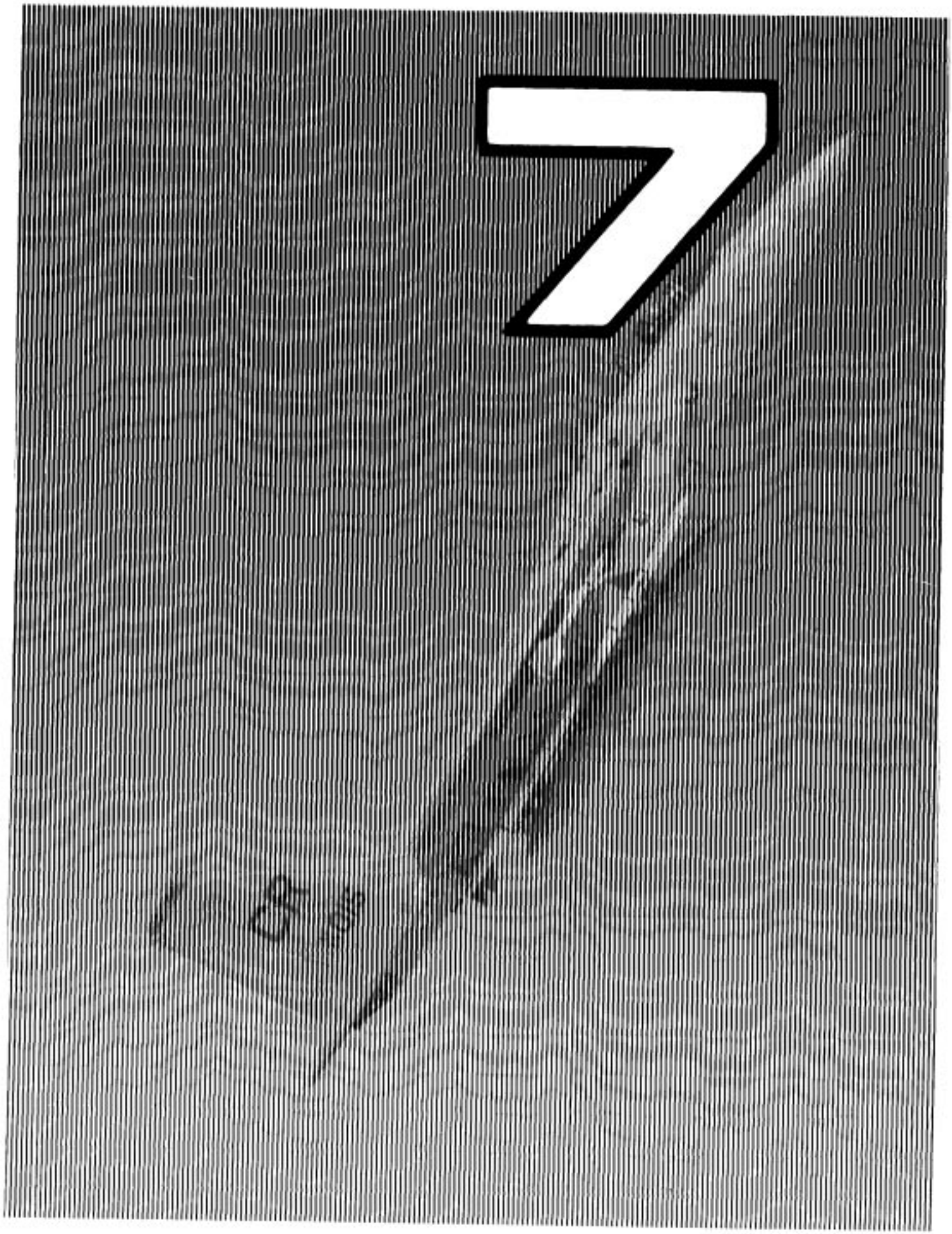

Chapter Seven
Nuclear Capable Aircraft and Bombs

According to the Department of Defense, "any airplane that is designed to carry an ordinary bomb can, with the proper wiring and certification, also carry a nuclear bomb."[1] However, not every airplane or even tactical fighter is so certified. "Most dual capable aircraft have not been optimized for the nuclear strike mission and have deficiencies that limit their effectiveness in this role."[2]

Nuclear bombs are designed for delivery by aircraft either in a bomb bay (internal) or under the wing (external). Aircraft configured for nuclear weapons delivery have an Aircraft Monitoring and Control (AMAC) system installed to monitor and control fuzing, arming, and safing functions of the nuclear bombs. A permissive action link (PAL) or Nuclear Consent Switch is installed in the cockpit to release the weapon for detonation.

Fifteen tactical aircraft are currently modified to carry nuclear weapons (see Table 7.2). Four different kinds of bombs are used in the tactical air forces. These bombs, B28, B43, B57, and B61 (see Chapter Three), vary in yield from approximately 5 kilotons to over 1 megaton. The newest can be delivered at low altitudes at supersonic speeds. Currently there are no nuclear missiles deployed with tactical aircraft.

Nuclear Bombs

All deployed nuclear bombs can be delivered with a variety of options, including ground ("laydown") and airburst detonations. Four delivery and fuzing modes are most common: airburst/retarded, groundburst/retarded, air/full fuzing and ground/full fuzing (see Glossary). Table 7.1 describes the six nuclear bombs deployed or under development. Nuclear bombs must usually be dropped directly over their targets to assure accuracy. In order to achieve optimum heights of air burst with all nuclear bombs to avoid detonation too close to the ground, the delivery aircraft must fly at an altitude that is vulnerable to enemy air defenses. The newer bombs, the deployed B61 and the not yet deployed B83, allow the pilot to release the weapon at as low as 50 feet, activating a parachute-type (drogue) retard and a time-delay fuze.[3] When used at low altitudes, the laydown delivery method is extremely accurate.[4] The accuracy of the B61 and B83 bombs delivered in the laydown mode is reportedly averaging 600 ft CEP.[5] The older bombs, like the B28, B43, and B57, have a minimum delivery altitude of 300-600 feet.[6] They can be delivered "over the shoulder and at low or medium angle loft."[7]

The B83 "Modern Strategic Bomb" is the major new nuclear weapon under development for aircraft delivery. The bomb, will replace the older B28, B43, and B53 bombs. It is entering production in FY 1983 and is planned for deployment starting in 1984-1985 after a long and difficult development period. The B83's roots are in the B77, a very expensive strategic bomb under development in the 1970s. The B77 included improved safety features, but also included a capability for delivery at high speeds at extremely low altitudes.[8] The cost of the B77 grew so excessive that in FY 1979 the program was cancelled, and a modified B43 model took its place.[9] Congress, however, directed that FY 1978 and 1979 funds not be expended on a modified B43 and instead allocated funds for development of a cheaper new strategic bomb. The B83, initiated in FY 1980, is a modern strategic bomb which contains most of the essential features of the B77, but at reduced cost.[10]

The B83 is intended to "enhance the effectiveness of the strategic nuclear gravity bomb stockpile."[11] The primary reason for developing the B83 is to enable tactical and strategic aircraft to deliver their weapons while flying low level, supersonic evasion missions.[12] With a 150 foot low-level high speed delivery capability and yield in the megaton range, the B83 will be capable of destroying "hardened Soviet ICBM silo and launch complexes, command, control and communication installations, and nuclear storage sites."[13] The B83 is the first megaton yield bomb specifically designed for groundburst retarded ("laydown") delivery against hard targets.[14] The production schedule of the B83 is being increased to meet larger strategic bomber force requirements with deployment of the B-1B.[15]

1 SASC, FY 1982 DOD, Part 7, p. 389.
2 JCS, FY 1982, p. 78.
3 ACDA, FY 1979 ACIS, p. 92.
4 ACDA, FY 1980 ACIS, p. 169.
5 *Aerospace Daily*, 28 December 1978, p. 263.
6 ACDA, FY 1979 ACIS, p. 92; ACDA, FY 1980 ACIS, p. 169.
7 ACDA, FY 1979 ACIS, p. 92.
8 SASC, FY 1979 DOE, p. 41.
9 Cancellation was also tied to cancellation of the B-1.
10 HAC, FY 1980 DOD, Part 4, p. 667.
11 ACDA, FY 1983 ACIS, p. 65.
12 Ibid.
13 ACDA, FY 1981 ACIS, p. 114.
14 SANDIA, "Lab News," 12 June 1981.
15 SASC, FY 1983 DOD, Part 7, p. 4172.

Table 7.1
Nuclear Bombs

Type	Weight (lb)	Yield (Kt)	Aircraft
B28	2027-2540	70-1450	A-7, F-4, F-100, F-104, B-52
B43	2060-2330	1000	A-4, A-6, A-7, B-52, F-4, F-100, F-104, F-111, FB-111
B53	8850	9000	B-52
B57	765	5-20	A-4, A-6, A-7, B-52, F-4, F-16, F-18, F-100, F-104, F-111, FB-111, P-3, S-3, SH-3
B61	less than 640	10-500	A-4, A-6, A-7, B-52, F-4, F-16, F-18, F-104, F-111, FB-111
B83	2408	1000+	A-4, A-6, A-7, B-1B, B-52, F-4, F-16, F-111, FB-111

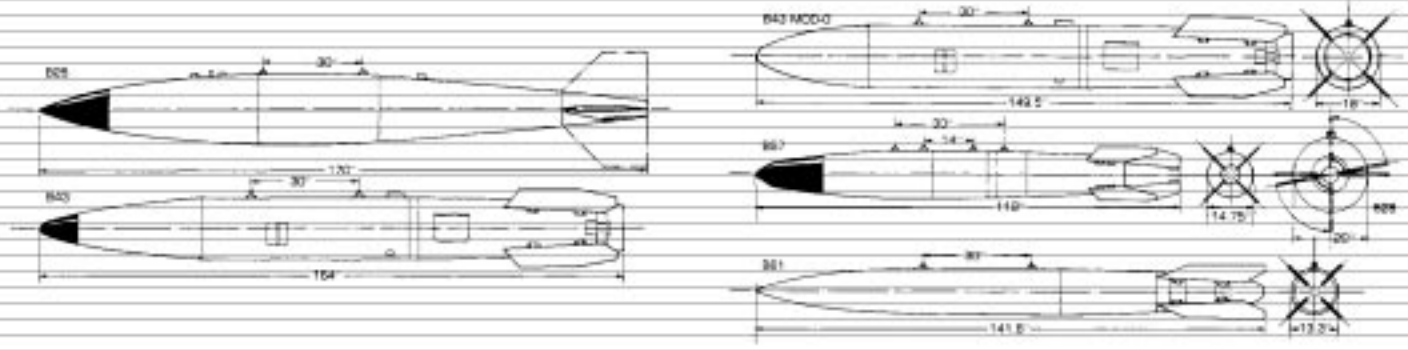

Table 7.2
Nuclear Capable Tactical Aircraft

Type	Function	Service[1]	Nuclear Weapons
A-4	Short-range attack	MC	B43, B57, B61
A-6	Long-range attack	N	B43, B57, B61
A-7	Medium-range attack	ANG, N	B43, B57, B61
AV-8B	Medium-range fighter	MC	B57, B61
CF-101	Interceptor	Canada	GENIE
F-4	Medium-range fighter	AF, N	B28, B43, B57, B61
F-15	Interceptor/fighter	AF	GENIE; bombs
F-16	Medium-range fighter	AF, NATO[2]	B43, B61
F-18/A-18	Medium-range fighter/attack	MC, N	B57, B61
F-100	Medium-range fighter	NATO[3]	B28, B43, B57
F-104	Medium-range fighter	NATO[4]	B28, B43, B57, B61
F-106	Interceptor	AF	GENIE
F-111	Long-range fighter	AF	B43, B57, B61
P-3	Long-range Maritime Patrol	N	B57
S-3	Long-range Maritime Patrol	N	B57
SH-3	Short-range ASW Helicopter	N	B57
SH-60F	Short-range ASW Helicopter	N	B57
TORNADO	Medium-range fighter	NATO[5]	B57, B61

1. Nuclear capable versions.
2. Belgium, Netherlands.
3. Turkey.
4. Belgium, Greece, Italy, Netherlands, West Germany.
5. Italy, West Germany.

