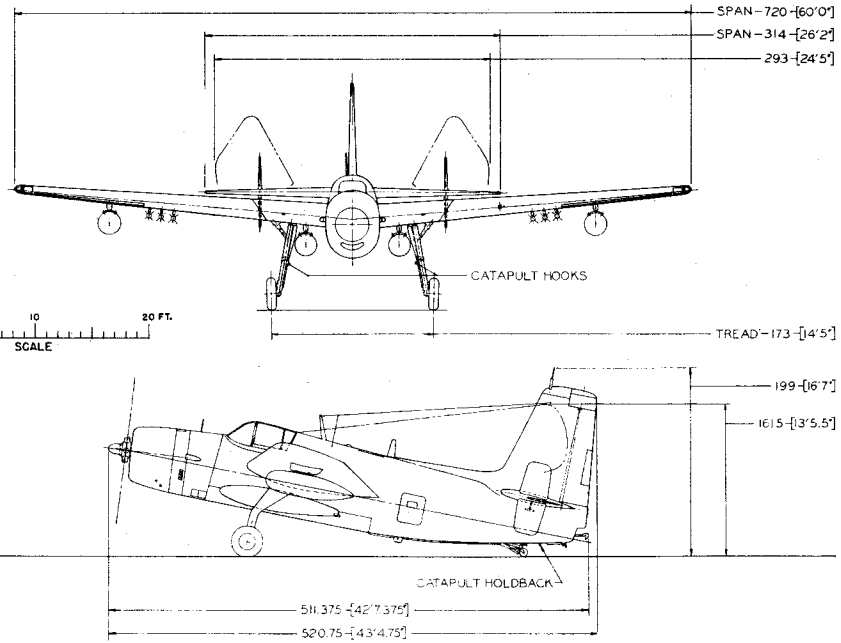
BUREAU OF AERONAUTICS
NAVY DEPARTMENT

WING AREA — 548.7
WING SECTION - N.A.C.A. 23018-23012
M.A.C. - 115.07
ASPECT RATIO - 6.6






## DESCRIPTIVE ARRANGEMENT

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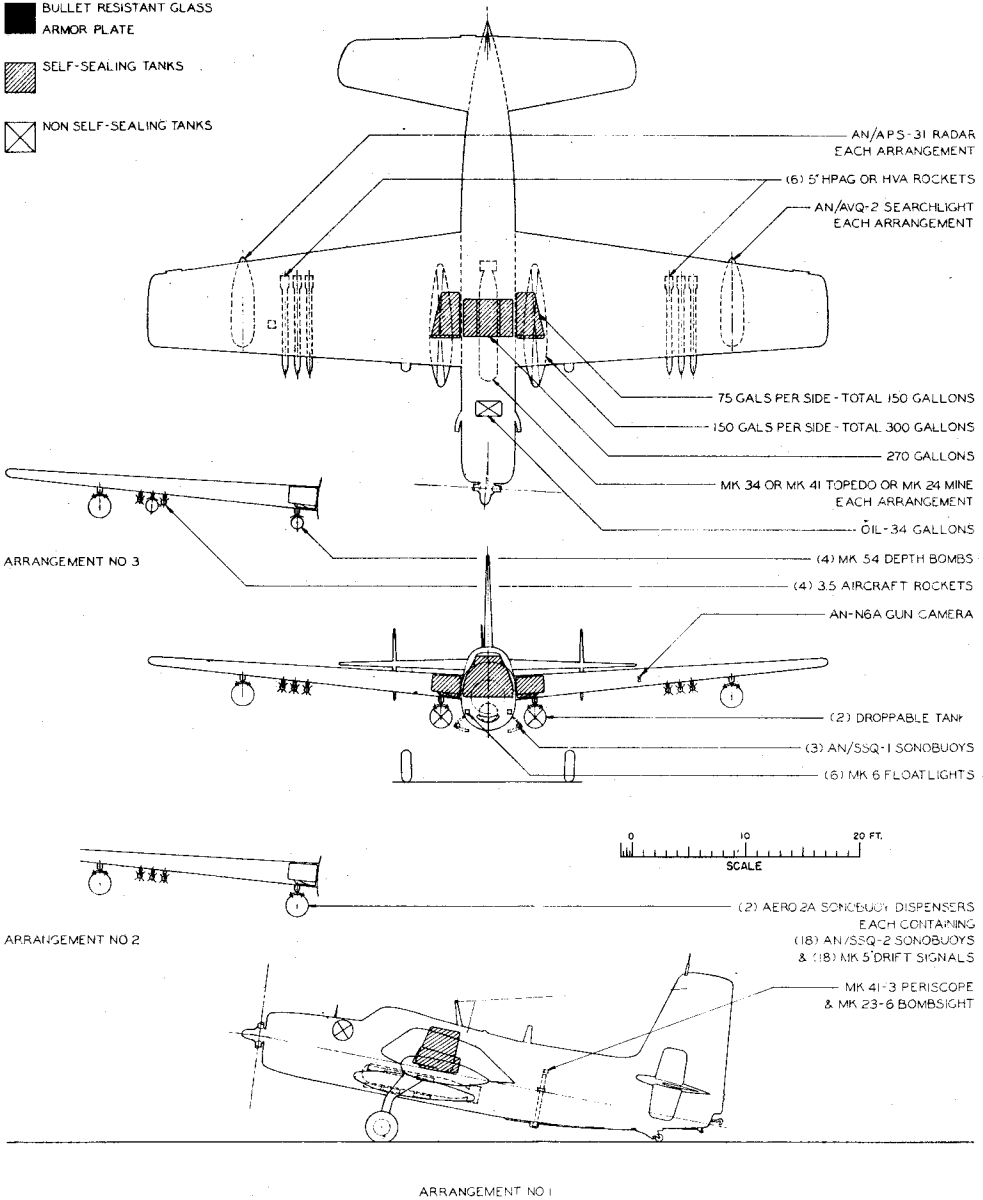
BUREAU OF AERONAUTICS
NAVY DEPARTMENT

