**B-1 Lancer**

**Brief:** A long-range multirole bomber capable of flying missions over intercontinental range without refueling, then penetrating enemy defenses with a heavy load of ordnance.

**Function:** Long-range conventional bomber.

**Operator:** ACC, ANG.

**First Flight:** Dec. 23, 1974 (B-1A); Oct. 18, 1984 (B-1B).

**Delivered:** June 1985–May 1988.

**IOC:** Oct. 1, 1986, Dyess AFB, Texas (B-1B).

**Production:** 104.

**Inventory:** 93 (B-1B).

**Unit Location:** Active: Dyess AFB, Texas; Ellsworth AFB, S.D.; Mountain Home AFB, Idaho; ANG: McConnell AFB, Kan.; Robins AFB, Ga.

**Contractor:** Boeing; North American; AIL Systems; General Electric.

**Power Plant:** Four General Electric F101-GE-102 turbofans, each 30,780 lb thrust.

**Accommodation:** Four pilots and weapon systems officers (offensive and defensive), on zero/zero ejection seats.

**Dimensions:** Span 337 ft, swept aft 78 ft, length 147 ft, height 34 ft.

**Weights:** Empty equipped 192,000 lb, max operating weight 477,000 lb.

**Performance:** Max speed at low level high subsonic; Mach 1.2 at altitude; range intercontinental.

**Armament:** Three internal weapons bays capable of accommodating a conventional role up to 84 Mk 82 (500-lb) bombs or Mk 62 mines and up to 30 CBU-87/89/97s.

**COMMENTARY**

Of blended wing/body configuration, the B-1’s variable-geometry design and turbofan engines combine to provide greater range and high speed at low level, with enhanced survivability. Unswapped wing setting permits takeoff from shorter runways and fast base-escape capability for airfields under attack. The fully swept position is used in supersonic flight and for the primary role of high-subsonic, low-altitude penetration.

The bomber’s offensive avionics include forward-looking radar, Moving Target Indicator (MTI), and Terrain-Following Radar (TFR), an extremely accurate Inertial Navigation System (INS), computer-driven avionics, strategic Doppler radar, and a radar altimeter, enabling aircrews to navigate, update mission profiles, and target coordinates in flight, and precision bomb. The current defensive avionics package, built around the ALQ-161 ECM system, is supplemented by chaff and flares to protect against radar-homing and heat-seeking missiles. Aircraft structure and radar-absorption materials reduce the aircraft’s radar signature to approximately 1 percent that of a B-52. The ALE-50 towed decoy will be added by December for greater protection against threat threats.

**B-1A.** This model of the new long-range strategic bomber never went into production. USAF acquired four prototype flight test models in the 1970s, but the program was canceled in 1977. Flight test of the four B-1A models continued through 1981.

**B-1B** is the improved variant initiated by the Reagan Administration in 1981. First production model flew October 1984 and USAF produced a total of 100. B-1B’s speed, superior handling qualities, and large payload make it a key element of any joint/composite strike force, with a flexibility to deliver Mk 82 conventional general-purpose bombs, Mk 62 naval mines, CBU-87 and CBU-89 cluster munitions, and CBU-97 Sensor Fuzed Weapons (to be fitted with the Wind-Corrected Munitions Dispenser kits); or to carry additional fuel, as required. The Joint Direct Attack Munition (JDAM) GPS–guided weapon will be added to the B-1B’s list of weapons this fiscal year.

The B-1B’s conventional capability is being significantly enhanced by the ongoing Conventional Mission Upgrade Program (CMUP). This gives the B-1B greater lethality and survivability through the integration of precision and standoff weapons and a robust ECM suite. CMUP will include GPS receivers, a MIL-STD-1760 weapon interface, secure radios, and improved computers to support precision weapons, initially the JDAM, followed by the Joint Standoff Weapon (JSOW) and the Joint Air to Surface Standoff Missile (JASSM). The Defensive System Upgrade Program will improve aircrew situational awareness and jamming capability.

**B-2 Spirit**

**Brief:** Stealthy, long-range, multirole bomber that can deliver conventional and nuclear munitions anywhere on the globe by flying through previously impenetrable defenses.

**Function:** Long-range heavy bomber.

**Operator:** ACC.

**First Flight:** July 17, 1989.

**Delivered:** Dec. 17, 1993–present.

**IOC:** April 1997, Whiteman AFB, Mo.

**Production:** 21 planned.

**Inventory:** 1.

**Unit Location:** Whiteman AFB, Mo.

**Contractor:** Northrop Grumman, with Boeing, LTV, and General Electric as principal subcontractors.

**Power Plant:** Four General Electric F118-GE-100 turbofans, each 17,300 lb thrust.

**Accommodation:** Two mission commander and pilot, on zero/zero ejection seats.

**Dimensions:** Span 172 ft, length 69 ft, height 17 ft.

**Weight:** Empty equipped 150,000–160,000 lb, gross 350,000 lb.

**Ceiling:** 50,000 ft.

**Performance:** Minimum approach speed 161 mph, typical estimated unrefueled range for a hi-lo-hi mission with 16 B61 nuclear free-fall bombs 5,000 miles, with one aerial refueling more than 10,000 miles.

**Armament:** In a nuclear role: up to 16 nuclear weapons (B61, B61 Mod II, B83). In a conventional role: 16 Mk 84 2,000-lb bombs, up to 16 2,000-lb GBU-36/B (GAM), or up to eight 4,700-lb GBU-37 (GAM-113) near-precision guided weapons. Various other conventional weapons, incl the Mk 82 500-lb bomb, M117 750-lb bomb, MB 52 500-lb naval mine, JDAM, and up to 32 CBU-87/89/97 cluster bombs. JASSM and JSOW are presently being added to B-2 Block 30 aircraft through Fiscal 2003.

**COMMENTARY**

The B-2 is a remarkable, highly advanced system, combining sophisticated technologies, notably Low- Observable (LO) stealth design, with high aerodynamic efficiency, enabling it to attack heavily defended targets and neutralize enemy defenses and, thereby, making way for less stealthy systems to operate.

Based on the flying wing concept, the B-2 has no vertical tail surfaces. The smoothly blended “fuselage” section accommodates two flight crew and two large weapon bays side by side in the lower centerbody. These bays contain rotary launchers or bomb rack assemblies capable of carrying a total weapons load of 40,000 lb; however, 16 nuclear weapons would be normal under the nation’s Single Integrated Operational Plan (SIOP).

Mounted in pairs within the wing structure are four non-afterburning turbofans, with scallaped over-wing intake ducts and shielded over-wing trailing-edge nozzles. The aircraft has a quadrupe redundant fly-by-wire digital flight-control system, actuating moving surfaces at the wing trailing edges that combine aileron, elevator, and rudder functions. A landing gear track of 40 ft enables the B-2 to use any runway that can handle a Boeing 727 airliner.
B-2A. B-2 production represents three blocks of capability. Block 10 aircraft carried B83 nuclear bombs or 16 Mk 82 2,000-lb conventional munitions. All Block 10 aircraft have been upgraded to Block 20 or Block 30 configuration.

Block 20 aircraft additionally carry the B61/7 and B61/11 nuclear gravity bombs, as well as two GP6-Aided Munitions, the GBU-37 and GBU-38B, providing an interim, near-precision strike capability. Up to 16 GBU-36Bs or 8 GBU-37s can be carried on two rotary launcher assemblies.

Block 30 configuration delivers full PGM capability, including up to 16 JDAMs on the rotary launcher assemblies, and carriage of the Mk 82 2,000-lb bomb, cluster munitions, including Sensor Fuzed Weapons, JSOW, JASSM, the GAM-113 hard target penetration munition, the M82A1 750-lb bomb, and the MK 62 air-delivered sea mine on a bomb rack assembly. Other Block 30 enhancements include fully operational defensive and offensive avionics, a more sophisticated mission planning system, and additional operating modes for the Synthetic Aperture Radar (SAR). All 21 aircraft will reach Block 30 capability by 2000.

Extensions of the B-2’s conventional capabilities beyond Block 30 configuration are under consideration. The first test B-2 is to be refurbished for service as an operational bomber by 2000, providing a total fleet of 21. Procurement of 21 operational B-2s will enable the 509th BW, Whiteman AFB, Mo., to field two squadrons, each with eight operational aircraft.

The first combat mission took place March 24, 1993, against both targets in Operation Allied Force. Two B-2s made a 30-hour-plus round-trip from White- man AFB, Mo., to attack “a variety of hard and soft targets, including tanks, which were not limited to, command-and-control sites and airfields.” Each aircraft dropped 16,200-pound JDAMs.

B-52 Stratofortress

Brief: A long-range, heavy multirole bomber that can perform a variety of missions, carrying nuclear or conventional ordnance or air launched cruise missiles, with worldwide precision navigation capability.

Function: Long-range heavy bomber.

Operator: ACC, AFRC.

First Flight: April 15, 1952 (YB-52 prototype).


IOC: June 19, 1955.

Production: 744.

Inventory: 94.

Unit Location: Barksdale AFB, La., Minot AFB, N.D., Ellsworth AFB, R.I., Hancock AFB, Fla.

Contractor: Boeing.

Power Plant: eight Pratt & Whitney TF33-P-3 turbfans, each 17,000 lb thrust.

Accommodation: two pilots, side by side, plus navigator, radar navigator, and electronic warfare officer.

Dimensions: span 185 ft, length 160 ft 11 in, height 55,000 ft.

Weight: empty approx 188,000 lb, max T/O weight approx 400,000 lb.

Ceiling: 55,000 ft.

Performance (approx): max speed 650 mph, range more than 10,000 miles.

Armament: 12 AGM-86B ALCMs or AGM-129A ACMs externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons include AGM-86C CALCMs, bombs up to 2,000 lb, GBU 87/89/97 cluster munitions, and on some aircraft, three to four AGM-124A Have Nap missiles or eight AGM-84 Harpoons in under-wing clusters.

COMMENTARY

A key element of USAF’s manned strategic bomber force for over 40 years, the B-52’s still-expanding armament and increased range, fixed under-wing external tanks, a remotely controlled tail gun turret that allowed the gunner to be repositioned with the rest of the crew. First flight August 1955, with the first of 193 aircraft entering service in February 1959. Withdrawn 1994.

B-52H. The only version of the Stratofortress still in service. The H introduced TF33 turbfans, providing increased fuel performance, and improved defensive armament. First flown July 1960, 102 were built, with deliveries between May 1961–October 1962.

Deployment of the B-1 and B-2 led to a change in the primary role of the B-2 to cruise missile carrier with, typically, multiple cruise missile launches at high altitude, often followed by B-52 low-level descent to attack additional targets using gravity weapons.

An ongoing modernization program is enhancing the conventional capabilities of the remaining B-52 fleet, extending the bomber’s service life well into the next century, the ability to provide massive firepower in low-threat environments supplemented by a standout attack capability. Upgrades include the installation of GPS terminals, secure radios, and MIL-STD-1760 interfaces; weapons capability to include naval mines, precision guided weapons, such as Harpoon, AGM-142 Have Nap, and AGM-86C CALCM (a conventional variant of the ALCM); and advanced weapons, such as JDAM, JSOW, Wind-Corrected Munitions Dispenser, and JASSM. Installation of a heavy stores adapter beam will standardize aircraft to carry all B-52-certified munitions.

Current plans envisage an eventual force of around 71 aircraft.
Ceiling: 45,000 ft. 
Performance: speed 420 mph, range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.

Armament: one 30 mm GAU-8/A gun; eight under-wing hardpoints and three under fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, Combined Effects Munition (CEM) dispensers, gun pods, up to six AGM-65 Maverick missiles, up to four AIM-9 Sidewinder missiles, and jammer pods. CHAFF and flares carried internally to counter radar-directed or infrared-directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

F-15E Strike Eagle (SrA. Jeffrey Allen)

AC-130U

AC-130U (Ted Carlson) 

AIM-9 Sidewinder missiles.

AIDS, self-protection systems, and AGM-65 Maverick and AMRAAM missiles.

136

AIM-7F/M Sparrow air-to-air missiles, or eight AIM-120 AMRAAMs, carried externally.

COMMENTARY
Reflected the demands of the Close Air Support (CAS) mission, the A-10 combines large military load, long loiter, and wide combat radius with the ability to operate under 1,000-ft ceilings, with 1.5-mile visibility, and in darkness with NVGs. In a typical anti-armor mission, the A-10, affectionately nicknamed "Warthog," can fly 150 miles and remain on station for an hour. The 30 mm GAU-8/A gun provides a cost-effective weapon with which to defeat the whole array of ground targets, including tanks. The large bubble canopy provides all-around vision for the pilot, and the cockpit is protected with titanium armor, capable of withstanding projectiles up to 23 mm.

A-10A equipment includes an Inertial Navigation System (INS), Head-Up Display (HUD), NVGs, the Low-Altitude Safety and Targeting Enhancement (LASTE) system for ground collision avoidance, Pave Penny Altitude Safety and Targeting Enhancement (INS), Head-Up Display (HUD), NVGs, the Low-Altitude Safety and Targeting Enhancement (LASTE) System (INS), Head-Up Display (HUD), NVGs, the Low-Altitude Safety and Targeting Enhancement (LASTE) System.

F-15C 

Eagle

(Ted Carlson)

Delivered: from November 1974.
IOC: September 1975.
Production: 874.
Inventory: 526

Contractor: Boeing.


Accommodation: pilot only in F-15A/C, two seats in F-15B.

Dimensions: span 42 ft 10 in, length 63 ft 9 in, height 18 ft 8 in.

Weight: empty 28,600 lb, gross 68,000 lb.

Ceiling: 65,000 ft.

Performance: F-15C: max speed Mach 2.5, TO run 900 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles, with CFTs 3,570 miles.

Armament: one internally mounted M61A1 20 mm six-barrel cannon; four AIM-9L Sidewinder and four AIM-7F/M Sparrow air-to-air missiles, or eight AIM-120 AMRAAMs, carried externally.

COMMENTARY
A supremely capable aircraft, the F-15's superior maneuverability and acceleration, range, weapons, and avionics enable it to penetrate hostile defenses and establish air superiority over enemy systems. F-15 fighters deployed to the Persian Gulf in support of Operation Desert Storm accounted for 29 of the 37 USAF air-to-air victories. They have since been deployed to southern Iraq in support of Operation Southern Watch, to Turkey in support of Operation Provide Comfort, and to Bosnia, currently in support of NATO operations.

F-15A (single-seat) and F-15B (two-seat) fighters immediately became USAF's front-line fighter upon introduction in the mid-1970s. Basic equipment includes APG-63 pulse-Doppler radar for long-range detection and tracking of small high-speed objects down to top-level and effective weapons delivery, a HUD for close-in combat, IFF, and INS. A/Bs now serve with the ANG.

F-15C (single-seat) and F-15D (two-seat) models followed in June 1979. Improvements include 2,000 lb of additional internal fuel and provision for carrying Conformal Fuel Tanks (CFTs), reducing in-flight refueling requirements and increasing time in the combat zone. Tactical capabilities have been extensively enhanced since 1983 through an ongoing program of installation or modification of new or existing avionics equipment, allowing for the carriage of more advanced weapons and increased self-protection.

The final 43 aircraft included improved APG-70 radar, and more than 148 C/Ds are scheduled to receive the APG-63 upgrade.

F-15E Strike Eagle

Eagle

(Ted Carlson)

Production: 221.
Inventory: 201.

Unit Location: Eglin AFB, Fla., Elmendorf AFB, Alaska, Mountain Home AFB, Idaho, Nellis AFB, Nev., RAF Lakenheath, UK, Seymour Johnson AFB, N.C.
Contractor: Boeing.

