B-1 Lancer

Brief: A long-range, air refuelable multrole bomber capable of flying missions over intercontinental range, then penetrating enemy defenses with the largest payload of guided and unguided weapons in the Air Force inventory.

Function: Long-range conventional bomber.

Operator: ACC, AFMC.

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


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

Production: 104.

Inventory: 67.

Unit Location: Dyess AFB, Tex., Ellsworth AFB, S.D., Edwards AFB, Calif.

Contractor: Boeing; AIL Systems; General Electric.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.

Performance: minimum approach speed 140 mph, max speed at low level high subsonic; ceiling 50,000 ft.

Armament: two, mission commander and pilot, four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Power Plant: four General Electric F110-GE-102 turbofans, each 30,780 lb thrust.

Accommodation: four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

Dimensions: span 172 ft, length 69 ft, height 17 ft.

Empty equipped 192,000 lb, max operating weight 336,500 lb.
of capability. Block 10 aircraft carried B83 nuclear bombs or 16 Mk 84 2,000-lb conventional munitions. Block 20 aircraft additionally carried B61/7 and B61/11 nuclear bombs, as well as GPS-aided munitions (GAMs), and GBU-36, on two rotary launcher assemblies, providing an interim, near-precision strike capability. All Block 10 and 20 aircraft have been upgraded to Block 30. (The last original Block 20 B-2, used as a test aircraft at Edwards AFB, Calif., was refurbished as an operational bomber and entered operational service in September 2002.) Block 30 configuration retains weapons capability introduced in Block 10 and 20 and adds significant new capability. The sporting rotary launcher assembly, all B-2s are capable of employing 16 Mk 84 JDAMs, 16 JSOWs, 16 JASSMs, 16 BLU-109 JDAMs or eight GBU-37s or GBU-28/87Bs. All B-2s are also capable of substituting bomb rack assemblies in place of the rotary launchers, providing the capability to employ 80 500-lb Mk 82s, 34 tactical munitions dispensers, or 80 Mk 62 sea mines. Modifications to the bomb racks add carriage of 80 independently targeted Mk 82 (500-lb) JDAMs. 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). A new stealth coating introduced under the Alternative High Frequency Material (AHFM) program is showing promise in dramatically improving combat readiness. Beyond Block 30, USAF plans to add UHF/EHF satellite communications systems and Link 16 digital data sharing capability and to replace the current mechanically scanned phased-array antenna with an active electronically scanned array.

The first use of B-2s in combat took place March 24, 1999, against Serb targets in Allied Force, with two aircraft each carrying 16 JDAMs. In October 2001, B-2s flew the longest combat sorties during Enduring Freedom, flying 44-hour sorties from Whiteman AFB, Mo., striking targets in Afghanistan, then landing in Diego Garcia for an extended run-up in theater. During the second crew flying a 29-hour sortie back to Whiteman, B-2s operate from three forward locations—Andersen AFB, Guam, RAF Fairford, UK, and Diego Garcia in the Indian Ocean.

