

**Model Number :** A-7

**Model Name :** Corsair II

**Model Type:** Tactical Fighter, Trainer



The LTV A-7 Corsair II was one of the most successful military aircraft of modern times and probably the greatest bargain in weapon system procurement history. The taxpayer certainly got his money's worth and the naval aviator was provided an efficient vehicle for operational training and a superior weapon for combat. A-7A's cost a little over one million dollars each and delivered weapons with an accuracy unheard of in their day, while achieving the lowest loss rate of any aircraft in the Vietnam war. Later A-7 models

went on to pioneer sophisticated avionics systems which are the norm today. The head-up display, the central navigation-weapon delivery computer and many other avionics innovations were first used on the A-7. The life of the A-7 covers several periods. The A-7A, B and C were basically the same airplane with engine updates and other system modifications related to the engine. The A-7D



and A-7E were giant steps into the future, with sophisticated avionics suites which set the pattern for all future weapon delivery and navigation systems. The next phase was a series of two-place designs, encompassing the U.S. Navy TA-7C, U.S. Air Force A-7K, Greek TA-7H and Portuguese TA-7P. Then came the low-altitude night attack (LANA) version of the A-7D and A-7K. Finally, there came a major propulsion upgrade which took the A-7 into the supersonic performance range as the U.S. Air Force YA-7F. The A-7A first flew in September 1965, and the first operational U.S. Navy squadron airplane was delivered in October 1966. An incredible first-flight-to-first-delivery record! The Navy entered combat with the A-7A in December 1967. The U.S. Navy flew its final A-7E combat missions during the Gulf War in 1990, and the A-7D's and A-7K's were retired from active service in 1993, with final operations still being conducted by Air National Guard units. The A-7, in all of its variants, had a remarkable record of success in flight operations and in combat. A truly successful airplane.



A total of 1,545 airframes were manufactured, and of these 113 were remanufactured to produce additional models of the airplane. This included 60 TA-7C's, 44 A-7B's, 6 TA-7P's and 2 YA-7F's. Though seldom publicized, it racked up accomplishments of startling proportions. In over 5 million flight hours between 1968 and 1991, U.S. Air Force and U.S.



Navy A-7's were the U.S. military's most cost-effective aerial weapon. It was noted for capability to carry very heavy weapon loads (up to 20,000 pounds), ultra low maintenance requirements (9 to 11 maintenance man hours per flight hour), superior weapon delivery accuracy (bombing within 50

meters of friendly troops), long range ( up to 4,250 nautical miles), low loss rate in combat (0.04%), and very low accident rate. It was also an airplane that was easy to fly and that was well liked by the pilots.

Unfortunately, DOD's desire for multi-role supersonic fighter/attack aircraft with stealth capabilities spelled doom for the A-7 and for low-cost combat aircraft in general. The day of the single-purpose combat aircraft that cost under \$5M gave way to the \$50M fighter/attack machine, at least in the United States. However, this trusty workhorse will be around for many years as an international warplane because of the incredible punch it can deliver at a very low price. The A-7's in storage at Davis-Monthan Air Force Base in Tucson, Arizona are fast disappearing and soon will be no more. It is sad sight to see such a marvelous piece of machinery, still fully capable, regulated to the scrap heap. However, thanks to our program support to our allies around the globe, A-7's are still in service in Portugal, Greece, and Thailand. Like the DC-3, the A-7 is likely to be around many decades in the future.

**Model Number :** A-7A

**Model Name :** Corsair II

**Model Type:** Attack Bomber

The initial contract, N0w-0363f, specified a total of 199 airplanes to be designated the A-7A. Design work began immediately and first flight took place in September 1965, only 18 months after the winner was announced. This is a record unequaled by any other modern military jet aircraft program. To add to its fine performance in the design program, LTV delivered the first A-7A to an operational Navy squadron in September 1966, only 12 months after first flight, another record which has never been equaled and is not likely to be.



