

## APPENDIX 1

# *Aircraft Data— Technical Information and Drawings*

*Compiled and written by*

Dr. William J. Armstrong

Historian

Naval Air Systems Command

### **A-3 (A3D) Skywarrior**

Early in the Second World War, the Navy began to explore the concept of a jet powered aircraft operating from carriers. Success encouraged further development of the concept, and early in the post war years the Navy began to consider jet power as a possible means of operating from carriers, aircraft that were large enough to provide a strategic bombing capability.

In January 1948, the Chief of Naval Operations issued a requirement to develop a long range, carrier-based attack plane that could deliver a 10,000 pound bomb load. The contract which the Navy awarded to the Douglas Aircraft Company on 29 September 1949

led to the development and production of the A3D Skywarrior. Unusually large for a carrier-based aircraft, the A3D quickly earned the nickname whale.

The Navy would never have a strategic bombing role in the defense of the United States, but the 282 Skywarriors which the Navy purchased served well in many roles. And as the last decade of the century began, the KA-3 and EA-3 soldiered on as tankers and electronic warfare aircraft.

First contract	29 September 1949
First flight	22 October 1952
First reported in squadron	By VAH-1 on 31 March 1956
Last delivery	January 1961
Number accepted	282



*An A3D-1 Skywarrior, 1956.*

**Model Designations Accepted from the  
Manufacturer (New Builds)**

**XA3D-1:**

Experimental aircraft.

**YA3D-1:**

Prototype aircraft.

**A3D-1 (redesignated A-3A):**

The primary mission was attack of enemy surface targets. The A-3A had a conventional swept-wing structure, two turbo-jet engines, provisions for a three-man crew of pilot, bomber-assistant pilot and a gunner-navigator. There were provisions for twelve 4,500 pound thrust JATO bottles and for in-flight refueling. The airplane was a conventional swept-wing structure with an all metal wing and a semi-monocoque fuselage. The two turbo-jet engines were enclosed in under-wing nacelles. The tricycle landing gear, arresting gear, wing fold and tail fold mechanisms, single slotted wing flaps and power boost were operated by hydraulic power. The horizontal stabilizer was adjustable for trim in flight.

**A3D-2 (redesignated A-3B):**

At first designated A3D-1B, the A3D-2 differed from the A3D-1 by additional provisions for a fourth crew member. The leading edge slats were actuated automatically by aerodynamic loads. Anti-skid braking was provided. The JATO installation accommodated twelve 4,500 pound thrust bottles. In-flight refueling and tanker provisions were provided for the A3D-2. The following are technical specifications for the A-3B:

**Weight:**

Empty	37,077 lbs
Basic	37,545 lbs
Design	55,942 lbs
Combat	61,377 lbs
Max T.O. (Land)	78,000 lbs
Max T.O. (Cat)	73,000 lbs
Max landing (land)	56,000 lbs
Max landing (carrier)	49,000 lbs

**Dimensions:**

Wing area	770 sq ft
Wing span	72.5 ft
M.A.C.	140.14 in
Sweepback	36 degrees
Length	74.7 ft
Height	22.8 ft
Tread	10.4 ft

**Ordnance:**

Bombs	twelve 500 pound G.P. six 1,000 pound G.P. eight 1,600 pound A.P. four 2,000 pound G.P.
Mines	twelve 500 pound Mk 50

six 1,000 pound Mk 36  
four 2,000 pound Mk 25  
two 2,000 pound Mk 10  
six 1,000 pound Mk 52-1  
twelve 374 pound Mk 53-0  
four 2,000 pound XG-7  
one 1,558 pound Mk 12  
four 2,000 pound Mk 39-0

**Special stores:**

Guns/ammunition      two 20 mm (M3)/500  
  rounds per gun  
  tail turret system Aero 21B

Radar bomb director      AN/ASB-1A

**Power plant:**

Two J57-P10 Pratt & Whitney turbojet dual rotor, axial flow engines.

Length                      158 in

Diameter                    41 in

**Electronics:**

Radio altimeter            AN/APN-22

VOR homing                AN/ARN-14E

VHF trans-receiver        AN/ARC-27A

TACAN                      AN/ARN-21

HF trans-receiver         AN/ARC-38

IFF transponder            AN/APX-6B

Interphone                 AN/AIC-4A

Coder                        AN/APA-89

UHF direction finder        AN/ARA-25

**A3D-2P (redesignated RA-3B):**

The production version of the YA3D-2P. This reconnaissance aircraft carried a pressurized camera compartment with twelve camera stations. The compartment also housed camera controls, camera door controls and stowage for spare film magazines. The bomb bay accommodated photo-flash bombs and/or cartridges. Sighting equipment and view-finders were located in the cockpit.

**A3D-2C (redesignated EA-3B):**

The principal mission of the A3D-2Q was to search for enemy radar. Provisions were made for a crew of seven: pilot, navigator-assistant pilot, gunner-radioman and four ECM operators including an evaluator.

**A3D-2T (redesignated TA-3B):**

Trainer version.

**Other Designations**

**A3D-1P (redesignated RA-3A):**

Same as A-3A except equipped for photography.

**A3D-1Q (EA-3A):**

Same as A-3A except equipped for countermeasures. Bomb capabilities removed.

**VA-3B:**

Similar to EA-3B aircraft except certain readily detachable electronic equipments removed from cabin area and the installation of equipment necessary for personnel accommodations.

**KA-3B:**

Similar to A-3A aircraft except modified to a tanker capability.

**EKA-3B:**

Model A-3B aircraft configured for the TACOS (Tanker Aircraft/Countermeasures or Strike) mission.

**NRA-3B:**

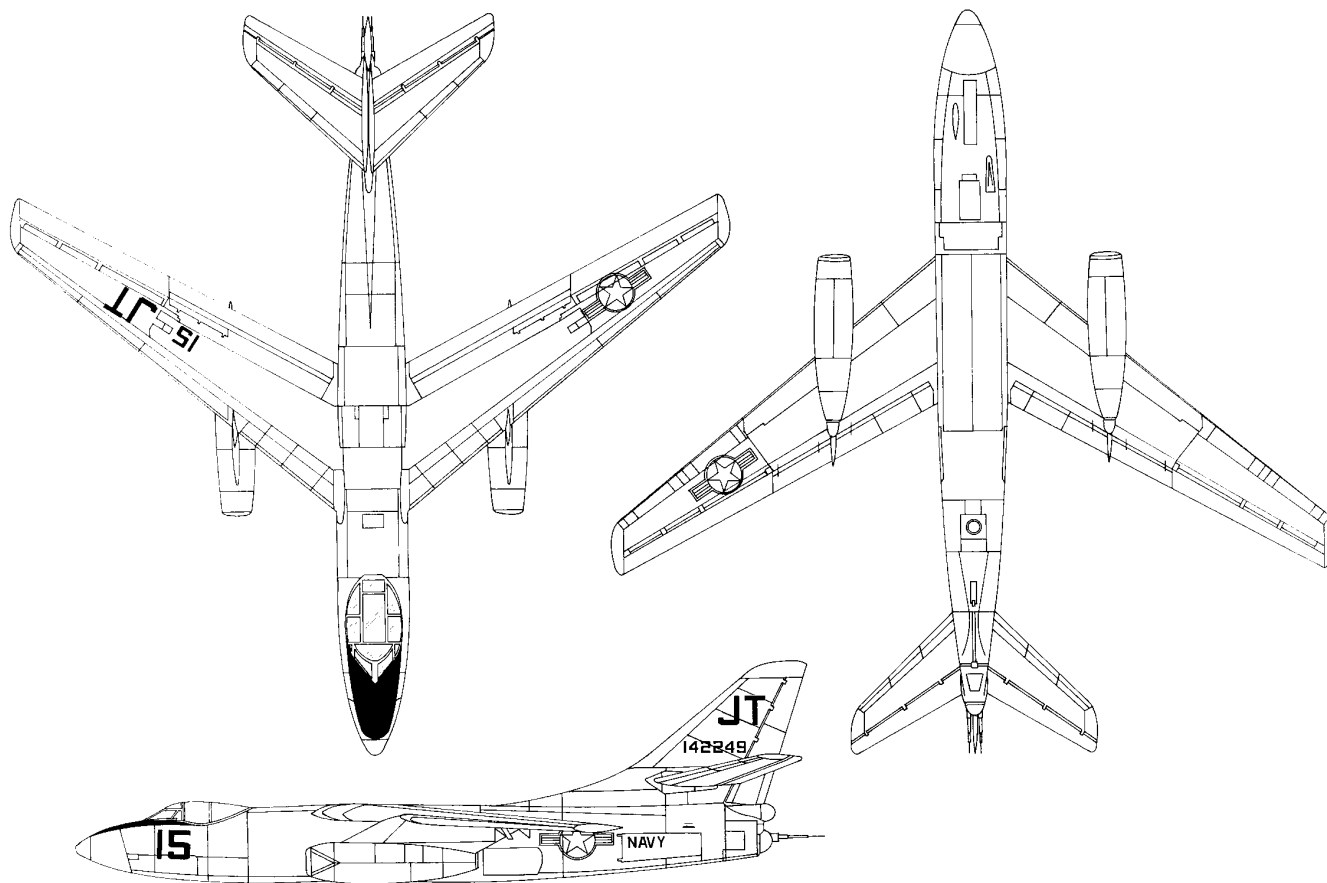
An A-3B equipped as test bed for Harpoon and Cruise missile guidance systems.

