

# NAVAL AIRCRAFT

# AVE

The TBF was designed in response to a Navy invitation for new designs for a torpedo bomber to replace the TBD *Devastator*. In April 1940, a contract was issued for two prototype XTBF-1s. First flight was August 7, 1941. The first public look at the plane was scheduled for December 7. That day's events led to naming the new aircraft *Avenger*.

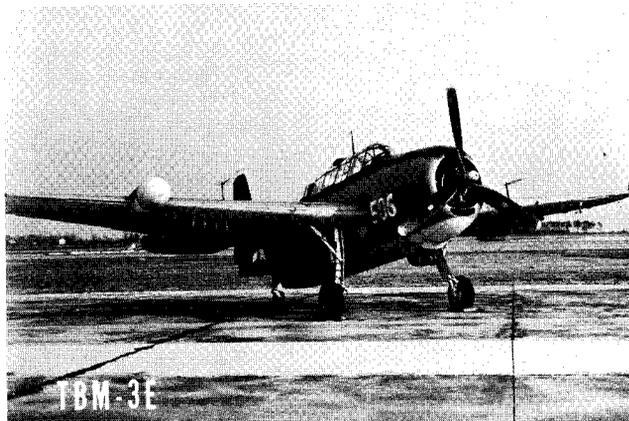
In December 1940, one year before U.S. entry into WW II, a production contract was ordered and TBF-1s began rolling off Grumman's assembly lines soon after. Among these early models were some assigned to Torpedo Squadron Eight. Though they did not reach the Pacific in time to join VT-8's TBDs on *Hornet*, six participated in the Battle of Midway from that island's airfield.

In November 1942, Eastern Aircraft, a division of General Motors, began delivering the first TBM-1s, supplementing *Avenger* production, and, in December 1943, Grumman discontinued building TBFs to concentrate on producing the F6F *Hellcat*.

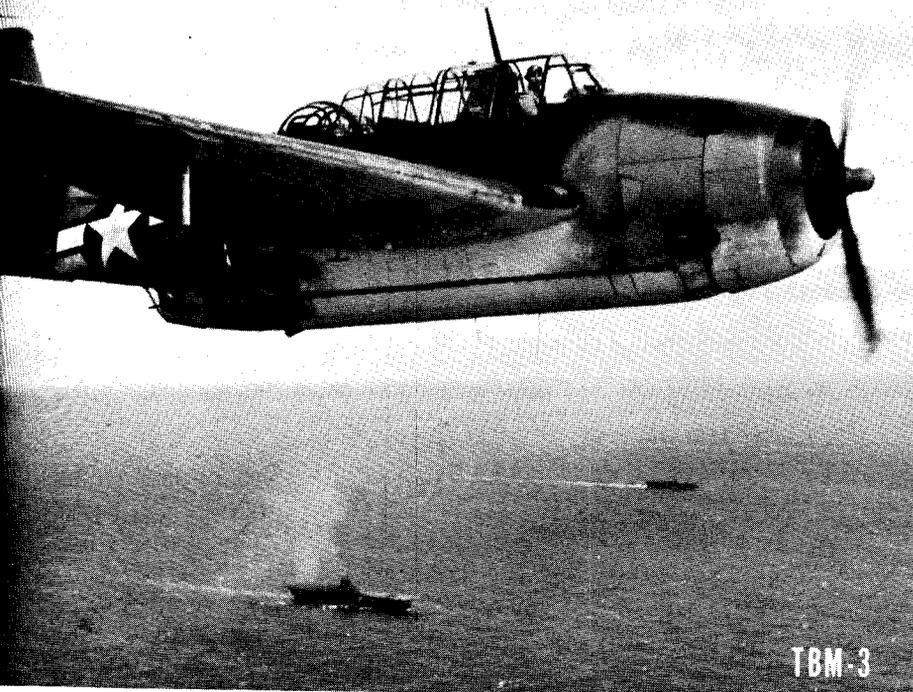
The *Avenger* was produced in many versions, the most numerous being the TBF-1 and TBM-1. Other models included the TBF-1C and TBM-1C with two wing-mounted .50 cal. guns; followed by versions with special radar; with cameras for photo recon and with searchlights for ASW. The TBM-3 with more powerful engines replaced the -1 series in production. Versions were built or modified including -3Es with improved radar; the first carrier AEW airplane; and ASW, utility, ECM and COD models.

The *Avenger* made its name in WW II as a rugged torpedo plane used effectively against surface vessels in the Pacific and from CVEs in the Atlantic as an ASW attack plane.