BULLET RESISTANT GLASS ARMOR PLATE
SELF-SEALING TANKS
NON SELF-SEALING TANKS




## ARMAMENT & TANKAGE

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## POWER PLANT

NO. & MODEL.....(1) R-2800-48
MFR.....Pratt & Whitney
SUPERCH.....1 Stage, 1 Speed
PROP. GEAR RATIO.....0.45
PROP. MFR.....Ham. Std.
PROP. DES. NO.....6557A-6
NO. BL./DIA.....4/13'-2"

### RATINGS

| | Bhp @ | Rpm @ | Alt. |
|---|---|---|---|
| T. O. | 2,300 | 2,800 | S. L. |
| MIL. | 2,300 | 2,800 | 3,500' |
| NORMAL | 1,900 | 2,600 | 7,000' |

SPEC. NO. N-8132-C

## ORDNANCE

BOMBS AND ROCKETS

| Type | Size | Location | No. |
|---|---|---|---|
| Torp. | Mk. 41 | Bomb Bay | 1 |
| Torp. | Mk. 34 | Bomb Bay | 1 |
| Torp. | Mk. 24 | Bomb Bay | 1 |
| D.B. | Mk. 54 | Wings | 4 |
| | on 2 stub wing racks and 2 middle Aero 14A launchers (3.5" rockets only adjacent) | | |
| HVAR | 5" | Wings | 6 |
| | on 6 - Aero 14A launchers | | |
| Sono. Disp. | Aero 2A | Wings | 2 |

FIRE CONTROL

1 Bombsight, MK. 23-6 mounted on a MK. 41-3 Periscope
1 Gun Sight, MK. 8-8

CAMERAS

Gun Camera.....AN-N6A
Recon. Camera.....K-25A
MAX. BOMB CAPACITY....3,700 #

## MISSION AND DESCRIPTION

The AF-2S airplane's primary mission is to attack enemy submarines after it has been directed to the submarine position last sighted by its companion aircraft, the AF-2W (search version). The AF-2S lays down a pattern of sonobuoys to determine exact location of the enemy submarine, after which, it launches its sonic-directed torpedo to complete the attack. Rockets and depth bombs may be carried to augment the attack.

The airplane is a 3 place land plane for operation ashore or aboard aircraft carriers, with or without the aid of a catapult.