Powered by the Navy-chosen Pratt & Whitney TF-30P6 non-afterburning engine which delivered 11,350 pounds thrust and weighed a mere 14,857 pounds, this sturdy little "bomb truck" could carry as much as 10,200 of pounds of fuel, which would allow it to stay in the air for over 12 hours! The normal weapon load was around 15,000 pounds, which was carried on eight store stations, but the A-7A demonstrated the capability to carry 20,000 pounds of ordnance. An incredible mix of weapons and fuel loading produced varying radius-of-action capabilities within its 42,000-pound gross weight limit.

**A-7:**

<b>Dimensions</b>	
Wingspan	38.73 ft
Overall Length	46.13 ft
Height	16.06 ft

<b>Weights and Capacities</b>	
Empty Weight	14857 lb
Gross Weight	31994 lb
Useful Load	
Fuel Capacity	10200 gal
Oil Capacity	
<b>Powerplant Characteristics</b>	
Type: Pratt & Whitney TF30-P6	
Rating Thrust	11350 lb
Rating Thrust with afterburner	
Weight	
Size (length X diameter)	
<b>Performance</b>	
Maximum Speed, Sea Level with afterburner	
Landing Speed, Sea Level	
Stall Speed, Sea Level	
Takeoff Distance	4150 ft
Climb to 30K feet	11.9 min
Maximum Range	
Service Ceiling	
Absolute Ceiling	
<b>Crew: 1</b>	
<b>Armament:</b> See Overview - <a href="#">“A-7 Aircraft Performance Perspective”</a>	

**Model Number :** A-7

**Model Name :** Corsair II

**Model Type:** Attack Bomber, Tactical Fighter, Trainer

### **A-7 Aircraft Performance Perspective**

Simply stated, aircraft performance is defined as how far, how fast, how high, and carrying what for how long to perform a specific task. Stated in the vernacular of the aircraft designer, these are *range, speed, altitude, payload, duration* and *mission*.

Defining the performance of the A-7, or any other modern military aircraft, is a very complex task because there are so many variables, all interacting with each other. To simply state the maximum or minimum value of a performance element gives only the most general feel for the vehicle.

The complexity of this issue is revealed by the Flight Handbook, USAF Technical Order 1A-7D-1, Section V, Operational Limitations, which requires 53 pages to define 34 stores (weapons and external fuel tanks) that can be loaded on the 68 store stations of the A-7 in 216 different configurations! Each of these configurations affects airspeed and acceleration (g-load) for carriage, employment, and release and jettison factors. Each configuration also affects dive angle, cg (center of gravity), range, total drag, total aircraft weight, and, in some cases, takeoff distance and maximum altitude.

However, so that some comparison can be made of the different models in the A-7 family, we have taken the CLOSE AIR SUPPORT and SEARCH & SURVEILLANCE missions as examples. For each mission in the comparison, the payload is defined as 6 Mark 82 Low-Drag General Purpose bombs, 500 rounds of 20-mm ammunition, and a full fuel load.

<b>PERFORMANCE COMPARISON OF VARIOUS MODELS OF A-7 AIRCRAFT</b>							
	<b>AIRCRAFT MODEL</b>						
<b>CONDITIONS, VARIABLES AND PERFORMANCE</b>	<b>A-7A</b>	<b>A-7B</b>	<b>A-7C</b>	<b>A-7D</b>	<b>A-7E</b>	<b>A-7H</b>	<b>A-7H</b>
<b>CONDITIONS</b>							
6 MK-82 LDGP bombs and 500 rounds of 20-mm ammo.							
<b>VARIABLES</b>							
Takeoff weight -lbs	31994	32204	33613	35234	35104	34539	35443
Fuel weight - lbs	10200	10172	10172	9263	10036	9593	10200
<b>PERFORMANCE</b>							
Takeoff distance FT	4150	3300	3700	3900	4000	3750	4200
Time to climb to 30K feet - mins	11.9	7.6	8.4	8.2	7.7	7.8	9.7
Close Air Support Mission time on target with 300 NM radius of action - hrs	2.86	2.20	2.00	1.20	1.48	1.30	1.75
Search and Surveillance	2.70	2.10	1.90	1.10	1.40	1.20	1.70