Power Plant: two Pratt & Whitney F110-PW-220, each 23,770 lb thrust; or F100-PW-229 turbofans, each 29,100 lb thrust.

Accommodation: crew of two on zero-zero ejection seats.

Dimensions: span 42 ft 9 in, length 63 ft 9 in, height 18 ft 8 in.

Weight: empty 32,000 lb, gross 81,000 lb.

Ceiling: 65,000 ft.

Performance: max level speed at Mach 2.5, max range 2,762 miles.

Armament: one internally mounted M61A1 20 mm six-barrel cannon; four AIM-9L/Sidewinder and four AIM-7/M Sparrow air-to-air missiles, or eight AIM-120 AMRAAMs; up to six AGM-65 Maverick air-to-surface missiles, AGM-130; EO, IR, and standard bombs; CBU 87/89/97 duster munitions; and nuclear weapons. Future options include JSOW and JASSM.

COMMENTARY
F-15E has a strengthened airframe for increased gross
F-16 Fighting Falcon

**Brief:** A compact, versatile, and low-cost multirole fighter aircraft, one that is highly maneuverable and has repeatedly proved itself in air-to-air combat and air-to-surface attack.

**Function:** Multirule fighter.

**Operator:** ACC, AETC, PACAF, USAFE, ANG, AFRC.

**First Flight:** Dec. 8, 1976 (full-scale development).

**Delivered:** August 1978–present.

**ID:** on October 1980, Hill AFB, Utah.

**Production:** 2,206.

**Inventory:** 1,448.

**Location:** 14 active wings, 23 ANG, and five AFRC units.

**Contractor:** Lockheed Martin.

**Power Plant:** One augmented turbofan. General Electric F110-GE-100 (27,600 lb thrust) and Pratt & Whitney F100-PW-220 (23,450 lb thrust) are alternative standard engines. IPES in aircraft delivered from late 1991: Block 50: F110-GE-129 (29,000 lb thrust); Block 52: F100-PW-229 (29,100 lb thrust).

**Acmodation:** pilot only, on zero/zero ejection seat.

**Dimensions:** wingspan with missiles 32 ft 6 in, length overall 49 ft 5 in, height 16 ft.

**Weight:** empty (F100-PW-220) 18,338 lb, (F110-GE-100) 19,020 lb; gross, with external load (Block 40/42) 42,300 lb.

**Ceiling:** above 50,000 ft.

**Performance:** max speed Mach 2, radius of action: Block 40/42 to F-16Cs/DSs, 2,206. F-16s specialize in night attack operations with precision guided weapons. Follow-on improvements include ALE-47 improved defensive countermeasures, ALR-56M advanced radar warning receiver (Block 40 only), Very High Speed Integrated Circuit (VHSIC) technology in the APG-68(V5) fire-control radar, a ring-laser gyro INS, a LANTIRN nav/attack system, and Increased Performance Engines (IPEs). System improvements also introduced at Block 40/42 include core avionics hardware, installation of a LANTIRN nav/attack system, GPS, enhanced-envelope gunsight, digital flight controls, automatic terrain following, increased takeoff weight and maneuvering limits, an 8,000-lb airframe, and expanded envelope 9g capability.

Block 50/52 F-16Cs/DSs have MSIP Stage III improvements, which also show up in selected retrofits of Block 25. These aircraft incorporate the latest cockpit control and display technology, including a wide-angle HUD.

**Commentary:** The F-16 is the workhorse of the USAF fighter fleet. The 200+ USAF F-16 multirole fighters deployed to the Persian Gulf were more sorties than any other type during Desert Storm, with 13,500 missions. F-16s are currently deployed to patrol the no-fly zones in southern Iraq and to Bosnia in support of NATO operations.

**Weapons improvements include multishot AMRAAM compatibility.**

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**ID:** on October 1980, Hill AFB, Utah.

**Production:** 2,206.

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**Location:** 14 active wings, 23 ANG, and five AFRC units.

**Contractor:** Lockheed Martin.

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**Weapons improvements include multishot AMRAAM compatibility.**
in April 1991. F-22A. Production-configured version entered EMD phase in August 1991. USAF is receiving nine single-seat F-22As, three without avionics to explore flight characteristics, flutter, loads, propulsion, and envelope expansion, and six as avionics test beds. It will also receive one static test and one fatigue test airframe. Provision for ground-attack capability has been included since 1993. Further mission capabilities that may be explored in the future include strategic attack/interdiction, reconnaissance and surveillance, and lethal and non-lethal SEAD missions.

F-117 Nighthawk
Brief: World’s first operational aircraft designed to exploit low-observable stealth technology to expand the range of heavily defended strategic targets that can be attacked.

Function: Attack aircraft.
Operator: ACC.
First Flight: June 18, 1981.
IOC: October 1983.
Production: 59.
Inventory: 52.
Unit Location: Holloman AFB, N.M.
Contractor: Lockheed Martin.
Power Plant: two General Electric F404-GE-F102 non-afterburning turbojets, each 10,800 lb thrust.
Accommodation: pilot only, on zero/zero ejection seat.
Dimensions: span 43 ft 4 in, length 65 ft 11 in, height 12 ft 5 in.
Weight: empty (estimated) 29,500 lb, max gross 52,500 lb.
Ceiling: classified.
Performance: high subsonic, mission radius, unrefueled (5,000-lb weapon load) 656 miles.
Armament: full internal carriage of what is described as a wide variety of tactical weapons, incl laser-guided 2,000-lb munitions.

COMMENTARY
Revealed officially in November 1988, the F-117’s first operational deployment was to Panama in support of Operation Just Cause. During the Persian Gulf War, a fleet of more than 40 F-117As undertook 1,270 missions, attacking top-priority targets in high-threat areas. No aircraft were lost or damaged by hostile fire. An F-117 was lost March 27, 1999, while participating in Operation Allied Force in Yugoslavia.

F-117A development and manufacture began simultaneously in November 1978 within a highly classified environment, using many parts either transferred or modified from existing aircraft. The F-117As were deployed initially with the 37th TFW, at Tonopah Test Range in Nevada, with the entire theater with its crew, laser fuel, and initial spares ready to move forward as US forces gain air superiority.

The attack laser’s main armament is a lightweight, megawatt-class Chemical Oxygen-Iodine Laser (COIL). The laser weapon contains 14 COIL modules and sufficient chemical fuel for 20–40 TBM kills. An optical system transports the laser beam up to the aircraft nose, where a 1.5-meter-diameter mirror in a ball turret points the beam at the target. The optical system contains low-power lasers, sensors, steering mirrors, and adaptive optics (deformable mirrors) to correct atmospheric distortions, thereby increasing the high-energy laser beam’s intensity on target and the system’s lethal range.

Reconnaissance and Surveillance Aircraft

E-3 Sentry
Brief: Modified Boeing 707 fitted with a rotating radar dome, 30 feet wide and 6 feet thick, which provides all-weather air surveillance and C2 for tactical and air defense forces. Capable of surveillance from Earth’s surface up to the stratosphere, over land or water, at more than 200 miles.

Operator: ACC, PACAF, AFRC.
Delivered: March 1977–84.
Production: 34.
Inventory: 32.
Unit Location: Elmendorf AFB, Alaska, Kadena AB, Japan, Tinker AFB, Okla.
Contractor: Boeing.
Power Plant: four Pratt & Whitney TF33-PW-100/100A turbofans, each 21,000 lb thrust.
ACCOMMODATION: basic operational crew of 17–23, incl 13–19 AWACS mission specialists and four flight crew members.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.
Weight: gross 335,000 lb, max T-O 347,000 lb.
Ceiling: above 30,000 ft.
Performance: optimum cruise Mach 0.78, endurance eight hr unrefueled.

COMMENTARY
The basic E-3 Airborne Warning and Control System (AWACS) aircraft is a militarized version of the Boeing 707-320B, equipped with an extensive complement of mission avionics, including computer, radar, IFF, communica-ions, display, and navigation systems. Its capability is provided by its lock-on radar, which makes possible all-altitude surveillance over land or water, with an ability to track both air and sea targets simultaneously.

E-3A: Of the 24 built for USAF, 10 for standard production configuration, 22 were later upgraded. An improved US/NATO Standard E-3A configuration was initiated with the 25th USAF Sentry, delivered in December 1981, with a larger memory computer and a maritime detection capability. Nine were built new for USAF, and one of the original E-3As was upgraded. E-3B is the upgraded earliest version E-3A. Twenty-two production models and two prototypes were produced. Improvements include much-enhanced computer capacity, jam-resistant communications, and improved maritime surveillance capability, additional radio communications, and five additional display consoles.

E-3C is an upgrade to the original US/NATO Standard E-3A aircraft, with additional radio, console, and radar capabilities. Redelivered 1984. USAF E-3s are undergoing major sustainability, reliability, and availability upgrades, known as Extended Sentry Program. Additionally, mission system upgrades include new passive detection systems, known as Electronic
**E-8C Joint STARS**

**Brief:** A modified Boeing 707-300 equipped with a large, canopied radome mounted on the starboard side of the fuselage, housing long-range, air-to-ground radar capable of locating, classifying, and tracking vehicles moving on Earth’s surface out to distances in excess of 200 km. Such data are then transmitted via data link to forward tracking stations or other aircraft.

**Function:** Ground surveillance, battle management, command and control.

**Operator:** ACC.

**First Flight:** December 1988.

**Delivered:** May 1996–present.

**IOC:** Dec. 18, 1997.

**Production:** 14 to be delivered to USAF by 2005.

**Inventory:** Four.

**Unit Location:** Robins AFB, Ga.

**Power Plant:** Four Pratt & Whitney JT3D-3B turbojets, each 18,000 lb thrust.

**Accommodation:** Mission crew of 21 Air Force/Army personnel.

**Weight:** Empty 171,000 lb, gross 336,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** Operating speed Mach 0.84, endurance 20 hr.

**COMMENTARY**

Joint STARS is an all-weather, round-the-clock system comprising an airborne E-8C aircraft (equipped with a multimode radar) and US Army mobile ground stations. The radar subsystem features a multimode, side-looking, phased-array radar with MTI as the primary mode. The radar can interleave MTI with Synthetic Aperture Radar (SAR) and Fixed Target Indicator (FTI) imagery. Joint STARS directs attack on targets, in real time, via a secure, jam-resistant digital data link to broadcast data to ground forces.

As part of their operational test and evaluation, Joint STARS aircraft flew more than 150 operational missions during Operations Desert Storm (21 aircraft), Desert Shield (12 aircraft), and Desert Storm (16 aircraft). As a result of the mission, Joint STARS’ original role was expanded to include bomb-damage assessment, SEAD, and the detection of mobile missile launchers and their defenses.

Two E-8C aircraft returned to Europe in late 1996 to support Joint Endeavor. E-8Cs also participated in USAF and joint exercises throughout 1997. The E-8C deployed to Korea in 1998.

**E-8A.** Prototype version, with specialized equipment installed aboard two specially modified 707–300 airframes. One was converted to an in-flight refueling configuration, the other with a Block 10 airborne refueling system installed aboard two specially modified 707-300 aircraft. Each 16,050 lb thrust.

**Accommodation:** Observation for 38.

**Dimensions:** span 131 ft 3 in, length 135 ft, height 42 ft 4 in.

**Weight:** gross 297,000 lb.

**Ceiling:** 50,000 ft (basic C-135).

**Performance:** Speed: 500 mph, unrefueled range 3,900 miles.

**COMMENTARY**

Approximately 3,000 feet above the ground, and one KA-91 pan camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography at approximately 35,000 feet. Data is processed and recorded by the Milieuus camera annotation system.

**RC-135W Rivet Joint**

**Brief:** A medium-altitude, long-endurance Unmanned Aerial Vehicle, flown remotely by a rated officer. Joint Force Commander asset with multiple imagery sensors.

**Function:** Unmanned reconnaissance aircraft.

**Operator:** ACC.

**First Flight:** July 1994.

**Delivered:** November 1996–present.

**IOC:** TBD

**Production:** 12 systems planned (system consists of four air vehicles, one ground control station, and one Trojan Spirit II comm system).

**Inventory:** five systems (as of Dec. 1, 1998).

**Unit Location:** Indian Springs AFAF, Nev.

**Power Plant:** four Pratt & Whitney TF33-5-5 turbofans, each 18,000 lb thrust.

**Accommodation:** Flight crew of four; 25–35 mission crew.

**Dimensions:** span 130 ft 10 in, length 134 ft 6 in, height 38 ft 4 in.

**Weight:** gross 299,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** Speed 500 mph plus, range, with air refueling, unlimited.

**COMMENTARY**

The 55th Wing at Offutt AFB, Neb., operates a highly specialized fleet for worldwide reconnaissance missions. RC-135 Cobra Ball is used for missile tracking. Equipment includes wide-area IR sensors, long-range optical telescopes, and an advanced communications suite that can locate a missile more than 350 miles away and calculate its trajectory and impact point. One aircraft, a revamped RC-135X, is receiving the latest sensor upgrades, featuring sensors on both sides of the aircraft. RC-135U Combat Sent. Two aircraft with larger tailcone and fin fairing, used for measuring and analyzing foreign electronic and IR equipment. IOC: 1967.

**RC-135V Rivet Joint.** Fourteen aircraft used for reconnaissance. RC-135 Rivet Jointers loiter near battlefields providing near-real-time data updates via the Tactical Information Broadcast System (TIBS) and JTIDS on enemy air defense systems to crews of F-16 HTS aircraft. Two additional Ws are being acquired. The aircraft’s recon systems are continuously upgraded to keep pace with new threats. Rivet Jointers have operated in the Persian Gulf region since 1990. IOC: 1973.

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**Function:** Unmanned reconnaissance aircraft.

**Operator:** ACC.

**First Flight:** July 1994.

**Delivered:** November 1996–present.

**IOC:** TBD

**Production:** 12 systems planned (system consists of four air vehicles, one ground control station, and one Trojan Spirit II comm system).

**Inventory:** five systems (as of Dec. 1, 1998).

**Unit Location:** Indian Springs AFAF, Nev.

**Power Plant:** four Pratt & Whitney TF33-5-5 turbofans, each 18,000 lb thrust.

**Accommodation:** Flight crew of four; 35 mission crew.

**Dimensions:** span 130 ft 10 in, length 134 ft 6 in, height 38 ft 4 in.

**Weight:** gross 299,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** Speed 500 mph plus, range, with air refueling, unlimited.

**COMMENTARY**

The 55th Wing at Offutt AFB, Neb., operates a highly specialized fleet for worldwide reconnaissance missions. RC-135 Cobra Ball is used for missile tracking. Equipment includes wide-area IR sensors, long-range optical telescopes, and an advanced communications suite that can locate a missile more than 350 miles away and calculate its trajectory and impact point. One aircraft, a revamped RC-135X, is receiving the latest sensor upgrades, featuring sensors on both sides of the aircraft. RC-135U Combat Sent. Two aircraft with larger tailcone and fin fairing, used for measuring and analyzing foreign electronic and IR equipment. IOC: 1967.

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with EO/IR and SAR sensors with Ku-band satellite data link allowing real-time transmissions of video images to a ground station.

Global Hawk

**Brief:** A high-altitude, long-range, long-endurance unmanned aerial vehicle.

**Function:** Unmanned reconnaissance aircraft.

**Operator:** TBD

**First Flight:** Feb. 28, 1998.

**Delivered:** TBD

**IOC:** TBD

**Production decision in Fiscal 2001.**

**Inventory:** TBD

**Unit Location:** TBD

**Contractor:** Teledyne Ryan.

**Power Plant:** one Allison AE 3007H turbofan, 7,050 lb thrust.

**Accommodation:** unmanned system.

**Dimensions:** length 44 ft 5 in, height 15 ft 2 in, span 103 ft 8 in.

**Weight:** empty 8,940 lb, gross 25,600 lb.

**Ceiling:** 65,000 ft.

**Performance:** design goals incl endurance of up to 40 hr at a cruise speed of 400 mph and at an altitude of 65,000 ft. This would allow loiter on station 3,450 miles from base for 24 hr.