The airplane is conventional in design and structure, with an all-metal 2 spar wing and a semi-monocoque fuselage. Landing gear, slotted flaps, wing folding and pilot's canopy are hydraulically operated. Ailerons are of sealed balance type with spring tabs and one trim tab. Rudder has a combination trim and 4 to 1 ratio balance tab. Elevators are interconnected; one is equipped with a spring tab and the other with a trim tab. Power plant installation is conventional with steel tube mount.

## DIMENSIONS

WING AREA.....549 sq. ft.
SPAN.....60' - 0"
LENGTH.....43' - 5"
HEIGHT.....16' - 7"
TREAD.....14' - 5"
M.A.C.....9' - 7"
PROP. CLEAR.....9"

## WEIGHTS

| Loadings | Lbs. | L.F. |
|---|---|---|
| EMPTY | 14,658 | |
| BASIC | 15,336 | |
| DESIGN | 19,200 | 5.0 |
| COMBAT | 18,123 | 5.0 |
| MAX.T.O. (Field) | 23,015* | 4.2 |
| MAX.LAND.(Field) | 22,500 | |

All weights are actual.

*Maximum anticipated loading.

## FUEL AND OIL

| Gals. | No. Tanks | Location |
|---|---|---|
| 270 | 1 | Fuse., S.S. |
| 150 | 2 | Wing, S.S. |
| 300 | 2 | Wing, Drop |

FUEL GRADE....115/145
FUEL SPEC..MIL-F-5572

### OIL

CAPACITY (Gals.).....32
GRADE.....1100
SPEC.....MIL-O-6082

## ELECTRONICS

VHF COMMAND.....AN/ARC-1
UHF COMM....AN/ARC-27 or -27A
(P.S.I., Repl. for AN/ARC-1)
MHF LIAISON.....AN/ARC-2
INTERPHONE....AN/AIC-4 or -4A
HOMING.....AN/ARR-2A
HOMING.....AN/ARN-21
(P.S.I., Repl. for AN/ARR-2A)
RANGE RECEIVER...R-23A/ARC-5
MARKER BEACON REC...AN/ARN-12
(Planned Service Installation)
RADAR ALT....AN/APN-1 or -22
Continued on NOTES sheet.

DECLASSIFIED

# PERFORMANCE SUMMARY

| TAKE-OFF LOADING CONDITION | | (1) ATTACK 1-Mk. 34 Torp. | (3) ATTACK 1-Mk. 34 Torp. 3-Mk. 54 D.B. 4-3.5" ASW Rock. | (4) ATTACK 1-Mk. 41-1 Torp. 6-5" HPAG Rock. | (5) ATTACK 1-Mk. 41-1 Torp. 6-5" HPAG Rock. 1-150 Gal. Tank |
|---|---|---|---|---|---|
| TAKE-OFF WEIGHT | lb. | 20,298 | 21,555 | 21,463 | 22,565 |
| Fuel (Fixed/Drop) | lb. | 2,520/- | 2,520/- | 2,520/- | 2,520/900 |
| Payload | lb. | 1,167 | 2,424 | 2,332 | 2,332 |
| Wing loading | lb./sq.ft. | 37.0 | 39.3 | 39.1 | 41.1 |
| Stall speed - power-off | kn. | 76.9 | 79.2 | 79.0 | 81.0 |
| Take-off run at S.L. - calm | ft. | 925 | 1,070 | 1,055 | 1,200 |
| Take-off run at S.L. 17.5kn. wind | ft. | 545 | 640 | 630 | 730 |
| Take-off to clear 50 ft. - calm | ft. | -- | -- | -- | -- |
| Max. speed/altitude (1) | kn./ft. | 231/9,200 | 216/9,200 | 225/9,200 | 221/9,200 |
| Rate of climb at S.L. (1) | fpm | 1,480 | 1,310 | 1,350 | 1,220 |
| Time: S.L. to 10,000 ft. (1) | min. | 7.3 | 8.3 | 7.8 | 8.9 |
| Time: S.L. to 20,000 ft. (1) | min. | 22.0 | 27.8 | 26.1 | 31.8 |
| Service ceiling (100 fpm) (1) | ft. | 22,900 | 21,100 | 21,700 | 20,500 |
| Combat range | n.mi. | 795 | 655 | 710 | 990 |
| Average cruising speed | kn. | 144 | 146 | 147 | 148 |
| Cruising altitude(s) | ft. | 1,500 | 1,500 | 1,500 | 1,500 |
| Combat radius | n.mi. | 320 | 260 | 285 | 395 |
| Average cruising speed | kn. | 144 | 146 | 147 | 148 |
| | | | | | |
| COMBAT LOADING CONDITION | | (2) COMBAT | | | |
| COMBAT WEIGHT | lb. | 18,123 | | | |
| Engine power | | Military | | | |
| Fuel | lb. | 1,512 | | | |
| Combat speed/combat altitude | kn./ft. | 233/1,500 | | | |
| Rate of climb/combat altitude | fpm/ft. | 2,280/1,500 | | | |
| Combat ceiling (500 fpm) | ft. | 21,600 | | | |
| Rate of climb at S.L. | fpm | 2,300 | | | |
| Max. speed at S.L. | kn. | 230 | | | |
| Max. speed/altitude | kn./ft. | 239/4,000 | | | |
| | | | | | |
| LANDING WEIGHT | lb. | 16,862 | | | |
| Fuel | lb. | 249 | | | |
| Stall speed - power-off | kn. | 70.1 | | | |
| Stall speed - with approach power | kn. | 65.1 | | | |