**ERA-3B:**

RA-3B modified to fleet electronic warfare support group configuration.

**Bureau Numbers**

XA3D-1	125412-125413
YA3D-1	130352
A3D-1	130353-130363
A3D-1	135407-135444
A3D-2	138902-138976
A3D-2	142236-142255
YA3D-2P	142256 (Aircraft never accepted)
A3D-2Q	142257 (Aircraft never accepted)
A3D-2W	142258 (Bureau number canceled)
A3D-2	142400-142407
A3D-2	142630-142665
A3D-2P	142666-142669
A3D-2Q	142670-142673
A3D-2	144626-144629
A3D-2P	144825-144847
A3D-2Q	144848-144855
A3D-2T	144856-144867
A3D-2	147648-147668



*Line drawings for an A-3 Skywarrior.*

## A4D (A-4) Skyhawk

By the early 1950s, jet power had matured to the point where the Navy became interested in using it for an attack aircraft. At that time, the AD Skyraider was the Navy's premier VA plane. The A4D Skyhawk (redesignated A-4) was the successor of the AD-1 Skyraider. Interdiction and close air support was what the aircraft was designed to do by the Douglas Company's aeronautical engineer, Mr. Ed Heinemann.

First contract	10 Sep 1952
First flight	22 Jun 1954
First reported in squadron	27 Sep 1956
Last delivery	27 Feb 1979
Number accepted	2,876



*An XA4D-1 Skyhawk takes off on its maiden flight from Edwards AFB, California, June 1954.*

### **Model Designations Accepted from the Manufacturer (New Builds)**

Only one model will list the technical specifications for the aircraft. All the other models will only identify the specific changes resulting in a new model designation.

#### **A4D-1 (Redesignated A-4A):**

The A4D-1 was a single seat aircraft designed as a light weight, carrier-based, turbo-jet plane whose primary mission was the destruction of enemy ground and surface targets. The structure was a conventional all metal semi-monocoque type. Fitted with automatically operated wing slats and hydraulically operated split flaps. Folding wings were not provided. The following are the technical specifications for the A4D-1:

#### Dimensions:

Wing area	260 sq ft
Wing span	27 ft 6 in
Length	39 ft 5 in
Height	15 ft 7 in

#### Weight:

Empty	8,286 lbs
Basic	8,375 lbs
Design	12,504 lbs
Combat	11,702 lbs
Max Takeoff (Field)	19,910 lbs
Max Takeoff (Catapult)	19,910 lbs
Max Landing (Field)	11,556 lbs
Max Landing (Arrest)	11,556 lbs

#### Ordnance:

Four 20 mm guns with 280 rounds on wing  
Fire control: six Aero 14B racks on wing  
Max load capacity 3,000 pounds

#### Electronics:

UHF Comm	AN/ARC-27A
IFF	AN/APX-6
IFF Coder	AN/APA-B9
UHF ADF	AN/ARA-25
TACAN (Backfit)	AN/ARN-21

#### Power Plant:

One Wright J65-W-4 axial flow engine.

#### **A4D-2 (Redesignated A-4B):**

The A4D-2 differed from the A4D-1 primarily by the incorporation of a pressure fueling-system, flight refueling provisions and a powered elevator system. One seat.

#### **A4D-2N (Redesignated A-4C):**

Improved A-4B with longer nose. One seat.

#### **A4D-5 (Redesignated A-4E):**

The A4D-5 was an A4D-2N with the J-52-P6 engine and two additional wing weapon stations. One crew.

#### **A-4F:**

Similar to A-4E but with J52-P-8A engine. ESCAPAC IC-3 ejection seat. One crew.

#### **A-4G:**

For Australian Navy.

#### **A-4H:**

For FMS.

#### **A-4K:**

For New Zealand.

#### **A-4KU:**

For FMS.

#### **A-4M:**

Similar to A-4F but with enlarged canopy. One crew.

#### **A-4N:**

For FMS.

### **Other Designations**

#### **TA-4B:**

Small, single-seat, delta wing, carrier-based, attack aircraft with tricycle landing gear and in-flight refueling capability.

**EA-4P:**

TA-4F modified for ECM missions.

**A-4L:**

A-4C with new engine, winglift spoilers, Walleye and Shrike missile capability, and improved avionics.

**OA-4M:**

A-4M modified for use by Marine Corps in high speed reconnaissance and tactical air control.

**A-4S:**

A-4B aircraft for use by Singapore.

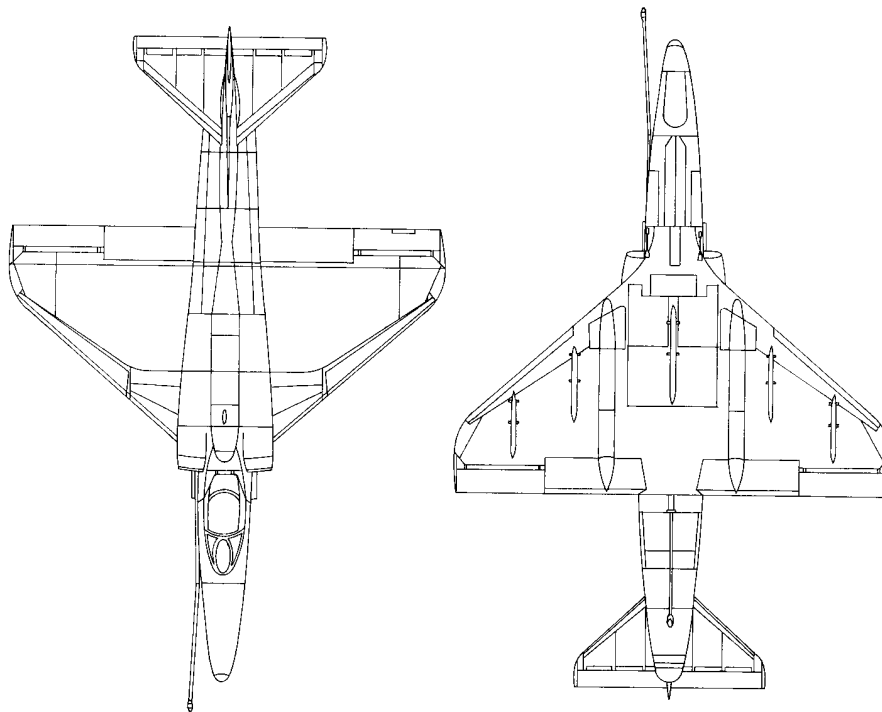
**TA-4S:**

Trainer version of the A-4S.