B83

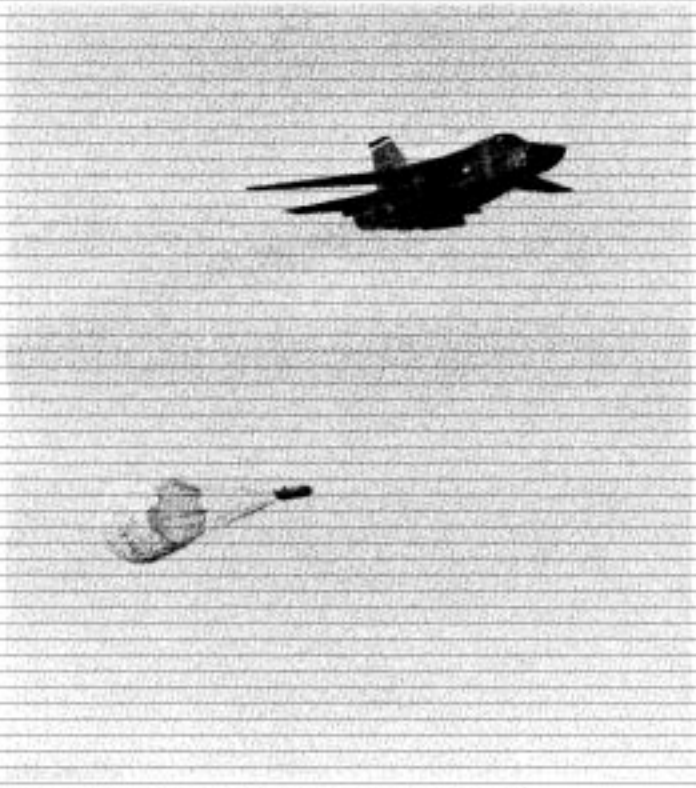

Figure 7.1 F-111 delivering **B83** bomb prototype.

FUNCTION:	Modern high-yield strategic bomb, with improved low level delivery capability.[1]
WARHEAD MODIFICATIONS:	none known
SPECIFICATIONS:	
Yield:	probably 1000+ Kt, "high yield,"[2] "megaton class"[3]
Weight:	2408 lb[4]
Dimensions:	
Length:	12 ft
Diameter	unknown
Materials:	probably plutonium/oralloy mixed weapon; IHE (probably PBX-9502)[5]
SAFEGUARDS AND ARMING FEATURES:	Category D PAL, nonviolent command disable;[6] weak link/strong link, one-point safe by the present criterion[7]
FUZING AND DELIVERY MODE:	improved low-level, high speed delivery capabilities;[8] airburst, groundburst, full fuzing; new parachute design permits the B83 to be dropped at transonic and supersonic speeds (up to Mach 2), slowing down the bomb to 60 mph to withstand the shock of delivery at high speeds from altitudes as low as 150 feet and as high as 50,000 feet[9]
DEVELOPMENT:	
Laboratory:	LLNL
History:	
IOC:	1984
Jan 1979	Lab assignment (Phase 3)[10] (through FY 1983)[11]
1981	B83 enters Phase 4[12]
1984	initial deployment (Phase 5)
Production Period:	1983-
DEPLOYMENT:	
Number Planned:	approximately 2500 (1983)
Delivery System:	primarily carried by the B-1B, B-52, and FB-111 strategic bombers; F-4, F-111, A-4, A-6, A-7, and F-16 will be secondary carriers.[13] It will be the major gravity weapon for the B-1B.[14]
Service:	Air Force, Navy
Allied User:	none planned

COMMENTS:

B83 is scheduled as a replacement for the older high-yield bombs, the B28, B53, and B43.[15] Because of the development of the B83, the production and development of the B77 was never executed.[16] The B77 was cancelled in 1978 and development was shifted to a variant of the B43Y1, then the B83. The B83 is still one of the more complicated and expensive bombs.[17]

1 HASC, FY 1982 DOE, p. 116.
2 SASC, FY 1981 DOE, p. 37.
3 Dennis Rockstroh, "A New Hydrogen Bomb Being Built," *San Jose Mercury*, 5 July 1981; information also provided by Sandia Corporation.
4 Sandia, "Lab News," 12 June 1981; GAO, Draft Study for B-1.
5 ACDA, FY 1982 ACIS, p. 115; SASC, FY 1981 DOE, p. 37.
6 ACDA, FY 1982 ACIS, p. 115.
7 ACDA, FY 1981 ACIS, p. 115-116; ACDA, FY 1983 ACIS, p. 65: "One point safe means that the probability of achieving a nuclear yield greater than four pounds of TNT equivalent shall not exceed one in one million in the event of a detonation initiated at a single point in the high explosive system."
8 SAC, FY 1981 EWDA, Part 2, p. 720.
9 ACDA, FY 1981 ACIS, p. 115; ACDA, FY 1983 ACIS, p. 65.
10 Continued in Phase 3 in FY 1982; SAC, FY 1981 EWDA, p. 818.
11 DOE Justification, FY 1983, p. 51.
12 Sandia, "Lab News," 12 June 1981.
13 HAC, FY 1981 EWDA, Part 4, p. 2669; HASC, FY 1981 DOE, p. 119; SASC, FY 1981 DOE, p. 37.
14 GAO, Draft Study for B-1.
15 SASC, FY 1981 DOE, p. 37; SASC, FY 1983 DOD, Part 7, p. 4172.
16 HAC, FY 1980 EWDA, p. 2050.
17 SASC, FY 1981 DOE, p. 32.

7

Future Nuclear Capable Aircraft

Tactical Nuclear Air-Launched Missiles[1]

While the nuclear capability of tactical aircraft consists entirely of gravity bombs, missiles with standoff capabilities and improved accuracies are under development. The BULLPUP (W-45) and the WALLEYE (W-72), both retired in 1978-1979, were the last nuclear armed air-to-surface missiles to be deployed with tactical air forces. Although the WALLEYE missile resulted from air-delivered standoff weapons using terminal guidance developed during the Vietnam War, nuclear armed versions were never adopted in large numbers. Improved modifications of the B61 bomb (and development of the B83) were pursued instead.

In 1972, a research program—Tactical Air-to-Surface Munition (TASM)—began to investigate the possibility of an accurate standoff capability with nuclear bombs. In May 1974, the program was redirected toward the development of an Extended Range Bomb (ERB) which called for a single weapon with all-weather inertial guidance, terminal guidance, and return-to-target capability against mobile battlefield targets. The TASM/ERB program consists of two separate tracks: one to develop a new standoff weapon with new warhead and greatly increased accuracy, and the other to develop modification kits to provide presently stockpiled bombs with a standoff and return-to-target airburst delivery capability. This conversion would require the addition of canards and tail surfaces, a rocket propulsion system, inertial navigation system, flight computer, radar altimeter, and weapon control panel for preflight insertion of target data. The TASM/ERB would be compatible with the A-4, A-6, A-7, F-4, F-16, F-18, F-104, F-111, and TORNADO.

One candidate for the TASM is TIGER (Terminal Guided and Extended Range Missile), a guided nuclear bomb under development since 1972 at Sandia National laboratories.[2] This weapon would allow for delivery of nuclear weapons at low altitudes, either outside of concentrated defense around fixed targets or against mobile targets, with one low level pass. TIGER would have extended range and a return-to-target capability by flying a circular trajectory, minimizing the delivery aircraft's exposure to air defenses. TIGER II is the present model being tested by Sandia as a candidate for the TASM/ERB. TIGER II will use field retrofit kits for the B61 bomb to demonstrate a standoff 90 meter CEP accuracy when delivered from low flying aircraft.

Three nuclear warheads are currently under development for TASM and other future air-delivered weapons. The TASM warhead was reported in Phase 1 during 1982 at DOE, with a yield of 10 Kt against both battlefield and fixed targets.[3] Also reported in Phase 1 during 1982 was the Advanced Tactical Air Delivered Weapon.[4] A feasibility study to design a nuclear warhead for the PHOENIX air-to-air missile was reported in FY 1983.[5]

Future Nuclear Capable Delivery Aircraft

A major expansion of tactical air forces with an increase in nuclear capability is scheduled for this decade. The Air Force tactical fighter force will have 40 full tactical fighter wings (26 active and 14 reserve) by 1985 and will build to full strength of 72 aircraft per wing, or 2880 aircraft. This is equivalent to an increase of some four wings between 1983-1988.[6] By FY 1990, 44 tactical fighter wings are planned, an addition of some 288 aircraft over FY 1982 levels.[7] A fourteenth aircraft carrier (USS *Roosevelt*) will join the Naval air fleet in 1988, which will add another air wing to the Navy's 13 wings. By the early 1990s, the Navy's 600 ship objective, built around 15 aircraft carrier battle groups, will add a 15th air wing.[8]

New aircraft will continue to enter the tactical inventory and replace older models. The tactical air forces will eventually stabilize with F-14, F-15, F-16, F/A-18, and AV-8B high performance aircraft. During the next 10 years, the A-4, A-7, F-4, F-100, F-104, and F-106 will be removed from the active inventory. Allied forces equipped with U.S. nuclear weapons will also undergo a major upgrade by the mid-1980s. The Canadian CF-101s will be replaced by CF-18s, and NATO nuclear armed F-104 aircraft will be replaced with F-16s and European-built TORNADOs.[9]

Rather than developing more high performance aircraft that have either air-to-air or air-to-surface roles, future tactical fighters will be dual role. The aircraft inventory was once composed solely of single role, highly specialized designs that were not capable of freely operating in other modes. In fact, some aircraft were specifically designed as nuclear weapons fighter bombers or interceptors with an internal weapons bay to carry only nuclear bombs or rockets. Only two aircraft of this type are still operational—the Marine Corps A-4M and the Air Force F-106. A third model (F-105) was retired in 1982.

1 Most of the information in this section is taken from Sandia, "TIGER: A Technology to Improve the Delivery Capability of Nuclear Bombs and the Survivability of the Delivery Aircraft," n.d.
2 *AWST*, 2 May 1983, p. 21.
3 Information provided by Sandia.
4 HAC, FY 1983 DOE, p. 95.
5 DOD, FY 1983 RDA, p. VII-14.
6 SAC, FY 1983 DOD, Part 4, p. 146.
7 HAC, FY 1983 DOD, Part 4, p. 146.
8 HAC, FY 1983 DOD, Part 5, p. 179.
9 SASC, FY 1983 DOD, Part 7, p. 4373.

As nuclear weapons became lighter and aircraft and air-to-air missile technology improved, allowing for greater versatility and payloads without sacrificing performance, air-to-surface ground attack aircraft were no longer designed only for bombing, but also for a variety of other roles. A portion of today's aircraft inventory, the so-called workhorses, is comprised of these versatile aircraft: F-111, A-6, A-7, and F-4. The new high performance aircraft first deployed in the 1970s—F-14, F-15, F-16, F/A-18, and AV-8A—largely concentrate on air-to-air or air-to-surface roles. The inclusion of nuclear weapons delivery neither influences design nor complicates other operations. Each of the new planes, with the exception of the F-14, is certified for nuclear weapons delivery.

As the older strike aircraft—specifically the F-4 and F-111—reach the end of their useful life because of attrition through accidents and old age, they will be replaced by a long-range dual role strike fighter which will augment the air-to-surface specialists. The Navy will introduce the F-18 for this role, and the Marine Corps plans the AV-8B. The Air Force, which has recently introduced the F-15 and F-16, has no plans to build another new aircraft until the early 1990s. Instead, the Air Force has established a new program—Tactical Fighter Derivative—to develop a modified F-16 designed to augment the aging F-111 and meet the F-4's requirements until the 1990s when the next generation of fighters is developed.

Tactical Fighter Derivative

The Tactical Fighter Derivative program, started in FY 1983, will examine upgraded dual role ground attack variants of two aircraft, designated the F-15E and the F-16E, which will incorporate improvements in range, payload, all-weather, and nighttime operations. According to the Air Force, the new aircraft will "double the target coverage of the [present] F-4" in Europe and make up for "critical deficiencies" in night/adverse weather operations.[10] Either the F-15 or F-16 candidate airplanes will be selected in FY 1983-1984, and 400 aircraft will be procured for the dual role.[11]

The F-15E derivative fighter will provide a full air-to-ground bombing capability with its greatly increased range and an upgraded and "missionized" rear cockpit for a weapons officer. An early prototype has been flying since 1980 under a McDonnell Douglas program, "STRIKE EAGLE". A new terrain following/terrain avoidance capability with greater ground target resolution and blind weapons delivery capability will be added to the F-15 radars. Nuclear capability would include control mechanisms added to five external weapons stations for nuclear weapons delivery.[12] Cost to develop the F-15E is estimated at $300-350 million. Procurement of 400 of these aircraft would cost $16 billion.[13]

The F-16E derivative fighter would use aerodynamic enhancements to improve the F-16's air-to-air characteristics and range. The new F-16E would employ a new "cranked arrow" (double delta) wing design in place of the current standard wing and horizontal tail. This would result in increased range and payload with more fuel capacity and greater lift. The new wing would also allow weapons to be carried "conformally" (close to the wing), which would reduce drag and give better fuel consumption. A section would be added to the fuselage for a second crew member and additional avionics. A computerized flight control system would be added. Finally, a new engine would be added, either a Pratt & Whitney F100 or General Electric F101 (the derivative fighter engine).[14] Cost to develop the F-16E is estimated at $776.1 million. Procurement of 400 aircraft would cost $12 billion.[15]

Advanced Tactical Fighter

A completely new airplane that is lightweight, reliable, easily maintained, and has increased combat radius and payload is now in development for the 1990s. The Air Force development program promises a "revolutionary change"[16] in capabilities through the incorporation of improved operating efficiencies and lower manufacturing costs, derived from new technology advances.[17] For example, composite structures would be used to achieve a very light weight. Very high speed integrated circuits (VHSIC) would also be used, as well as a new engine design and greater efficiency derived from the cruise missile program.[18] The advanced tactical fighter would incorporate three new major features:[19]

- Stealth technology: "significantly reduced radar and infrared detectability."
- Supersonic Cruise: increased practical (sustained) operating speeds at both high and low altitudes, without penalties in maneuverability, and

10 HAC, FY 1983 DOD, Part 5, p. 629.
11 HAC, FY 1983 DOD, Part 5, p. 565.
12 SAC, FY 1983 DOD, Part 4, p. 249.
13 HAC, FY 1983 DOD, Part 5, p. 630.
14 HAC, FY 1983 DOD, Part 5, pp. 585-585, 601; SASC, FY 1983 DOD, Part 4, p. 150.
15 HAC, FY 1983 DOD, Part 5, p. 630.
16 HAC, FY 1983 DOD, Part 5, p. 586.
17 SAC, FY 1983 DOD, Part 4, p. 130.
18 HAC, FY 1983 DOD, Part 5, pp. 586-588, 633.
19 Ibid.