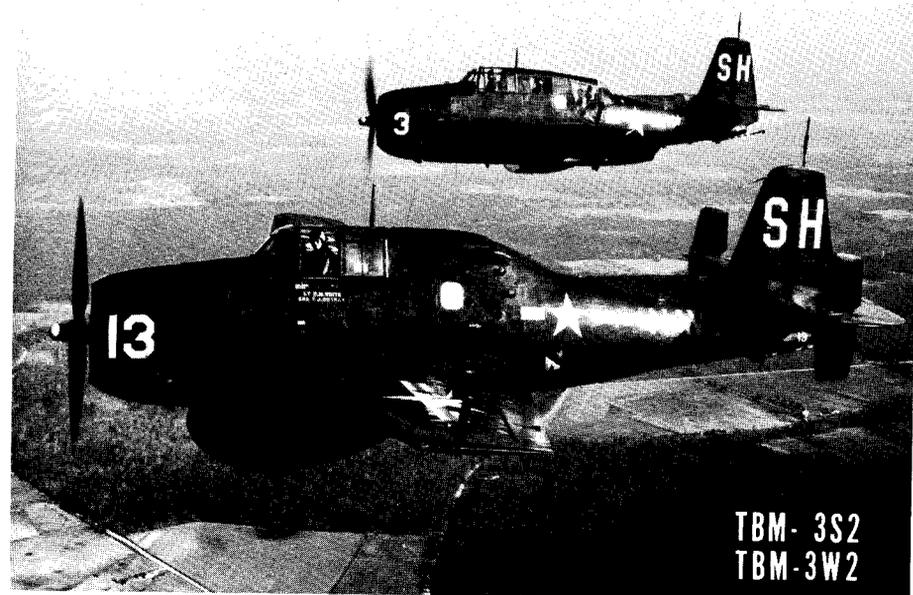
*Avengers* also served with the Royal Navy, Royal New Zealand Air Force and French Navy. Ironically, the last TBMs to be retired from active service, in 1962, were flown by the Japanese Maritime Self Defense Force.



# INGER



TBM-3

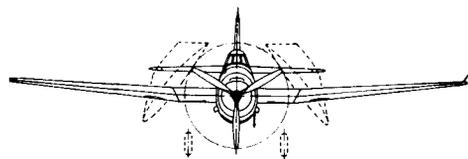
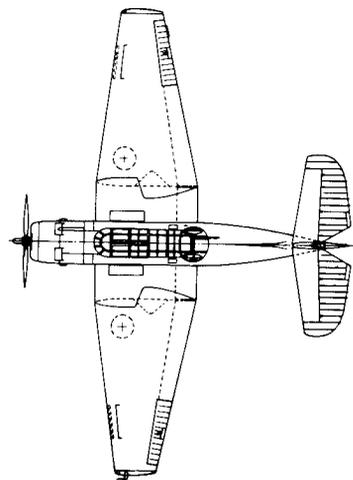
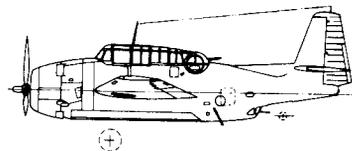


TBM-3S2  
TBM-3W2



TBF/TBM

Length	40'11½"
Height	16'3"
Wing span	54'2"
Power plant	
TBF-1	R-2600-8 1,700 hp
TBM-3E	R-2600-20 1,900 hp
Maximum speed	
TBF-1	232 kts
TBM-3E	220 kts
Cruising speed	
TBF-1	126 kts
TBM-3E	125 kts
Service ceiling	
TBF-1	22,400'
TBM-3E	27,100'
Maximum range	
TBF-1	1,055 nm
TBM-3E	880 nm
Armament	
TBF-1	one fixed cowl-mounted .30 cal., one dorsal .50 cal., one ventral .30 cal., 1,600 lbs. in bomb bay
TBM-3E	two fixed wing .50 cal., one dorsal .50 cal., one ventral .30 cal., 2,000 lbs. in bomb bay
Crew	pilot, gunner, radar operator



NAVAER ISSUE OF 6 PAGES  
AIRPLANE CHARACTERISTICS & PERFORMANCE

BUREAU OF AERONAUTICS-NAVY DEPT.