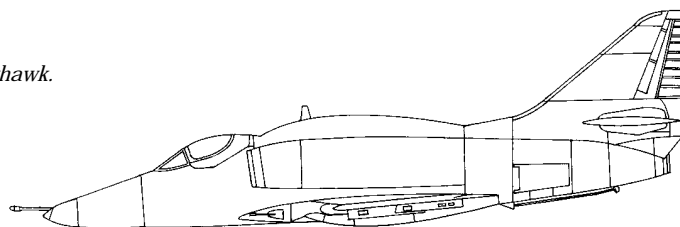
A-4E	151984-152100
TA-4E	152102-152106
A-4F	152101, 154172-154286, 154970-155069
TA-4F	152846-152878, 153459-153531, 153660-153690, 154287-154343, 154614-151657
A-4G	154903-154910
TA-4G	154911-154912
A-4H	155242-155289, 157395-157428, 157918-157925
TA-4H	157429-157134, 157926-157929
TA-4J	155070-155119, 156891-156950, 158073-158147, 158453-158527, 158712-158723, 159099-159104, 159546-159556, 153795-159798
A-4K	157904-157913
TA-4K	157914-157917
A-4KU	160180-160209
TA-4KU	160210-160215
A-4M	158148-158136, 158412-158435, 159470-159493, 159778-159794, 160022-160045, 160241-160264
A-4N	158726-158746, 159035-153052, 159075-159098, 159349-159350, 159515-159545, 159799-159824
A4D-5	149647-149666, 149959-150438, 151022-151261

**Bureau Numbers**

XA4D-1	137812
A4D-1	137813-137831, 139919-139970, 142142-142235
-	142082-142141, 142116-142423, 142674-142953, 144868-145061
A4D-2N	145062-145146, 146460-146692, 147669-147819, 148304-148317, 148465-148614, 149487-149646, 150581-150600
A4D-3	145147-145156



*Line drawings for an A-4 Skyhawk.*



## A3J (A-5) Vigilante

The two aircraft that rank as the heaviest the Navy ever deployed aboard carrier are the A-3 Skywarrior and the A-5 Vigilante. Designed by North American to be a supersonic, allweather, strategic bomber, the Vigilante began life as the A3J and was redesignated A-5 in the general redesignation of Defense Department airplanes that occurred in 1962. The contractor referred to this design as the “North American General Purpose Attack Weapon” (NAGPAW). The first contract for this aircraft was awarded to North American by the Navy on 29 August 1956. Its first flight occurred two years later on 31 August 1958. Technical difficulties and strategic priorities prevented the A3J from ever serving in its intended role, but it did find a valuable place as a reconnaissance aircraft. The Vigilante was first reported in squadron by VAH-3 in June 1961, and completed its final deployment in September 1979. A total of 156 Vigilantes were bought.



*A YA3J-1 Vigilante takes off, circa late 1950s.*

### **Model Designations Accepted from the Manufacturer (New Builds)**

#### **YA3J-1:**

Prototype version of the A3J-1.

#### **A3J-1 (redesignated A-5A):**

Crew	two
Length	76 ft 6 in
Span:	
Open	53 ft
Folded	42 ft
Wing area	700 sq ft
Height:	
Tail upright	19 ft
Tail folded	14 ft 6 in

Weight:	
Empty	32,714 lbs
Combat	47,530 lbs
Combat Range	1,750 nm to 2,270 nm
Engines	two 17,000 lbs General Electric J79-8 or two 15,690 lbs General Electric J79-2
Ordnance	Internal stores including special weapons Two wing stations for external stores.

#### **A3J-2 (redesignated A-5B):**

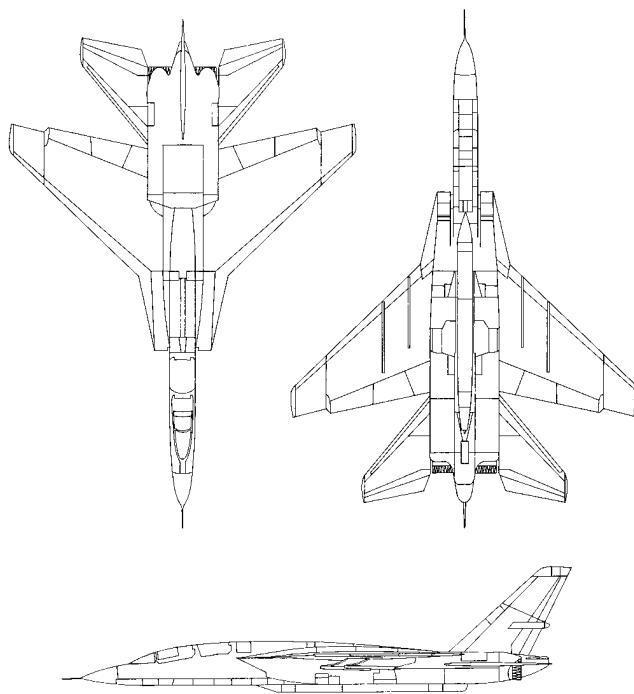
Greater fuel capacity and two additional wing stations for ordnance.

#### **A3J-3P (redesignated RA-5C):**

Same as A-5B but equipped with day and night panoramic cameras that could scan horizon to horizon. Also equipped with cameras for still photography. Electronic systems included jamming and intelligence gathering capabilities.

### **Bureau Numbers**

YA3J-1	145157-145158
A3J-1	147850-147863
A3J-1	148924-148923
A3J-1	149276-149299
A3J-2	149300-149305
A3J-3P	149306-149317
A3J-3P	150823-150842
RA-5C	151615-151634
RA-5C	151726-151728
RA-5C	151962-151969 (all canceled)
RA-5C	156608-156653



*Line drawings for an A3J (A-5) Vigilante.*

## A-6 Intruder

The Navy's experience with jet aircraft in the Korean conflict led to a requirement for a low-level attack bomber that could deliver ordnance against moving and fixed sea and land targets in all-weather and darkness. It was to be subsonic and capable of delivering nuclear as well as conventional ordnance thus being useful in both nuclear retaliatory and conventional conflicts. The Chief of Naval Operations issued the operational requirement (CA-01504) for this aircraft on 2 October 1956. On 5 March 1957 the Navy announced its intention to conduct a design competition for an aircraft that would meet the operational requirement. Eight manufacturers submitted eleven designs to this competition. The Navy selected the Grumman design. The aircraft that Grumman produced was a swept-wing two-place plane with exceptional loitering ability that could fly under enemy radar and carry greater and more varied stores than any naval attack aircraft of its time. It was powered by two Pratt & Whitney J-52 P-6 turbojet engines each with 8,500 pounds of thrust. The Intruder made its first flight 19 April 1960 as the A2F-1, a designation that became A-6A in the Department of Defense's uniform designation system.

First contract	26 March 1959
First flight	19 April 1960
First reported in squadron	February 1963 (A-6A in VA-42)
Initial operating capability	February 1963
Number accepted	687

### *Model Designations Accepted from the Manufacturer (New Builds)*

**A-6A:**

Originally designated A2F-1 and changed to A-6A in the DOD uniform designation system, this aircraft was first accepted by the Navy in February 1963 by VA-42. At light weights it could operate from short unprepared fields in close support of ground troops; at higher weights it could operate from catapult on long range special weapon strikes against heavily defended fixed targets. The A-6A had an attack-navigation and central digital computer system to find targets in all moving conditions.

**EA-6A:**

The original designation of the EA-6A was A2F-1Q. This aircraft retained a portion of the A-6A's attack capability but gave up much of its bombing and navigation equipment to make space for antennas to convert the attack plane into an effective electronic warfare aircraft.

**A-6B:**

The A-6B was a version of the A-6A design produced to meet the special wartime need of destroying ground-based anti-aircraft defenses. The A-6B was equipped to carry the Standard Anti-Radiation Missile (ARM) and had emitter location sensors.

**KA-6D:**

A-6A modified for use as aerial refueling tanker.

**A-6E:**

The Navy began to develop this version of the



*An early A2F-1 Intruder in flight, circa early 1960s.*

Intruder in the late 1960s. The first production deliveries were made in 1971. The A-6E was intended to reduce the necessary maintenance on the aircraft by increasing the reliability of its equipment and support. There were also improvements in the search and track radar, the computer and armament control equipment. The A-6E program involved new production A-6E's and the modification of A-6A's to the -6E configuration. The latter resulted in converting 240 A-6As to A-6Es.