- Short Take Off and Landing: greatly increased flexibility with ability to operate from runways of less than 2000 ft.

The research and development program for the Advanced Tactical Fighter began in FY 1983. Full scale engineering development is planned for 1987.[20] The earliest possible IOC is 1993, and full scale operations are planned for the mid-1990s.[21]

Table 7.3
Future Tactical Fighter Aircraft Programs

Program	Description (Program Period)
Advanced Fighter Technology Integration (AFTI-16):	Future fighter aircraft testbed using modified F-16A (1978-present)
Advanced Tactical Fighter:	Next generation tactical fighter planned for 1990s with stealth technology, new engine, upgraded avionics (1980-present)
F/A-18L:	Northrop version of F-18 for land-based future lightweight fighter with increased payload (1980-present)
F-16/101:	Test version of F-16 powered by F100 (8-1) engine to determine its suitability as engine for advanced military aircraft (1980-1981)
F-16E/F-16 SCAMP/ F-16XL:	Advanced versions of F-16 with new wing design, simplified flying controls, upgraded weapons load, additional fuel and storage space for future avionics and sensors, derivative fighter candidate (1978-present)
Forward Swept Wing:	DARPA sponsored Grumman tests of smaller, lighter weight, more efficient fighter designs (1980-present)
F-15E/STRIKE EAGLE:	Upgraded all-weather strike and interdiction model of F-15, designed for air-to-surface roles, derivative fighter candidate (1978-present)

20 SAC; FY 1983 DOD; Part 4; p. 130.

21 HAC; FY 1983 DOD; Part 5; p. 386.

Nuclear Capable Aircraft

A-4 SKYHAWK

Figure 7.2 A-4M SKYHAWK.

DESCRIPTION: Light, single-seat, single-engine, carrier-based, attack aircraft used by the Marine Corps.

Nuclear Capable Versions:[a] A-4D/E/M

CONTRACTORS:
McDonnell-Douglas Corp.
Long Beach, CA
(prime/airframe)
Pratt & Whitney Aircraft
East Hartford, CT
(engine)
Hughes Aircraft Co.
Canoga Park, CA
(angle rate bombing system)
IBM Corp. Federal Systems
Oswego, NY
(bombing computer)

SPECIFICATIONS:[a]	(A-4M)[b]
Dimensions:	
Length:	40 ft 3 in
Height:	15 ft
Wingspan:	27 ft 6 in
Takeoff Weight (max):	25,500 lb
Powerplant:	1 P&W J-52-P-408A turbojet[c]
Ceiling:	57,570 ft; 40,800 ft[b]

7

A-4 SKYHAWK

Speed:	(max) 650 mph (Mach 0.94) at 25,000 ft; 700 mph at sea level
Range:	341 mi (550 km) (combat radius); 403 mi (648 km) (combat radius)[4]
Aerial Refueling Capability:	yes
Crew:	1
NUCLEAR WEAPONS:	one nuclear weapon: B28,[5] B43, B57,[6] B61; five weapons stations

DEPLOYMENT:

Number Deployed:	158 built (A-4M)
Locations:	MCAS El Toro, CA; MCAS Cherry Point, NC; MCAS Iwakuni, Japan
Number per Squadron:	16 (UE)

HISTORY:

IOC:	1956 (A-4A); 1970 (A-4M)
1952	preliminary design of A-4 begins
Oct 1952	authority to start production
Jun 1954	first flight of A-4A
1969	production began of A-4M
Apr 1970	A-4M first flight
Nov 1970	first delivery of A-4M
1975	last Navy squadron disbanded
FY 1977	last A-4 procured
Feb 1979	last A-4 delivered (2960th A-4 produced)
COST:	$2.8 m (program) (TY)[9] $5.8 m (flyaway) (FY 1979)[10]

FY	Number Procured	Total Appropriation ($ million)
1982 & prior	158 (A-4M)	399.6[11]

COMMENTS: Originally built as a daylight-only nuclear strike aircraft for use in large numbers from aircraft carriers, the A-4 has been updated for visual reference day or night attack. It has been retired from U.S. Navy use. AV-8B will replace A-4M in Marines starting in 1985.[12] 2960 A-4 and TA-4 SKYHAWKS were built between 1953 and 1979.

1. JCS, FY 1982, p. 76.
2. Information furnished by McDonnell Douglas, "Navy/McDonnell Douglas Skyhawk, Background Information," February 1979.
3. A-4M has an improved engine and weapons delivery capability.
4. Added power of new engine greatly enhanced short field (4000 ft runway) take-off capability.
5. *U.S. Military Aircraft Data Book, 1981*, pp. 2-3 – 2-8.
6. *Ibid.*
7. *Ships and Aircraft of the U.S. Fleet, 11th Ed.*, p. 266.
8. *Ibid.*
9. *U.S. Military Aircraft Data Book*, *op. cit.*
10. *Ibid.*
11. *Ibid.*
12. HAC, FY 1983 DOD, Part 5, p. 282.

A-6 INTRUDER

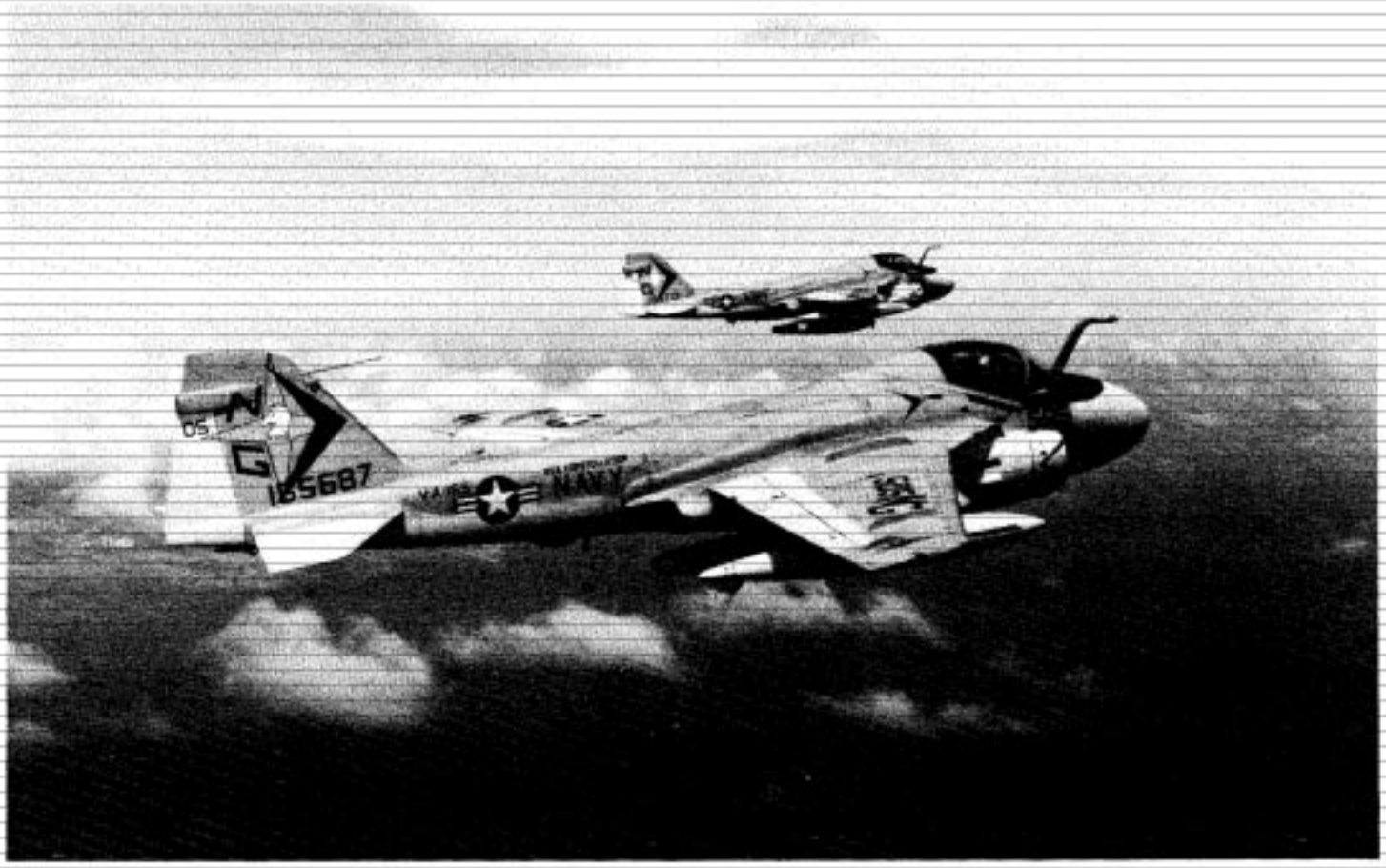

Figure 7.3 A-6 INTRUDER.

DESCRIPTION:	Long-range, two-seat, twin engine, carrier-based, all-weather attack aircraft used by the Navy and Marine Corps.
Nuclear capable versions:	A-6E[1]
CONTRACTORS:	Grumman Aerospace Bethpage, NY (prime) Pratt and Whitney Hartford, CT (engine)

SPECIFICATIONS:	(A-6E)
Dimensions:	
Length:	54 ft 7 in
Height:	16 ft 2 in
Wingspan:	53 ft (25 ft 4 in folded)
Takeoff Weight (max):	60,450 lb
Powerplant:	2 P&W J52-P-8A/B turbojets
Ceiling:	42,400 ft
Speed:	(max) 655 mph (Mach 0.86)

7

A-6 INTRUDER

Range:	370-1125 mi (595-1810 km) (combat radius) (with carrier-based aerial refueling);[3] 1924 mi (combat range)[4]
Aerial Refueling Capability:	yes
Crew:	2 (pilot, bombadier/navigator)
NUCLEAR WEAPONS:	three nuclear weapons;[5] B28,[5] B43, B57,[6] B61; five weapons stations under wings with total capacity of 18,000 lb; HARPOON is also carried on A-6E TRAM
DEPLOYMENT:	
Number deployed:	332 A-6E;[7] 256 A-6;[8] 608 A-6 aircraft produced (1960-1980); 318 operational A-6Es planned
Locations:	MCAS El Toro, CA; MCAS Iwakuni, Japan; MCAS Cherry Point, NC; NAS Oceana, VA; NAS Whidbey Island, WA
Number per Squadron:	10 (UE)[9]
HISTORY:	
IOC:	1963 (A-6); 1972 (A-6E)
Apr 1960	first flight
1969	development begins on A-6E
Feb 1970	A-6E first flight
1975	final delivery of initial buy
1981	HARPOON capability added to A-6[10]
1984	production of A-6E completed
COST (A-6E):[11]	$10.6 m (FY 1978) (flyaway) (TY);[12] $14.8 m (program);[13] $18.5 m (FY 1982) (flyaway); $24.6 m (FY 1983) (flyaway)[14]

FY	Number Procured	Total Appropriation ($ million)
1979 & prior	123	1351.9[15]
1980	6	159.8
1981	12	270.7
1982	12	293.1
1983	8	249.0
1984	6	239.0

COMMENTS: A-6 has low-level navigation and weapons delivery capability at night and in adverse weather.[16] Aircraft in Mediterranean are "dedicated" to SACEUR's Selective Strike Plan.[17] Aircraft also provide nuclear anti-surface ship capability with tactical bombs.[18]

1 Information provided by Grumman Aerospace Corporation, Bethpage, NY.
2 JCS, FY 1982, p. 77.
3 *U.S. Military Aircraft Data Book*, 1981, pp. 2-11, 2-14.
4 Adelphi No. 168, p. 32.
5 *Ships and Aircraft of the U.S. Fleet*, 11th Ed., p. 266.
6 Ibid.
7 As of 1 January 1982: HAC, FY 1983 DOD: Part 5, p. 249; inventory as of 1 January 1981 was 120; HASC, FY 1982 DOD: Part 2, p. 603.
8 As of January 1980: JCS, FY 1982, p. 78.
9 Number reduced from 12 to 10 due to depleted inventory of aircraft: HAC, FY 1980 DOD, Part 7, p. 466.
10 HAC, FY 1983 DOD: Part 5, p. 184.
11 Information provided by Grumman Aerospace Corporation, Bethpage, NY.
12 *U.S. Military Aircraft Data Book*, op. cit.
13 Ibid.
14 Ibid., p. 249.
15 *U.S. Military Aircraft Data Book*, op. cit.
16 Ibid., p. 78.
17 JCS, FY 1981, p. 46.
18 Ibid., p. 45.