Mission search time with 300 NM radius of action - hrs							

<b>PERFORMANCE COMPARISON OF VARIOUS MODELS OF A-7 AIRCRAFT</b>							
<b>CONDITIONS, VARIABLES AND PERFORMANCE</b>	<b>AIRCRAFT MODEL</b>						
	<b>TA-7H</b>	<b>A-7K</b>	<b>A-7P</b>	<b>TA-7P</b>	<b>A-7D LANA</b>	<b>A-7K LANA</b>	<b>YA-7F</b>
<b>CONDITIONS</b>							
6 MK-82 LDGP bombs and 500 rounds of 20-mm ammo.							
<b>VARIABLES</b>							
Takeoff weight -lbs	35455	36686	32708	34026	35357	36818	46000
Fuel weight - lbs	9620	9263	10036	10043	9263	9263	10638
<b>PERFORMANCE</b>							
Takeoff distance FT	4150	4250	3450	3800	3900	4250	3500
Time to climb to 30K feet - mins	8.4	9.2	7.9	8.8	8.2	9.2	5.2
Close Air Support Mission time on target with 300 NM radius of action - hrs	1.15	0.96	2.06	1.08	1.20	0.96	2.20
Search and Surveillance Mission search time with 300 NM radius of action - hrs	1.05	0.90	1.96	1.75	1.10	0.90	2.10

**Model Number :** A-7B  
**Model Name :** Corsair II  
**Model Type:** Attack Bomber

In the normal evolution of the aircraft and propulsion system, the second lot of A-7 aircraft was upgraded with the TF-30P8 engine, rated at 12,200 pounds thrust, and was designated the "B" model. A total of 196 A-7B's was manufactured in a single lot under contract number N00019-67-C-0082. The A-7B model had exactly the same structural configuration as the A-7A and could be distinguished externally only by the serial numbers. The A-7B was 1308 pounds heavier. The TACAN and radar altimeter systems were updated to later models. Performance was improved by approximately eight percent with the upgraded engine. The A-7B first flew on 6 February 1968 and the first squadron deployed aboard the carrier U.S.S Enterprise on 6 January 1969 and entered combat in Vietnam with squadrons VA-126 and VA-215 on 4 March 1969. As did its older brother, the A-model, the B-bird had a productive combat tour with small losses and high target destruction rates.



**Model Number :** A-7C  
**Model Name :** Corsair II  
**Model Type:** Attack Bomber

To meet production schedules, the first 67 Navy airplanes, which would desirably have been equipped and designated as E-models, were equipped with the P&W TF-30P-408 engine. Because of the engine difference and the inclusion of other components also used in the A-7B, which made these 67 somewhat of a hybrid model, the Navy decided to redesignate this lot as the A-7C. Other B-model systems and features used in the C-model included the dual hydraulic system instead of the triple system, the ESCAPAC IG ejection seat versus the SJU-8/A, resulting in a minus 1542-pound empty weight and a small difference in performance. Later, the Navy retrofitted these airplanes with the TF-41 engine, but retained the C model designation (surely this was a move devised to confuse historians).



<b>Dimensions</b>	
Wingspan	38.73 ft
Overall Length	46.13 ft
Height	16.06 ft



<b>Weights and Capacities</b>	
Empty Weight	17568 lb
Gross Weight	33613 lb
Useful Load	
Fuel Capacity	10172 gal
Oil Capacity	
<b>Powerplant Characteristics</b>	
Type: Pratt & Whitney TF30-P6	
Rating Thrust	13400 lb
Rating Thrust with afterburner	
Weight	
Size (length X diameter)	
<b>Performance</b>	
Maximum Speed, Sea Level with afterburner	
Landing Speed, Sea Level	
Stall Speed, Sea Level	
Takeoff Distance	3700 ft
Climb to 30K feet	8.4 min
Maximum Range	
Service Ceiling	
Absolute Ceiling	
<b>Crew: 1</b>	
<b>Armament:</b> See Overview - <a href="#">“A-7 Aircraft Performance Perspective”</a>	

**Model Number :** A-7D (Air Force), A-7E (Navy)

**Model Name :** Corsair II

**Model Type:** Attack Bomber

A part of the original VA(L) RFP called for consideration of an advanced avionics concept designated as the Integrated Light Attack Avionics Suite 1965 (ILAAS 65). This was a concept being developed by the Sperry Corporation under a U.S. Navy Research & Development contract and intended for incorporation in A-7's when the LTV airframe had sufficiently matured and the avionics suite was in a satisfactory state of development. The A-7E was intended to be the recipient of this fine new system, but there was a long road to travel before the



avionics suite would be available. Entry of the U. S. Air Force into the procurement process introduced further delays.