#### **A-6E TRAM:**

The Target Recognition Attack Multisensor (TRAM) configuration of the A-6E greatly improved the aircraft's capability. Introduced in 1976, the TRAM version was equipped with a laser ranger and designator, a laser spot tracker and high resolution infrared sensor. The crew was able to view television quality images of their targets by day or night. The TRAM sensors greatly improve both ballistic and visual bombing accuracy. The TRAM version is equipped to launch laser-guided bombs and missiles. The TRAM's ASN-92 CAINS inertial navigation system gave the crew greater reliability and accuracy than was possible with the ASN-31. The TRAM version also had an Automatic Carrier Landing System (ACLS) and the Approach Power Compensator to provide totally automatic landing aboard carrier.

Specifications for the A-6E are as follows:

Length	54 ft 9 in
Span	53 ft
Height	16 ft 3 in
Height with wings folded	21 ft 11 in
Weight	26,896 pounds empty 60,400 pounds gross
Crew	2
Speed	Over 500 knots
Engines	2 Pratt & Whitney 9,300 lb J52-P-8
Ordnance	Five external store positions. Maximum load of 17,280 pounds

#### **Other Designations (Modifications of existing airframes)**

##### **A-6C:**

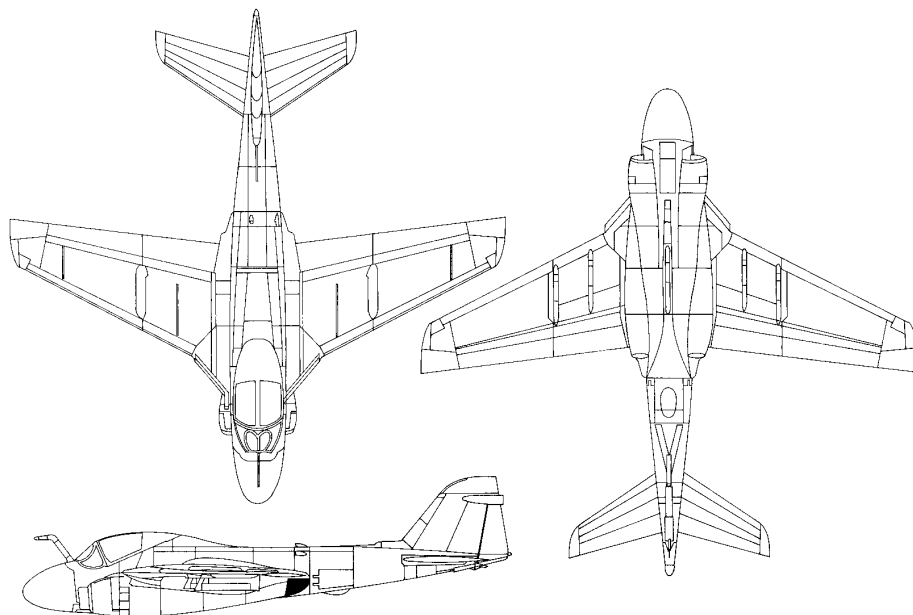
The A-6C was another special version of the A-6A produced to meet a wartime necessity. It was equipped with infrared sensors and Low Light Level Television (LLLT). The A-6C was known by the acronym TRIM which described the aircraft's mission as Trails, Roads Interdiction Multi-sensor. The A-6C's sensors were meant to detect the enemy's supply depots and truck traffic in Southeast Asia.

##### **JA-6A:**

A-6A modified as a test-bed for Circulation Control Wing research and development.

#### **Bureau Numbers**

A2F-1	147861-147867, 148615-148626, 149475-149486, 149935-149958, 151558-151594
A2F-1Q	151595-151612
A-6A	151780-151827, 152583-152646, 152891-152964, 154124-154171, 155137-155190, 155581-155721, 156994-157029, 158041-158052, 160421-160431
A-6B	154046-154099
KA-6D	158053-158072
A-6E	158041-158052, 158528-158539, 158787-158798, 159174-159185, 159309-159317, 159567-159581, 159895-159906, 160421-160431, 160993-160998, 161082-161093, 161100-161114, 161230-161241, 161659-161694, 161886-161897, 163520-163530



*Line drawings for an A-6 Intruder.*



## A-7 Corsair II

In May 1963, the Navy began a design competition for a light-attack, carrier-based aircraft to replace the Douglas A-4E Skyhawk. The new aircraft was to carry a larger ordnance payload than the Skyhawk and fly a greater combat radius. Vought, Douglas, Grumman, and North American responded to the Navy's invitation to bid. Vought was selected as the winner in February 1964. In March, the designation A-7A was approved for the new aircraft. The proposal by Vought engineers was based on their F-8 Crusader but without that fighter's adjustable wing incidence. It was to incorporate the Pratt & Whitney TF30-P-6 turbo-fan engine which had been developed for the F-111. The engine for the A-7, however, was not to have an afterburner. By using a proven design and engine, development of the A-7 was greatly accelerated over what it would have been if both airframe and powerplant were entirely new concepts.

The following are significant dates for the A-7:

The first flight occurred on 27 September 1965, and an A-7A Corsair II was delivered to VA-174 on 13 October 1966.

Carrier trials began aboard *America* (CVA 66) in November 1966.

Carrier trials ended with the final acceptance trials at sea aboard *Constellation* (CVA 64) in March 1967.

First tactical unit, VA-147 was established February 1967 and the second, VA-87, was established in June 1967.

First operational squadron deployed aboard *Ranger* (CVA 61) in November 1967.

CDR James C. Hill, writing in *Proceedings*, states that his squadron, VA-147, was established February 1967 and the A-7 "deployed into the combat environment of Southeast Asia on 4 November."

First A-7 combat action was December 1967, flown by VA-147 from *Ranger* (CVA 61).

### *Model Designations Accepted from Manufacturer (New Builds)*

#### **A-7A:**

A single-place, carrier-based, light attack, subsonic, medium range aircraft, the A-7A was powered by the Pratt & Whitney TF30-P-6 engine and designed to provide high attack utility and flexibility for close support and interdiction missions by virtue of a large number of external store stations to provide ordnance loading capacity and freedom of ordnance choice. A large internal fuel capacity made external fuel unnecessary for most missions while retaining maximum number of stations for armament. The A-7A's combat range was not less than 1,180 nautical miles with an average cruising speed never under 390 knots. The aircraft had an excellent overload capability in terms of wind-over-deck requirements, flying qualities and structural integrity. Features to expedite maintenance and airplane turnaround were important A-7A design characteristics. The A-7A was designed with a fixed wing incidence and a high-lift system composed of leading edge flaps and single slotted trailing edge flaps. Lateral control was provided by outboard ailerons and inboard spoilers.

#### **A-7B:**

Similar to A-7A except with improved engine, a Pratt & Whitney TF30-P-8 or -408, instead of the TF30-P-6 used in the A-7A. Also, variable position flaps, not found in the A-7A, were incorporated in the A-7B.

#### **A-7C:**

Initially intended to be a two-seat training version of the A-7B. When this plan was not pursued, the A-7C designation served as a "stop-gap" assigned to those aircraft accepted with the improvements intended for aircraft accepted as A-7E but lacking the Rolls Royce TF41-A-2 engine intended for the A-7E. All A-7Cs were powered by either the Pratt & Whitney TF30-P-8 or -408.



*An early A-7A Corsair II in flight, circa mid-1960s.*

**A-7D:**

For U.S. Air Force.

**A-7E:**

Made its combat debut when VA-146 and VA-147 deployed in April 1970 in *America* (CVA 66). The A-7E was similar to A-7B but with improved naval weapons delivery system, the AVQ-7B Head-Up Display, the ASN-91 Tactical Computer, the APQ-126 Forward Looking Radar, the ASN-90 Inertial Measurement Set and one 20 mm M61A1 gun instead of two 20 mm MK-12 guns. All A-7Es were powered by the Rolls Royce TF41-A-2 engine built, with modifications under license by Allison division of General Motors. The TF41, a non-afterburner engine, had a thrust of 15,000 pounds which was a considerable increase over the TF30-P-8 and -408. Specifications for the A-7E are as follows:

**Wing:**

Area	375 sq ft
Maximum span	38.73 ft
Folded span	23.77 ft
Aspect ratio	4
Sweep 1/4 chord	35°
MGC	130.08 in
Length	46.13 ft
Height	16.06 ft
Maximum tread	9.49 ft
Weight (with TF41-A-2 engine):	
Empty	18,546 lbs
Basic	19,576 lbs
Design	29,575 lbs
Combat (Clean A/P)	25,834 lbs
Maximum takeoff (Overload)	42,000 lbs
Maximum takeoff (Normal)	37,279 lbs
Maximum landing (Carrier)	25,300 lbs

**Ordnance:**

One 20 mm aircraft gun, M61.  
Two fuselage pylons for missiles.  
Six wing-mounted pylons with total capacity of 19,000 pounds.