A-7 CORSAIR II[1]

Figure 7.4 A-7 CORSAIR.

DESCRIPTION:	Lightweight, single-seat, single-engine, carrier and land based, visual attack aircraft with forward looking infrared, all-weather, and night capability used by the Navy (A-7E) and Air National Guard (A-7D/K).
Nuclear capable versions:[2]	A-7A/B/D/E
CONTRACTORS:	Vought Corporation (LTV, Inc.) Dallas, TX (prime/airframe) Detroit Diesel, Allison Division[3] Indianapolis, IN (engine)

SPECIFICATIONS:	(A-7E)
Dimensions:	
Length:	46 ft, 1.5 in
Height:	16 ft, 2 in
Wingspan:	38 ft 8.5 in
Takeoff Weight (max):	42,000 lb
Powerplant:	1 TA-41-A-2 turbofan
Ceiling:	52,500 ft; 35,500 ft[4]
Speed:	(max) 693 mph at sea level

7

A-7 CORSAIR II

Range:	1123 mi (max) (combat radius clean); 236 mi (loaded with one hour loiter); 1000+ km (with carrier-based aerial refueling)[1]
Aerial Refueling Capability:	yes
Crew:	1; 2 (A-7K)
NUCLEAR WEAPONS:	B28,[4] B43, B57,[5] B61; reportedly capable of carrying 4 nuclear weapons;[6] eight weapons stations, six wing pylons and two missile stations; maximum capacity of wing pylons is 3500 lb.

DEPLOYMENT:

Number deployed:	more than 1500 built; approximately 370 (A-7E) (Navy); 375 (A-7D) (Air National Guard); (A-7B) (Naval Reserve)
Locations:	NAS Cecil Field, FL; NAS Lemoore, CA; NAS Atsugi, Japan; other reserve bases.
Number per Squadron:	12 (UE) (Navy); 24 (UE) (Air Force)

HISTORY:

IOC:	1967 (A-7A); 1969 (A-7E)
Sep 1965	first flight (A-7A)
Nov 1967	development of A-7E for Navy started
Feb 1968	first flight of A-7B
Apr 1968	first flight of A-7D
Nov 1968	A-7E first flight
Sep 1980	procurement of A-7E completed
Apr 1981	Air National Guard begins delivery of new two-seat A-7Ks
COST:	$5.3 m (flyaway) (FY 1977);[9] $4.4 m (program) (TY)[10]

FY	Number Procured	Total Appropriation ($ million)
1979 & prior	596 (A-7E)	2530.3[11]
1980	-	14.5
1981	-	31.2
1982	-	16.0

COMMENTS: Replaced the A-4 SKYHAWK and A-1 SKYRAIDER in the Navy. A-18 will replace A-7 starting in early 1983. Naval aircraft in Mediterranean are "dedicated" to SACEUR's Selective Strike Plan.[12] Naval aircraft also provide nuclear anti-surface ship capability with tactical bombs.[13] A-7 is also flown by Portugal (A-7P) and Greece (A-7H).

1 Information provided by LTV Corporation; background information is also available in "The Story of Sandy, SLUF and the Little Hummers," *Air Intersotional*, March 1982, pp. 121-125+, and April 1982, pp. 168-177+.
2 JCS, FY 1982, p. 78; ACDA, FY 1979 ACIS, p. 162.
3 Engine is Allison built Rolls-Royce designed turbofan.
4 *U.S. Military Aircraft Data Book*, 1981, pp. 2-16, 2-18.
5 JCS, FY 1982, p. 77.
6 *Ships and Aircraft of the U.S. Fleet*, 12th Ed., p. 288.
7 Ibid.
8 Adelphi No. 168, p. 32.
9 *U.S. Military Aircraft Data Book*, op. cit.
10 Ibid.
11 Ibid.
12 JCS, FY 1981, p. 46.
13 Ibid., p. 48.

AV-8B HARRIER II

Figure 7.5 AV-8B HARRIER.

DESCRIPTION:	Vertical or short take-off and landing (V/STOL) close air support attack aircraft planned for the Marine Corps.	Takeoff Weight (max):	29,750 lb
		Powerplant:	1 Rolls-Royce Pegasus II (F402-RR-404) turbofan
CONTRACTORS:	McDonnell-Douglas Corp. St Louis, MO (prime)	Ceiling:	50,000 ft
	Rolls Royce Ltd. Bristol, U.K. (engine)	Speed:	(max) 684 mph
		Takeoff Distance:	0-1200 ft
SPECIFICATIONS:	(AV-8B)	Range:	163 mi (combat radius); 75-890 mi (combat radius)[1]
Dimensions:			
Length:	46 ft 3 in	Aerial Refueling Capability:	yes
Height:	11 ft 6 in		
Wingspan:	30 ft 3 in	Crew:	1

7

AV-8B HARRIER II

NUCLEAR WEAPONS: one nuclear weapon; B61, seven weapons stations, three for heavy weapons, 9000 lb capacity

DEPLOYMENT:

Number Planned: 336 planned for U.S. Marine Corps

Locations: MCAS El Toro, CA; MCAS Cherry Point, NC

Number per Squadron: 20 (UE)

HISTORY:

IOC: September 1985[2]

Nov 1978 first flight of YAV-8B

COST:

Program Cost: $10,111.2 m (Dec 1982)

Unit Cost: $46 m (FY 1982) (flyaway)[4]

FY	Number Procured	Total Appropriation ($ million)
1981 & prior	-	785.64
1982	12	898.7
1983	21	1033.8
1984	32	1165.8

COMMENTS: AV-8B will replace 8 squadrons worth of A-4M and AV-8A aircraft. The AV-8B has twice the range and payload of the current AV-8A. The AV-8B upgrade includes modified engine and airframe and a new graphite wing. The AV-8A is not nuclear certified.

1 Combat radius varies greatly depending upon weight of ordnance, mission profile, and use of vertical takeoff or 1200 ft short takeoff. HASC, FY 1982 DOD, Part 2, p. 610.
2 HAC, FY 1983 DOD, Part 5, p. 188.
3 HASC, FY 1982 DOD, Part 2, p. 609.
4 U.S. Military Aircraft Data Book, 1981, pp. 2-111, 2-122.

CF-101B VOODOO

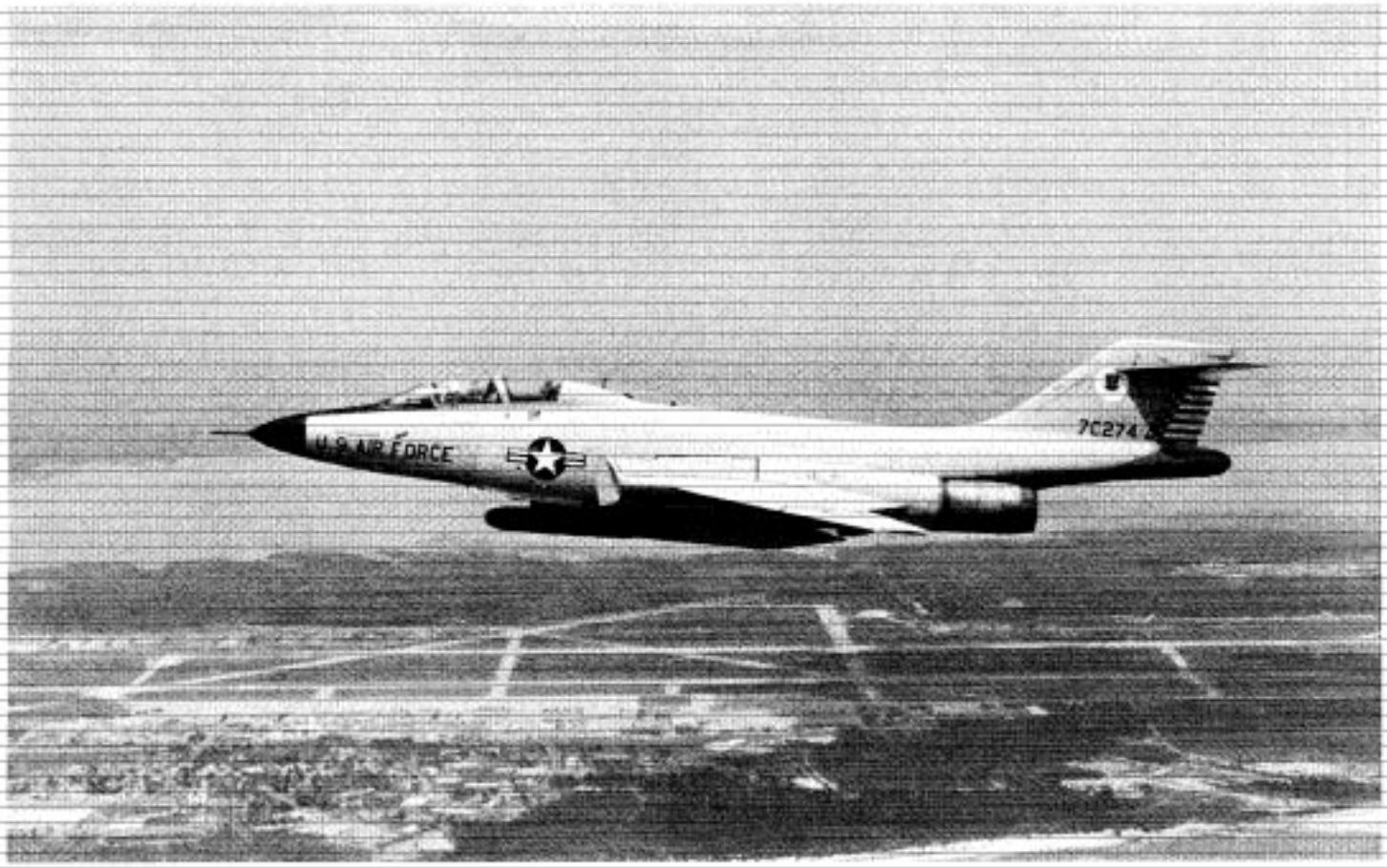

Figure 7.6 F-101B VOODOO.