**COMMENTS:**

A high-altitude endurance UAV carrying a 2,000-lb payload, incorporating EO/IR and SAR sensors that will permit ground commanders to switch among radar, IR, and visible wavelengths as required. Navigation is by GPS/INS. It flies autonomously from takeoff to landing, providing near-real-time imagery products for tactical and theater commanders. Vehicle ground track and mission plan can be updated in real time to respond to changing air traffic control needs and/or mission collection needs.

**U-2 Dragon Lady**

**Brief:** Single-seat, single-engine, high-altitude endurance, reconnaissance aircraft carrying a wide variety of sensors and cameras, providing continuous day or night, high-altitude, all-weather area surveillance in direct support of US forces.

**Function:** High-altitude reconnaissance.

**Operator:** ACC.

**First Flight:** August 1955 (U-2); 1967 (U-2R).

**Delivered:** 1955–October 1989.

**IOC:** circa 1956

**Production:** 35 (U-2S).

**Inventory:** 35.

**Unit Location:** Beale AFB, Calif.

**Contractor:** Boeing/Lockheed Martin.

**Power Plant:** two General Electric CF6-50E2 turbofans, 40,400 shp.

**Accommodation:** single (two for trainer).

**Dimensions:** span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.

**Weight:** gross 80,000 lb.

**Performance:** max cruising speed ceiling, more than 620 mph; with aerial refueling up to 114 hr; unrefueled endurance in excess of 12 hr.

**COMMENTS:** The U-2 is capable of collecting multisensor photo, electro-optic, infrared, and radar imagery, as well as performing other types of intelligence functions. Current upgrades to its sensors, airframe, and cockpit will extend the U-2’s usefulness well into the next century.

**U-2R**

**Brief:** Single-seat and U-2RT (two-seat) aircraft are R and RT aircraft that have been re-engined with the General Electric F118-101, a derivative of the engine used in the B-2 bomber, providing improved performance and supportability. The Air Force accepted the first U-2S in October 1994, and conversion of the entire fleet of 31 single-seat aircraft and four two-seat trainers was completed this year.

**WC-130 Hercules**

**Brief:** A high-wing, medium-range aircraft flown by Air Force Reserve Command for weather reconnaissance missions. It flies into the eye of tropical cyclones or hurricanes, collecting weather data from within the storm’s environment.

**Function:** Weather reconnaissance aircraft.

**Operator:** AFRC.

**First Flight:** not available

**Delivered:** not available

**IOC:** 1959 (B model), 1962 (E), 1964 (H).

**Production:** five (WC-130B).

**Inventory:** 10.

**Unit Location:** Keesler AFB, Miss.

**Contractor:** Lockheed.

**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.

**Accommodation:** six.

**Dimensions:** span 132 ft 6 in, length 99 ft 4 in, height 38 ft 6 in.

**Weight:** gross 155,000 lb.

**Ceiling:** 33,000 ft at 100,000 lb gross T-O weight.

**Performance:** speed 374 mph at 20,000 ft, range 4,000 miles.

**COMMENTS:** The WC-130 is flown by AFRC organizations known as the Hurricane Hunters. The hurricane reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas.

**WC-130H/E**

Earlier version C-130 modifications used for weather reconnaissance. Now retired.

**WC-130H**

Current improved version, operated by the 53rd WRS for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements. It is equipped with two external 1,400 gallon fuel tanks, an internal 1,800 gallon fuel tank, and uprated engines. An average weather reconnaissance mission might last 11 hours and cover almost 3,500 miles while the crew collects and reports weather data every minute. Results are transmitted via satellite to the National Hurricane Center, Miami, Fla.

**WC-130J**

Six weather-capable versions of the latest C-130 model are scheduled for delivery from Fiscal 1998.

**Special Duty Aircraft**

**E-4B National Airborne Operations Center**

**Brief:** A four-engine, swept-wing, long-range, high-altitude airplane providing a modern, highly survivable, command, control, and communications center allowing the National Command Authority to direct US forces, execute emergency war orders, and coordinate actions by civil authorities.

**Function:** Airborne operations center.

**Operator:** ACC.

**First Flight:** June 13, 1973 (E-4A); June 10, 1978 (E-4B).

**Delivered:** December 1974–85.

**IOC:** December 1974 (E-4A); January 1980 (E-4B).

**Production:** four.

**Inventory:** four.

**Unit Location:** Offutt AFB, Neb.

**Contractor:** Boeing.

**Power Plant:** four General Electric CF6-50E2 turbofans, each 52,300 lb thrust.

**Accommodation:** up to 114.

**Dimensions:** span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.

**Weight:** gross 80,000 lb.

**Ceiling:** above 30,000 ft.

**Performance:** unrefueled endurance in excess of 12 hr.

**COMMENTS:** E-4 aircraft were developed as the National Emergency Airborne Command Post (NEACP), now the National...
Airborne Operations Center (NAOC). The E-4B fleet provides a survivable C4I platform capable of supporting the National Command Authority throughout the full threat spectrum, including sustained operations in a nuclear environment.

The first B model was delivered to the Air Force in January 1980. Four were produced, of which three were converted E-4As. The first operational mission was flown in March 1980. They are hardened against the effects of nuclear explosions, including electromagnetic pulse. A 1,250-kVA electrical system supports advanced system electronics as well as state-of-the-art communications and data processing equipment such as Extremely High Frequency (EHF) Military satellite terminals and six-channel International Maritime Satellite (INMARSAT). Newly developed Tri-band radomes also house the E-4B’s Super High Frequency (SHF) Frequency Demand Multiple Access (FDMA) communications antenna, the only such system on an airborne platform.

The E-4B system is capable of tying into commercial telephone and radio networks and could be used for radio broadcasts to the general population. E-4Bs also support the Federal Emergency Management Agency.

**E-9**

**Brief:** Airplane used for low-altitude, over-the-horizon data gathering during missile tests and for sea surveillance in order to keep boats out of the Gulf Test Range during tests.

**Function:** Electronic surveillance.

**Operator:** ACC.

**First Flight:** (Prototype Dash 8) June 20, 1983.

**Delivered:** 1988.

**IOC:** circa 1988.

**Production:** two.

**Inventory:** two.

**Unit Location:** Tyndall AFB, Fla.

**Contractor:** de Havilland of Canada.

**Power Plant:** two Pratt & Whitney Canada PW120A turboprops, each 2,000 shp. (No military designation during tests.

**Data gathering during missile tests and for sea surveillance in order to keep boats out of the Gulf Test Range during tests.**

**Function:** Electronic warfare.

**Operator:** ACC, ANG.

**First Flight:** January 1990.

**Delivered:** March 1990.

**IOC:** December 1990.

**Production:** seven.

**Inventory:** seven.

**Unit Location:** Active: Davis–Monthan AFB, Ariz.

**ANG:** Harrisburg IAP, Pa.

**Contractor:** Lockheed Martin.

**EC-130E**

**ABC difficulties in the two aircraft support USAF and USN missile testing and are also capable of monitoring and controlling UAVs.**

**EC-130E**

**Brief:** A heavily modified C-130 which, in its several variants, is used to carry out battlefield command, electronic warfare, and electronic combat.

**Function:** Electronic warfare.

**Operator:** ACC, ANG.

**First Flight:** January 1990.

**Delivered:** March 1990.

**IOC:** December 1990.

**Production:** seven.

**Inventory:** seven.

**Unit Location:** Active: Davis–Monthan AFB, Ariz.

**ANG:** Harrisburg IAP, Pa.

**Contractor:** Lockheed Martin.

**EC-130H**

**Compass Call**

**Brief:** A heavily modified C-130 for electronic combat.

**Function:** Electronic warfare.

**Operator:** ACC.

**First Flight:** 1981.

**Delivered:** 1982.

**IOC:** 1983.

**Production:** not available

**Inventory:** 14.

**Unit Location:** Davis–Monthan AFB, Ariz.

**Contractor:** Lockheed Martin.

**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.

**Accommodation:** standard crew 13.

**Dimensions:** span 132 ft 7 in, length 100 ft 6 in, height 38 ft 3 in.

**Weight:** gross 155,000 lb.

**Ceiling:** 20,000 ft.

**Performance:** speed 374 mph at 20,000 ft.

**COMMENTARY**

A variant used as an airborne communications jamming platform. It played a vital role in disrupting Iraqi military communications at strategic and tactical levels during the Persian Gulf War and has since been deployed to Bosnia.

**EC-135**

**Modified KC-135 tanker aircraft extensively equipped and capable of flying in continuous airborne alert in support of national command and control; also telemetry and voice relay aircraft.**

**Function:** Command and control aircraft; ARIA aircraft.

**Operator:** ACC, AFMC.

**First Flight:** not available

**Delivered:** not available

**IOC:** Feb. 3, 1961.

**Production:** not available

**Inventory:** seven.

**Unit Location:** Edwards AFB, Calif., Offutt AFB, Neb.

**Contractor:** Boeing.

**Power Plant:** (EC-135C) four Pratt & Whitney TF33-P-9 turboprops, each 18,000 lb thrust.

**EC-130 Commando Solo**

**ANG** uses this version as a communications relay aircraft.

**EC-130 Commando Solo**

**ANG** uses this version as a communications relay aircraft.

**Function:** Compass Call.

**Operator:** ACC.

**First Flight:** 1981.

**Delivered:** 1982.

**IOC:** 1983.

**Production:** not available

**Inventory:** 14.

**Unit Location:** Davis–Monthan AFB, Ariz.

**Contractor:** Lockheed Martin.

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**Function:** Command and control aircraft; ARIA aircraft.

**Operator:** ACC, AFMC.

**First Flight:** not available

**Delivered:** not available

**IOC:** Feb. 3, 1961.

**Production:** not available

**Inventory:** seven.

**Unit Location:** Edwards AFB, Calif., Offutt AFB, Neb.

**Contractor:** Boeing.

**Power Plant:** (EC-135C) four Pratt & Whitney TF33-P-9 turboprops, each 18,000 lb thrust.
KC-10 Extender

Brief: A modified McDonnell Douglas DC-10 which combines in a single aircraft the operations of aerial refueling and long-range cargo transport.

Function: Aerial refueling/transport.
Operator: AMC, AFRC.

First Flight: April 1986.

IOC: August 1962.
Production: 60.

Inventory: 59.

Unit Location: McGuire AFB, N.J., Travis AFB, Calif.

Contractor: McDonnell Douglas (now Boeing).

Power Plant: Three General Electric CF6-50C2 turbofans, each 52,500 lb thrust.

Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

Weight: (EC-135C) 301,600 lb.

Ceiling: 40,600 ft.

Performance: cruising speed Mach 0.825, range with 11,192 miles.

Accommodation: flight crew of four; up to 80 passengers.

KC-135R Stratotanker (Ted Carlson)

KC-135E Stratotanker (Handy Jolly)

KC-130P (Ted Carlson)

KC-130P Brief: Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for special operations helicopters or to airdrop small special operations teams, small bundles, and zodiac and combat rubber raiding craft.

Function: Air refueling for SOF helicopters/airdrop.
Operator: AETC, AFSC, ANG, AFRC.

First Flight: Dec. 8, 1964 (as HC-130M).
Delivered: from 1965.

Production: not available.

Inventory: 57.

Unit Location: Active: Egin AFB, Fla., Kadena AB, Japan; Kirkland AFB, N.M., Travis AFB, Calif.; McGuire AFB, N.J.; Nellis AFB, Nev., Offutt AFB, Neb., RAF Mildenhall, UK, Robins AFB, Ga., ANG: 19 units. AFRC, seven units.

Contractor: Boeing.


Accommodation: four flight crew, plus four mission crew.

Dimensions: span 132 ft 7 in, length 98 ft 9 in, height 38 ft 6 in.

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

Performance: speed 289 mph, range more than 4,000 miles.

COMMENTARY: Since initial introduction Combat Shadow aircraft have served a wide range of roles and missions. They are currently dedicated to special operations.
missions, conducting single-ship or formation in-
flight refueling of SOF helicopters in a low-threat
to targeted small-thrud environment. In 1990,
during Operations Desert Storm, they provided air refueling of SOF helicopters over friendly and hostile territory as well as psychological operations and leaflet drops.

MC-130P Active duty forces have 28 MC-130P (formerly HC-130N/P) in service. All are modified with new secure communications, self-contained inertial navigation, and ECM systems. The next version includes advanced integrated navigation equipment, including digital scan radar, ring-laser gyro INS, FLIR, and GPS, and dual nav stations, as well as new missile warning systems and countermeasures for refueling missions in hostile environments. Fifteen have been fitted with an in-flight refueling receptacle to extend their service life by 30,000 flight hours. One HC-130 is in service in the Persian Gulf region and to Bosnia, where the C-17 was the only aircraft capable of carrying out airdrop cargo into Tuzla AB.

C-17 Globemaster III

Brief: A heavy-lift, air refuelable cargo transport for inter- and intra-theater direct delivery airlift of all classes of military cargo, including outsized items.

Function: Cargo and troop transport.

Operator: AETC, AMC, AFRC.


Delivered: June 1993–present.


Production: 120 minimum planned.

Inventory: 45 as of December 1998.

Unit Location: Altus AFB, Okla., Charleston AFB, S.C.

Contractor: Boeing.

Power Plant: four Pratt & Whitney F117-PW-100 turbofans, each 41,700 lb thrust.

Accommodation: normal flight crew of three (two pilots plus loadmaster). Provisions for the full range of military airlift missions, including capacity for up to 102 passengers/patroltroops, or 36 litters; range of military cargo incl tanks, jeeps, and up to three AH-64A helicopters; air-drop capability for up to 60,000-lb single platforms or 110,000-lb multiple platforms.

Dimensions: span over wingtips 170 ft 9 in, length 173 ft 11 in, height 55 ft 1 in.

Weight: empty 277,000 lb, max payload (2.25g) 170,900 lb, gross 585,000 lb.

Ceiling: 45,000 ft.

Performance: normal cruising speed at height 518 mph (Mach 0.77), unrefueled range with 130,000-lb payload 3,200 miles, unlimited with refueling.

Developed to meet US force projection requirements, the C-17 is able to operate routinely into small, austere airfields (3,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.

C-17A completed its first flight test program in June 1995. It is the first military transport to feature a full digital fly-by-wire control system and two-person cockpit, with two full-time, all-function HUDs and four multifunction electronic displays. Operational deployments have been made in support of Operation Vigilant Warrior in the Persian Gulf region and to Bosnia, where the C-17 was the only aircraft capable of carrying outsized cargo into Tuzla AB.

A total of 120 production aircraft have been approved through 2004. Planned disposition of the C-17 includes 48 aircraft each to Charleston AFB, S.C., and McChord AFB, Wash., eight to an AETC training unit at Altus AFB, Okla., and six to ANG’s 172d AW at Jackson IAP, Miss.; the remaining 10 aircraft will be used for backup.

C-135 Stratolifter

Brief: A version of the KC-135 tanker, without refueling equipment, produced for non-tanker duties.

Function: Passenger and cargo airlifter.

Operator: ACC, AFMC, AMC, PACAF.

First Flight: May 1961.


Production: 48, plus five WC/CTC-135s.

Inventory: six.

Unit Location: Andrews AFB, Md., Edwards AFB, Calif., Hickam AFB, Hawaii, Offutt AFB, Neb.

Contractor: Boeing.

Power Plant: (C-135B) four Pratt & Whitney TF33-P-5 turbofans, each 18,000 lb thrust.