COLUMN NUMBER	1	2	3	4
LOADING CONDITION	TORPEDO 1-MK13-2	TORPEDO 1-MK13-2	TORPEDO 1-MK13-2 TWO TANKS EXTERNAL	BOMBER 4-500#
GROSS WEIGHT LBS.	16412	16412	17364	16425
EMPTY WEIGHT (ACTUAL) LBS.	10555			
FUEL/OIL GALS.	335/19	335/19	451/25	335/19
FIXED GUNS/AMMUNITION	2-.50/400 rds		2-.50/600 rds	
FLEXIBLE GUNS/AMMUNITION	1-.50/200, 1-.30/500		1-.50/400, 1-.30/500	
ENGINE POWER USED FOR PERFORMANCE	MILITARY	NORMAL	NORMAL	NORMAL
WING LOADING LBS/SQ.FT.	33.4	33.4	35.4	33.4
POWER LOADING ① LBS/BHP.	11.3	12.1	12.8	12.1
V-MAX. SEA LEVEL MPH.	249	238	227	238
V-MAX. AIRPLANE CRIT. ALT. MPH.	257/12000	254/11700	241/11700	254/11700
V-STALL. GROSS WEIGHT. ② MPH.	76.9	76.9	79.2	77.0
V-STALL. WITHOUT FUEL ② MPH.	72.0	72.0	72.6	72.0
TIME-TO-CLIMB -10000FT.- MIN.		13.0	15.9	13.0
TIME-TO-CLIMB -20000FT.- MIN.		41.6	59.7	41.9
SERVICE CEILING FT.	21400	20900	19400	20900
TAKE-OFF DISTANCE -CALM- FT.		1071	1383	1076
TAKE-OFF DISTANCE -15 KN- FT.		650	850	653
TAKE-OFF DISTANCE -25 KN- FT.		435	563	438
TAKE-OFF TIME SECONDS.	-	-	-	-
MAX. RANGE /V-AV. ③ ST.MI/MPH.		1105/153	1390/152	1105/153
BOMBING RADIUS /V-AV.-20% R- NMI/KN.				
BOMBING RADIUS /V-AV.-33% R- NMI/KN.				
PATROL RADIUS /V-AV.-20% R- NMI/KN.				
PATROL RADIUS /V-AV.-33% R- NMI/KN.				
SCOUT. RADIUS NMI.				
COMBAT RADIUS NMI.		225	340	225
ENGINE /PROP.GEAR RATIO	W.A.C. R-2600-8 (16:9)			
ENGINE RATING BHP/RPM/ALT.	NORMAL 1500/2400/SL-5800 1350/2400/8900-13000		MILITARY 1700/2600/SL-3000 1450/2600/7800-12000	
	1700/2600/Take-off			
NOTE	STATUTE MILES USED-EXCEPT-RADIUS IS GIVEN IN NAUTICAL MILES & KNOTS. ① BHP AT MAX.CRIT.ALT. ② STALL-WITHOUT POWER ③ AT 5000' ALTITUDE			

	TANKAGE IN GALLONS	OIL	FUEL	OFFENSIVE ARMAMENT
FIXED	PROTECTED	32	335	Fuselage Bomb Bay
	UNPROTECTED			Torpedoes: 1 MK13-1, or -2
	TOTAL-INCL.PROT.	32	335	Bombs : 1-1600#, 1-1000#
AUX.	INCREASE-REMOVED PROTECTION (Not Removable)			4-500#, 12-100#
	DROPPABLE Bomb Bay (Unprot.)		275	D. Bombs : 1-650# or 4-325#
	DROPPABLE Wing: 2@ 58 (Unprot.)		116	NOTE: Torpedoes or Bombs can not be carried if internal droppable tank is installed.
	PROTECTED+UNPROTECTED+DROPPABLE	32	726	

REMARKS- Ferry Range is 2685 miles with gross weight 15770 lbs.; 726 gals. fuel; and having ASB, Guns, Ammunition and Armor removed.

TBF-1 & TBM-1 have only 1-.30 cal. fixed gun & are 354 lbs. lighter for max. ammunition load conditions. Weight & Performance given for -1C Model.

SUPERSEDES 8/8/42

NAVAER  
AIRPLANE CHARACTERISTICS & PERFORMANCE

BUREAU OF AERONAUTICS-NAVY DEPT.