B-52 Stratofortress

Brief: A long-range, heavy multirole bomber that can carry nuclear or conventional ordnance or cruise missiles, with worldwide precision navigation capability. Function: Long-range heavy bomber. Operator: ACC, AFMC, AFRIC. First Flight: April 15, 1952 (YB-52 prototype). Delivered: November 1955-October 1962. IOC: June 19, 1955. Production: 744. Inventory: 84. Unit Location: Barksdale AFB, La. (ACC, AFRIC), Edwards AFB, Calif. (AFMC), Minot AFB, N.D. Contractor: Boeing. Power Plant: eight Pratt & Whitney TF33-P-3 turbofans, each 17,000 lb thrust. Accommodation: two pilots, side by side, plus navigator, radar navigator, and electronic warfare officer. Dimensions: span 185 ft, length 159.3 ft, height 40 ft 2 in. Weight: empty approx 188,000 lb, gross 488,000 lb. Ceiling: 50,000 ft. Performance (approx): max level speed 449 mph, range more than 10,000 miles. Armament: 12 AGM-86B Air Launched Cruise Missiles (ALCMs) or AGM-129A Advanced Cruise Missiles (ACM) externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons include AGM-86C/D Conventional ALCMs (CALCMs), naval mines, bombs up to 2,000 lb, CBU 87/89/97 unguided munitions, CBU-103/104/105 Wind-Corrected Munitions Dispenser (WCMD)-guided munitions, GBU-31 JDAMs, and JSOWs. Future weapons include CBU-113/115 WCM-D Extended Range (WCM-D ER) and the Miniature Air-Launched Decoy (MALD), as well as laser-guided bombs. COMMENTARY (The B-2's still-expanding weapons capability reflects its continued ability to perform a wide range of missions, including show of force, maritime operations, long-range precision strikes, close air support (CAS), offensive counterair, air interdiction, and defense suppression. USAF plans to use B-2s as standoff electronic warfare platforms have been cancelled.) Equipment includes GPS, ARC-210 radios, Have Quick II jammer radio, KY-100 secure radio, an electro-optical (EO) viewing system that uses forward-looking infrared (FLIR) and high-resolution low-light-level television (LLETV) sensors to augment the targeting, battle assessment, flight safety, and terrain avoidance systems, improving combat and low-level flight capability. Pilots have night vision goggles (NVGs) to further enhance operation. Some B-52s are modified to carry weapons targeting pods. Future plans include modification of the entire fleet with an integrated self-targeting and battle damage assessment (BDA) capability. B-52s support a MIL-STD-1760 mission/weapon reprogramming capability. Iraqi Freedom saw B-52s delivering laser guided bombs for the first time using newly installed Litten targeting pods. Use of heavy stores adapter enables aircraft to carry most B-52-certified munitions. ALCMs, CALCMs, or ACMs are carried on unique pylons or internally on a rotary launcher. Avionics improvements include the avionics modular improvement (AMI) program, which replaces the current system processors, inertial navigation unit (INU), and data transfer system (DTS) cartridges. Electronic attack improvements include the EO-9 and EO-9 upgrade package, and the 172 set. The Combat Network Communications Technology (CONECT) improvement will provide a modern cockpit information avionics architecture, in-flight beyond line of sight (BLOS) and LOS Link 16 intratheater data link connectivity and mission/weapon reprogramming capability.

B-52H Stratofortress (Richard VanderMeulen)

**AC-10 Gunship**

**Brief:** Heavily armed aircraft using side-firing weapons integrated with sophisticated sensor, navigation, and fire-control systems to provide precise firepower or area saturation for long periods, at night and in adverse weather.

**Function:** Attack aircraft.

**Operator:** AFSC.

**First Flight:** 1967.

**Delivered:** 1968-present.

**IOC:** 1972 (AC-130H); 1996 (AC-130U).

**Production:** 39; conversion of four additional C-130s to AC-130 standard contracted.

**Inventory:** eight (AC-130H); 13 (AC-130U).

**Unit Location:** Hurlburt Field, Fla.

**Contractor:** Lockheed Martin (airframe); Rockwell (OA-10).

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

**Armament:** AC-130H crew of 14; AC-130U crew of 13.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130H**

**Conversion:** A-10A.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130U**

**Conversion:** A-10A.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130 Gunship**

**Brief:** Heavily armed aircraft using side-firing weapons integrated with sophisticated sensor, navigation, and fire-control systems to provide precise firepower or area saturation for long periods, at night and in adverse weather.

**Function:** Attack aircraft.

**Operator:** AFSC.

**First Flight:** 1967.

**Delivered:** 1968-present.

**IOC:** 1972 (AC-130H); 1996 (AC-130U).

**Production:** 39; conversion of four additional C-130s to AC-130 standard contracted.

**Inventory:** eight (AC-130H); 13 (AC-130U).

**Unit Location:** Hurlburt Field, Fla.

**Contractor:** Lockheed Martin (airframe); Rockwell (AC-130H); Rockwell, now Boeing (AC-130U).

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

**Armament:** AC-130H crew of 14; AC-130U crew of 13.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

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**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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**Ceiling:** 32,000 ft.

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**AC-130U**

**Conversion:** A-10A.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130 Gunship**

**Brief:** Heavily armed aircraft using side-firing weapons integrated with sophisticated sensor, navigation, and fire-control systems to provide precise firepower or area saturation for long periods, at night and in adverse weather.

**Function:** Attack aircraft.

**Operator:** AFSC.

**First Flight:** 1967.

**Delivered:** 1968-present.

**IOC:** 1972 (AC-130H); 1996 (AC-130U).

**Production:** 39; conversion of four additional C-130s to AC-130 standard contracted.

**Inventory:** eight (AC-130H); 13 (AC-130U).

**Unit Location:** Hurlburt Field, Fla.

**Contractor:** Lockheed Martin (airframe); Rockwell (AC-130H); Rockwell, now Boeing (AC-130U).

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

**Armament:** AC-130H crew of 14; AC-130U crew of 13.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130H**

**Conversion:** A-10A.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.

**AC-130U**

**Conversion:** A-10A.

**Dimensions:** span 132.6 ft, length 99 ft, height 38.5 ft.

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

**Ceiling:** 32,000 ft.

**Performance:** speed 420 mph, range 1,000 miles, with three 7,500 lb of weapons and up to four AIM-9 Sidewinder missiles.
Inventory: 499.
Contractor: McDonnell Douglas (now Boeing); Raytheon.