Accommodation (C-135B): 60 passengers.

Dimensions: span 130 ft 10 in, length 134 ft 6 in, height 38 ft 4 in.

Weights (C-135B): operating weight empty 102,300 lb, gross 275,000 lb.

Ceiling: 10,700 ft.

Performance (C-135B): max speed 600 mph, range with 54,000-lb payload 4,625 miles.

COMMENTARY

Several C-135 transports and variants, without the KC-135’s refueling equipment, remain operational within USAF. They were ordered originally to serve as interim jet passenger or cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratolifters in two versions.

C-135A

The first 15 aircraft were equipped with J57-P-5 turbojets.

C-135B

The next version included upgraded Pratt & Whitney turboprop units. USAF retrofitted 11 Bs with revised interior for VIP transportation.

C-141 Starlifter

Brief: The workhorse of US airlift force, the Starlifter can project combat forces over long distances, inject those forces and their equipment either by air-land or airdrop, resupply these employed forces, and extract the sick and wounded from the hostile area to advanced strategic zones.

C-5 Galaxy

The workhorse of the US airlift force, the Starlifter can project combat forces over long distances, inject those forces and their equipment either by air-land or air-drop, resupply these employed forces, and extract the sick and wounded from the hostile area to advanced strategic zones.

C-5 Galaxy

Galaxy

A heavy-lift, air refuelable cargo transport for inter- and intra-theater direct delivery airlift of all classes of military cargo, including outsized items.

Function: Cargo and troop transport.

Operator: AETC, AMC, AFRC.

First Flight: June 30, 1968.


IOC: September 1970.

Production: 151.

Inventory: 126.

Accommodation: crew of six, rest area for 15 (relief crew, etc.); seating for 75, and 36 standard 463L pallets or 110,000-lb multiple platforms.

Dimensions: empty 34,000 ft with a 605,000-lb load.

Weight: empty 277,000 lb, max payload (2.25g) 170,900 lb, gross 585,000 lb.

Ceiling: 45,000 ft.

Performance: normal cruising speed at height 518 mph (Mach 0.77), unrefueled range with 130,000-lb payload 3,200 miles, unlimited with refueling.

Developed to meet US force projection requirements, the C-5 is a valuable asset in humanitarian and relief missions and in support of combat operations.

C-5A

USAF took delivery of 81 of these basic models between December 1969 and May 1973. A major wing modification was subsequently undertaken, extending the aircraft’s service life by 30,000 flight hours. One ANG and two AFRC squadrons are C-5A-equipped.

The reliability and maintainability of the C-5A version have been the focus of numerous AMC studies, and a program is in hand to upgrade the fleet with the avionics subsystems developed for the C-5B (see below).

C-5B

is generally similar to the C-5A but embodies all the improvements introduced since completion of C-5A production including the strengthened wings, improved turbofans, and updated avionics, with color weather radar and triple INS. The first C-5B flew for the first time in September 1986 and was delivered to Altus AFB, Okla., in January 1986.

All of USAF’s Galaxys are having their flight-management systems modernized and embedded GPS receivers installed; new, safer interior panels are also being fitted. A number of C-5s have been equipped with a prototype missile defense system.

C-5C

The C-5C is a Galaxys modified to carry outsize cargo (34,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.

C-5D

The C-5D is a Galaxys modified to carry outsized cargo (34,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.

C-5E

The C-5E is a Galaxys modified to carry outsized cargo (34,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.

C-5F

The C-5F is a Galaxys modified to carry outsized cargo (34,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.

C-5G

The C-5G is a Galaxys modified to carry outsized cargo (34,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-land or air-drop outsized cargo in the tactical environment.
medical facilities.

Function: Long-range troop and cargo airlift.
Operator: AETC, AFMC, AMC, ANG, AFRIC.
IOC: May 1965.
Production: 285.
Inventory: 207.
Contractor: Lockheed.
Power Plant: four Pratt & Whitney TF33-P-7 turbofans, each 21,000 lb thrust.

Accommodation: crew of five; cargo on 13 standard 40L pallets. Alternative freight or vehicle payloads, 200 fully equipped troops, 155 paratroops, or 103 litter patients plus attendants.

Dimensions: span 159 ft 11 in, length 168 ft 4 in, height 39 ft 3 in.
Weight: operating 150,000 lb, max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb. max 645,000 lb emergency war planning.
Ceiling: 41,600 ft.
Performance: max cruising speed 566 mph, range with max fuel 2,170 miles without air refueling.

COMMENTARY
Longtime mainstay of USAF's airlift fleet, the C-141 was the first jet aircraft designed to meet military standards as a troop and cargo carrier. It played a major role in Operation Desert Storm and has deployed to numerous humanitarian and emergency situations.

C-141A entered service with MAC in April 1965, and 285 were built, some of which were structurally modified to accommodate the Minuteman ICBM. One C-141A has been greatly modified as an Advanced Radar Test Bed (ARTB) for use as an airborne laboratory platform to test a wide range of sensors in a dynamic ECM environment.

C-141B is a stretched C-141A with in-flight refueling capability. All C-141As (except four AFMC aircraft used for test purposes) were lengthened by 23 ft 4 in to realize the aircraft’s full payload potential. First C-141B flew March 1977 and redeliveries took place between December 1979 and June 1982. The modification gave USAF the equivalent of 90 additional C-141A aircraft. Subsequent improvements include structural upgrades, a state-of-the-art autopilot and all-weather landing system, and improved air-drop systems. Modification of 13 C-141Bs is being performed to increase their SOLL (Special Operations Low Level) capability and survivability.

C-141C is a C-141B modified with computerized touch screens, digital readouts. The first version, which rolled out at Warner Robins ALC, Ga., Oct. 1, 1997, is assigned to AFRC’s 452d Air Mobility Wing, March ARB, Calif. ANG and AFRC are slated to get 64 of these glass-cockpit transports.

C-9 Nightingale
Introduction, medium-range, swing-wing jet aircraft used primarily for the aeromedical evacuation mission. A modified version of the DC-9, it is the only USAF aircraft specifically designed for the movement of litter and ambulatory patients.

Function: Aeromedical evacuation.
Operator: AMARC, PACAF, USAFE, AFRIC.
First Flight: August 1968.
IOC: circa 1968.
Production: 24.
Inventory: 23.
Unit Location: Andrews AFB, Md., Ramstein AB, Germany, Scott AFB, Ill., Yokota AB, Japan.
Contractor: McDonnell Douglas (now Boeing).
Power Plant: two Pratt & Whitney JT9D-9 turbofans, each 25,000 lb thrust.

Accommodation: crew of three; 40 litter patients or 40 ambulatory patients, or a combination of both, pit 21,000 lb thrust.
Dimensions: span 93 ft 5 in, length 119 ft 3 in, height 27 ft 5 in.
Weight: gross 121,000 lb.
Ceiling: 35,000 ft.
Performance: max cruising speed at 25,000 ft 565 mph, range more than 2,000 miles.

Commentary
C-9A transport is a derivative of the DC-9 Series 30 commercial airliner, modified to include a special-care compartment with separate atmospheric and ventilation controls. Two C-9As also provide special operations aircraft.

C-9C. Three specially configured C-9s were delivered to Andrews AFB, Md., in 1975 for President Ford and other US government commitments.

C-12 Huron
Aircraft to provide airlift support for attaché and military advisory groups worldwide.

Function: Special airlift.
Operator: AETC, PACAF.
First Flight: Oct. 27, 1972 (Super King Air 200).
Production: 65.
Inventory: 33.
Unit Location: Elmendorf AFB, Alaska, Keiser AFB, Miss., Osan AB, South Korea, various overseas embassies.
Contractor: Beech.
Power Plant: (C-12J) two Pratt & Whitney Canada PT6A-65 turboprops, each 1,100 shp.

Accommodation: crew of two; C-12C: up to 19 passengers.

Dimensions: (C-12J) span 54 ft 6 in, length 43 ft 9 in, height 15 ft.
Weight: (C-12J) empty 9,850 lb, gross 16,600 lb.
(C-12J) 25,000 ft.
Performance: (C-12J) max cruising speed at 16,000 ft 307 mph, range with 10 passengers 1,806 miles.

Commentary
C-12C. Re-engined C-12As, with PT6A-41 turboprops, deployed to overseas embassies, under AFCSC control.
C-12D. Similar to C model and also deployed to overseas embassies.
C-12F. With updated PT6A-42 engines, can support medical airlift.
C-12J. A military version of the larger Beechcraft Model 1900, operated by PACAF.

C-20 Gulfstream
A twin-engine turbofan aircraft acquired to provide airlift for high-ranking government and DoD officials.

Function: Operational support airlift; special air missions.
Operator: AMC, USAFE.
First Flight: December 1979.
Delivered: From September 1983.
IOC: circa 1983.
Production: not available
Inventory: 13.
Unit Location: Andrews AFB, Md., Ramstein AB, Germany.
Contractor: Gulfstream.

Power Plant: C-20A/B: two Rolls–Royce Spey MK611-8 turbofans, each 13,850 lb thrust.

Accommodation: crew of five; 12 passengers.

Weight: C-20A/B gross 68,200 lb; C-20H gross 74,600 lb.
Ceiling: 45,000 ft.
Performance: max cruising speed 561 mph, range 4,060 miles.

Commentary
C-20A. Three Gulfstream III transports were acquired to replace aging C-140B aircraft. They provide USAFE’s Special Air Mission fleet with intercontinental range and ability to operate from short runways.

C-20B. Seven C-20B versions, with advanced mission communications equipment and revised interior, were acquired in the late 1980s. Two C-20B aircraft have been retired.

C-20C. Three special missions aircraft, with hardened strategic communications equipment.

C-20H. Two Gulfstream IV–SP aircraft, with advanced technology flight-management systems and upgraded Rolls–Royce engines, were acquired by USAF to meet expanding special air mission requirements.

C-21
Aircraft designed to provide cargo and passenger airlift and transport litters during medical evacuations.

Function: Pilot seasoning, passenger and cargo airlift.
Operator: AETC, AMC, PACAF, USAFE, ANG.
Production: 84.
Inventory: 76.
Unit Location: Andrews AFB, Md., Howard AFB, Panama, Keiser AFB, AFRC, Langley AFB, Va., Maxwell AFB, Ala., Offutt AFB, Neb., Peterson AFB, Colo., Ramstein AB, Germany, Randolph AFB, Texas, Scott AFB, Ill., Wright-Patterson AFB, Ohio, Yokota AB, Japan.
Contractor: Learjet.

Power Plant: two AlliedSignal TFE731-2 turbofans, each 3,500 lb thrust.

Accommodation: crew of two and up to eight passengers or 3,153 lb cargo. Convertible to aeromedical evacuation configuration.

Dimensions: span 39 ft 6 in, length 48 ft 7 in, height 12 ft 3 in.
Weight: empty, equipped 10,119 lb, gross 18,300 lb.
Ceiling: 45,000 ft.
Performance: max level speed at 16,000 ft 452 mph, range with max passenger load 2,420 miles, with max cargo load 1,653 miles.

Commentary
C-21A aircraft provide operational support airlift for time-sensitive movement of people and cargo throughout the US and the Pacific and European
to provide transportation for DVs, such as Congressional or high-ranking military members. It can also be configured for medevac and cargo use.

**Function:** VIP air transport and operational support.

**Operator:** ANG.

**First Flight:** 1958.

**Delivered:** Circa 600.

**IOC:** 1960.

**Production:** 1,000.

**Inventory:** 250.

**Accommodation:** Three crew and eight passengers.

In medevac role: two Spectrum 500 Life Support Units and two medical attendants. All seats removable for cargo.

**Dimensions:** Span 54 ft 7 in, length 55 ft 7 in, height 18 ft 2 in.

**Weight:** Gross 42,500 lb, empty 24,800 lb.

**Performance:** Cruise speed Mach 0.87, cruising altitude 33,000 ft.

**Aviation**

**Contractor:** Boeing.

**Function:** Intratheater airlift.

**Operator:** ANG.

**First Flight:** September 1956.

**Delivered:** 1957-58.

**IOC:** 1960.

**Production:** 750.

**Inventory:** 250.

**Accommodation:** 35 seats.

**Dimensions:** Span 133 ft, length 95 ft 11 in.

**Weight:** Gross 24,000 lb.

**Performance:** Max speed 428 mph, range 2,240 miles.

**Aviation**

**Contractor:** Lockheed Martin.

**Function:** A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel, to deliver personnel and equipment in support of SOF, and to refuel helicopters.

**Operator:** AETC, AFSOC, AMC, PACAF, USACE, ANG.

**First Flight:** June 1995.

**Delivered:** 1996.

**IOC:** 1997.

**Production:** 38.

**Inventory:** 14.

**Accommodation:** Of nine; 53 troops or 26 paratroopers; H: crew of seven; 75 troops or 52 paratroopers.

**Dimensions:** Span 132 ft 7 in, length 97 ft 9 in, height 38 ft 1 in.

**Weight:** Empty 72,892 lb, gross 155,000 lb.

**Performance:** Max speed 385 mph, range 3,110 miles.

**Aviation**

**Contractor:** Lockheed Martin.

**Function:** A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel, to deliver personnel and equipment in support of SOF, and to refuel helicopters.

**Operator:** AETC, AFSOC, AMC, PACAF, USACE, ANG.

**First Flight:** August 1954.

**Delivered:** Circa 1956.

**IOC:** September 1970.

**Production:** More than 1,000.

**Inventory:** 687.

**Accommodation:** Max crew of five; up to 92 troops, 64 paratroopers, 74 litter patients plus attendants, 54 passengers on palletized seating, or up to five 46L standard freight pallets, etc.

**Dimensions:** Span 132 ft 7 in, length 97 ft 9 in, height 38 ft 1 in.

**Weight:** Empty 80,606 lb, max payload 38,536 lb, gross 155,000 lb.

**Ceiling:** 33,000 ft at 100,000 lb T-O weight.

**Performance:** (C-130H) max cruising speed 258 mph, T-O run 3,685 ft, landing run (at 130,000 lb) 1,700 ft, range with 40,000-lb payload 2,240 miles.

**Commentary:** Continuing in production, the C-130 Hercules transport aircraft first flew 43 years ago and has been delivered to more than 60 countries. Basic and specialized versions operate throughout USAF, performing a diversity of roles in both peace and war situations, including airlift support, DEW Line and Arctic ice cap resupply, aeromedical missions, aerial spray missions, fire-fighting duties for the US Forest Service, and natural disaster and humanitarian relief missions.

**IOC:** B, and D. Early versions, now retired. The initial production C-130A had four Allison T56-A-11 or -9 turboprop engines. USAF ordered a total of 219. The C-130B had improved range and higher weights and introduced Allison T56-A-7 turboprops; 134 were produced, with delivery from April 1959. Six were modified in 1966 as JC-130Bs for air-satellite recovery. Twelve C-130Ds were modified as for Arctic operations.

**IOC:** C-130E. An extended-range development of the C-130B, with large under-wing fuel tanks; 389 were ordered, with deliveries beginning in April 1962. A wing modification to correct fatigue and corrosion has extended the life of the aircraft well into the next century. Other modifications include a Self-Contained Navigation System (SCNS), computerized communications/navigation management suite, GPS capability, and a state-of-the-art autopilot that incorporates a Ground Collision Avoidance System.

**IOC:** C-130H is generally similar to the E model but has updated turboprops, a redesigned outer wing, updated avionics, and other, minor, improvements; delivery began in July 1974. More than 350 C-130Hs and derivatives were ordered for active and reserve units of the US services, including eight funded in FY 1996. Night Vision Instrumentation System was introduced from 1993, TCAS II in new aircraft from 1994. ANG and AFRC C-130Hs are used in fire-fighting missions. Specifically modified aircraft are used by AFRC’s 575th AS for aerial spraying, typically to suppress mosquito-spread epidemics. Seven LC-130Hs, modified with wheel-ski gear, are operated by ANG’s 109th AW, Schenectady County Airport, N.Y., in support of Arctic and Antarctic operations. Two DC-130Hs were modified for UAV control duties.