COLUMN NUMBER		5	6	7	8
	LOADING CONDITION	BOMBER 1-1000#	SCOUT	SCOUT	SCOUT
GROSS WEIGHT	LBS.	15422	14358	16334	17121
EMPTY WEIGHT (ACTUAL)	LBS.	10555			
FUEL/OIL	GALS.	335/19	335/19	610/32	726/32
FIXED GUNS/AMMUNITION		2-.50/600			
FLEXIBLE GUNS/AMMUNITION		1-.50/400		1-.30/500	
ENGINE POWER USED FOR PERFORMANCE		NORMAL	NORMAL	NORMAL	NORMAL
WING LOADING	LBS/SQ.FT.	31.4	29.3	33.3	34.8
POWER LOADING ①	LBS/BHP.	11.4	10.6	12.1	12.7
V-MAX. SEA LEVEL	MPH.	239	241	238	228
V-MAX. AIRPLANE CRIT. ALT.	MPH.	256/11700	258/11700	254/11700	242/11700
V-STALL. GROSS WEIGHT. ②	MPH.	74.6	72.0	76.8	78.6
V-STALL. WITHOUT FUEL ②	MPH.	69.5	66.8	67.6	67.8
TIME-TO-CLIMB -10000FT.-	MIN.	10.9	9.2	12.8	15.1
TIME-TO-CLIMB -20000FT.-	MIN.	32.5	25.8	41.0	54.2
SERVICE CEILING	FT.	22200	23600	21000	19600
TAKE-OFF DISTANCE -CALM-	FT.	880	718	1055	1285
TAKE-OFF DISTANCE -15 KN-	FT.	520	418	640	796
TAKE-OFF DISTANCE -25 KN-	FT.	340	262	428	532
TAKE-OFF TIME	SECONDS.	-	-	-	-
MAX. RANGE/V-AV. ③	ST.MI/MPH.	1180/148	1300/142	2135/149	2335/146
BOMBING RADIUS/V-AV.-20% R-	NMI/KN.				
BOMBING RADIUS/V-AV.-33% R-	NMI/KN.				
PATROL RADIUS/V-AV.-20% R-	NMI/KN.				
PATROL RADIUS/V-AV.-33% R-	NMI/KN.				
SCOUT. RADIUS	NMI.		340	580	645
COMBAT RADIUS	NMI.	235			

PERFORMANCE IS BASED ON- Flight Test

RANGE & RADIUS ARE BASED ON Flight Test FUEL CONSUMPTION DATA INCREASED BY 5 PERCENT TO CONFORM WITH PAST EXPERIENCE.

Practical combat radius is based on 20 min. warm-up and idling; 1 min. take-off; 10 min. rendezvous at 60% normal sea level power (n.s.p.) and auto-rich; climb to 15000' at 60% n.s.p. and auto-lean unless auto-rich is required for cooling; cruise out at 15000' at 60% n.s.p. and required mixture; dive, drop bombs, torpedoes and external tanks; combat at 1500' for 5 min. with full military power plus 10 min. with full normal power; cruise-back at 1500' at 60% n.s.p. and auto-lean; 60 min. rendezvous, landing and reserve at V for max. range and auto-lean. Radius includes distance covered in climb but not in dive.

Practical scouting radius is 1/3 of range at V for max. range at 1500' with fuel taken out for 20 min. warm-up and idle, 1 min. take-off and 60 min. for rendezvous, landing and reserve.

The following changes are incorporated: Contract - thru AQ; Service - thru #121; Pending - (1) 2-.50 Cal. wing guns installation (2) provisions for 2-58 gal. droppable wing tanks.