## NOTES

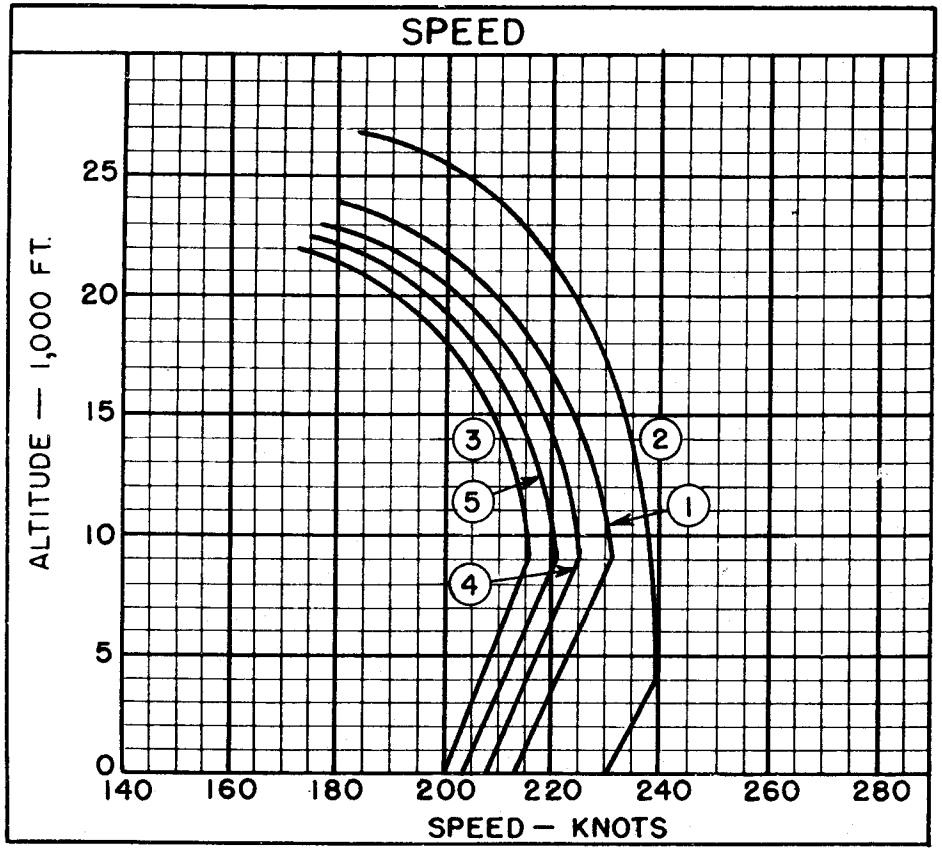
(1) Normal Power

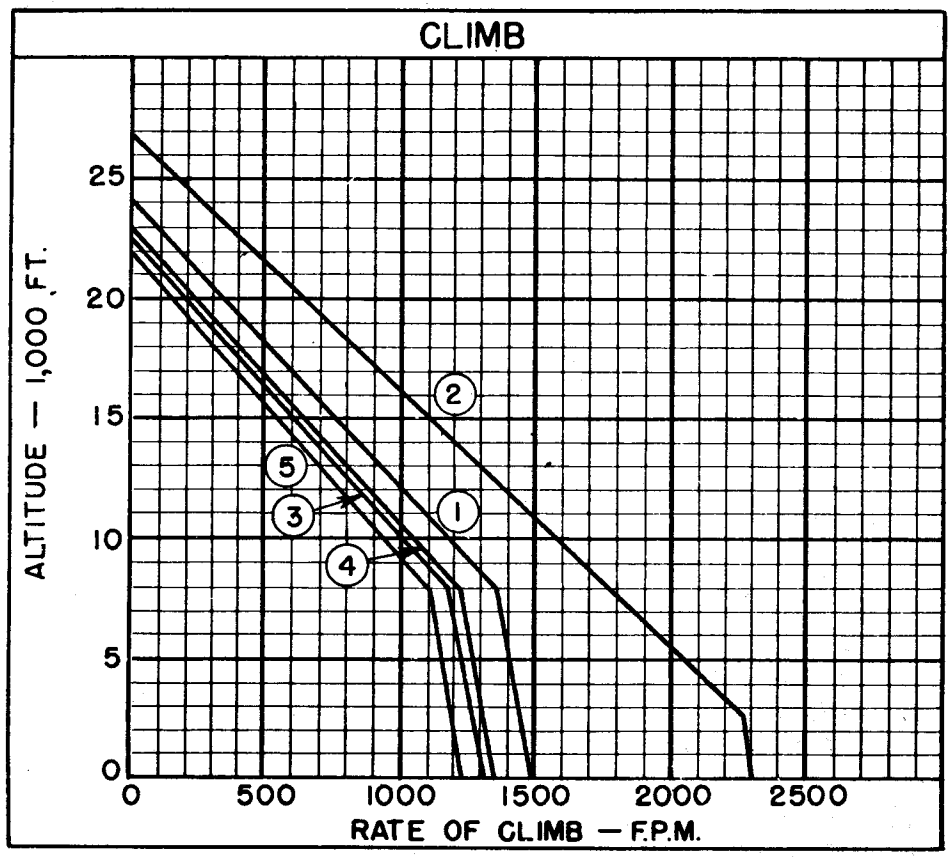
Performance is based on NATC flight test