**A-7H:**

For Greece.

**TA-7H:**

Two-seat trainer version of A-7H for Greece.

**A-7K:**

Two-seat A-7D for U.S. Air Force.

**Other Designations****TA-7C:**

Two-seat trainer version, converted from A-7B and A-7C.

**A-7G:**

Designation of aircraft for Switzerland. Never delivered.

**EA-7L:**

Converted from TA-7C; modified to FEWSG configurations.

**A-7P:**

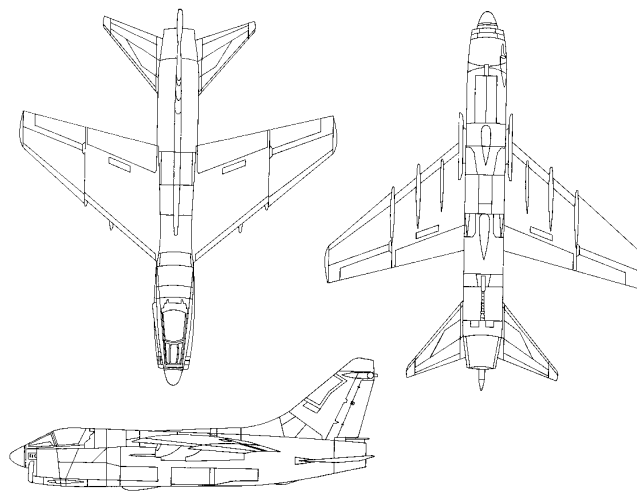
For Portugal, converted from A-7A.

**TA-7P:**

Two-seat trainer version for Portugal, converted from A-7A.

**Bureau Numbers**

YA-7A	152580-152582
A-7A	152647-152685
A-7A	153134-153273
A-7A	154344-154360
A-7A	154913-154929 (Deliveries canceled)
A-7B	154361-154573 (Deliveries of 154557-154573 canceled)
A-7B	156178-156417 (Deliveries canceled)
A-7C	156734-156800
A-7E	156801-156890
A-7E	157435-157648 (Deliveries of 157595-157648 canceled)
A-7E	158002-158028
A-7E	158652-158681
A-7E	158819-158842
A-7E	159261-159308
A-7E	159638-159661
A-7E	159668-159679
A-7E	159967-160006
A-7E	160537-160566
A-7E	160613-160618
A-7E	160710-160739
A-7E	160857-160886 (Deliveries of 160881-160886 canceled)
A-7H	159622-159667
A-7H	159913-159966
TA-7H	161218-161222



*Line drawings for an A-7 Corsair II.*

## AD (A-1) Skyraider

During World War II the Navy began looking for a new dive-bomber torpedo aircraft to meet its changing tactical and operational requirements. Several planes, among them the AD's direct predecessor, the SB2D/BTD, were developed by the Bureau of Aeronautics. Design difficulties and over-weight problems, however, ultimately led to a decision not to produce the SB2D/BTD. This in turn led to a new design which incorporated the good features of the SB2D/BTD while overcoming its inherent difficulties.

The AD series (later redesignated A-1) that emerged from the combined efforts of the Bureau of Aeronautics and Douglas, who was the contractor, had two particularly significant design aspects. First, great emphasis was placed on the importance of the stringent weight control policy. Secondly, the standard bulky, heavy bomb displacing gear was replaced by a light, explosive device which literally blew the bomb clear. In comparison with the most advanced operational dive-bombers in 1945, the AD's initial design compared most favorably with a 27 percent greater top speed and a capability of carrying up to 4,000 pounds of either bombs or torpedoes.

First contract	6 Jul 1944
First flight	18 Mar 1945
First reported in squadron	6 Dec 1946
Last delivery	Mar 1957
Last reported in squadron	31 Dec 1971
Number accepted	3,180

### *Model Designations Accepted from the Manufacturer (New Builds)*

Only one model will list the technical specifications for the aircraft. All the other models will only identify the specific changes resulting in a new model designation.

#### **AD-1:**

The initial single seat version of the Skyraider was powered by a 2,500 hp Wright R-3350-24W engine. Its details were as follows:

Weight empty	10,508 lbs
Gross (Scout)	13,924 lbs
Gross (Bomber)	18,030 lbs
Dimensions:	
Wing span	50 ft
Length	38 ft 4 in
Height	17 ft 6 in
Ordnance on Fuselage:	
Bombs	one 2,000 lbs
Depth bomb	one 650 lbs
Mine	one 2,000 lbs
Torpedo	one MK 13-3
Ordnance on Wings:	
Bombs	two 2,000 lbs
Depth Bombs	two 650 lbs
Mines	two 1,000 lbs
Rockets	two 11.75 in. Tiny Tim twelve HVAR
Torpedo	two MK 13-3
Guns	two 20 mm (M3)

#### **AD-1Q:**

AD-1 with countermeasures unit.



*An XBT2D-1 in flight. This was the first designation assigned to the AD Skyraider.*

**AD-2:**

Powered with the improved 2,700 hp Wright R-3350-26W engine.

**AD-2Q:**

AD-2 with countermeasures equipment.

**AD-3:**

Stronger fuselage, improved landing gear, new canopy design.

**AD-3N:**

Equipped for night attack.

**AD-3Q:**

Countermeasures equipment improved and relocated to provide better operation and crew comfort.

**AD-3W:**

Airborne early warning equipment.

**AD-4:**

The AD-4 was equipped with a strengthened landing gear, improved radar, G-2 compass, anti-G suit provisions, 4-20 mm cannon, and Aero 14 rocket launchers capable of carrying up to 50 pounds of bombs.

**AD-4W:**

Airborne early warning equipment.

**AD-1N:**

The primary mission of the AD-4N airplane was night attack and radar countermeasures.

**AD-4Q:**

Countermeasures equipment.

**AD-5 (Redesignated A-1E):**

A redesign of the aircraft. The AD-5 incorporated side by side seating for an assistant pilot. The revised crew arrangement facilitated all-weather operation and permitted utilization for long range navigation, radar search, spotting and observation, air support coordination, instrument training, pilot familiarization and other operations requiring a second crew member. Controls, armament and tactical equipment were located for single pilot operation. A single dive brake was provided for dive bombing and maneuvering control. The AD-5 could be converted rapidly aboard a carrier for operation as a passenger, cargo, ambulance or long range airplane by installation of appropriate conversion kits supplied as alternate equipment.

**AD-5N (Redesignated A-1G):**

Night attack version with radar countermeasures.

**AD-5W (Redesignated EA-1E):**

Airborne early warning version.

**AD-6 (Redesignated A-1H):**

The single-place airplane is conventional in design and structure, landing gear, canopy, flaps, wing folding and three fuselage dive brakes are operated hydraulically. Capable of low level bombing, the cen-

terline bomb station of the AD-6 was capable of carrying external stores up to 3500 pounds weight and 30 inches diameter. A combination 14 and 30 inch suspension bomb ejector was installed. A bomb director suitable for either high or low altitude bombing was also installed.

**AD-7 (Redesignated A-1J):**

The improvements in the AD-7 over its predecessors include the use of the R-3350-26WB engine and structural improvements in the wing to improve fatigue life.

### *Other Designations*

**AD-1U:**

AD-1 with radar countermeasures and tow target equipment. Deletion of armament and water injection equipment.

**XAD-1W:**

AD-1 with airborne early warning equipment. AD-3W prototype.

**XAD-2:**

Similar to XBT2D-1 except engine, increased fuel capacity.

**AD-2N:**

Equipped for night operations.

**AD-2U:**

AD-2 with radar countermeasure and tow target equipment. Deletion of armament and water injection equipment.

**XAD-3E:**

AD-3W modified for submarine search. Aero products propeller.

**AD-2W:**

AD-2 with airborne early warning equipment.