**IOC:** C-130J, USAF is purchasing some of the new C-130J version. This model features a two-crew flight system, 6,000 shp Allison AE2100D3 engines, digital avionics and mission computers, enhanced performance, and improved reliability and maintainability.

**IOC:** MC-130 Combat Talon Brief: A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel, to deliver personnel and equipment in support of SOF, and to refuel helicopters.

**Function:** SOF infiltration, exfiltration, and resupply.

**Operator:** AETC, AFSOC, AMC.

**First Flight:** circa 1965.

**Delivered:** January 1990.

**IOC:** June 1990.

**Production:** 38.

**Inventory:** 14.

**Accommodation:** E: crew of nine; 53 troops or 26 paratroopers; H: crew of seven; 75 troops or 52 paratroopers.

**Dimensions:** Span 132 ft 7 in, length 97 ft 9 in, height 38 ft 1 in.

**Weight:** 76,892 lb, gross 155,000 lb.

**Performance:** Max speed 366 mph, range 3,110 miles, unlimited with refueling.

**Commentary:** Specially modified C-130 transports, these aircraft are equipped with in-flight refueling equipment, terrain following/terrain avoidance radar, INS/GPS, and a high-speed aerial delivery system. These systems are used to locate small drop zones and deliver people or equipment with greater accuracy and at higher speeds than is possible with a standard C-130. The aircraft can penetrate hostile airspace at low altitudes, at night, and in adverse weather.

**IOC:** C-130E (Combat Talon I). Fourteen modified C-130E aircraft, nine of which are equipped with a surface-to-air Fulton air recovery system. During Operation Desert Storm, MC-130Es played a vital role performing psychological operations, with a secondary mission in combat search and rescue.

**IOC:** C-130H (Combat Talon II). Twenty-four modified new-build C-130Hs were acquired to supplement the Talon I. They include an integrated glass cockpit compatible with NVGs and improved infrared and electronic defensive countermeasures. The 1st, 7th, and 15th SOSs employ the Combat Talon II, supporting unconventional warfare units from their bases in Japan, Europe, and CONUS, respectively. The 58th SOW at Kirtland AFB, N.M., is responsible for MC-130H mission qualification training.

**IOC:** C-130J (Combat Talon III). Twenty-four new-build C-130J aircraft, each with improved avionics and mission computers, to provide increased performance and reliability.

**IOC:** C-137 Stratoliner Brief: A modified Boeing 707 that provides transportation for the vice president, cabinet and Congressional members, and other high-ranking US and foreign officials. It also serves as a backup for Air Force One, the Presidential aircraft.

**Function:** VIP air transport.

**Operator:** AMC.

**First Flight:** April 1959.

**Delivered:** 1959.

**IOC:** 1962.
Military Aircraft

**T-1 Jayhawk**
*Brief:* A medium-range, twin-engine jet trainer version of the Beechcraft 400A. It is used by the Air Force to train student pilots to fly airlift, tanker, and bomber aircraft.
*Function:* Advanced tanker/transport/bomber training.
*Operator:* AETC, AFRC.
*First Flight:* Sept. 22, 1989 (Beechcraft 400A).
*IOC:* January 1993.
*Production:* 186.
*Inventory:* 179.
*Unit Location:* Columbus AFB, Miss.; Laughlin and Randolph AFBs, Texas; Vance AFB, Okla.
*Contractor:* Raytheon.
*Power Plant:* two Pratt & Whitney Canada JT15D-5B turbofans, each 2,000 lb thrust.
*Accommodation:* two side by side and one to the rear; rails are fitted to accommodate an extra four seats to permit transport of maintenance teams.
*Dimensions:* span 43 ft 6 in, length 48 ft 5 in, height 13 ft 11 in.
*Weight:* empty 5,200 lb, gross 16,100 lb.
*Performance:* max speed 450 mph, range 2,222 miles.

**T-3 Firefly**
*Brief:* A propeller-driven aircraft used by the Air Force to screen pilot candidates by exposing them to military style traffic patterns and aerobatics. It is also used to teach takeoff and landing, stalls, slow flight, ground operations, and mission planning.
*Function:* Primary screener.
*Operator:* AETC.
*IOC:* March 1994.
*Production:* 113.
*Inventory:* 110.
*Unit Location:* Randolph AFB, Texas; Vance AFB, Okla.
*Contractor:* Slingsby; Northrop.
*Power Plant:* Textron Lycoming AEIO-540-D4A5 engine, 280 hp.
*Accommodation:* two side by side.
*Dimensions:* span 34 ft 9 in, length 24 ft 9 in, height 7 ft 9 in.
*Weight:* empty 1,780 lb, gross 2,550 lb.
*Ceiling:* 19,000 ft.
*Performance:* max level speed 155 mph, range with max fuel, 65 percent power at 8,000 ft 469 miles.

**T-6A Texan II**
*Brief:* A single engine, propeller-driven aircraft that will be used for training undergraduate pilots, undergraduate navigators, and tactical navigator students in fundamentals of aircraft handling and instrument, formation, and night flying.
*Function:* Primary trainer.
*Operator:* AETC.
*Delivery:* from Fiscal 1999 (planned).
*IOC:* Fiscal 2001 (planned).
*Production:* USAF 372, USN 339 (planned).
*Inventory:* USAF 372 (planned).
*Unit Location:* Columbus AFB, Miss.; Laughlin, Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla. Navy: NAS Corpus Christi, Texas; NASS Whiting and Pensacola, Fla.
*Contractor:* Raytheon.
*Power Plant:* one Pratt & Whitney Canada PT6A-68 turboprop, 1,708 shp.
*Accommodation:* two, in tandem, on zero/zero ejection seats.
*Dimensions:* span 33 ft 5 in, length 33 ft 4 in, height 10 ft 8 in.
*Weight:* empty (approx) 4,415 lb.
*Ceiling:* 35,000 ft.
*Performance:* max speed 368 mph.

**T-37 Tweet**
*Brief:* Winner of the Joint Primary Aircraft Training System (JPATS) competition, Raytheon’s Beech/Pilatus PC-9 Mk II is based on the Swiss Pilatus PC-9 aircraft, modified to include a strengthened fuselage, upgraded engine, more fuel, pressurized cockpit, larger, bird-resistant canopy, and new digital avionics. The new aircraft will replace USAF’s T-37B’s and USN’s T-34C’s in training entry-level pilots, as well as supporting undergraduate naval flight officer training.
*Dimensions:* span 34 ft 6 in, length 48 ft 5 in, height 13 ft 11 in.
*Weight:* empty 5,200 lb, gross 16,100 lb.
and USAF navigator training. Delivery will be made initially to Randolph, followed by Laughlin, Vance, Columbus, and Sheppard.

**T-37 Tweet**

Brief: A twin-engine jet used for training undergraduate pilots and undergraduate navigator and tactical navigator students in fundamentals of aircraft handling and instrument, navigation, formation, and night flying.

Function: Primary trainer.

Operator: AETC, AFRC.

First Flight: September 1955.

Delivered: from December 1956.

IOC: 1957.

**T-38 Talon**

Production: 985.

Inventory: 419.

Unit Location: Columbus AFB, Miss.; Laughlin, Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla.

Contractor: Cessna.

Power Plant: two Continental J69-T-25 turbojets, each 1,025 lb thrust.

Accommodation: two, side by side, on ejection seats.

Dimensions: span 33 ft 8 in, length 29 ft 3 in, height 9 ft 2 in.

Weight: empty 3,870 lb, gross 6,625 lb.

Ceiling: 35,000 ft.

Performance: max speed at 25,000 ft 426 mph, range at 360 mph with standard tankage 870 miles.

**COMMENTARY**

USAF’s first purpose-built jet trainer, the T-37 currently is AETC’s standard two-seat primary trainer. A distinctive dark blue–and-white finish is intended for Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla., Columbus AFB, Miss.; Laughlin, Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla. A distinctive dark blue–and-white finish is intended for Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla., Columbus AFB, Miss.; Laughlin, Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla.

**T-38A**

Almost identical in structure to the F-5A export tactical fighter, the T-38A was the world’s first supersonic trainer aircraft. It is used to teach supersonic techniques, aerobatics, formation, night and instrument flying, and cross country navigation. Also used to train test pilots and flight engineers at Edwards AFB, Calif., by AFMC to test experimental equipment, and by ACC to maintain pilot proficiency.

**AT-38B**

A slightly different version, with a gunsight and practice bomb dispenser, used by AETC for training at the US Air Force Academy.

**T-43**

A distinctive dark blue–and-white finish is intended for Randolph, and Sheppard AFBs, Texas; Vance AFB, Okla., Columbus AFB, Miss., Eglin AFB, Fla., Randolph, Laughlin, and Sheppard AFBs, Texas, Vance AFB, Okla., Whitman AFB, Mo.

Contractor: Northrop.


Accommodation: two, in tandem, on ejection seats.

Dimensions: span 25 ft 3 in, length 46 ft 4 in, height 12 ft 10 in.

**T-43C**

All T-38A and AT-38B airframes will be redesignated as C models upon modification of the avionics systems, with delivery beginning in 1999.

**T-43**

Brief: A medium-range, swept-wing jet aircraft equipped with modern navigation and communica-

**Helicopters**

**HH-1 Iroquois**

Brief: Modifed Bell Model 205 helicopter, used to support Air Force ICBM facilities.

Function: Utility helicopter.

Operator: AFSPC.

First Flight: Oct. 20, 1956 (UH-1).


Production: 30.

Inventory: six.

Unit Location: Grand Forks AFB, N.D.

Contractor: Bell.

Power Plant: one Lycoming T53-L-13B turboshaft; 1,400 shp.

Accommodation: two pilots and 12 passengers; or two crew and 2,400 lb of cargo.

Dimensions: rotor diameter 48 ft 4 in, length of fuselage 42 ft, height 13 ft.

Weight: gross 9,500 lb.

Ceiling: 13,450 ft, at mission gross weight.

Performance: max speed 120 mph, range with max fuel 347 miles.

**HH-1H**

A general-purpose military version of the Bell Model 205 helicopter, first ordered by USAF in 1970. It is used for site support duties by Air Force Space Command, which operates USAF ICBM sites.

**HH-1 Iroquois**

Brief: Modified Bell Model 212 helicopter, used to support Air Force ICBM facilities and administrative airlift.

Function: Utility helicopter.

Operator: AETC, AFSOC, AFSPC, AMC, PACAF.

First Flight: Oct. 20, 1956 (UH-1).

Power Plant: Pratt & Whitney Canada T400-CP-400 Turbo “Twin-Pac,” 1,290 shp. Accommodation: two pilots and 14 passengers or cargo, or external load of 4,000 lb. Dimensions: rotor diameter (with tracking tips) 48 ft 2 in, length of fuselage 42 ft 4 in, height 14 ft 4 in. Weight: gross and mission weight, 11,200 lb. Ceiling: 13,000 ft. Performance: max cruising speed at S/L 115 mph, max range, no reserves, 261 miles. Armorment (optional): two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-tube 2.75-in rocket launchers.

COMMENTARY

UH-1N is a twin-engine version of the UH-1 utility helicopter, most of which remain in the inventory for missile site support duties with AFSPC and for administrative airlift. The UH-1N is also used by AETC’s 58th SOW, Kirtland AFB, N.M., for training purposes and by the 336th TG, Fairchild AFB, Wash., for aircrew survival training.

MH-53 Pave Low

Brief: Specially outfitted heavy-lift helicopters used by Air Force Special Operations Forces for infiltration and exfiltrations as well as combat search-and-rescue missions.

Function: SOF heavy-lift helicopter.

Operator: AFSOC, AETC.

First Flight: March 1967.


Production: not available.

Inventory: 46.

Unit Location: Hurlburt Field, Fla., Kirtland AFB, N.M., Osan AB, South Korea, RAF Mildenhall, UK.

Contractor: Sikorsky.

Power Plant: two General Electric T64-GE-100 turboshfts, each 4,300 shp.

Accommodation: crew of six; 38 troops.

Dimensions: rotor diameter 72 ft 3 in, length of fuselage (without refueling probe) 67 ft 2 in, height 24 ft 11 in.

Weight: gross 50,000 lb.

Ceiling: 16,000 ft.

Performance: max speed 164 mph, max range 630 miles, unlimited with air refueling.

Armament: mounts for any combination of three 7.62 mm miniguns or 30 caliber machine guns.

COMMENTARY

MH-53H. Older version of the helicopter, all of which, together with all HH-CH-53B/Cs, have been upgraded to MH-53J Pave Low III “Enhanced” standard from 1986.

MH-53J. These highly sophisticated aircraft are equipped with a nose-mounted FLIR, an integrated digital avionics suite that includes terrain-following and terrain-avoidance radar, GPS, INS, Doppler, secure communications, armor plating, and an ECM suite with radar and IR missile jammers, flare/chauff dispensers, radar warning receivers, and missile launch detectors.

Programmed modifications include the capacity to integrate on-board EW systems with off-board, over-the-horizon intelligence. Additionally, a Service Life Extension Program (SLEP) was implemented to upgrade the aircraft’s hydraulics, wiring, and basic airframe structure for increased gross weight, as well as a shipboard fold/compatibility modification. MH-53Js were used extensively in Operations Just Cause and Desert Storm, performing both SOF and personnel recovery, and humanitarian relief. Ninety-eight Black Hawk helicopters were modified to HH-60G Pave Hawk configuration, with aerial refueling capability and internal auxiliary fuel. Configuration varies between aircraft, but both versions are modified USMC CH-53As, as basic qualification trainers. Modifications include the installation of General Electric T64-GE-100 engines, air refueling probe, and some standard USAF equipment.

HH/HH-60G Pave Hawk

Brief: Specially outfitted heavy-lift helicopters used by Air Force Special Operations Forces for infiltration and exfiltrations as well as combat search-and-rescue missions.

Function: SOF heavy-lift helicopter.

Operator: ACC, AETC, AFSOC, PACAF, ANG, AFRC.


Production: 98.

Inventory: 99.


Contractor: Sikorsky.

Power Plant: two General Electric T700-GE-700/700TC turboshfts, each 1,620 (continuous) shp.

Accommodation: crew of three or four; 11–14 troops, up to six litters, or internal or external cargo.

Dimensions: rotor diameter 53 ft 7 in, length of fuselage 64 ft 8 in, height 16 ft 8 in.

Weight: empty 12,330 lb, max gross 22,500 lb.

Ceiling: 14,200 ft.

Performance: max speed 222 mph, max range, with reserves, 373 miles (internal fuel), 500 miles (auxiliary tank).

Armament: two 7.62 mm miniguns, with provision for two .50 caliber machine guns in cabin doors.

COMMENTARY

Ninety-eight Black Hawk helicopters were modified to MH and HH-60G Pave Hawk configuration, with aerial refueling capability and internal auxiliary fuel. Configuration varies between aircraft, but both versions are equipped with an integrated navigation system using GPS, INS, and Doppler, with input to a flight path–vector FLIR. Both have unsecure VHF and secure FM, HF, UHF, and satellite communications. Further modifications include an integral rescue hoist and an External Stores Support System (ESSS) for weapons and additional fuel. Pave Hawk capabilities permit rapid-response, long-range/loiter mission profiles requiring a broad scale of payload possibilities. MH-60G. The six MH-60Gs operated by AFSOC’s 16th SOW provide a wide variety of SOF mission capabilities, including infiltration/exfiltration and personnel recovery, and humanitarian relief.