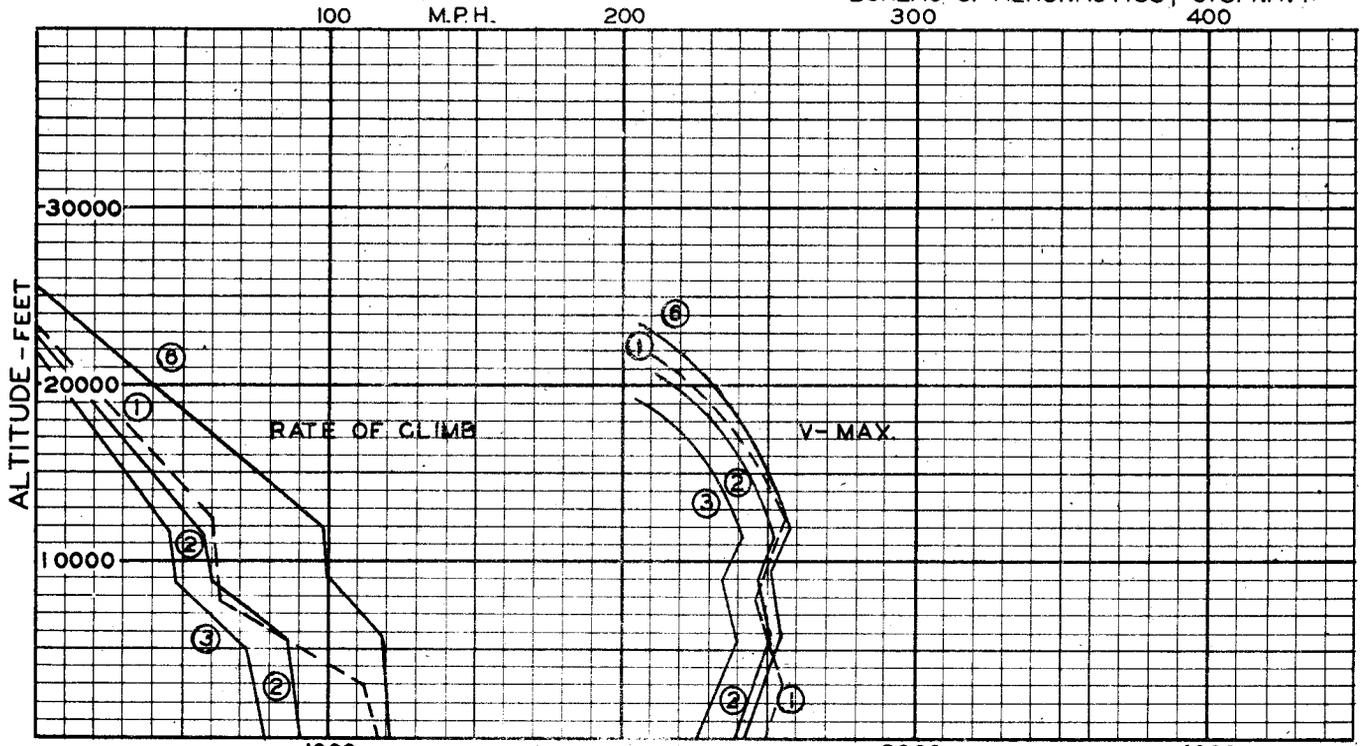
Col. (7) - Internal Droppable Fuel Tank Installed.

Col. (8) - Internal Droppable & Wing Droppable (2) Fuel Tanks Installed.