**AD-4L:**

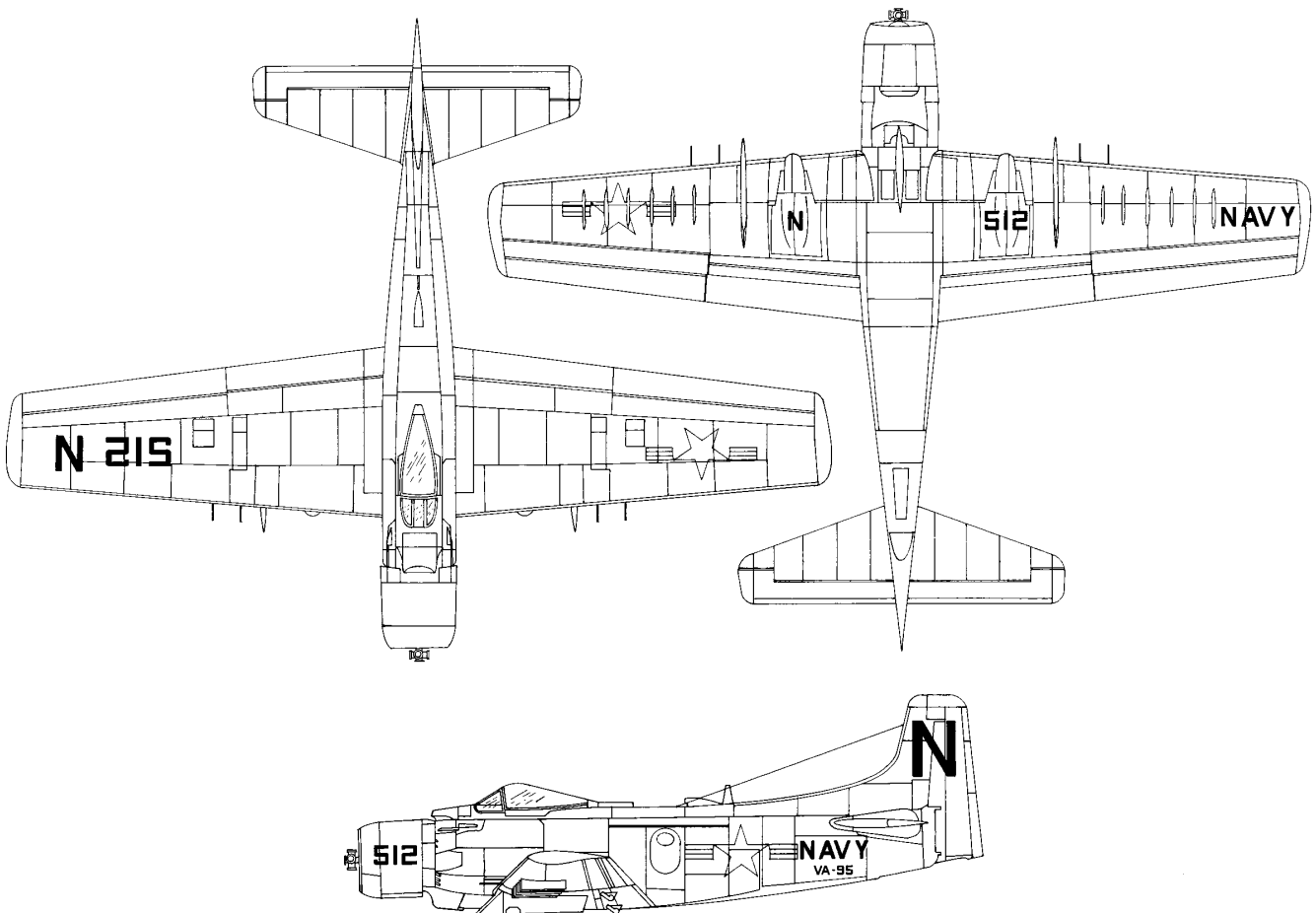
AD-4 equipped for winterized version.

### *Bureau Numbers*

The Navy ordered the AD under the designation BT2D indicating that it was the second bomber torpedo aircraft which Douglas had designed for the Navy. The designation was later changed to A to reflect the Navy's decision to adopt the letter A in its designation system to the replace the older system of T, B, SB indicating assault aircraft and the intention to combine these missions in one aircraft.

XBT2D-1	09085-09095, 09097, 09100-09106
XBT2D-1W	09107
XBT2D-1P	09096
XBT2D-1Q	09109
XBT2D-1N	09098-09099
XAD-2	09108
AD-1	09110-09351, 21742-22006

AD-1Q	09352-09392 (09387-09392 canceled)	AD-4NL	124725-124760
AD-2	122210-122365	AD-4Q	124037-124075
AD-2Q	122366-122372, 122374-122387	AD-4W	124076-124127, 124761-124777, 125765-125782, 126836-126875, 127921-127961
AD-2QU	122373	XAD-5	124006
AD-3	122729-122852	AD-5	132392-132476, 132478, 132637-132728, (132687-132728 canceled) 133854-134004 (133930-134004 canceled), (134076-134233 canceled)
AD-3E	122906-122907	AD-5N	132477, 132480-132636, 134974-135053, (135055-135138 canceled)
AD-3N	122908-122909, 122912-122922	AD-5Q	135054
AD-3Q	122854-122876	AD-5S	132479
AD-3S	122910-122911	AD-5W	132729-132792 (132731-132792 canceled), 133757-133776, 135139-135222, (138535-138568 canceled), 139556-139605
AD-3W	122877-122905	AD-6	134466-134637, 135223-135406, 137492-137632, 139606-139821, 142010-142081 (142010 canceled)
AD-4	122853, 123771-124005 (124007-124036 canceled), 127844-127853, 127861-127865, 127873-127879, 128917-128936, 128944-128970, 128979-129016	XAD-7	(142010 canceled)
AD-4B	127854-127860, 127866-127872, 128937-128943, 128971-128978, 132227-132391, (134005-134018 canceled)	AD-7	142011-142081, (142546-142629 canceled) (143050-143133 canceled)
AD-4N	124128-124156, 124725-124760, 125707-125741, 126876-126902, 126926-126946, 126970-126987, 127011-127018, 127880-127920		
AD-4NA	125742-125764, 126903-126925, 126947-126969, 126988-127010		



Line drawings for an AD (A-1) Skyraider.

## AF Guardian

The genesis of the Guardian begins in the late months of World War II as Grumman developed plans to replace the TBF Avenger. The normal continuation of the designation, TB2F, was used on a design for a two-engine aircraft that never was built but the designation was recognized by the Navy. The design which the Navy ordered in February 1945 was a single engine attack aircraft designated XTB3F. Because of the designation change of all Navy attack aircraft to "A" the TB3F entered squadron service in October 1950 as the AF. The aircraft was intended to work in hunter-killer pairs composed of an AF-2S and AF-2W.

First contract	19 February 1945
First flight	December 1946
First reported in squadron	18 October 1950
Last delivery	April 1953
Last reported in squadron	31 August 1955
Initial operational capability	October 1950
Number accepted	389



*An AF-2S Guardian in flight, June 1950.*

### **Model Designations Accepted from the Manufacturer (New Builds)**

**XTB3F-1**

**XTB3F-2S**

**AF-2W**

**AF-2S**

**AF-3S**

#### **AF-2S (Mission and Description):**

The AF-2S was the production development of the XTB3F-2S. Its primary mission was to attack enemy submarines after being directed to the target's position by the AF-2W. The AF-2S laid down a pattern of sonobuoys to determine exact location of the enemy submarine after which it launched its sonic-directed torpedo to complete the attack. Rockets and depth

bombs could be carried to augment the attack. The AF-2S was a three-place plane for operation ashore or aboard carriers. It was conventional in design and structure with an all-metal two spar wing and a semi-monocoque fuselage. Landing gear, slotted flaps, wing folding mechanism and pilot's canopy were hydraulically operated. Ailerons were of sealed balance type with spring tabs and one trim tab. Rudder had a combination trim and four to one ratio balance tab. Elevators were interconnected, one equipped with a spring tab and the other with a trim tab. Power plant installation was conventional with steel tube mount.