MH-60G. Used by active duty, ANG, and AFRC air rescue units for combat search and rescue and various mission-support activities worldwide.

Strategic Missiles

LG-30 Minuteman

Brief: A solid-fuel, intercontinental-range ballistic missile capable of being fired from silo launchers and delivering a thermonuclear payload of one or several warheads with high accuracy over great distances.

Function: Strategic surface-to-surface ballistic missile.

Operator: AFSPC.


IOC: December 1962, Malmstrom AFB, Mont.

Production: 1,800.

Inventory: 500.

Unit Location: F.E. Warren AFB, Wyo., Malmstrom AFB, Mont., Minot AFB, N.D.

Contractor: Boeing.

Power Plant: first stage: Thiokol IM-55 solid-propellant motor, 210,000 lb thrust; second stage: Aerojet–General SR19-AJ-1 solid-propellant motor, 60,300 lb thrust; third stage: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.

Guidance: inertial guidance system.

Warheads: three Mk 12/12A MIRVs (downloaded to one).

Dimensions: length 59 ft 10 in, diameter of first stage 5 ft 6 in.

Weight: launch weight (approx) 78,000 lb.

Performance: speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load more than 7,000 miles.

COMMENTARY

Minuteman continues to play a key role in the US strategic deterrent posture. It is a three-stage, solid-propellant ICBM, housed in underground silos for which an upgrade program was completed in 1980 to provide increased launch-facility protection.

LG-30A/B. The Minuteman I version that was deployed in the early 1960s. The last Minuteman I missile was removed from its silo at Malmstrom AFB, Mont., in February 1969. USAF had deployed 150 A and 650 B models in 16 squadrons.

LG-30F. The Minuteman II version that incorporated a larger second stage, an improved guidance package, had greater range and payload capability, and was hardened against the effects of nuclear blast. IOC was reached in October 1965 at Grand Forks AFB, N.D. USAF deployed 450 in nine squadrons.

LG-30G. The current version, Minuteman III, became operational in June 1970, providing improved range, rapid retargeting, and the capability to place three Multiple Independently Targetable Re-Entry Vehicles (MIRVs) in each silo. It is an improved version of Minuteman II with an increased warhead capability, extended range, and a three-stage propulsion system providing greater range, increased accuracy, and improved reliability.
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<th>Inventory</th>
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</thead>
<tbody>
<tr>
<td>AGM-86A</td>
<td>Prototype cruise missile, developed in the mid-1970s. Slightly smaller than the later versions, it never entered production.</td>
<td>USAF</td>
<td>IOC: 1986</td>
<td>Production: 1,715</td>
<td>1,700+</td>
</tr>
<tr>
<td>AGM-129A</td>
<td>Advanced Cruise Missile</td>
<td>USAF</td>
<td>IOC: 1983</td>
<td>Production: 461</td>
<td>460</td>
</tr>
</tbody>
</table>

### AIM-7 Sparrow
- **Function:** Air-to-air guided missile
- **First Flight:** December 1983 (AIM-7M)
- **Delivered:** from 1956.
- **IOC:** April 1976 (AIM-7F).
- **Production:** not available
- **Inventory:** classified.
- **Contractor:** Raytheon/Hughes, General Dynamics.
- **Guidance:** (AIM-7M) monopulse semi-active radar, (Warhead: high-explosive, blast fragmentation, weighing 86 lb.
- **Dimensions:** length 12 ft, body diameter 8 in, wingspan 3 ft 4 in.
- **Weight:** launch weight 504 lb.
- **Performance:** max speed more than Mach 3.5, range more than 30 miles.

### AIM-9 Sidewinder
- **Function:** Designed to improve missile performance against sophisticated ECM by means of a new IR seeker added to the guidance and control section, incorporated in a multimode seeker.
- **First Flight:** September 1953.
- **Delivered:** 1963–98 (AIM-9M current operational variant).
- **IOC:** circa 1983 (AIM-9M).
- **Production:** not available.
Inventory: not available
Contractor: Raytheon/Loral.
Power Plant: Thiokol Mk 36 Mod 11 solid-propellant rocket motor.
Guidance: solid-state passive IR homing guidance.
Warhead: high-explosive, weighing 20.8 lb.
Dimensions: length 9 ft 5 in, body diameter 5 in, finspan 2 ft 11 in.
Weight: launch weight 190 lb.
Performance: max speed above Mach 2, range 8.7 miles, max altitude 50,000 ft.

AIM-7 Sparrow (Guy Aceto)

AIM-9 Sidewinder (top), AIM-120 AMRAAM (middle), AGM-88 HARM (bottom) (Ted Carlson)

AIM-120 AMRAAM
Brief: A new-generation radar-guided, all-weather, beyond-visual-range air-to-air missile carried by fighters, with high capability to attack low-altitude targets. Pilot may aim and fire several Advanced Medium-Range Air-to-Air Missiles simultaneously at multiple targets and perform evasive maneuvers.
Function: Air-to-air guided missile.
Range: more than 12,000 planned for USAF/USN.
Inventory: classified.
Contractor: Raytheon.
Power Plant: Gencorp Aerojet two-stage solid-propellant rocket motor.
Guidance: inertial and command inertial with active radar terminal homing.
Warhead: high-explosive directed fragmentation weighing 48 lb.
Dimensions: (A/B models) length 12 ft, body diameter 7 in, span of tail control fins 2 ft 1 in.
Weight: 335 lb.
Performance: cruising speed approx Mach 4, range more than 20 miles.

AIM-120A AMRAAM
Brief: First production AIM-120A, delivered by Hughes in 1988 to the 33d TFW at Eglin AFB, Fla.
AIM-120B and AIM-120C versions are currently in production, the latter with smaller control surfaces to permit increased internal carriage capability in the F-22.
An improvement program seeks to develop AMRAAM capabilities, including software reprogrammability, advanced counter-countermeasures, and options for improved propulsion. The missile is combat-tested, having scored two kills during Operation Desert Storm and one in Bosnia.

AIM-65 Maverick
Brief: A tactical, TV- or IIR-guided air-to-surface missile carried by fighters and designed for use in close air support, interdiction, and defense suppression missions, with high capability to attack low-altitude targets. Software has been modified to include options for targeting ships and large land targets as well as mobile armor. This version also has a digital autopilot and a pneumatic, rather than hydraulic, actuation system.

AIM-120 AMRAAM

AIM-9 Maverick

AIM-84 Harpoon

Maverick missiles were first employed by USAF in Vietnam and were used extensively during the Persian Gulf War. They currently equip A-10, F-15E, and F-16 aircraft for use against tanks and columns of vehicles and in the SEAD role.

AGM-65A. The basic Maverick is a launch-and-leave, TV-guided air-to-surface missile that enables the pilot of the launch aircraft to seek other targets or leave the target area once the missile has been launched. Production was initiated in 1971, following successful test launches over distances ranging from a few thousand feet to many miles and from high altitudes to treetop level.

AGM-65A. A version with a “scene magnification” TV seeker that enables the pilot to identify and lock on to smaller or more distant targets.

AGM-65D. System developed to overcome limitations of TV Maverick, which can be used only in daylight and clear-weather conditions. This version has an Imaging-Infrared (IIR) seeker as well as a lower-smoke motor. IIR Maverick became operational on A-10s in February 1986.

AGM-65G. Uses the IIR seeker with an alternate 298-lb blast fragmentation warhead for use against hardened targets. Software has been modified to include options for targeting ships and large land targets as well as mobile armor. This version also has a digital autopilot and a pneumatic, rather than hydraulic, actuation system.

AGM-65H. Upgraded TV Maverick with significant reliability, maintainability, and performance improvements over the AGM-65B.

AGM-84 Harpoon

Brief: An all-weather, over-the-horizon, anti-ship missile system, carried by bombers, with a low-level, sea-skimming cruise trajectory, active radar guidance, and high-explosive warhead. Used for attack on warships.

Function: Air-to-surface anti-ship missile.
First Flight: March 1974 (for USN).
Delivered: from 1977 (USN).
IOC: circa 1985 (USAF).
Production: not available
Inventory: classified.
Contractor: McDonnell Douglas (now Boeing).
Power Plant: Teledyne CAE J402-CA-400 turbojet, 660 lb thrust.

Guidance: sea-skimming cruise monitored by radar altimeter, active radar terminal homing.
Warhead: penetration high-explosive blast type, weighing 488 lb.
Dimensions: length 12 ft 7 in, body diameter 1 ft 1 in, wingspan 3 ft.
Weight: 1,145 lb.
Performance: speed high subsonic, range more than 57 miles.

AGM-84 Harpoon

COMMENTARY
Harpoon and its launch control equipment provide USAF the capability to interdict ships at ranges well beyond those of other aircraft. Originally acquired to equip two squadrons of now-retired B-52G aircraft for maritime anti-surface operations, the Harpoon all-weather anti-ship missile now arms conventional-mission B-52Hs.

AGM-84D is a variant of the US Navy Harpoon that
152

AGM-88 HARM

Brief: An air-to-surface tactical missile designed to seek and destroy enemy radar-equipped air defense systems, using an advanced guidance system that senses and homes in on enemy radar emissions.


Production: not available

Inventory: classified.

Contractor: Raytheon.

Power Plant: Thiokol smokeless, dual-thrust, solid-propellant rocket motor.

Guidance: passive homing guidance system, using seeker head that homes on enemy radar emissions.

Warhead: high-explosive fragmentation, weighing 140 lb.

Dimensions: length 13 ft 8.5 in, body diameter 10 in, wingspan 3 ft 8.5 in.

Weight: 807 lb.

Performance: cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 10 miles.

COMMENTARY

This High-speed Anti-Radiation Missile (HARM) exhibits great velocity along with an ability to cover a wide range of frequency spectrums through the use of programmable digital processors in both the carrier aircraft's avionics equipment and in the missile. The combination gives this second-generation anti-radiation missile greatly improved capability over first-generation Shrikes and Stargards. The AGM-88 proved highly effective against enemy ground radar during the Persian Gulf War. HARMs now equip F-16 Block 50/52s dedicated to the SEAD mission and have been used against Iraqi defenses as part of Operation Southern Watch.

AGM-88A. A factory-programmed version used to equip the now-retired F-4G Wild Weasel to increase its lethality in electronic combat.

AGM-88B. USAF is updating older AGM-88Bs with the new, enhanced capability guidance seeker currently equipping the C version.

AGM-88C. This current production version has a more lethal warhead, containing tungsten alloy cubes, rather than steel, and the enhanced-capability AGM-88C-1 guidance head.

Erasable Electronically Programmable Read-Only Memory has been retrofitted on USAFE, PACAF, and ACC HARMs, permitting changes to missile memory in the field.

AGM-130

Brief: A powered TV- or IIR-guided air-to-surface missile, carried by the F-15E and designed for high- and low-altitude strikes at standoff ranges against heavily defended targets.

Function: Air-to-surface guided and powered bomb.


Production: approx 600.

Inventory: classified.

Contractor: Boeing.

Guidance: TV or IIR seeker, or DME transponder.

Warhead: Mk 84 bomb (2,000-lb unitary), BLU-109, or CBU-75.

Dimensions: length 12 ft 10 in, body diameter 1 ft 6 in, wingspan 4 ft 11 in.

Weight: launch weight 2,917 lb.

Performance: cruising speed subsonic, ceiling in excess of 30,000 ft.

COMMENTARY

AGM-130 is a product improvement to the GBU-15 glide bomb, with a guidance system designed to give pinpoint accuracy from low or medium altitudes. The AGM-130 adds a rocket motor, radar altimeter, and digital control system, providing it with triple the standoff range of the GBU-15.

Upgrades include a new solid-state TV seeker, an improved IR seeker, and INS/GPS guidance that permit operation in adverse weather and improve target acquisition.

AGM-130A. Currently in production with a Mk 84 warhead.

AGM-130C. Currently in production in a BLU-109/B penetrating warhead.

AGM-142 Have Nap

Brief: A medium-range standoff attack missile, carried by the F-117A with heavy bombs, that gives the long-range aircraft a conventional precision strike capability.

Function: Air-to-surface guided missile.

First Flight: 1990.


Production: approx 250.

Inventory: classified.

Contractor: Rafael (Israel).

Power Plant: solid-propellant rocket motor.

Guidance: inertial, with data link, TV, or IIR homing.

Warhead: high-explosive, 750-lb-class blast/fragmentation or penetrator.

Dimensions: length 15 ft 11 in, body diameter 1 ft 9 in, wingspan 5 ft 9 in.

Weight: 2,984 lb.

Performance: range approx 50 miles.

COMMENTARY

Initial operational test and evaluation launches were completed in May 1990. Primary carrier aircraft are conventional-mission B-52Hs.

AGM-154 Joint Standoff Weapon

Brief: First in a joint USAF and Navy family of low-cost, highly lethal glide weapons with a standoff capability, useful against heavily defended targets.

Function: Air-to-surface guided missile.


Production: not available

Inventory: not available

Contractor: Raytheon.


Performance: length 13 ft 4 in.

Weight: 1,065–1,500 lb.

Performance: range: low-altitude launch 17 miles, high-altitude launch 40+ miles.

COMMENTARY

JSOW allows for the integration of several different submunition and unitary warheads, non-lethal payloads, various terminal sensors, and different modes of propulsion into a common glide vehicle. The services are integrating JSOW with BLU-97 combined effects bomblets, BLU-108 Sensor Fuzed Weapon submunitions, and unitary BLU-111 for area and armored targets.

AGM-154A. The baseline BLU-97 variant, now in production.


AGM-154C. The third variant, JSOW/Unitary integrates an IIR terminal seeker and a 500-lb unitary warhead. A wide range of testing has been completed on the F-15E and F-16, as well as fit checks on the F-15E, F-16, F-117A, F/A-18, A-6E, AV-8B, B-1, B-52, Tornado, and Jaguar. JSOW will also equip B-2 bombers.

AGM-154D. The BLU-97 variant.

CBU-97 Sensor Fuzed Weapon

Brief: The CBU-97 SFW is an anti-armor cluster munition to be used by fighters and bombers for multiple kills per pass.

Function: Wide-area cluster munition.

First Flight: circa 1990.


Production: TBD

Inventory: TBD

Contractor: Textron Systems.

Guidance: IR sensors in each warhead search for targets, then detonate over them.

Dimensions: length 92 in; diameter 16 in.

Weight: 927 lb.

Performance: delivers 40 lethal projectiles.

COMMENTARY

The CBU-97 Sensor Fuzed Weapon comprises an SUU-66/B tactical munitions dispenser with a FZU-39 fuze. Each tactical munitions dispenser contains 10 BLU-108 submunitions, and each submunition contains four projectiles that, upon being thrown out, seek out their target and deliver a warhead. Each SFW can deliver a total of 40 lethal projectiles. The projectiles’ IR sensors can detect a vehicle’s infrared signature; if no target is detected, the warhead detonates after a preset time. The SFW is currently delivered as an unguided, gravity weapon. The Air Force is already working on improved versions, leading to reduced cost and increased capability. Among ongoing changes, the service is adding a laser range finder to enable the SFW to detect targets based on height as well as IR signature.

CBU-106. USAF plans to retrofit its existing inventory.
GBU-15

Brief: An unpowered glide weapon carried by the F-15E and used to destroy high-value enemy targets from short standoff distances.

Function: Air-to-surface guided munition.

First Flight: 1975.


Inventory: classified.

Contractor: Boeing and Raytheon.

Guidance: TV or LRF seeker.

Warhead: Mk 84 bomb (2,000-lb unitary) or BLU-109.

Dimensions: length 12 ft 10 in, body diameter 1 ft 6 in, wingspan 4 ft 11 in.

Weight: 2,450 lb.

Performance: cruising speed subsonic.