While Vought and the Navy were launching the A-7E configuration studies, DOD was lobbying Congress for funds to buy a version of the A-7 for the Air Force. This was based on studies which indicated that a single-purpose attack aircraft would be many times more cost-effective than trying to satisfy the Vietnam ground war close support requirements with high-performance fighters equipped to drop bombs. Congress approved the funds in 1966 and the program was underway. As the Air Force defined its requirements, it soon became obvious that the 20-plus changes they defined would create a new model of the aircraft, and the A-7D designation was assigned. The program was to be managed out of the U.S. Navy Program Office in Washington D..C. and was headed by a crusty and crafty old fighter pilot of World War II fame, Thomas (Black Tom) Gallagher. His Deputies were Navy Captain Bob Doss and Air Force Colonel Bob Hails. Bob Doss was a true visionary with great skills in the field of avionics. Captain Doss deserves the lion's share of the credit for the success of the avionics suite used in the A-7D and A-7E airplanes. Bob Hails led the A-7D development through a veritable minefield of technical and political considerations.

Given that DoD, not the Air Force, selected the A-7, Colonel Hails had a very difficult task in keeping his Air Force bosses happy, while maintaining the program on an even keel. With Sol Love leading the company team, it was indeed a powerful triumvirate.

Hallmark of this A-7 series was the incorporation of a state-of-the-art Navigation/Weapon Delivery system built around the ASN-91 Central Computer. Major systems elements included the APQ-126 Radar, AVQ-7 Head-Up Display, and a Projected Map Display system. There were also major improvements in the Doppler Radar, Inertial Navigation System, and Weapon Control System.

The other major change was in the propulsion system. More thrust was desired by both services but the TF-30 engine had reached its limit of development without thrust augmentation, and an afterburning version was at least three years down the road. An ideal replacement candidate was the Rolls Royce Spey commercial engine. Rolls Royce teamed with Allison and bid a military version of the Spey. It became the TF-41 and filled the bill. The USAF TF-41-A1 version supplied 14,250 pounds of thrust, and the Navy's TF-41-A-2 model produced 15,000 pounds.

There were other significant changes that the Air Force required, some of which were picked up by the Navy in the A-7E version. The M-61 "Gatling Gun", with its incredible rate of fire, was one of the changes picked up by the Navy.



Peculiar to the Air Force A-7D were the band receptacle type of inflight refueling system, higher energy-

rated wheels, tires, and brakes, and the ESCAPAC IC ejection seat, modified to utilize the USAF survival kit and restraint system together with a low-pressure, demand-type oxygen system.

Both the A7-D and the A-7E aircraft went on to establish an impressive string of combat successes in Vietnam.



<b>Dimensions</b>		
Wingspan	38.73 ft	38.73 ft
Overall Length	46.13 ft	46.13 ft
Height	16.06 ft	16.06 ft
<b>Weights and Capacities</b>		
Empty Weight	19792 lb	19111 lb
Gross Weight	35234 lb	35104 lb
Useful Load		
Fuel Capacity	9263 lb	100036 lb
Oil Capacity		
<b>Powerplant Characteristics</b>		
Type: Allison TF41-A-1(A-7D) Allison TF41-A-2 (A-7E)		
Rating Thrust	11350 lb	14800 lb
Rating Thrust with afterburner		
Weight		
Size (length X diameter)		
<b>Performance</b>		
Maximum Speed, Sea Level with afterburner		
Landing Speed, Sea Level		
Stall Speed, Sea Level		
Takeoff Distance	3900 ft	4000 ft
Climb to 30K feet	8.2 min	7.7 min
Maximum Range		
Service Ceiling		
Absolute Ceiling		
<b>Crew: 1</b>		
<b>Armament:</b> See Overview - " <a href="#">A-7 Aircraft Performance Perspective</a> "		