Specifications for the AF-2S are as follows:

Power plant	One Pratt & Whitney R-2800-48
Weight:	
Empty	14,658 lbs
Basic	15,336 lbs
Design	19,200 lbs
Combat	18,123 lbs
Maximum Takeoff	23,015 lbs
Maximum Landing	22,500 lbs

#### Dimensions:

Wing	
Area	549 sq ft
Span	60 ft
Length	43 ft 5 in
Height	16 ft 7 in
Tread	14 ft 5 in

#### Ordnance:

##### Bomb bay

- 1 Mk 41 Torpedo
- 1 Mk 34 Torpedo
- 1 Mk 24 Torpedo
- 1 Mk 24 Mine could be substituted for either the Mk 41 or the Mk 34 Torpedo.

##### 4 Wing Points (inboard and mid-wing)

- Six 5-inch HPAG or HVAR Rockets.
- Four 3.5 inch aircraft rockets.
- Four Mk 54 depth bombs.
- Three AN/SSQ-1 Sonobuoys.
- Two dispensers of AN/SSQ-2 Sonobuoys and Mk 5 drift signals (nine each).

Two releasable fuel tanks, 75 or 150 gallons each.

#### Fire control:

- 1 Mk 23-6 Bombsight mounted on a Mk 41-3 periscope.
- 1 Mk 8-8 Gun sight.

Maximum bomb capacity: 3,700 lbs

#### Cameras:

- 1 AN-N6A, Gun
- 1 K-25A, Reconnaissance

AN/AVQ-2 Searchlight on starboard outboard wingpoint.

AN/APS-31 Radar on port outboard wingpoint.

Combat range 795–990 nautical miles

#### **AF-2W (Mission and Description):**

The AF-2W was the production development of the XTB3F-1S. Its mission was radar search for submarines.

After detecting an underwater craft the AF-2W would direct its companion aircraft, the AF-2S onto the target to launch an attack. The AF-2W was a four-place aircraft for operation ashore and aboard carriers. The airplane was conventional in design and structure with an all metal two-spar wing and a semi-monocoque fuselage. The landing gear, slotted flaps, wing folding mechanism, and pilot's canopy were hydraulically operated. Ailerons were of the sealed balance type with spring tabs and one trim tab. Rudder had a combination trim and 4 to 1 ratio balance tab. Elevators were interconnected, one equipped with a spring tab and the other with a trim tab. Power plant installation was conventional with steel tube mount.

Specifications for the AF-2W are as follows:

Power plant One Pratt and Whitney R-2800-48

Weight:  
 Empty 15,858 lbs  
 Basic 16,037 lbs  
 Design 19,200 lbs  
 Combat 18,629 lbs  
 Maximum takeoff 21,802 lbs  
 Maximum landing 21,500 lbs

Dimensions:  
 Wing Area 549 sq ft  
 Span 60 ft  
 Length 43 ft 5 in  
 Height 16 ft 7 in  
 Tread 14 ft 5 in

Ordnance:  
 None

Electronics:  
 VHF Communication AN/ARC-28  
 UHF Communication (Dual) AN/ARC-27  
 MHF Liaison AN/ARC-2  
 Interphone AN/AIC-4 or AN/AIC-4A  
 Homing AN/ARR-2A and AN/ARN-21

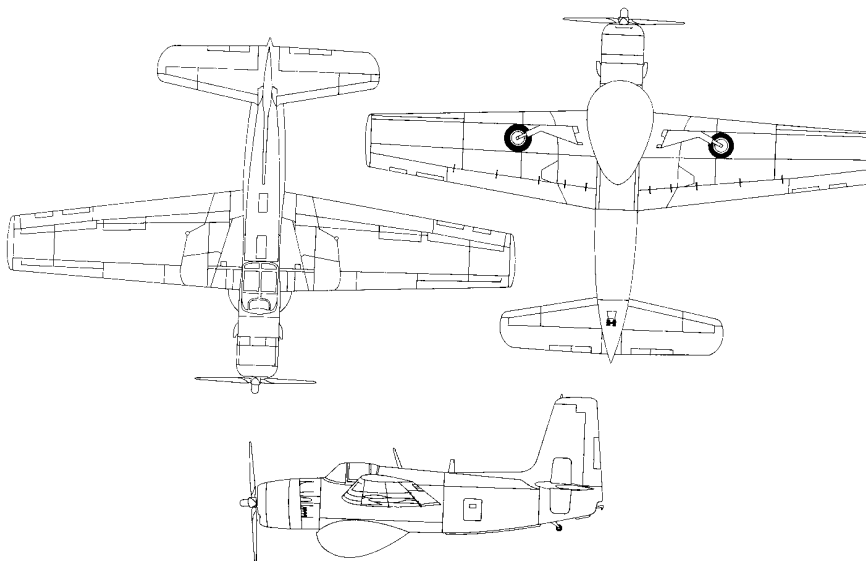
Radar Altimeter AN/APN-1 or AN/APN-22  
 Range Receiver R-23A/ARC-5  
 Radar Countermeasures AN/APR-9B and AN/APA-70C  
 Radar AN/APS-20C  
 Speed Control Kit AN/APS-20  
 Radar Receiving Set AN/APR-12  
 Radar Relay Transmitter AN/ART-26 or AN/ART-28  
 Ground Position Indicator AN/APA-57A or AN/APA-57C or AN/APA-81  
 IFF AN/APX-2 or AN/APX-2A or AN/APX-6 or AN/APX-7  
 Combat Range: 750-1,315 nautical miles

**AF-3S (Mission and Description):**

Same as the AF-2S but with MAD gear installed.

**Bureau Numbers**

XTB3F-1 90504  
 XTB3F-2S 90505  
 XTB3F-1S 90506 (XTB3F-1S canceled)  
 AF-2S 123088-123116 (Even numbers to AF-2S)  
 AF-2W 123089-123117 (Odd numbers to AF-2W)  
 AF-2W 124187-124209 (Odd numbers to AF-2W)  
 AF-2S 124188-124210 (Even numbers to AF-2S)  
 AF-2S 124778-124848 (Even numbers to AF-2S)  
 AF-2W 124779-124849 (Odd numbers to AF-2W)  
 AF-2S 126720-126737  
 AF-2W 126738-126755  
 AF-2S 126756-126821  
 AF-2W 126822-126835  
 AF-2S 129196-129242  
 AF-3S 129243-129257  
 AF-2W 129258-129299  
 AF-3S 130364-130388  
 AF-2W 130389-130404



*Line drawings for an AF Guardian.*

## AJ (A-2) Savage

On 24 June 1946, the Navy awarded North American a contract to build the aircraft that would become the AJ Savage. Intended as a carrier based bomber, the AJ was first reported in squadron service by VC-5 on 13 September 1949. It was eventually redesignated A-2.

First contract	26 June 1946
First flight	3 July 1948
First reported in squadron	13 Sept 1949
Last delivery	June 1954
Last reported in squadron	An AJ-2P by VAP-62 and VCP-61 in January 1960
Number Accepted	143



*An AJ-2 Savage.*

### **Models Accepted from the Manufacturer (New Builds)**

**XAJ-1:**

Experimental version.

**AJ-1 (Redesignated A-2A):**

Crew of three in pressurized cockpit. Wing contained slotted flaps. Power boost system for ailerons, elevators, and rudder.

**Weights:**

Empty	27,558 lbs
Basic	27,938 lbs
Design	47,000 lbs
Combat	35,742 lbs
Maximum take off	50,954 lbs
Maximum Landing	41,300 lbs

**Power plant:**

Two Pratt & Whitney R-2800 44W propellers on wings.  
One Allison J-33-A-1 turbojet in tail.