DESCRIPTION:	Long-range, nuclear armed, strategic interceptor used by Canada (F-101F).
CONTRACTORS:	McDonnell-Douglas (prime/airframe)
SPECIFICATIONS:	(F-101B)
Dimensions:	
Length:	67 ft 4 in
Height:	18 ft
Wingspan:	39 ft 7 in
Takeoff Weight (max):	46,700 lb
Powerplant:	2 J57-PW-55 turbojets
Ceiling:	52,000 feet
Speed:	Mach 1.85 (max)
Range:	1550 nm
Aerial Refueling Capability:	no
Crew:	2
NUCLEAR WEAPONS:	two GENIE (AIR-2A)[1]

7

CF-101B VOODOO

DEPLOYMENT:

Number Deployed:	66 (1982)
Locations:	nuclear armed versions at Bagotville and Comox bases, Canada

HISTORY:

IOC:	1952 (U.S.)
1951	SAC develops requirement for long-range bomber escort
1952	TAC and ADCOM take delivery of F-101
1961	Canada receives F-101Bs capable of carrying GENIE
1961	F-101B interceptor deployed
1971	Canada receives new F-101Fs with new electronics
1981	Canada chooses F-18 HORNET to replace CF-101s

COST: $1.8 m (1961)

COMMENTS: remained in U.S. active service until 1974, and then with interceptor units in the Air National Guard until 1981

1. AFR 0-2, p. 46.

F-4 PHANTOM II

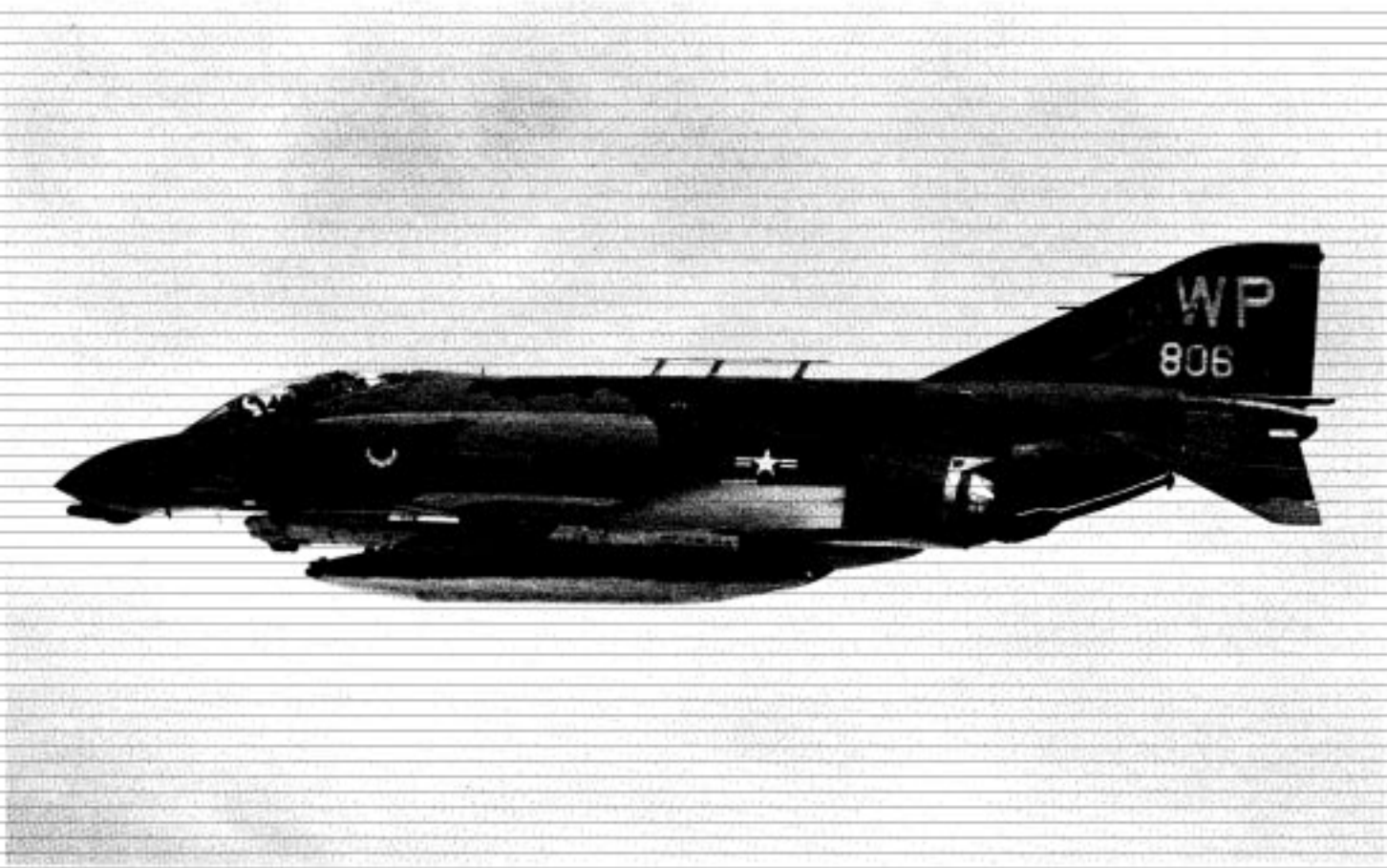

Figure 7.7 F-4D PHANTOM II.

DESCRIPTION:	Two-seat, twin-engine, all-weather, supersonic, multi-mission fighter, used by the Air Force, Marine Corps, and Navy.
Nuclear capable versions:[1]	F-4C/D/E
CONTRACTORS:	McDonnell Douglas St. Louis, MO (prime) General Electric (engines)

SPECIFICATIONS:	(F-4E)
Dimensions:	
Length:	62 ft 11.75 in
Height:	16 ft 3 in
Wingspan:	38 ft 5 in
Takeoff Weight (max):	60,630 lb
Powerplant:	2 GE J79-GE-15 (F-4 C/D) turbojets; 2 J79-GE-17 turbojets (F-4 E/G)
Ceiling:	64,630 ft, 71,000 ft[2]
Speed:	(max) 1500 mph (Mach 2.27) at 40,000 ft

7

F-4 PHANTOM II

Range:	660 mi (1060 km) (combat radius); 1000 mi (1610 km) ground attack[3]
Aerial Refueling Capability:	yes
Crew:	2
NUCLEAR WEAPONS:	three pylons (centerline and wings) can carry nuclear weapons (one each) weighing up to 2170 lb;[4] B28RE[5], B43, B57,[6] B61, B83;[7] possibly GENIE in strategic interceptor force
DEPLOYMENT:	
Number deployed:	954 (Air Force);[8] 144 (Marine Corps, Navy)
Locations:	NAS Miramar, CA; NAS Oceana, VA; Clark AB, Philippines; Elmendorf AFB, AK; Spangdahlem AB, West Germany; Ramstein AB, West Germany; Osan AB, Korea; Taegu AB, Korea; Homestead AFB, FL; Seymour Johnson AFB, NC; Moody AFB, GA; Torrejon AB, Spain

HISTORY:	
IOC:	1961
May 1958	first flight
Jun 1967	F-4E first flight
1979	production completed of all F-4 versions
COMMENTS:	5057 F-4s produced, with last U.S. delivery in October 1979. It is probable that NATO nuclear capable F-4s are limited to Greek and Turkish forces.[9] F-4 is being replaced by F-18 and F-14 in the Navy and Marine Corps, and F-16 and F-15 in the Air Force. Two F-106 air defense National Guard units will receive F-4Ds in FY 1983-1984.[10]

1 Marine Corps F-4 versions (F-4J/S) are not nuclear capable; JCS, FY 1981, p. 48.
2 Norman Polmar, *World Combat Aircraft Directory*, p. 284.
3 Ibid.
4 *Air International*, November 1978, p. 215.
5 *Ships and Aircraft of the U.S. Fleet*, 11th Ed., p. 266; USAF, "Safety Rules for the F-4G/D/E B43/B57/B61 Weapon System," AFR 122-44, 11 July 1980.
6 *Ships and Aircraft of the U.S. Fleet*, 11th Ed., op. cit.
7 SASC, FY 1981 DOE, p. 37.
8 There are approximately 120 training F-4 aircraft assigned to NORAD for strategic defense in a contingency; SASC, FY 1980 DOD, Part 2, p. 440.
9 ACDA, FY 1979 ACIS, p. 144.
10 DOD, "Memorandum for Correspondents," 31 January 1983.

F-15 EAGLE

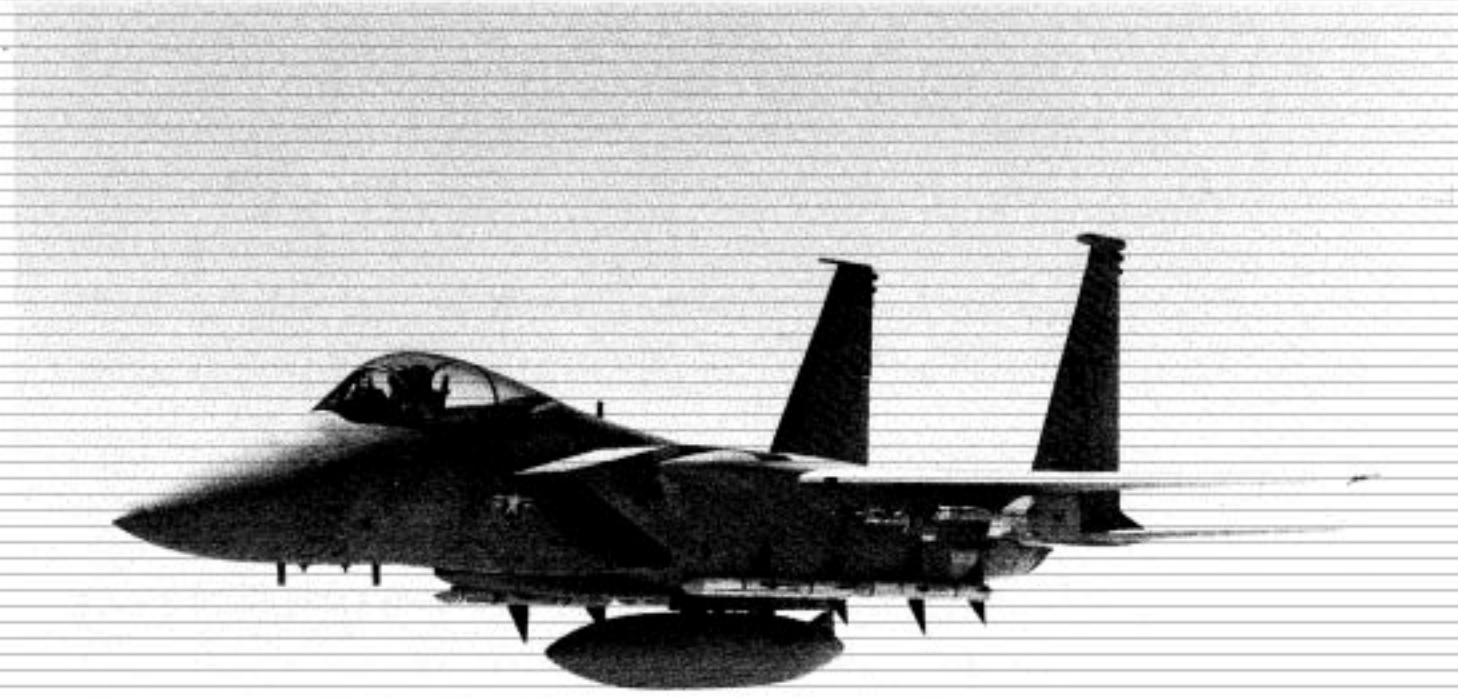

Figure 7.8 F-15 EAGLE.

DESCRIPTION:	Long-range, high performance, twin engine interceptor used by the Air Force.	Takeoff Weight (max):	56,000 lb (F-15A/B); 68,000 lb (F-15C/D)
		Powerplant:	2 F100-PW-100 turbofan
Nuclear Capable Versions:[1]	F-15A/C, F-15E (derivative fighter)	Ceiling:	65,000 ft
CONTRACTORS:	McDonnell Douglas (prime/airframe)	Speed:	(max) 1900 mph[2]
	Pratt & Whitney Aircraft (engines)	Range:	1681 mi (combat range)[3]
		Aerial Refueling Capability:	yes
SPECIFICATIONS:			
Dimensions:			
Length:	63 ft 8 in	Crew:	1 (F-15A/C); 2 (F-15B/D trainers)
Height:	18 ft 6 in		
Wingspan:	42 ft 8 in		

7

F-15 EAGLE

Figure 7.9 F-15 EAGLE underside.

NUCLEAR WEAPONS:	possibly GENIE (W25), five weapons stations capable of carrying more than 16,000 lb
DEPLOYMENT:	
Number Deployed:	620;[1] 383 F-15A, 60 F-15B produced; 1400+ F-15 planned through 1990[5]
Locations:	Elmendorf AFB, AK; Kadena AB, Japan; Langley AFB, VA; Bitburg AB, Germany; Eglin AFB, FL; Holloman AFB, NM; Soesterberg AB, Netherlands; First strategic interceptor unit at Langley AFB, VA; Langley and McChord AFB, WA earmarked for F-15 ASAT operations.[4]
Number per Squadron:	24 (UE)
HISTORY:	
IOC:	1975
Dec 1969	development of F-15 started
Jul 1972	first flight of F-15A
Mar 1973	production started
Feb 1979	first flight of F-15C
Jun 1979	F-15C/D production began
COST:	
Program Cost:	$41,500.8 m (Dec 1982)
Unit Cost:	$13.7 m (flyaway) (TY)[1]

FY	Number Procured	Total Appropriation ($ million)
1980 & prior	638	11,754.3[5]
1981	42	967.6[5]
1982	36	1187.7
1983	39	1553.9
1984	48	2266.8

COMMENTS:

Although F-15 is not primarily for nuclear weapons use, it is nuclear certified and would be highly capable in the nuclear delivery mode. The F-15 is the only Air Force fighter able to carry and deliver air-to-surface weapons at supersonic speeds. It takes less than an hour to convert the air-to-air F-15 into air-to-surface role. Six squadrons of active force F-106s will be replaced by F-15s for strategic defensive forces.[10] In addition, in the event of a crisis, F-15s dedicated to peacetime training could be used for strategic interception.[11] F-15E STRIKE EAGLE, originally a company funded upgraded air-to-surface model, has been chosen as candidate in the derivative tactical fighter to augment and then replace F-111 and F-4 pending introduction of Advanced Tactical Fighter in the 1990s (see Introduction). The enhanced F-15E air-to-ground capability would be specifically to give the F-15 a nuclear weapons strike ission.[12]

1 AFM 50-5, Volume II, p. 3-85.
2 *U.S. Military Aircraft Data Book*, 1981, pp. 2-55, 2-58.
3 *Ibid.*
4 As of January 1982; SAC, FY 1983 DOD, Part 4, p. 546.
5 Total procurement upgraded from 729 F-15s in FY 1983; SAC, FY 1983 DOD, Part 4, p. 137.
6 HAC, FY 1983 DOD, Part 5, p. 561.
7 *U.S. Military Aircraft Data Book*, *op. cit.*
8 *Ibid.*
9 SASC, FY 1982 DOD, Part 3, p. 1540.
10 DOD, FY 1983 RDA, p. VII-9.
11 SASC, FY 1981 DOD, Part 2, p. 582.
12 Ibid., p. 1617; SAC, FY 1983 DOD, Part 4, pp. 248-249.