Power Plant: F-15C: two Pratt & Whitney F100-PW-220 turbofans, each 25,000 lb thrust, with max afterburner.

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

Dimensions: span 42.8 ft, length 63.8 ft, height 18.7 ft.

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

Ceiling: 65,000 ft.

Performance: F-15C: max speed Mach 2.5; T-O run 800 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles.

Armament: one internally mounted M61A1 20 mm six-barrel cannon; up to four AIM-9L/MX Sidewinder and up to four AIM-7 Sparrow air-to-air missiles, or up to eight AIM-120 Advanced Medium-Range Air-to-Air Missiles (AMRAAMs), carried externally.

COMMENTARY
Superior maneuverability and acceleration, range, weapons, and avionics enable the F-15 to penetrate hostile defenses and establish air superiority over enemy systems. F-15 fighters deployed to the Persian Gulf for Desert Storm accounted for 34 of the 37 USAF air-to-air victories, and in Iraq Freedom F-15Cs led coalition aircraft in maintaining aerial dominance.

F-15A (single-seat) and F-15B (two-seat) fighters became USAF’s front-line fighter immediately upon introduction in the mid-1970s. A multimission avionics system includes APG-63 pulse-Doppler radar for long-range detection and tracking of small high-speed objects down to treetop level and effective weapons delivery, a HUD for close-in combat, identification, friend or foe (IFF), and INS. F-15As now serve with ANG. In February 2004, Florida’s 125th FW received the first F-15As retrofitted with E-kit upgrades, providing additional thrust and improved combat capability.

F-15C (single-seat) and F-15D (two-seat) models followed in June 1979. Improvements included 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. From 1983 through 1997, tactical capabilities were enhanced extensively through the multiligated improvement program (MIP), a program of installation of new or modification of existing avionics equipment, which allows for the carriage of more advanced weapons, and increased self-protection. The last 443 aircraft included improved APG-70 radar, and F-15C/Ds are receiving an APG-63 upgrade, the APG-63(V1). One squadron in Alaska received the later APG-63(V2), featuring an active electronically scanned array (AESA), permitting the aircraft to track multiple targets and to guide air-to-air missiles against them. The Joint Helmet Mounted Cueing System (JHMCS), a “look and shoot” head-mounted system, is intended, along with the AIM-9X, to significantly enhance lethality in close-range aerial combat. Other modifications include improved engines, GPS equipment, and the Link 16 fighter data link.

F-15E Strike Eagle
Brief: A heavily modified, two-seat, dual-role variant of the original F-15, with weapons systems totally integrated for all-weather deep interdiction missions as well as air-to-air combat.

Function: Dual-role fighter.
Operator: ACC, AFMC, PACAF, USAFE.
Production: 223.

Unit Location: Eglin AFB, Fla., Elmendorf AFB, Alaska, Mountain Home AFB, Idaho, Nellis AFB, Nev., RAF Lakenheath, UK, Robins AFB, Ga., Seymour Johnson AFB, N.C.
Contractor: McDonnell Douglas (now Boeing); Raytheon.

Power Plant: two Pratt & Whitney F100-PW-220, each 25,000 lb thrust; or F100-PW-229 turbofans, each 29,000 lb thrust.

Accommodation: crew of two, on zero/zero ejection seats.

Dimensions: span 42.8 ft, length 63.8 ft, height 18.7 ft.

Weight: empty 45,000 lb, gross 81,000 lb.

F-15E Strike Eagle (MSgt. John E. Lasky)

F-16 Fighting Falcon
Brief: A compact, versatile, and low-cost multirole fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air combat and air-to-ground attack on tactical targets at night and in adverse weather, the F-15E carries a high-resolution APG-70 radar which provides a high-resolution synthetic aperture radar (SAR) map and LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pods, with wide-field FLIR. The APG-70 gives the F-15E, with its AIM-RAAM, AIM-7, and AIM-9 load, a true multrole capability with the inherent air-to-air capability of the F-15C. The three-redundant digital flight-control system, in combination with the LANTIRN navigation pod and the WFOV HUD, permits automatic terrain following. Other improvements include an EGI and Link 16 data link. F-15E aircraft have been JSOW-, JDAM-, and WCMD-capable since 2003. In addition, some F-15E aircraft have been equipped with Litening and Sniper targeting pods for improved precision attack capability. External CFTs have been fitted to increase combat range while carrying ordnance. Ten aircraft delivered in FY02-04 have upgraded programmable armament control sets (PACS), ready-installed software for delivery of JDAM, JSOW, and WCMD, and an enhanced night vision capability. A future upgrade, known as the "Golden" F-15E, will provide new core processors ensuring increased capability and reliability, while a number of F-15Es will receive an active electronically scanned array (AESA) radar to improve targeting and mapping capabilities.