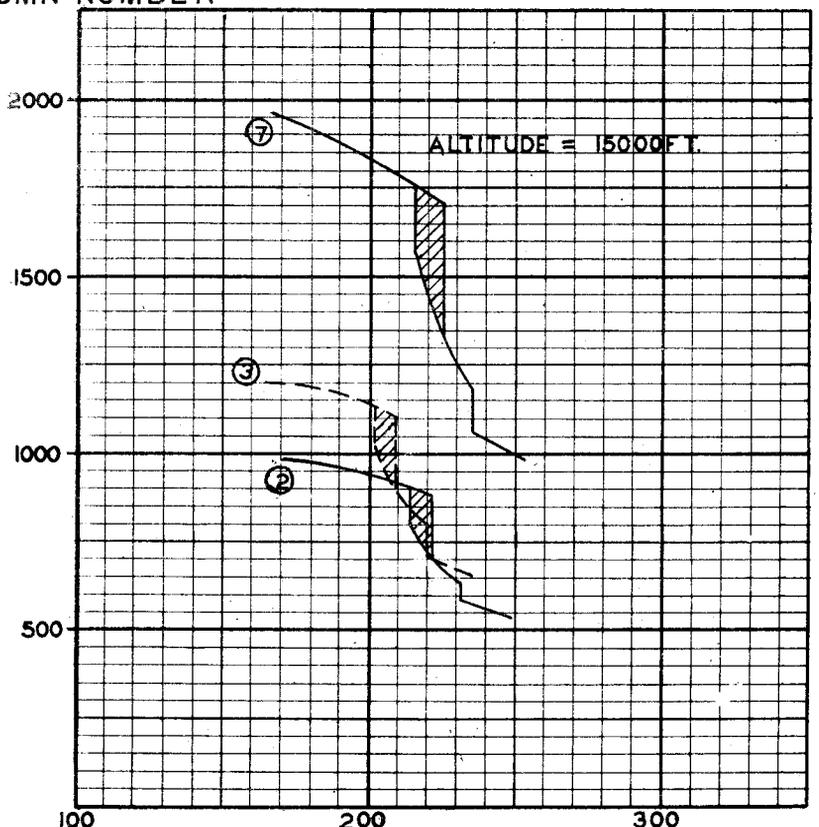
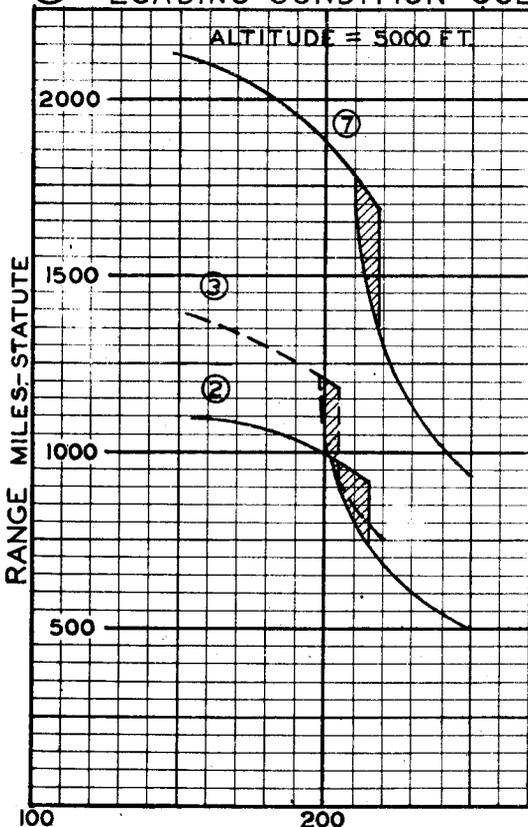
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NAVAER AIRPLANE PERFORMANCE