of the AF-2S airplane.

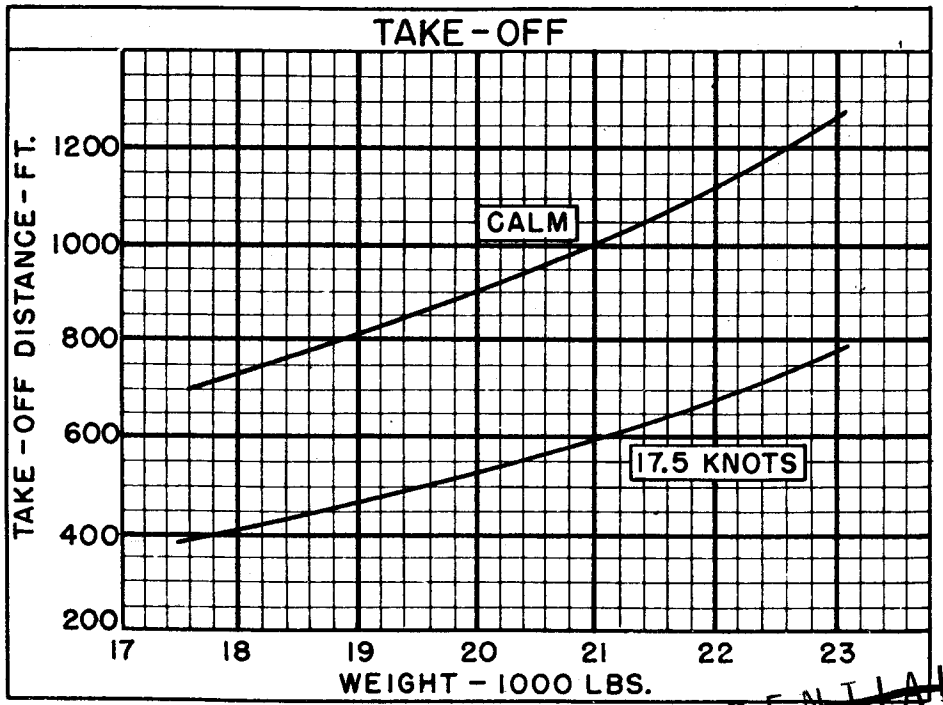
Range and radius are based on flight test fuel consumption data increased by 5%.