**Dimensions:**

Wing area	836 sq ft
Wing span	71 ft 5 in
Length	63 ft 1 in
Height	20 ft 5 in

**Ordnance:**

Guns	None
Maximum Bomb Capacity	12,000 lbs

**AJ-2:**

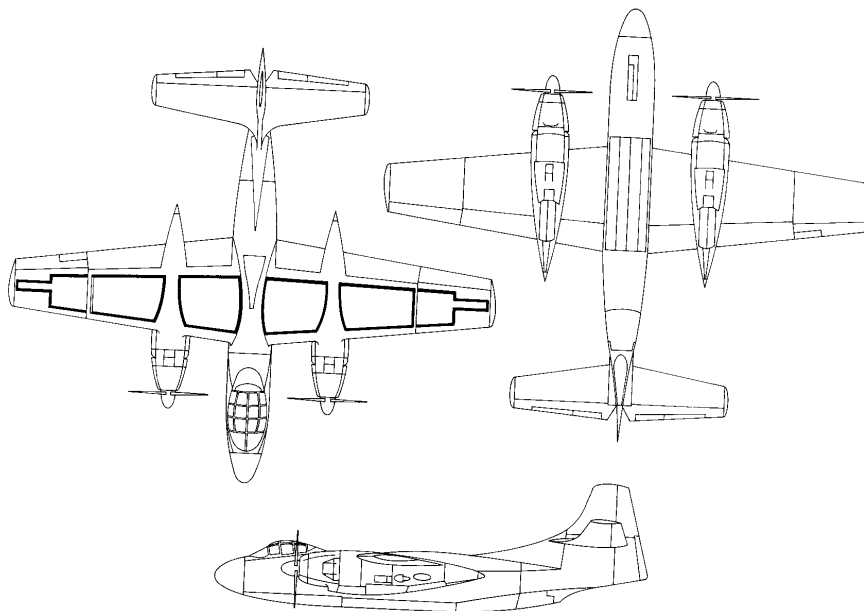
The AJ-1 with two Pratt & Whitney R-2800-48 and one Allison J33-A-10 engine. Fuel capacity was increased over that of AJ-1.

**AJ-2P:**

AJ-2 aircraft with nose redesigned to accommodate cameras.

### **Bureau Numbers**

XAJ-1	121460-121462
AJ-1	122590-122601
AJ-1	124157-124186
AJ-1	124850-124864
AJ-2P	128043-128051
AJ-2P	129185-129195
AJ-2	130405-130421
AJ-2P	130422-130425
AJ-2	134035-134072
AJ-2P	134073-134075



*Line drawings for an AJ Savage.*



## AM Mauler

Improvements in engines and aircraft design led the Navy to abandon its old system of using different aircraft such as SB for Scout Bomber and TB for Torpedo Bomber and to combine these missions in one aircraft. The Douglas Company's BT2D was an example of an aircraft that was to combine the bombing and torpedo launching functions in one airframe. The Martin Company's BTM was designed in the same spirit. Eventually the old system of designation reflected the

changes when the letter A for Attack replaced S (Scout), B (Bomber) and T (Torpedo). The BT2D served virtually all its life as the AD and later A-1. The BTM is remembered as the AM Mauler.

First contract	14 January 1944
First flight	26 August 1944
First reported in squadron	1 March 1948
Last delivery	October 1949
Last reported in squadron	An AM-1Q on 1 October 1950 by VC-4
Number Accepted	152



*An AM-1 Mauler in flight carrying a full load of ordnance, March 1949.*

### **Models Accepted from the Manufacturer (New Builds)**

**XBTM-1:**

Experimental model of the AM-1.

**AM-1**

Torpedo and dive bomber, also for use in scouting missions. All bombs, mines, torpedoes, rockets, etc. were carried externally on three pylons on wings and fuselage. Provision for radar on right wing pylon. One crew. Structure was conventional, all-metal. Split dive brakes interlocked with landing flaps. Capable

of carrying incendiary and fragmentation clusters and smoke tanks.

**Weight:**

Empty	15,100 lbs
Basic	15,830 lbs
Design	19,450 lbs
Combat	20,083 lbs
Maximum take off	25,000 lbs
Maximum landing	17,950 lbs on carrier. 20,600 lbs on land.

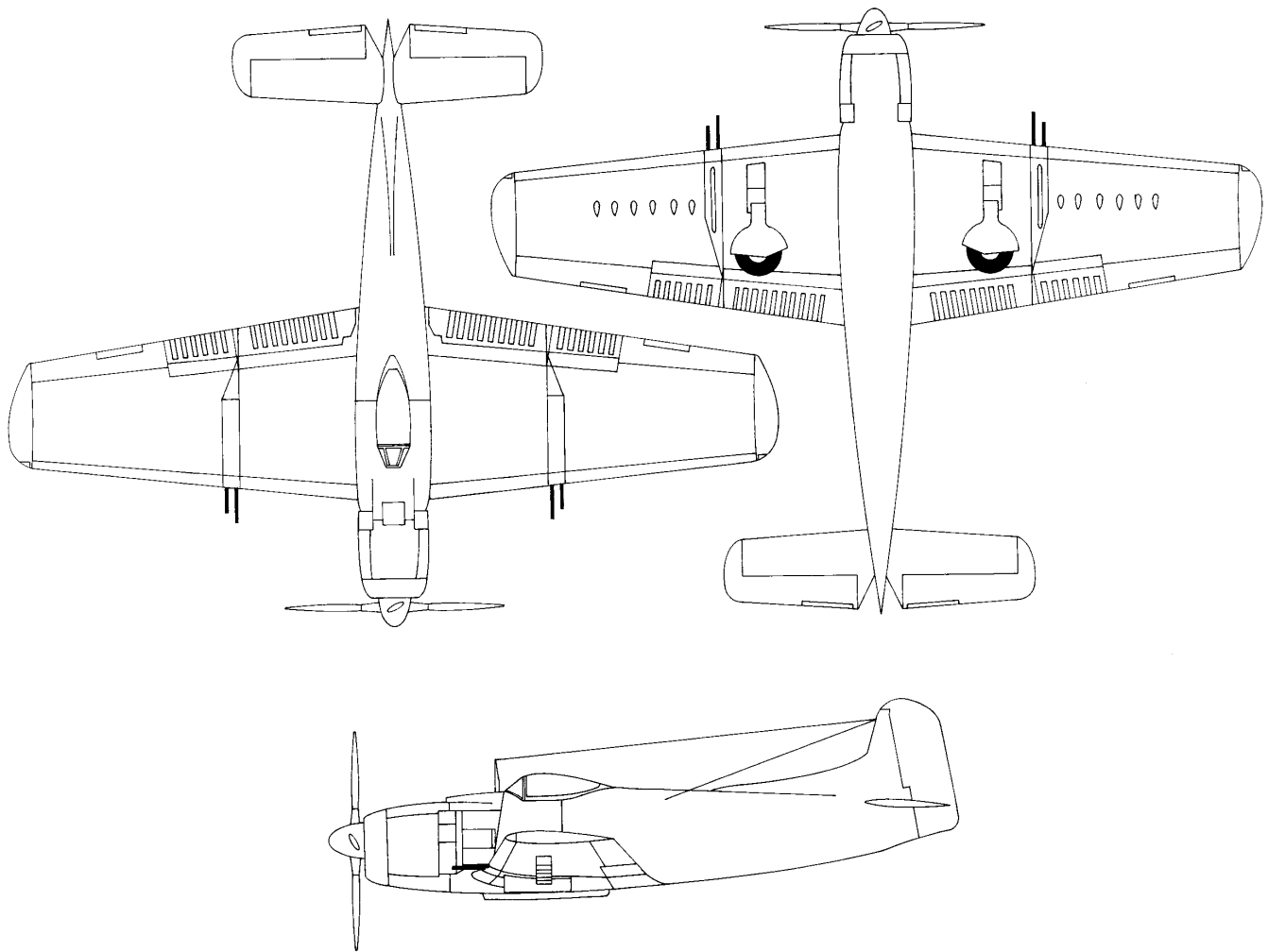
Power plant One Pratt & Whitney R-4360-4W.  
Dimensions:

Wing area            496 sq ft  
 Wing span          50 ft 1 3/8 in  
 Length              41 ft 8 13/16 in  
 Height               16 ft 10 5/8 in  
 Ordnance:  
   Guns                four 20 mm (M3) with 800 rounds  
   Maximum Bomb  
     Capacity          6,000 lbs

**AM-1Q:**  
 Equipped for radar countermeasures.

**Bureau Numbers**

XBTM-1	85161-85162
AM-1	22257-22295
AM-1Q	22296
AM-1	22297-22345
AM-1Q	22346-22355
AM-1	22356-22856
AM-1Q	122388-122393
AM-1	122394-122437



*Line drawings for an AM Mauler.*