BUREAU OF AERONAUTICS, U.S. NAVY

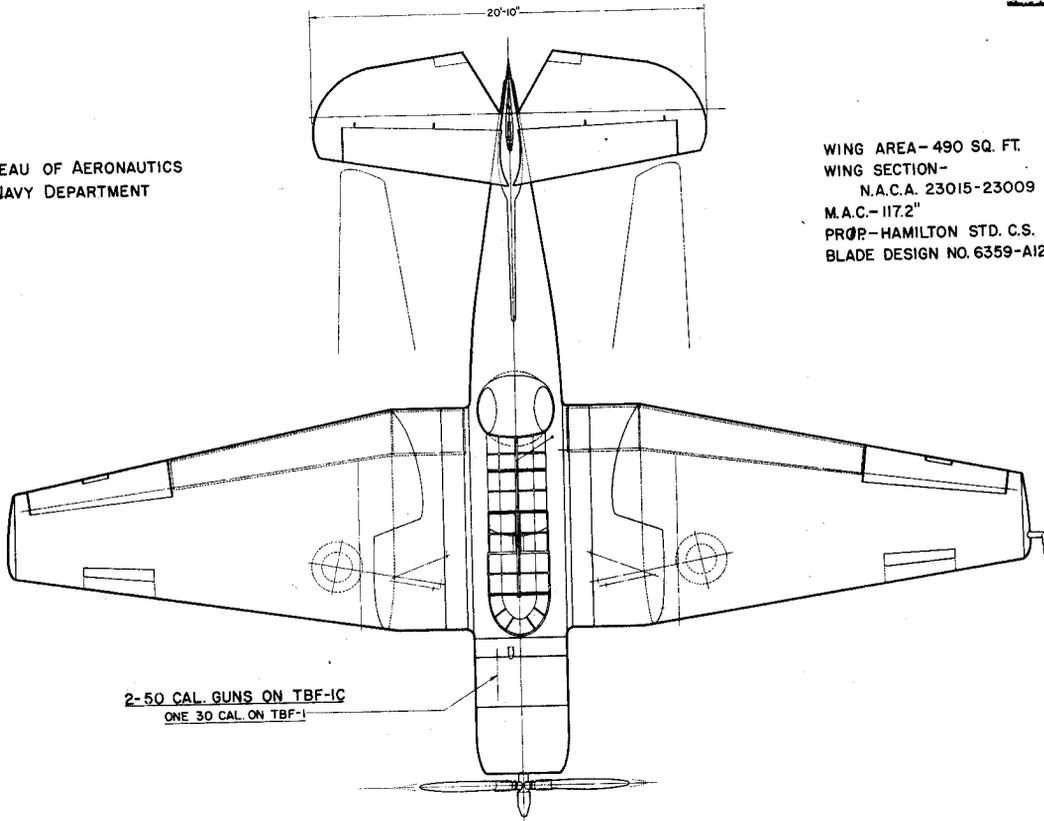


○ - LOADING CONDITION COLUMN NUMBER

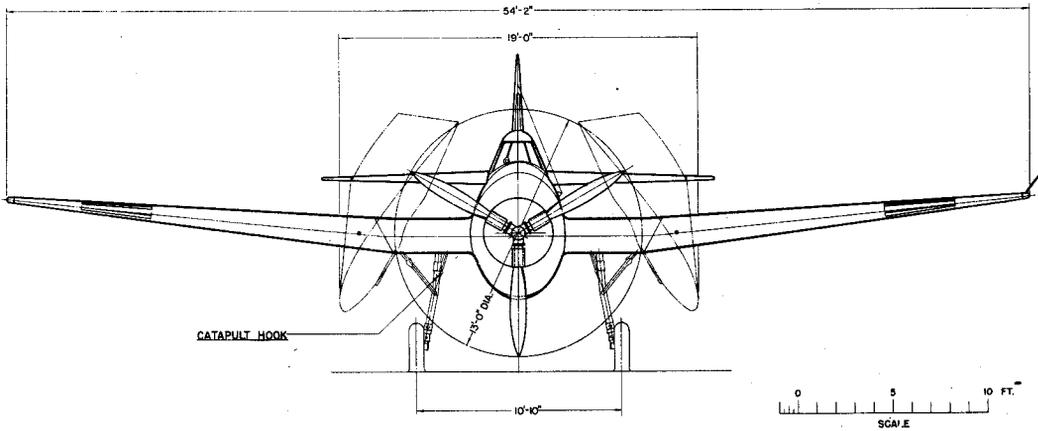


BUREAU OF AERONAUTICS  
NAVY DEPARTMENT

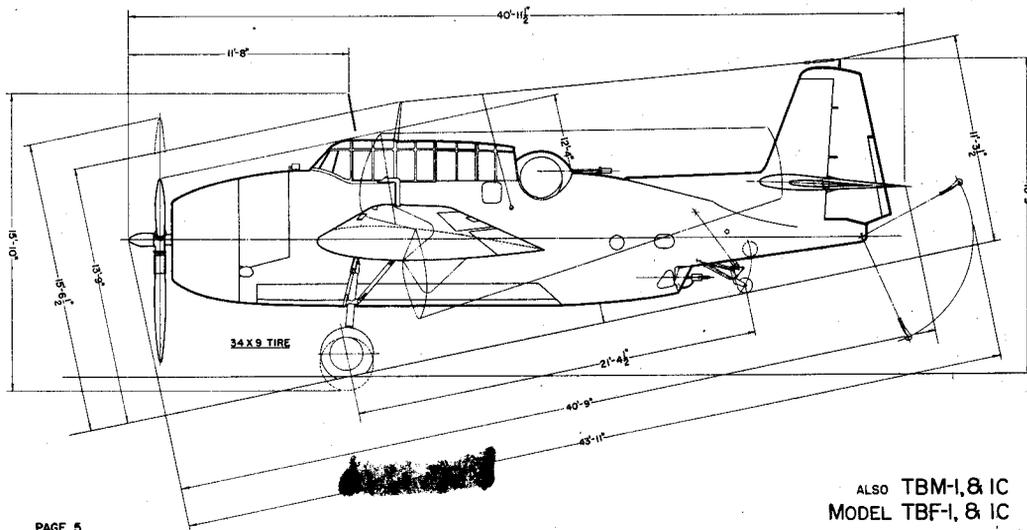
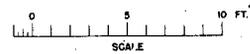
WING AREA - 490 SQ. FT.  
WING SECTION -  
N.A.C.A. 23015-23009  
M.A.C. - 117.2"  
PROP - HAMILTON STD. C.S.  
BLADE DESIGN NO. 6359-A12