COMMENTARY

GBU-15 is an air-launched, cruciform-wing glide bomb fitted with a guidance system designed to give it pinpoint accuracy from low or medium altitudes. It also has a standoff capability. Development began in 1974, based on experience gained in Vietnam with the earlier Pave Strike GBU-8 modulator weapon program. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. The target-detecting device is carried on the front of the warhead. The control module, with autopilot and data link module, attaches to the rear.

The weapon has two modes of attack. In direct attack, the weapon is locked on to the target before launch and flies a near line-of-sight profile to impact. In the indirect mode, the seeker can be locked on to the target after launch, or the operator can fly the weapon manually to impact, using guidance updates provided through the data link. A “buddy” system may be operated whereby the weapon is launched from one aircraft and controlled by another. The GBU-15 is deployed with the F-15E.

GBU-24

Brief: A precise air-to-ground penetrating glide bomb equipped with an advanced guidance kit.

Function: Air-to-surface guided bomb.


Production: USAF 14,000; Navy 12,000.

Inventory: classified.

Contractor: Raytheon.


Dimensions: length 14 ft 2 in.

Weight: 2,350 lb.

Performance: 1,000-lb general-purpose Mk 83.


Performance: not available.

Inventory: classified.

Contractor: Lockheed Martin.

Dimensions: length 19 ft 2 in, diameter 1 ft 2 in.

Weight: 5,707 lb.

Performance: capable of penetrating more than 100 ft of dirt or 20 ft of concrete.

COMMENTARY

To meet the unique requirements of the F-117A, the GBU-24A/B was adapted to GBU-27 standard, incorporating specific guidance features to accomplish this mission. The GBU-27 is extremely precise and was used to great effect in the Persian Gulf War.

GBU-27

Brief: A huge, 5,000-lb air-to-ground penetrating glide bomb equipped with an advanced guidance kit, uniquely useful for striking and destroying hard-underground targets.

Function: Air-to-surface guided bomb.


Performance: not available.

Inventory: classified.

Contractor: Lockheed Martin.

Dimensions: span 5 ft 6 in, length 13 ft 11 in.

Weight: 2,170 lb.

COMMENTARY

At 5,707 lb, the GBU-27 is the largest glide bomb used during Operation Desert Storm. It was not available in time for the 1990–1991 Gulf War, but it became available in time for Operation Southern Watch in 1992.

GBU-30

Brief: A joint USAF/Navy INS/GPS–guided 1,000- or 2,000-lb weapon, carried by fighters and bombers, that provides highly accurate, autonomous, all-weather, conventional bomb- ing capability.

Function: Air-to-surface guided bomb.

First Flight: October 22, 1996.


IOC: 1996.

Production: USAF 62,000; USN 25,496 (planned).

Performance: 13 m CEP with GPS; 30 m CEP with INS only.

First Flight: TBD.

Delivered: TBD.

IOC: Fiscal 2001 (planned).

Performance: 2,400 (USAF planned); TBD (Navy).

Performance: not available.

Weight: not available.

Dimensions: 1,000-lb class warhead (both versions).

COMMENTARY

JASSM is intended to be a precision, long-range weapon to hold high-value targets at risk. USAF officials announced April 9, 1998, that Lockheed Martin won the competition to develop and build the JASSM for the USAF. Boeing was not selected.

Wind-Corrected Munitions Dispenser

Brief: A tail kit to be fitted to CBU 87/89/97 dispenser munitions. When dropped from high altitude its guidance system corrects for launch transients caused by the force of winds and preserves high accuracy.

Function: Guidance tail kit.

Dimensions: Mk 84 with JDAM 152.7 in; BLU-109 with JDAM 148.6 in; Mk 83 with JDAM 119.5 in.

Weight: Mk 84 2,036/2,056 (USAF/USN); BLU-109 2,115/2,135; Mk 83 1,013/1,028.

Performance: 13 m CEP with GPS; 30 m CEP with INS only.

First Flight: TBD.

Delivered: TBD.

IOC: Fiscal 2001 (planned).

Performance: 2,400 (USAF planned); TBD (Navy).

Performance: not available.

Weight: not available.

Dimensions: 1,000-lb-class warhead (both versions).

COMMENTARY

JDAM is designed to provide USAF and USN with highly accurate, autonomous, all-weather, conventional bombing capability. While still aboard the launch aircraft, JDAM can be continually updated with target information through the aircraft’s avionics system. Once released, the inertial guidance kit will take over and, with periodic GPS updates to the INS, will guide the weapon to its target. JDAM is intended for use on a variety of aircraft, including the B-1, B-2, B-52, F-15E, F-16, F-22, F-117A, F/A-18, and AV-8B.

GBU-31

Brief: Variant that adds an INS/GPS guidance kit to the 2,000-lb general-purpose Mk 84 bomb or the 2,000-lb BLU-109 penetrator.

GBU-32

Brief: Variant that adds an INS/GPS guidance kit to the 1,000-lb general-purpose Mk 83 bomb.

Joint Air-to Surface Standoff Missile

Brief: An advanced weapon designed to be able to attack heavily defended targets with high precision at great standoff range.

Function: Air-to-surface guided weapon.

First Flight: TBD.

Delivered: TBD.

IOC: Fiscal 2001 (planned).

Performance: 2,400 (USAF planned); TBD (Navy).

Performance: not available.

Weight: not available.

Dimensions: 1,000-lb-class warhead (both versions).

COMMENTARY

JASSM is intended to be a precision, long-range weapon to hold high-value targets at risk. USAF officials announced April 9, 1998, that Lockheed Martin won over Boeing after the two-year definition and risk reduction phase. Lockheed Martin expects to begin the Engineering and Manufacturing Development program in November. DoD plans to use JASSM with the B-1B, B-2, B-52H, F-15E, F-16C/D, F/A-18E/F, and AV-8B.
Launch Vehicles

**Atlas**
- **Brief:** An expendable, medium-lift launch vehicle whose primary mission is to launch payloads into the Defense Communications Satellite System (DCS) satellite.
- **Function:** Medium payload vehicle.
- **Orbit:** 41,600 mi.
- **First Launch:** December 1957; Feb. 10, 1992 (Atlas II A).
- **IOC:** September 1959.
- **Launches Scheduled:** one (FY99); two (FY00).
- **Unit Location:** Patrick AFB, Fla., Vandenberg AFB, Calif.
- **Contractor:** Lockheed Martin.

**Delta**
- **Brief:** A high-energy upper stage with multiburn and extended coast capability.
- **Function:** High-energy upper stage.
- **Operator:** AFSPC.
- **First Launch:** November 1963; earlier flight in May 1961 was not successful.
- **IOC:** 1966.
- **Launches Scheduled:** three (FY99); five (FY00).
- **Unit Location:** Patrick AFB, Fla., Vandenberg AFB, Calif.
- **Contractor:** Boeing.
- **Power Plant:** first stage: Boeing North American RS-27A liquid-propellant engine, 237,000 lb thrust; second stage: Aerojet AJ-10-118K engine, 9,750 lb thrust; third stage: Thiokol STAR-48B solid-propellant motor, 14,820 lb thrust; strap-onGem solid rocket motors, 100,270 lb thrust (sea level).
- **Dimensions:** length 130 ft, diameter 8 ft; bulbous payload fairing, max diameter 10 ft.
- **Launch Weight:** 511,190 lb.
- **Performance:** up to 111,100 lb to near Earth orbit, up to 4,010 lb to geo transfer orbit, up to 2,000 lb to geosynchronous orbit.
- **COMMENTARY**

The Delta program has had more than 250 successful domestic and foreign military and commercial launches. Delta I. Delta launch vehicle family began in 1959 with a contract to Douglas Aircraft Co. (now Boeing) for the production and integration of 12 space-launch vehicles. The Delta used components from USAF's Thor intermediate-range ballistic missile as its first stage and the Navy's Vanguard launch vehicle program as its second. The first Delta was launched from Cape Canaveral and had the ability to deliver a 100-lb spacecraft into geostationary transfer orbit. Delta II. Selected by the Air Force in 1987 to launch the Navstar GPS satellites, the Delta II is slightly larger than the earlier Delta IIA rocket, to satisfy USAF's medium-payload requirement. The first launch took place in February 1989, and 25 operational GPS satellites have been launched. Delta II is a three-stage booster surrounded by nine solid-propellant Graphite Epoxy Motors. For LEO missions, the third stage is typically not used. In December 1995, a newly assigned vehicle, complete with new avionics, an increased expansion ratio on three of the GEMs, and a new launch control system, successfully placed a NASA payload into orbit. Delta II will continue to support GPS into the next century by replenishing aging capacity, as they fail and are supporting other DoD payloads.

**FIM-92 Stinger**
- **Dimensions (Atlas stage):** length 8 ft 7 in, max body diameter 10 ft.
- **Launch Weight:** 416,000 lb.
- **Performance:** In Atlas IIA configuration, capable of putting 19,050 lb into a Low Earth Orbit (LEO) from Cape Canaveral AS, Fla. Range of payloads Atlas II through Atlas IAS can lift into Geosynchronous Transfer Orbit (GTO) from Cape Canaveral is 4,900–8,150 lb and 13,650–15,900 lb to LEO from Vandenberg AFB, Calif.
- **COMMENTARY**

Early Atlas launchers were refurbished Atlas ICBMs used from December 1957 to launch military payloads into space. Versions include Atlas D/E/F and SLV-3A and 3D with longer tanks and increased engine thrust, compatible, respectively, with the Agnea and Centaur upper stages.

**Delta**
- **Brief:** A high-energy upper stage with multiburn and extended coast capability.
- **Function:** High-energy upper stage.
- **Operator:** AFSPC.
- **First Launch:** November 1963; earlier flight in May 1961 was not successful.
- **IOC:** 1966.
- **Launches Scheduled:** one (FY99); one (FY00).
- **Unit Location:** Patrick AFB, Fla., Vandenberg AFB, Calif.
- **Contractor:** Lockheed Martin.
- **Power Plant:** two Pratt & Whitney liquid oxygen/liquid hydrogen rocket engines; D-1A: RL10A-3 engines, each with 20,500 lb thrust; G-prime: RL10A-3A engines, each with 16,500 lb thrust.
- **Dimensions:** D-2A: length 33 ft, diameter 10 ft; G-prime: length 29 ft, diameter 14 ft in.
- **Launch Weight:** D-2A (approx) 45,000 lb; G-prime-mod (approx) 53,000 lb.
- **COMMENTARY**

Centauro was the first US high-energy upper stage and the first to use liquid hydrogen as a propellant. Its multiburn and extended coast capability were first used operationally during the 1977 Mariner Jupiter/Saturn missions.

**RAPIER**
- **Brief:** A 24-hour, highly mobile SAM unit designed to defend airfields against low-flying attacking aircraft.
- **Function:** Surface-to-air missile.
- **First Flight:** August 1973.
- **Delivered:** 1980.
- **IOC:** 1984 (USAF).
- **Production:** not available.
- **Inventory:** not available.
- **Contractor:** Raytheon (Hughes).
- **Power Plant:** solid-propellant rocket motor.
- **Guidance:** IR homing guidance.
- **Warhead:** high-explosive blast fragmentation, weighing 6.6 lb.
- **Dimensions:** length 5 ft, body diameter 2.7 in, wingspan 5.5 in.
- **Weight:** launch weight 35.2 lb.
- **Performance:** range 1.86 miles.
- **COMMENTARY**

First developed as a man-portable, tube-launched SAM for the US Army, Rapier has been employed since 1984 by air personnel in South Korea to provide basic defense against high-speed, low-level, ground-attack aircraft.

**F-16**
- **Power Plant:** single Pratt & Whitney F100-220 turbofan engine.
- **Guidance:** semi-active laser homing.
- **Warhead:** semi-armor-piercing, with impact fuze.
- **Dimensions:** length 7 ft 4 in, body diameter 5 in, wingspan 1 ft 3 in.
- **Weight:** approx 94 lb.
- **Performance:** approx 400 miles.
- **IOC:** 1979.
- **Operator:** United States.
- **First Flight:** 1973.
- **Delivered:** 1977.
- **IOC:** 1979 (USAF).
- **Production:** 4,533.
- **Inventory:** 2,789.
- **Contractor:** General Dynamics.
- **Power Plant:** single Pratt & Whitney F100-200 turbofan engine.
- **Guidance:** semi-active radar homing.
- **Warhead:** high-explosive blast fragmentation, weighing 150 lb.
- **Dimensions:** length 61 ft, body diameter 14 ft in, wingspan 16 ft 3 in.
- **Weight:** approx 12,000 lb.
- **Performance:** approx 600 miles.
- **IOC:** 1979.
- **Operator:** United States.
- **First Flight:** September 1975.
- **Delivered:** 1977.
- **IOC:** 1979 (USAF).
- **Production:** 2,300.
- **Inventory:** 1,819.
- **Contractor:** General Dynamics.
to heavy payloads. The requirement is to place payloads of 2,500 to 45,000 lb into LEO.

**Function:** Medium/heavy space launch vehicle.

**Operator:** commercial (oversight AFSPC).

**IOC:** 2003 (planned).

**Launches Scheduled:** first government FY02.

**Unit Location:** Patrick AFB, Fla., Vandenberg AFB, Calif.

**Contractor:** Boeing and Lockheed Martin.

**COMMENTARY**

Following a 5-month low-cost concept validation phase for the EELV by Alliant, Boeing, Lockheed Martin, and McDonnell Douglas (now Boeing), on Dec. 20, 1996, Lockheed Martin and McDonnell Douglas were each awarded a $60 million contract for the 17-month pre-EMD phase. EMD contracts for $500 million were awarded Oct. 16, 1998, to Boeing and Lockheed Martin. Initial launch services contracts for Fiscal 2003–06 were awarded to Boeing for 19 launches and to Lockheed Martin for nine launches. Both versions will be operated as commercial systems with competitively awarded government launches. The first government medium-liftvariant will launch in Fiscal 2002, the heavy-lift in Fiscal 2003.

**Inertial Upper Stage**

**Brief:** An upper stage for use with DoD’s Titan IV launcher as well as with NASA’s shuttle.

**Function:** Upper stage for space launchers.

**Operator:** AFSPC.

**First Launch:** October 1982.

**IOC:** circa 1982.

**Launches Scheduled:** two (FY99).

**Unit Location:** Patrick AFB, Fla., Vandenberg AFB, Calif.

**Contractor:** Boeing.

**Power Plant:** aft-stage solid rocket motor 59,000 lb thrust; forward-stage solid rocket motor 25,000 lb thrust.

**Guidance:** inertial.

**Dimensions:** length 17 ft, diameter 9 ft 6 in.

**Launch Weight:** 32,600 lb.

**Performance:** 5,200 lb into GEO when used on Titan IVA or 5,350 lb with Titan IVB.

**COMMENTARY**

Serving as an upper stage for the Titan IV for DoD, as well as with the shuttle for NASA, the highly reliable IUS consists of an aft skirt, an aft-stage solid rocket motor, an interstage, a forward-stage solid rocket motor, and an equipment support structure.

**Pegasus**

**Brief:** A small winged launcher tasked to carry small payloads to LEO.

**Function:** Space launch vehicle (small payload).

**Operator:** AFSPC.

**First Launch:** April 5, 1990.

**IOC:** circa 1996 (DoD).

**Launches Scheduled:** none.

**Contractor:** Orbital Sciences/Alliant.

**Power Plant:** three solid-propellant motors developing 109,400 lb, 27,600 lb, and 7,800 lb thrust, respectively.

**Guidance:** inertial guidance.

**Dimensions:** length 49 ft, wingspan 22 ft, diameter 4 ft 2 in.

**Launch Weight:** 42,000 lb.

**Performance:** 850–1,050 lb payloads to LEO.

**COMMENTARY**

USA’s smallest launcher, this three-stage winged vehicle is air-launched from a B-52. Developed jointly as a private venture by Orbital and Hercules, the vehicle was under contract to the Defense Advanced Research Projects Agency (DARPA) for its initial two flights. In July 1991, it successfully placed seven minisatellites in orbit. Now managed by the Air Force, it will support the USAF space test program and the Ballistic Missile Defense Organization. The enhanced-performance Pegasus XL successfully launched a DoD payload into polar orbit March 8, 1996, following two earlier, unsuccessful launch attempts. Pegasus had undertaken 25 launches by the end of 1998. Orbital Sciences now uses an L-1011 aircraft to launch Pegasus.