F-16 FIGHTING FALCON[1]

Figure 7.10 F-16 FALCON.

DESCRIPTION:	Lightweight, single-seat, single-engine, supersonic, multi-mission, air-to-air and air-to-ground fighter used by the Air Force and NATO Air Forces.		Delco (computers) Kaiser (radar and fire control) Singer-Kearfott (inertial system)
Nuclear capable versions:[2]	F-16A/B, F-16C/D (after 1984), F-16E (derivative fighter)	**SPECIFICATIONS:**	(F-16A)
CONTRACTORS:	General Dynamics[3] Fort Worth, TX (prime/airframe) Pratt & Whitney Aircraft East Hartford, CT (engine) Westinghouse Electric, Inc. (radar) Marconi-Elliott (flight control)	Dimensions: Length: Height: Wingspan: Takeoff Weight (max): Powerplant:	 49 ft 6 in 16 ft 3 in 32 ft 33,000 lb[4] 1 F-100-PW-100 turbofan

Figure 7.11 F-16 FALCON

Ceiling:	50,000 ft
Speed:	1400 mph (max); 1520 mph[3] (max)
Range:	575 mi[4] (combat radius)
Aerial Refueling Capability:	yes
Crew:	1
NUCLEAR WEAPONS:	B43, B61;[7] reported capable of delivering up to five nuclear bombs on five of nine hardpoints;[8] later report indicates 3rd, 5th, and 7th stations used for nuclear bombs;[9] standard weapons configuration is one or two nuclear weapons;[10] general profile is one B61;[11] the B57 is prohibited from use on F-16A/B aircraft[12]
DEPLOYMENT:	
Number Deployed:	365;[13] 1388 planned (1982); 1445+ planned (1983);[14] including 204 F-16B two-seaters; 348 produced initially for NATO; air-to-surface improvements incorporated into aircraft no. 786 and on.[15]
Locations:	Kunsan AB, Korea; Shaw AFB, SC; Hill AFB, UT; Hahn AB, West Germany (first U.S. base in Europe).
Number per Squadron:	24 (UE)
HISTORY:	
IOC:	1979
Apr 1972	development of F-16 begins
Jan 1974	first flight
Jun 1975	four NATO counties announce joint program to procure F-16
Dec 1976	full scale testing began
Sep 1977	production started
Aug 1978	first production aircraft accepted
Jan 1979	first F-16 delivered to Hill AFB, UT
Jan 1979	delivery of first European manufactured F-16
1982-1983	F-16s arrive at Hahn AB, West Germany to take up nuclear roles in replacement of F-4s
COST:	
Program Cost:	$43,494.2 m (Dec 1982)
Unit Cost:	$11.9 m (TY) (flyaway)

FY	Number Procured	Total Appropriation ($ million)
1977 & prior	-	751.3[16]
1978	105	1655.9
1979	145	1554.2
1980	175	1684.3
1981	180	2035.4
1981 & prior	605	7052.6[17]
1982	120	2294.5
1983	120	2334.1
1984	120	2279.5

7

F-16 FALCON

COMMENTS:

F-16 will complement the F-15 in air superiority role and replace F-4 in air-to-surface mode. F-16 will replace 5 squadrons of F-106 in Air National Guard fighter interceptor units starting in FY 1986-1987.[18] Nuclear capable versions are also being produced for Belgium and the Netherlands. Although Denmark and Norway are receiving new F-16s, these will most likely not be nuclear certified. In the nuclear bombing role the weapon's delivery accuracy has been better than F-111.[19] F-16 could reach the western Soviet Union from bases in West Germany with a single nuclear weapon and aerial refueling.[20] Advanced versions of the F-16 (F-16E) are being considered for a derivative tactical fighter to augment and then replace F-111 and F-4 pending introduction of Advanced Tactical Fighter in 1990s (see introduction to this chapter).

1 Detailed background information on the F-16 is contained in Jay Miller, *General Dynamics F-16 Fighting Falcon* (Austin, TX: Aerofax, Inc., 1982).
2 [CS, FY 1982, p. 78; ACDA, FY 1979 ACIS, p. 141.
3 Consortium of 5 primary international companies assembling aircraft and producing components: Fokker (Netherlands), SABCA (Belgium), Fairey (Belgium), Per Udsen (Denmark), and General Dynamics. An additional 52 European subcontractors are involved in component production.
4 ACDA, FY 1979 ACIS, p. 141.
5 *U.S. Military Aircraft Data Book*, 1981, pp. 2-50, 2-52.
6 "The Texan Swing Fighter," *Air International*, November 1977, p. 223; ACDA, FY 1979 ACIS, p. 141.
7 HASC, FY 1981 DOD, Part 4, Book 2, p. 2318.
8 "The Texan Swing Fighter," *Air International*, November 1977, op. cit.
9 Jay Miller, *General Dynamics F-16 Fighting Falcon*, op. cit.
10 ACDA, FY 1979 ACIS, p. 141.
11 HASC, FY 1981 DOD, Part 4, Book 2, p. 2318.
12 USAF, "Safety Rules for the F-16A/B B57/B61 Weapon System," AFR 122-26, 30 January 1981.
13 As of January 1982. HAC, FY 1983 DOD, Part 5, p. 545.
14 HAC, FY 1983 DOD, Part 5, p. 545; the current DOD plan is 1445 F-16s through FY 1987, with more to follow on in later years.
15 HAC, FY 1983 DOD, Part 5, p. 648.
16 *U.S. Military Aircraft Data Book*, 1981, op. cit.
17 HASC, FY 1982 DOD, Part 2, p. 897.
18 "The Texan Swing Fighter," *Air International*, November 1977, op. cit.
19 HAC, FY 1981 DOD, Part 9, p. 145.
20 ACDA, FY 1979 ACIS, p. 142.

F-18/A-18 HORNET

Figure 7.12 F-18 HORNET.

DESCRIPTION: Single-seat, twin-engine, supersonic carrier and land based all-weather fighter and attack aircraft used by the Marine Corps and Navy. Attack configuration (A-18) also capable of delivering nuclear weapons.

Nuclear capable versions:[1] F-18A, A-18, CF-18

CONTRACTORS:
McDonnell-Douglas
St. Louis, MO
(prime/airframe)
Northrop Aircraft
Hawthorne, CA
(40 percent subcontracting)
General Electric
West Lynn, MA
(engine)
Hughes Aircraft Co.
Culver City, CA
(radar)

SPECIFICATIONS:

Dimensions:	
Length:	55 ft 7 in
Height:	15 ft 2 in
Wingspan:	40 ft 7 in
Takeoff Weight (max):	44,000+ lb
Powerplant:	2 F-404-GE-400 turbofans
Ceiling:	50,000 ft

7

F/A-18 HORNET

Figure 7.13 F-18 HORNET.

Speed:	(max) 1368 mph[2]
Range:	400+ mi (645 km) (combat radius);[3] 840 mi (1350 km);[4] 550 nm (interdiction); 460 mi (combat radius)[5]
Aerial Refueling Capability:	yes
Crew:	1 (2 in trainer version)
NUCLEAR WEAPONS:[6]	two B57 or B61;[7] two of nine external weapons points on outboard wing stations capable of carrying nuclear bombs; BDU-11/12, BDU-20, BDU-36 nuclear practice bombs
DEPLOYMENT:	(see Table 7.4)
Number Deployed:	27;[8] 1366 planned for U.S.; Canada is planning to buy 138 F-18s, partly to replace CF-101s, currently flying a nuclear armed air defense mission.
Locations:	NAS Lemoore, CA (training); MCAS El Toro, CA (initial base)[9]

Table 7.4

F/A-18 Deployments[1]

Unit	Number of Squadrons	Squadron Aircraft	Total Procured
Marine Corps Fighter Squadron	12	144	258
Marine Corps Attack Squadron	8	160	278
Navy Fighter Squadron	6	72	161
Navy Attack Squadron	24	288	513
Navy Reconnaissance Squadron	1	36	74
Marine Corps Reconnaissance Squadron	1	21	38
Marine Corps TACA	1	30	44
			1366
Squadron Authorized Aircraft			751
R&D Aircraft			19
Training Aircraft			151
Total Operation			921
Total Pipeline			124
Attrition Aircraft			321
			1366

1. HASC, FY 1982 DOD, Part 2, p. 668; AWST, 19 January 1981, p. 25.

Number per Squadron:	12 (UE)
HISTORY:	
IOC:	Dec 1982
Jul 1974	first flight (YF-17)
Nov 1975	development of F/A-18A begins
Nov 1978	first flight (F-18)
Nov 1980	first training squadron commissioned at NAS Lemoore, CA
Jun 1981	full production approved
1985	carrier deployment
1993	production completed

COST:

Program Cost: $39,827.2 m (Dec 1982) (F-18 program, not counting YF-17 prototype costs)

Unit Cost: $22.5 m (FY 1982) (flyaway)
$25.1 m (FY 1983) (flyaway)

FY	Number Procured	Total Appropriation ($ million)
1977 & prior	-	491.8
1978	-	654.4
1979	9	1038.5
1980	25	1463.3
1981	60	2190.8
1982	63	2629.1
1983	84	2598.2
1984	84	2762.8

COMMENTS: F/A-18 will replace Navy's F-4, and A-7; Marine Corps' F-4. All-digital weapon control system provides greater bombing accuracy over the F-4.

1 JCS, FY 1982, p. 77; fighter and attack versions virtually identical in performance and characteristics, with common internal wiring and only external configuration adjustments; ACDA, FY 1979 ACIS, p. 159; A-18 will be equipped with five rather than three weapons store pylons; it will take 30 minutes to convert from attack to fighter versions and vice versa; information provided by McDonnell Douglas.
2 U.S. Military Aircraft Data Book, pp. 2-83, 2-88.
3 Norman Polmar, World Combat Aircraft Directory, op. cit.
4 Nikolaus Krivinyi, World Military Aviation: Aircraft, Air Forces, Weaponry and Insignia (New York: Arco, 1977), p. 179.
5 U.S. Military Aircraft Data Book, op. cit.
6 HAC, FY 1983 DOD, Part 5, p. 346.
7 General Accounting Office, "F/A-18 Naval Strike Fighter: Its Effectiveness is Uncertain" (PSAD-80-24), 14 February 1980.
8 As of 1 January 1982; HAC, FY 1983 DOD, Part 5, p. 257.
9 HAC, FY 1983 DOD, Part 5, p. 202.