2-50 CAL. GUNS ON TBF-1C  
ONE 30 CAL. ON TBF-1



CATAPULT HOOK



34 X 9 TIRE

ALSO TBM-1, & IC  
MODEL TBF-1, & IC

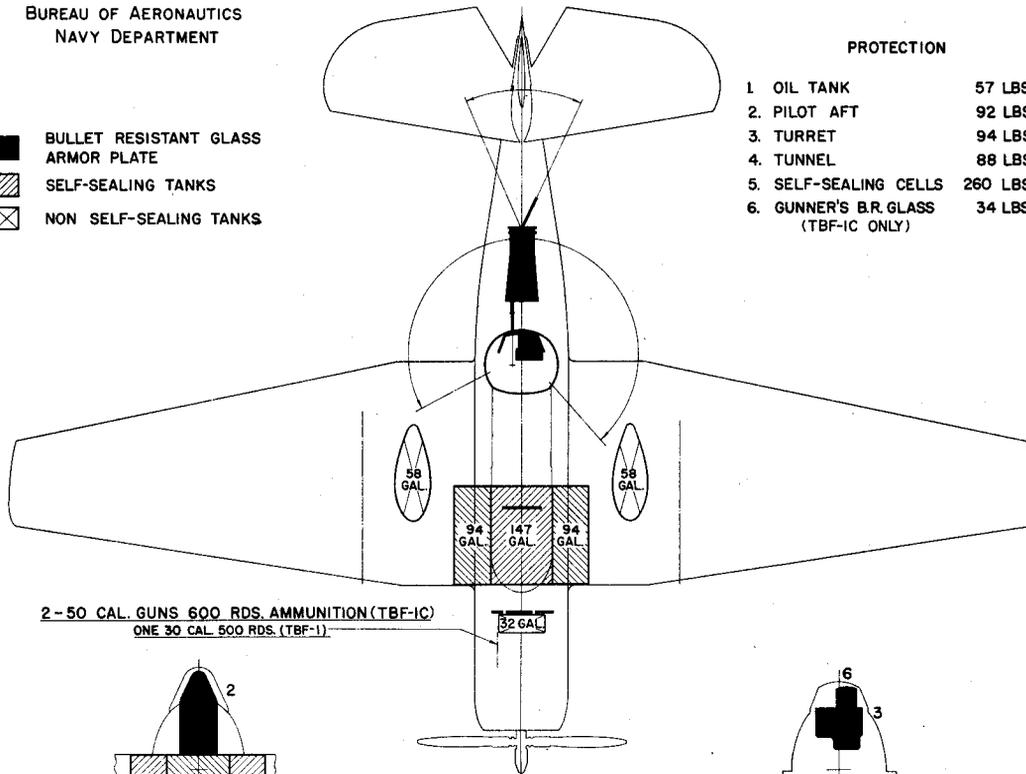
MODEL TBF-1, & IC  
ALSO TBM-1, & IC

BUREAU OF AERONAUTICS  
NAVY DEPARTMENT

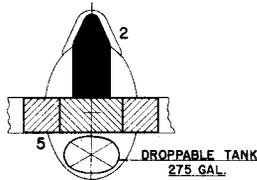
-  BULLET RESISTANT GLASS ARMOR PLATE
-  SELF-SEALING TANKS
-  NON SELF-SEALING TANKS

PROTECTION

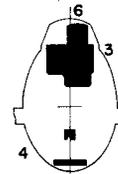
- |                        |          |
|------------------------|----------|
| 1 OIL TANK             | 57 LBS.  |
| 2. PILOT AFT           | 92 LBS.  |
| 3. TURRET              | 94 LBS.  |
| 4. TUNNEL              | 88 LBS.  |
| 5. SELF-SEALING CELLS  | 260 LBS. |
| 6. GUNNER'S B.R. GLASS | 34 LBS.  |
| (TBF-1C ONLY)          |          |



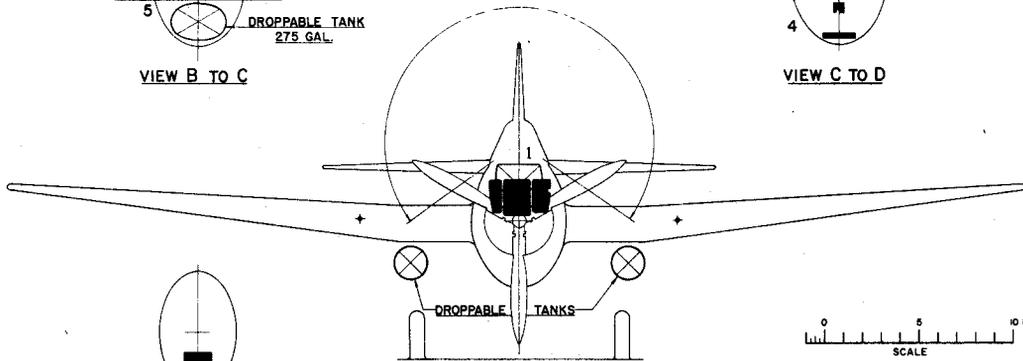
2-50 CAL. GUNS 600 RDS. AMMUNITION (TBF-1C)  
ONE 30 CAL. 500 RDS. (TBF-1)



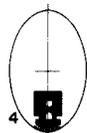
VIEW B TO C



VIEW C TO D



VIEW A TO B



VIEW D