**Taurus**

**Brief:** A small ground-based launch vehicle for use in testing a quick-readiness, mobile launch facility.

**Function:** Space launch vehicle (small payload).

**Operator:** AFSPC.

**First Launch:** March 13, 1994.

**IOC:** March 13, 1994.

**Launches Scheduled:** none.

**Contractor:** Orbital Sciences.

**Power Plant:** four solid-propellant motors generating 495,400 lb, 109,140 lb, 26,600 lb, and 7,200 lb thrust, respectively.

**Dimensions:** length 89 ft, diameter 50–92 in.

**Weight:** gross 50,000 lb.

**Performance:** capable of lifting 3,200 lb to LEO and 1,130 lb to GTO using a Star 37 perigee kick motor.

**COMMENTARY**

A more powerful version of the Pegasus space launch vehicle, using an LGM-118 Peacekeeper missile first-stage addition and with the Pegasus wings removed. Taurus is ground-launched from regular launch complexes and will be used to test a quick-readiness, mobile launch facility. The first launch, March 13, 1994, put two USAF and DARPA satellites into a 340-mile polar orbit.

**Titan II**

**Brief:** Modified ICBM used to launch military, classified, and NASA payloads into space.

**Function:** Space launch vehicle.

**Operator:** AFSPC.

**First Launch:** April 1964 (NASA’s Titan II–Gemini).

**IOC:** Sept. 5, 1988 (USAF).

**Launches Scheduled:** one (FY99).

**Unit Location:** Vandenberg AFB, Calif.

**Contractor:** Lockheed Martin.

**Power Plant:** first and second stages: Aerojet liquid hypergolic propel­lant rocket engines; first stage 430,000 lb thrust; second stage 100,000 lb thrust.

**Guidance:** inertial guidance system.

**Dimensions:** first and second stages: height 94 ft, diameter 10 ft; payload fairing heights 20, 25, and 30 ft.

**Launch Weight:** 408,000 lb.

**Performance:** more than 4,200 lb to low Earth polar orbit.

**COMMENTARY**

Titan I. The Titan family was established in October 1955 when the Air Force awarded the then Martin Co. (now Lockheed Martin) a contract to build a heavy-duty space system. It became known as the Titan I, the nation’s first two-stage and first silo-based ICBM.

**Titan II.** Titan I provided many structural and propulsion techniques that were later incorporated into the Titan II. The launcher was used in the 1960s for the manned Gemini flights. Fourteen Titan II ICBMs have since been refurbished and modified to provide expendable space launch capability. Seven successful launches have included the launch of the space probe Clementine toward the Moon in January 1994, marking the first US lunar mission since Apollo 17 in December 1972. Remaining refurbished Titan IIs are assigned to the Air Force’s Defense Meteorological Satellite Program (DMSP), National Oceanic and Atmospheric Administration (NOAA) satellites, and other government agencies’ satellites into a 340-mile polar orbit through the turn of the century.

**Titan IV**

**Brief:** A heavy-lift space launch vehicle used to carry Department of Defense payloads such as Defense Support Program and Militar satellites into space. It is the newest and the largest unmanned space booster used by the Air Force.

**Function:** Heavy expendable booster system.

**Operator:** AFSPC.

**First Launch:** June 14, 1989.

**IOC:** June 14, 1989.

**Launches Scheduled:** two (FY99); two (FY00).

**Unit Location:** Cape Canaveral, Fla., Vandenberg AFB, Calif.

**Contractor:** Lockheed Martin.

**Power Plant:** Aerojet liquid hypergolic propel­lant rocket engines; first stage, two engines 551,200 lb thrust each; second stage, 106,150 lb thrust; initially two United Technolo­gies solid rocket boosters, each 1,400,000 lb peak thrust; later two Alliant (formerly Hercules) solid rocket boosters, each 1,800,000 lb peak thrust.

**Guidance:** digital avionics system on Titan IVB.

**Dimensions:** first and second stages: height 119 ft 2 in, diameter 10 ft.

**Launch Weight:** 1,900,000 lb.

**COMMENTARY**

USA’s primary heavy-lift launcher, Titan IV was selected in 1985 to augment the space shuttle and is used to launch critical military payloads, including the Defense Support Program (DSP) and Milstar satellites. It is a growth version of the earlier Titan 340, with stretched first and second stages, three-segment solid boosters, and a 16-ft-8.5-in diameter payload fairing, with various heights of payload fairings available.

**Titan IVB.** Titan IVA is capable of placing a 32,000-lb payload into low polar orbit and 39,000 lb into LEO. With a modified Centaur G–prime upper stage, it can place 12,200 lb into GEO. With an alternative Inertial Upper Stage (IUS), it can place 5,200 lb into GEO. The Titan IV is no longer in production and has completed all launch operations.

**Titan IVB.** The latest Titan IVB version has mission-unique kits, providing a standard interface for payloads to permit launch-site processing, a new electrical system on the booster core, a new ground system, and upgraded solid-rocket motors with 25 percent improved performance. First launch from Cape Canaveral was made successfully Feb. 23, 1997; the first from Vandenberg AFB, Calif., will be in 1999. The latest program decision is to use a maximum of 39 vehicles.
Satellite Systems

Defense Support Program System

Brief: An early warning spacecraft that travels in geosynchronous orbit and provides alert of possible ballistic missile attack on US forces or homeland.

Function: Strategic and tactical launch detection system.

Operator: AFSPC.
First Launch: early 1970s.

Constellation: classified.

Launch Vehicle: Titan IV IUS.

Unit Location: Peterson AFB, Colo.

Orbit Altitude: 22,000+ miles in geosynchronous orbit.

Contractor: TRW and Aerojet.

Power Plant: solar arrays generating 1,485 watts.

Dimensions: height 12 ft, width 4 ft, length 13 ft, including solar paddles deployed.

Weight: 6,150 lb.

Performance: orbits at approx 22,000 miles altitude in geosynchronous orbit; uses IR sensors to sense heat from missile and booster plumes against Earth's background.

COMMENTARY

Defense Support Program (DSP) satellites are a key part of North America's early warning system, capable of detecting missile launches, space launches, and nuclear detonations. Warning data is fed to NORAD and US Space Command early warning centers at Cheyenne Mountain AS, Colo. Since their first launch DSP satellites have provided an uninterrupted early warning capability to the US. Though not designed to spot and track smaller missiles, the system's capability was demonstrated during the Persian Gulf War, when the satellites provided warnings of Iraqi Scud attacks. A total of 18 DSP satellites have been launched by USAF since 1971 (DSCS II); 1982 (DSCS III). Ten are currently in orbit, with launches continuing until 2002. These satellites are nuclear hardened, can resist jamming, and are equipped with electronics capable of providing low-gain, Earth-field-view coverage and steerable, high-gain area coverage.

Navstar Global Positioning System

Brief: A constellation of orbiting space vehicles that provides highly precise and reliable navigation data, 24 hours a day, to military and civilian users around the world. Signals permit calculation of location within a few feet.

Function: Worldwide navigation satellite.

Operator: AFSPC.
Constellation: 24.

Design Life: six yr (I/IIA); 7.5 yr (IIR).

Launch Vehicle: Delta I.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: 11,000 miles.

Contractor: Boeing and Lockheed Martin.

Power Plant: solar arrays generating 700 watts (I/IIA), 1,143 watts (IIR).

Dimensions: width 5 ft, length 17/6 in, incl solar array.

Weight: 1,860 lb (I/IIA); 2,445 lb (IIR) (in orbit).

Performance: GPS satellites orbit the Earth every 12 hr, emitting continuous navigation signals. The signals are so accurate that time can be figured to within one-millionth of a second, velocity within a fraction of a mile per hour, and location to within a few feet. Receivers are used in aircraft, ships, and land vehicles and can also be handheld.

COMMENTARY

The 24 satellites of the Navstar Global Positioning System (GPS) provide 24-hour navigation services, including accurate, three-dimensional (latitude, longitude, and altitude) velocity and precise time; passive, all-weather operation; communications; support to an unlimited number of users and areas; and support to civilian users currently at a slightly less accurate level. Concern over potential enemy use of GPS is being addressed under the NAVWAR and GPS modernization efforts. There are currently 27 satellites on orbit: eight Block II, 18 IIA, and one IIR.

Also benefiting from the GPS are such functions as mapping, aerial refueling and rendezvous, geodetic surveys, and search-and-rescue operations.

Militar Satellite Communications System

Brief: A satellite communications system that provides secure, jam-resistant worldwide “C” communications for tactical and strategic forces in all levels of conflict, linking command authorities to ground forces, ships, submarines, and aircraft.

Function: Communications satellite.
Operator: AFSPC.
IOC: July 1997 (Mastar I).

Constellation: six.

Design Life: 10 yr.

Launch Vehicle: Titan IV/Centaur.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: 22,400 miles.

Contractor: Lockheed Martin.

Power Plant: solar arrays generating 8,000 watts.

Dimensions: width 5 ft, length 17 ft 6 in, incl solar array extension.

Weight: 10,000 lb.

Performance: The constellation will consist of four satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65° north and 65° south latitude.

COMMENTARY

Militar is a joint-service communications system that provides secure, jam-resistant EHF communications. Operated by the 50th Space Wing, the constellation will link command authorities with a wide variety of resources, including on-shore, on-ship, and ground stations.

Currently serving tactical as well as strategic forces, the last four Militars (to be launched between 1999 and 2002) will include low-data-rate and medium-data-rate
payloads able to transmit higher data rates to highly mobile forces.

**Fleet Satellite Communications System**

**Brief:** A satellite communication system providing a secure link between the USAF, USN, and the Presidential command network.

**Function:** Communications satellite.

**Operator:** AFSPC, US Navy.

**First Launch:** Feb. 9, 1978.

**IOC:** 1978.

**Constellation:** four.

**Function:** Aerial target.

**Operator:** ACC.

**First Flight:** 1991.

**Delivered:** circa 1991.

**Production:** 1,800.

**Inventory:** not available

**Unit Location:** Tyndall AFB, Fla.

**Contractor:** Teledyne Ryan.

**Power Plant:** one General Electric J85-GE-100 turbojet, 2,850 lb thrust.

**Guidance and Control:** remote-control methods incl. choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the GRCUS, which allows multiple targets to be flown simultaneously.

**BQM-34 Firebee**

**Brief:** A jet-powered, variable speed, recoverable target drone.

**Function:** Aerial target.

**Operator:** ACC.

**First Flight:** 1991.

**Delivered:** circa 1991.

**Production:** 1,800.

**Inventory:** not available

**Unit Location:** Tyndall AFB, Fla.

**Contractor:** Teledyne Ryan.

**Power Plant:** one General Electric J85-GE-100 turbojet, 2,850 lb thrust.

**Dimensions:** length 22 ft 11 in, body diameter 3 ft 1 in, span 12 ft 11 in.

**Weight:** launch weight 2,500 lb.

**Performance:** max level speed at 6,500 ft 690 mph, operating height range 20 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.

**COMMENTARY**

More than 1,800 of these jet target vehicles have been delivered to USAF since initial development of the BQM-34A in the 1950s.

**Current BQM-34As with uprated General Electric J85-100 engine provide a thrust-to-weight ratio of 1-to-1, enabling this version to offer higher climb rates and 6g maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. Used for weapon system evaluation.

**QF-4**

**Brief:** A converted, remotely piloted F-4 Phantom fighter used for full-scale training or testing.

**Function:** Aerial target.

**Operator:** ACC.

**First Flight:** September 1993.

**IOC:** not available

**Inventory:** not available

**Unit Location:** Tyndall AFB, Fla.

**Contractor:** Tracor.

**Power Plant:** two Pratt & Whitney J79-GE-17 turbojets, each with approx 17,000 lb thrust with afterburning.

**Guidance and Control:** remote-control methods incl. the GRDCUS and the Drone Formation and Control System and will also accommodate the triservice Next-Generation Target Control System currently under development.

**Dimensions:** length 63 ft, height 16 ft 5 in, wingspan 38 ft 5 in.

**Weight:** mission operational weight 49,500 lb.

**Performance:** max speed Mach 2, ceiling 55,000 ft, range (approx) 500 miles.

**COMMENTARY**

Replacing the QF-106 as a joint-service Full-Scale Aerial Target (FSAT), the QF-4 has an improved flight-control system and greater payload compared with the earlier drone. Approximately 500 F-4s will be converted to FSATs.

**QF-106**

**Brief:** A converted, remotely piloted F-106 fighter used for full-scale training or testing.

**Function:** Aerial target.

**Operator:** ACC.

**First Flight:** not available

**IOC:** not available

**Inventory:** approx 194.

**Contractor:** Honeywell.

**Power Plant:** one Pratt & Whitney J75-P-17 turbojet, 24,500 lb thrust with afterburning.

**Guidance and Control:** remote-control methods include the GRDCUS and the Drone Formation and Control System (the US Army's predecessor to the GRDCUS) and the Drone Tracking and Control System (a microwave command guidance system scheduled for phaseout).

**Dimensions:** length 70 ft 8.75 in, height 20 ft 8.5 in, wingspan 38 ft 3.5 in.

**Weight:** mission operational weight 40,500 lb.

**Performance:** max speed Mach 2, ceiling 50–55,000 ft, typical radius 575 miles.

**COMMENTARY**

Replacing the QF-100 in USAF service from late 1991, the QF-106 permits higher supersonic speeds while under remote control and increased maneuverability.

**Aerial Targets**

**MQM-107 Streaker**

**Brief:** A jet-powered, variable speed, recoverable target drone.

**Function:** Aerial target.

**Operator:** ACC.

**First Flight:** not available

**Delivered:** 1984–86 (B).

**IOC:** 1987.

**Production:** 70 (B); 221 (D).

**Inventory:** not available

**Unit Location:** Tyndall AFB, Fla.

**Contractor:** Raytheon (D model); Tracor (E model).

**Power Plant:** initially on D model, one Teledyne CAE 373-8 engine, 960 lb thrust; MQM-107Ds delivered since 1989 have 1,060 lb thrust TRI 60-5 turbojets. Microturbo TRI 60-5 engine, 1,061 lb thrust or TCAE 373-8B (E model).

**Guidance and Control:** analog or digital, for both ground control and preprogrammed flight; high-g autopilot provisions (D model); digital autopilot and remote control by the Gulf Range Drone Control Upgrade System (GRDUC) as multifunction command-and-control multilateralation system (E model).

**Dimensions:** length 18 ft 1 in, body diameter 1 ft 3 in, span 10 ft 10 in.

**Weight:** max launch weight (excl booster) 1,460 lb.

**Performance:** operating speed 230–594 mph, operating height 50–40,000 ft, endurance 2 hr 15 min (D model); operating speed 207–631 mph, operating height 50–40,000 ft, endurance 2 hr 15 min (E model).

**COMMENTARY**

**MQM-107D**

A third-generation version of the MQM-107 Streaker, it is a recoverable, variable-speed target drone used for Research, Development, Test, and Evaluation (RDT&E) and the Weapon System Evaluation Program.

**MQM-107E**

Improved performance follow-on to the...