F-100 SUPERSABRE

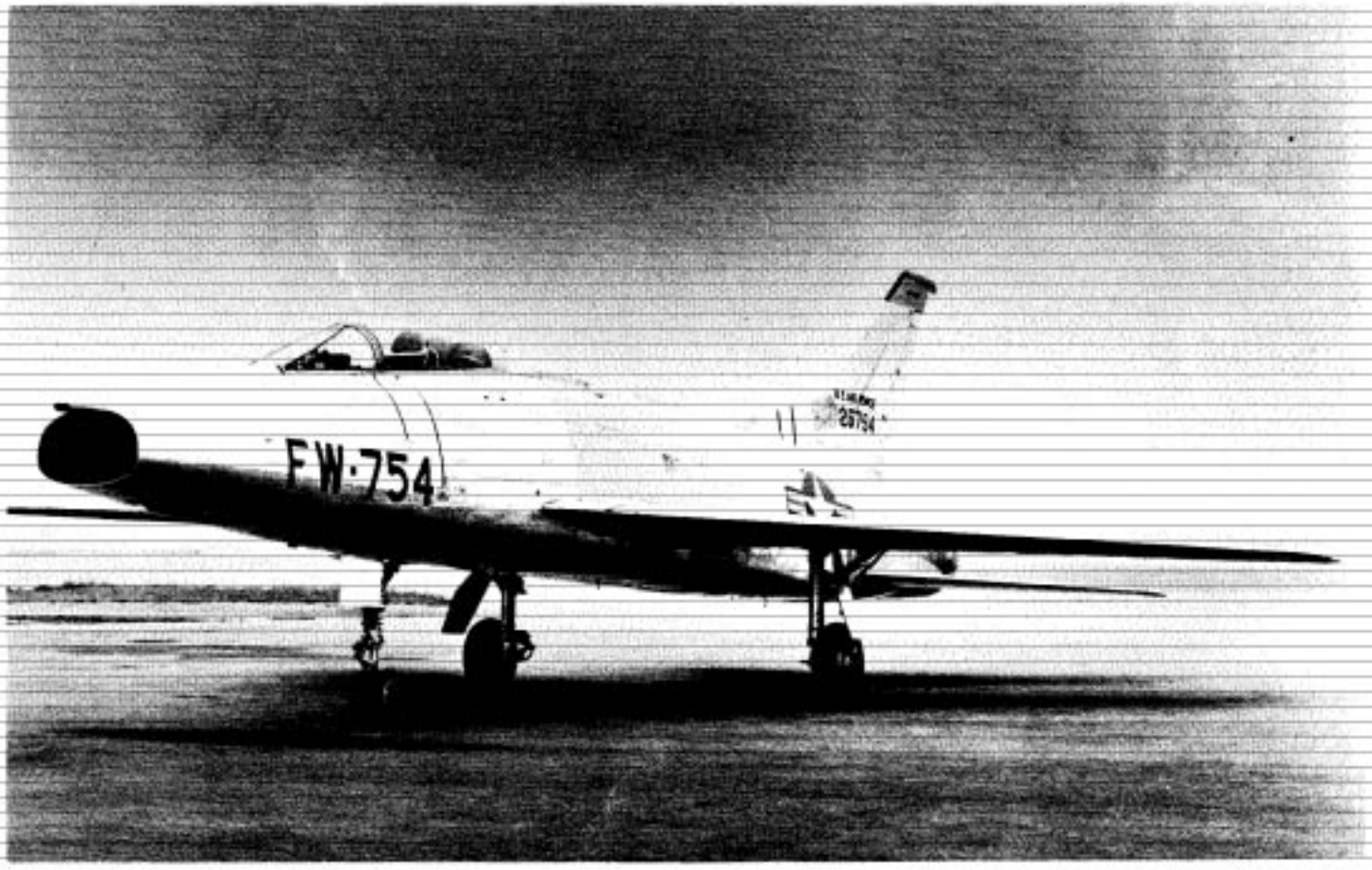

Figure 7.14 F-100 SUPERSABRE.

DESCRIPTION:	Single-seat, single-engine, supersonic fighter bomber in use with the Turkish Air Force.
Nuclear capable versions:	F-100D/F[1]
CONTRACTORS:	North American (prime) Pratt & Whitney (engine)
SPECIFICATIONS:	(F-100D)
Dimensions:	
Length:	54 ft 3 in[2]
Height:	16 ft 2.5 in
Wingspan:	38 ft 9 in[3]
Takeoff Weight (max):	34,831 lb
Powerplant:	1 P&W J57-P-21A turbojet
Ceiling:	50,000 ft
Speed:	862 mph (max) (Mach 1.3) at 35,000 ft
Range:	550 mi (885 km) (combat radius)
Aerial Refueling Capability:	yes
Crew:	1

NUCLEAR WEAPONS:[1]	one nuclear weapon; B28, B43, B57
HISTORY:	
IOC:	1954
May 1953	first flight
Jan 1956	F-100D first flight
COMMENTS:	1274 F-100D, 476 F-100C, built 1953-1959

1 F-100D (LW1), F-100D(1)/F(1)/F(CL) are designated as nuclear certified; USAF, "Safety Rules for the Non-U.S. NATO F-100D (LW1) and F-100D(1)/F(CL) B28/B43/B57 Weapon Systems"; AFR 122-71, 9 January 1979.

2 Norman Polmar, *World Combat Aircraft Directory*, p. 165.
3 *Ibid.*
4 *Ibid.*

F-104 STARFIGHTER

Figure 7.15 F-104G STARFIGHTER in West German Air Force.

DESCRIPTION:	Single-seat, single-engine, daylight fighter-interceptor in wide use within Belgian, Dutch, Greek, Italian, and West German air forces for strike missions.	**SPECIFICATIONS:**	(F-104G)
		Dimensions:	
		Length:	54 ft 9 in
		Height:	13 ft 6 in
		Wingspan:	21 ft 11 in
Nuclear capable versions:[1]	F-104G/S[2] (F-104C, F-104D?)	Takeoff Weight (max):	28,770 lb
CONTRACTORS:	Lockheed (prime)	Powerplant:	1 GE J79-11A turbojet
	General Electric (engines)	Ceiling:	58,000+ ft
		Speed:	913 mph (max) (Mach 1.2) at sea level; 1324 mph (Mach 2) at 39,375 ft

Range:	808 mi (1300 km) (combat radius); 745 mi[3]
Aerial Refueling Capability:	unknown
Crew:	1
NUCLEAR WEAPONS:[4]	one nuclear bomb[5]; B28, B43, B57, B61-2, -3, -4, and -5[6]
DEPLOYMENT:	
Locations:[7]	Memmingen, West Germany; Buchel, West Germany; Norvenich, West Germany; Kleine Brogel, Belgium; Volkel, Netherlands; Rimini, Italy; Ghedi-Torre, Italy

HISTORY:	
IOC:	1958
Feb 1954	first flight
Oct 1960	F-104G first flight
COMMENTS:	Being replaced by TORNADO in West German and Italian forces, and by F-16 in Belgian and Dutch forces.

1 JCS, FY 1982, p. 76.
2 USAF, "Safety Rules for the Non-U.S. NATO F-104G/S B28/B43/B57/B61-2, -3, -4, and -5 Weapon System," AFR 122-71, 9 January 1980.
3 Norman Polmar, *World Combat Aircraft Directory*, p. 162.
4 USAF, AFR 122-71, op. cit.
5 Krivinyi, op. cit. p. 168.
6 USAF, AFR 122-71, op. cit.
7 Bases with USAF nuclear weapons.

F-106 DELTA DART

Figure 7.16 F-106 DELTA DART after firing a training version of the GENIE rocket.

DESCRIPTION:	Single-seat, single-engine, all-weather, supersonic strategic interceptor used by the Air Force and Air National Guard.	**SPECIFICATIONS:**	(F-106A)
		Dimensions:	
		Length:	70 ft 8.75 in
		Height:	20 ft 3 in
Nuclear capable versions:[1]	F-106A[2]	Wingspan:	38 ft 3.5 in
		Takeoff Weight (max):	34,510 lb
CONTRACTORS:	General Dynamics/Convair (prime)		
	Pratt & Whitney (engine)	Powerplant:	1 J75-P-17 turbojet
	Hughes (fire control)	Ceiling:	57,000 ft
		Speed:	1525 mph (max) (Mach 2.3)
		Range:	365 mi (587 km) (combat radius)

Aerial Refueling Capability:	no
Crew:	1
NUCLEAR WEAPONS:	one GENIE (AIR-2A) (W25 warhead) air-to-air missile carried in an internal weapons bay[5]
DEPLOYMENT:	
Number Deployed:	277 F-106A; 63 F-106B
Locations:	See Table 4.6
HISTORY:	
IOC:	1959
Dec 1956	first flight
Jul 1959-Jul 1960	production delivery
1988	last F-106 unit deactivated[6]

COMMENTS: 337 aircraft produced, replacing the F-102. Under current DOD plans, five squadrons of active force F-106s will be replaced with F-15s assigned strategic defensive missions.[7] Air National Guard F-106s will also be modernized with F-4s and F-16s,[8] the first units receiving F-4Ds in late 1983.[9]

1: JCS, FY 1979, p. 38.
2: F-106B is operational trainer.
3: Norman Polmar, *World Combat Aircraft Directory*, p. 110.
4: HAC, FY 1983 DOD, Part 5, p. 349.
5: DOD, FY 1983 RDA, p. VII-9.
6: SASC, FY 1982 DOD, Part 7, p. 3838.
7: DOD, "Memorandum for Correspondents," 31 January 1983.

F-111

Figure 7.17 F-111.

DESCRIPTION:	Long-range, two-seat, twin-engine, all-weather supersonic strike fighter used by the Air Force.	Takeoff Weight (max):	91,501 lb
		Powerplant:	2 TF-30-P/-3 turbofans
Nuclear capable versions:	F-111A/D/E/F[1]	Ceiling:	60,000+ ft
		Speed:	1650 mph (max) (Mach 2.5) at 49,000 ft; 915 mph (Mach 1.2) at sea level[2]
CONTRACTORS:	General Dynamics Fort Worth, TX (prime)		
	Pratt & Whitney (engine)	Range:	1500 mi (2400 km) (combat radius)
SPECIFICATIONS:			
Dimensions:		Aerial Refueling Capability:	yes
Length:	73 ft 6 in		
Height:	17 ft 1.5 in		
Wingspan:	63 ft (spread), 31 ft 11.5 in (swept)	Crew:	2

NUCLEAR WEAPONS:[1]	up to 3 nuclear bombs;[2] B43, B57, B61, B83;[3] 2 nuclear weapons on underwing pylons; also has internal bomb bay
DEPLOYMENT:	
Number Deployed:	240; 455 built[4]
Locations:	Cannon AFB, NM; Mountain Home AFB, ID; RAF Lakenheath, U.K.; RAF Upper Heyford, U.K.
HISTORY:	
IOC:	1968
Dec 1964	first flight
1976	production completed

COMMENTS: F-111s are on nuclear armed quick reaction alert (QRA) at all times at two bases in the U.K.: Upper Heyford and Lakenheath.[7] F-111 has onboard radar for all-weather nuclear attack, including terrain following and ground mapping capabilities. Its low level navigation and weapons delivery capability allows bombing at night and in adverse weather.[8] It can conduct "direct" and "offset" bombing. Area targets for F-111 include: lines of communication, airfields, transportation terminals, bivouac areas, attack helicopter forward operating locations, supply depots, staging areas, choke points, and POL storage.[9]

1 All models of the F-111 are nuclear capable: SASC, FY 1982 DOD, Part 7, p. 3891.
2 Norman Polmar, *World Combat Aircraft Directory*, op. cit.
3 USAF, "Safety Rules for the F-111A/D/E/F B43/B57/B61 Weapon System," AFR 122-37, 11 July 1960.
4 All models of the F-111 are nuclear capable: SASC, FY 1982 DOD, Part 7, p. 3882.
5 SASC, FY 1981 DOE, p. 37.
6 SAC, FY 1983 DOD, Part 4, p. 245.
7 HASC, FY 1981 DOD, Part 4, Book 2, p. 2316.
8 JCS, FY 1982, p. 78.
9 HASC, FY 1981 DOD, Part 4, Book 2, p. 2316.

P-3 ORION

Figure 7.18 P-3 ORION.