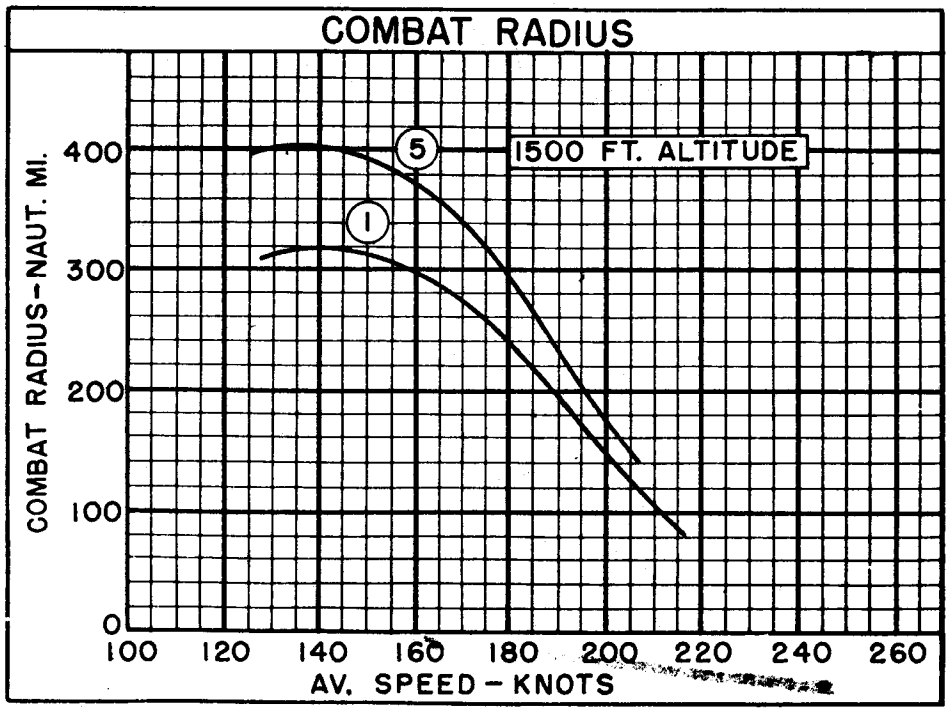
All conditions include AN/AVQ-2 searchlight on port wing and AN/APS-31 radome on starboard wing.

All climbs are made with rich mixture for satisfactory engine cooling.

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# NOTES

Spotting: 200 ft. length is required to spot 16 airplanes on the 96 ft. wide deck immediately aft of the forward ramp on the CV-9 class carriers.

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ASW RANGE AND RADIUS PROBLEM

WARM-UP, TAXI, TAKE-OFF: 10 minutes at normal power.
CLIMB: On course to 1,500 ft. at normal power.
COMBAT RANGE: Cruise at V for long range at 1,500 ft. External fuel tanks dropped when empty.
RESERVE: 20 minutes at V for long range plus 5% of initial fuel load.

COMBAT RADIUS = 40% OF COMBAT RANGE

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ELECTRONICS (Continued)

SONOBUOY RECEIVER.....AN/ARR-31 or -26
RADAR.....AN/APS-31 or -31A
RADAR RELAY RECEIVER.....AN/ARR-27A
SEARCHLIGHT.....AN/AVQ-2A
IFF.....AN/APX-2 or -2A
16 SONOBUOYS IN AERO 2A DISPENSER.SSQ-2

IFF.....AN/APX-6
IFF (I-R UNIT).....AN/APX-17
(P.S.I., Repl. for AN/APX-2, -2A)
WIRE RECORDER.....13-A-3-j or IC/VRW-7
SWEEP INTEGRATOR KIT.....
(Planned Service Installation)

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This chart supersedes previously issued chart dated 1 October 1949.
Reason for reissue: NATC flight test data available.

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