DESCRIPTION:	Long range, land-based four-engine, all-weather anti-submarine, and maritime patrol plane used by the U.S. and Dutch navies for nuclear weapons delivery.[1]
Nuclear capable versions:	P-3A/B/C
CONTRACTORS:	Lockheed Aircraft Burbank, CA (prime/airframe) Detroit Diesel, Allison Division Indianapolis, IN (engines) CTM Buffalo, NY (bomb racks)
SPECIFICATIONS:	(P-3C)
Dimensions:	
Length:	116 ft 10 in
Height:	33 ft 8.5 in
Wingspan:	99 ft 8 in
Takeoff Weight (max):	142,000 lb
Powerplant:	4 T56-A-14 turboprop
Ceiling:	28,300 ft

Speed:	473 mph (max) at 15,000 ft; 237 mph at 1500 ft (patrol speed)
Range:	1550 mi (2500 km) (radius), 3 hours on station at 1500 ft
Aerial Refueling Capability:	no
Crew:	10 (normal complement)
NUCLEAR WEAPONS:	two B57 nuclear depth charges;[2] also carries HARPOON; ten underwing stations, one station in bomb bay
DEPLOYMENT:	24 active, 13 reserve squadrons stationed in the U.S., with overseas deployment sites
Number deployed:	200 P-3C;[3] 343 total[4] (18 of 24 active squadrons with P-3C)
Locations:	NAS Moffett Field, CA; NAS Barbers Point, HI; NAS Brunswick, ME; NAS Jacksonville, FL; numerous deployment sites worldwide
Number per Squadron:	9 (UE)

HISTORY:

IOC:	1961 (P-3); 1969 (P-3C)
Aug 1958	first flight (prototype)
Apr 1961	first flight (P-3A)
1966	development of P-3C begins
Sep 1968	first flight (P-3C)
1969	production of P-3 begins
Nov 1981	Dutch Navy receives first of 13 P-3Cs
FY 1983	procurement program for U.S. Navy continued after initial plans for its halting
COST:	$27.9 m (FY 1982) (flyaway)[5] $39.1 m (FY 1983) (flyaway)[6]

FY	Number Procured	Total Appropriation ($ million)
1979 & prior	195 (P-3C)[7]	2964.4[8]
1980	12	408.3
1981	12	459.8
1982	12	454.8
1983	6	317.7
1984	5	309.5

COMMENTS: 17 of 24 active squadrons equipped with P-3C, remainder converted by FY 1991.[9] Present P-3 modification programs include improved sensor systems, HARPOON launch system, and navigation improvements. Patrol endurance of the ORION is up to 17 hours. Latest modification is P-3C Update III which will enter the Navy in May 1984.[10]

1 The P-3C began introduction in Dutch Navy in 1982, equipping one squadron. It assumed a nuclear role pending further governmental decision on future nuclear mission of Dutch forces.
2 Krivinyi, op. cit. p. 389.
3 As of 1 January 1982: HAC, FY 1983 DOD, Part 5, p. 264; as of 1 January 1981, there were 187; HASC, FY 1983 DOD, Part 2, p. 693.
4 JCS, FY 1982, p. 88.
5 As of 1 January 1982: HAC, FY 1983 DOD, Part 5, p. 264; as of 1 January 1981, there were 187; HASC, FY 1983 DOD, Part 2, p. 693.
6 HAC, FY 1983 DOD, Part 5, p. 191.
7 U.S. Military Aircraft Data Book, 1981, pp. 2-99 - 2-102.
8 Ibid.
9 JCS, FY 1983, p. 90.
10 HAC, FY 1983 DOD, Part 5, p. 191.

S-3 VIKING

Figure 7.19 S-3 VIKING.

DESCRIPTION:	Medium-range, twin-engine, carrier-based, maritime patrol and anti-submarine warfare aircraft used by the Navy.
Nuclear capable versions:	S-3A
CONTRACTORS:	Lockheed California Co. Burbank, CA (prime/airframe) General Electric West Lynn, MA (engines)

SPECIFICATIONS:	(S-3A)
Dimensions:	
Length:	53 ft 4 in
Height:	22 ft 9 in
Wingspan:	69 ft 8 in (29 ft 6 in folded)
Takeoff Weight (max):	52,530 lb
Powerplant:	2 TF-34-400B-GE-2 turbofans
Ceiling:	40,000 ft
Speed:	184 mph (296 kmh) (patrol loiter); 507 mph (816 kmh) at sea level
Range:	2300 mi (3700 km) (radius)

Aerial Refueling Capability:	yes
Crew:	4 (pilot, copilot, sensor operator, tactical coordinator)
NUCLEAR WEAPONS:	one B57 nuclear depth charge, three wing stations for weapons; future provisions for HARPOON

DEPLOYMENT:

Number Deployed:	187 produced
Locations:	NAS Cecil Field, FL; NAS North Island, CA
Number per Squadron:	10 (UE)

HISTORY:

IOC:	1974
Dec 1967	development of S-3A started
1971	production begins
May 1972	full production begins
Jan 1972	first flight
Mar 1978	production completed
1983-1985	aircraft upgraded under weapon system improvement program and redesignated S-3B

COST:

FY	Number Procured	Total Appropriation ($ million)
1981 & prior	179	3428.2[1]
1982	-	31.3[2]

COMMENTS: The VIKING's patrol endurance is over nine hours.

1 *U.S. Military Aircraft Data Book*, 1981, p. 2-110.

2 Ibid.

SH-3 SEA KING

Figure 7.20 SH-3H SEA KING.

DESCRIPTION:	Heavy helicopter, used for aircraft carrier-based anti-submarine warfare by the Navy.
Nuclear capable versions:[1]	SH-3D/H
CONTRACTORS:	Sikorsky (prime)

SPECIFICATIONS:

Dimensions:	
Length:	54 ft 9 in (fuselage)
Height:	15 ft 6 in
Wingspan:	62 ft (rotor diameter)
Takeoff Weight (max):	20,500 lb
Powerplant:	2 GE T58-GE-10 turboshafts
Ceiling:	14,700 ft
Speed:	(max) 166 mph (267 kph) at sea level
Range:	625 nm
Aerial Refueling Capability:	no
Crew:	4 (2 pilots, 2 systems operators)
NUCLEAR WEAPONS:	one B57 nuclear depth bomb

DEPLOYMENT:

Number Deployed:	104 (SH-3H)[2]
Locations:	NAS North Island, CA; NAS Jacksonville, FL

HISTORY:

IOC:	1961 (SH-3); 1966 (SH-3D)
Mar 1959	first flight of SH-3A
COMMENTS:	SH-3 will be replaced by variant of SH-60 (SH-60F) in 1988.[3]

1. CANTRAC, p. GI8.
2. HAC; FY 1983 DOD; Part 3, p. 314.
3. HAC; FY 1983 DOD; Part 5, pp. 312-314.

SH-60 SEAHAWK

Figure 7.21 SH-60 SEAHAWK.

DESCRIPTION:	Carrier-based, active sensor, inner zone anti-submarine helicopter to protect aircraft carriers; planned for the Navy.	**SPECIFICATIONS:**	(SH-60B)
		Dimensions:	
		Length:	64 ft 10 in
		Height:	17 ft 2 in
Nuclear Capable Versions:	SH-60F	Wingspan:	53 ft 8 in (rotor diameter)
		Takeoff Weight (max):	21,844 lb
CONTRACTORS:	Sikorsky Aircraft Division, United Technologies Corp. Stratford, CT (prime)	Powerplant:	2 GE T700-GE-401 turboshafts
	General Electric Lynn, MA (engine)	Ceiling:	22,000 ft
		Speed:	155 mph (max cruise)
		Range:	50 nm (radius) with 3 hours on station

7

SH-60 SEAHAWK

Aerial Refueling Capability:	no
Crew:	4 (pilot, copilot, tactical officer, sensor operator)
NUCLEAR WEAPONS:	B57 nuclear depth charge
DEPLOYMENT:	
Number Planned:	175[1] (1983)
Location:	NAS North Island, CA; NAS Jacksonville, FL
HISTORY:	
IOC:	1988[2]
Dec 1979	first flight of prototype SH-60B
1983	SH-60F program started to develop replacement for SH-3[3]
1986	first procurement of SH-60F planned
COST:	Total Planned Cost: $3759.8 m[4] SH-60F variant R&D costs estimated at $87.7 m[5]

FY	Number Procured	Total Appropriation ($ million)
1982 & prior	23	2063.9[6]

COMMENTS: SH-60F is planned replacement for current SH-3H. SH-60F is modification of SH-60B Light Airborne Multipurpose System (LAMPS) Mk-III, planned for deployment aboard surface ships.

1 Program cost for SH-60B: HAC, FY 1980 DOD, Part 5, p. 282.
2 Ibid., p. 314.
3 Ibid., p. 313.
4 Ibid., p. 336.
5 Ibid.
6 Ibid., p. 282.

TORNADO

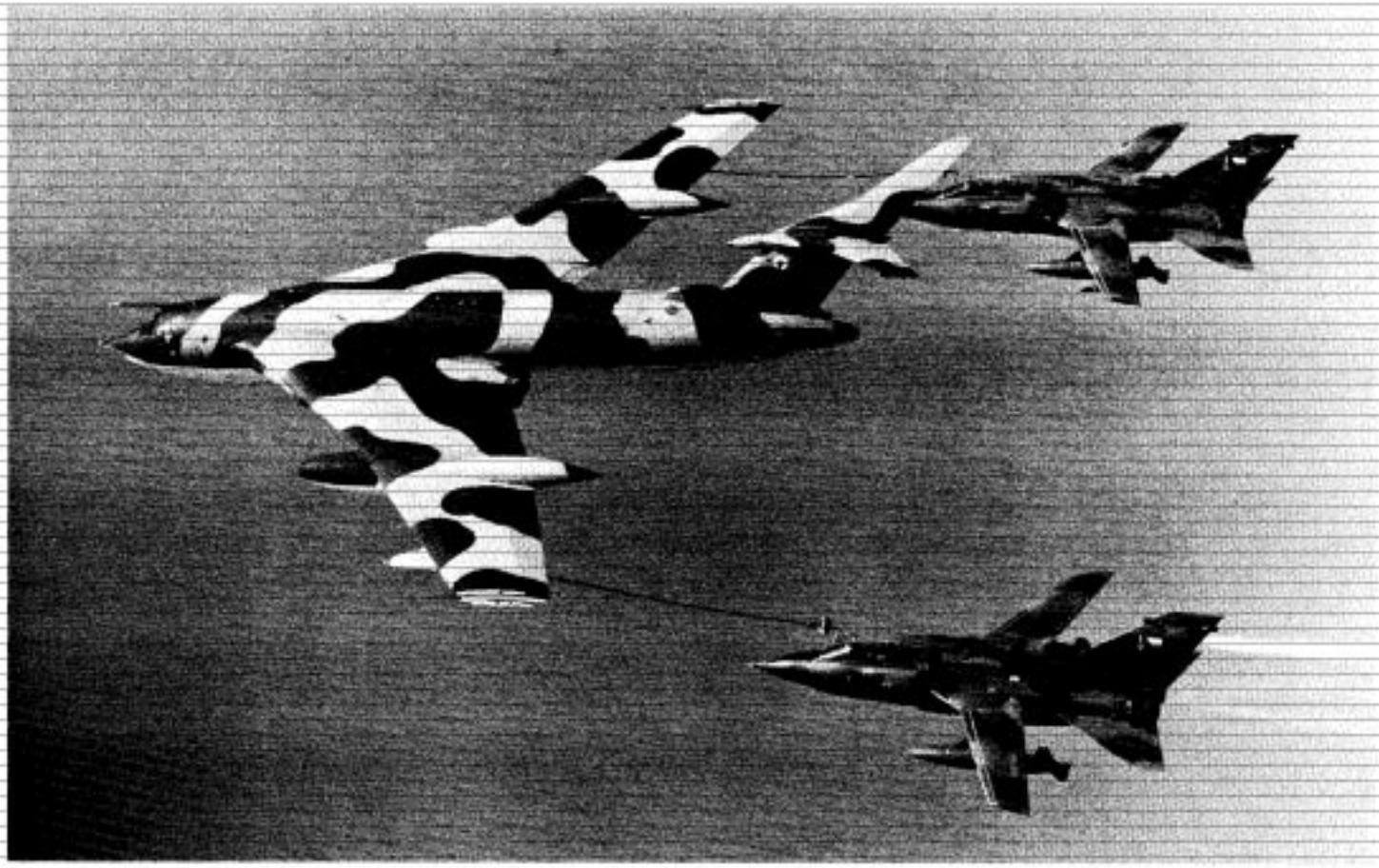

Figure 7.22 TORNADOs being refueled by tanker aircraft.

DESCRIPTION: Multinationally developed (British, German, Italian) all-weather, low-level penetration fighter bomber.

CONTRACTORS:
- Panavia (British Aerospace, Messerschmnitt-Bolkow-Blohm, Aeritalia consortium) (prime)
- Turbo-Union (Rolls Royce, Motoren, Fiat consortium) (engine)
- Avionica (Elliott, Elektronik System Gesellschaft, SIA consortium) (components)

SPECIFICATIONS:[1]

Dimensions:	
Length:	16.7 m
Height:	5.71 m
Wingspan:	8.61 m (minimum); 13.92 m (maximum)
Takeoff Weight (max):	26,300 kg
Powerplant:	Turbo-Union RB-199
Ceiling:	unknown
Speed:	Mach 1.1 (low flight); Mach 2.2 (high profile)
Range:	370-1250 km (combat radius)

7

TORNADO

Aerial Refueling Capability:	yes
Crew:	2
NUCLEAR WEAPONS:	B28, B43, B57, B61
DEPLOYMENT:	
Number Planned:	647
HISTORY:	
IOC:	1981

COMMENTS: TORNADO uses improved attack sensors and has significantly greater nuclear strike radius than the present F-104.[2] Operating combat radius, however, appears similar to the F-104.[3]

1 *Luftfahrt International*; May-June 1978, p. 4291.
2 [CS, FY 1982, p. 78.
3 See Alfred Mechtersheimer, *Rustung und Politik in der Bundesrepublik*, MRCA Tornado [Hornef Osang Verlag, 1977], pp. 106-108.