During Desert Storm, 48 USAF F-15Es were deployed to the Persian Gulf where they operated mainly at night, hunting Scud missile launchers and artillery sites using the LANTIRN system; the ability to operate in conjunction with E-8 Joint STARS aircraft both then and in Iraqi Freedom proved critical to success.

Function: Mult-role fighter.
Operator: ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRIC.
First Flight: Dec. 8, 1976 (full-scale development).
IOC: October 1980, Hill AFB, Utah.
Production: 2,206.
Inventory: 1,325.
Unit Location: 13 active wings, 27 ANG, and five AFRC units (one associate).
Contractor: Lockheed Martin; Northrop Grumman.

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

Accommodation: pilot only, on zero/zero ejection seats.

Dimensions: wingspan with missiles 32.7 ft, length 18.5 ft.

Weight: (F-16C) empty (F100-PW-229) 18,591 lb, (F110-GE-129) 18,917 lb; gross, with external load (Block 40/42) 42,000 lb.

Ceiling: 50,000 ft.

Performance: max speed Mach 2, radius of action: Block 40 with two 2,000-lb bombs, two AIM-9 missiles, and external fuel, hi-lo to hi 852 miles; combat range 575 miles.

Armament: one M61A1 20 mm multiduum cannon, with 511 rd, mounted in fuselage; wingtip-mounted missiles; seven other external stores stations for fuel tanks and a...
range of air-to-air and air-to-surface munitions.

COMMENTARY

The F-16 is the workhorse of the USAF's fighter fleet, constituting more than 50 percent of its strength through at least 2010. The 200+ USAF F-16 multimission fighters deployed to the Persian Gulf Theater flew more sorties than any other type during Desert Storm, with 13,500 missions. In Iraqi Freedom, the F-16 flew hundreds of missions helping to destroy the unit cohesion of the Republican Guard.

F-16A (single-seat) and F-16B (two-seat) versions, which entered service with the 388th TFW, Hill AFB, Utah, incorporated advanced technologies from the start, making these aircraft two of the most maneuverable fighters built. Equipment includes a multimode radar with a clutter-free look-down capability, advanced radar warning receiver (RWR), internal chaff/flare dispensers and a 500-rd 20 mm internal gun.

Production of the F-16A and B for USAF ended in 1985. Most now belong to ANG. A midlife upgrade program, undertaken cooperatively by USAF and NATO operators, includes improvement to the radar, fire-control computer, stores-management computer, and avionics software, giving F-16A/Bs the ability to use next generation air-to-air and air-to-surface weapons.

Reliability and maintainability improvements include a ring-laser gyro INS and installation of the upgraded F-16B-service program to remedy fatigue problems (map), all blocks of F-16 aircraft are undergoing a structural modification program to remedy fatigue problems.

The Multinational Staged Improvement Program, implemented in 1985, ensured the aircraft could accept systems under development, thereby minimizing retrofit costs. All F-16s delivered since November 1981 have had built-in structural changes to allow for future upgrades. Included in the increase were new computer displays, the application of APG-77 radar, an electronic warfare system with radar warning receiver (RWR), HUD, internal chaff/flare dispensers and a 500-rd 20 mm internal gun.

The F-16CG Block 40/42 aircraft incorporate the General Electric F110-GE-100 engine. Deliveries began in 1984. With the exception of AFMC, all of the active and many of the Guard and Reserve units have since converted to F-16C/Ds.

ANG and AFRC Block 25/30/32 F-16s are receiving upgrades aimed at increasing throughput and memory for new weapon capabilities, including the 500-lb JDAM, plus Advanced Identification Friend/FOE (AIFF) to reduce the risk of fratricide. These aircraft also carry the Theater Airborne Reconnaissance System (TARS), a podded system with EO sensors and future high-capacity data link to move the imagery to users on the ground.

ANG F-16s are equipped with Litening II/Litening ER targeting pods.

F-16CG Block 40/42 aircraft specialize in night attack operations with precision guided weapons. Follow-on improvements include AESA-47 improved defensive countermeasures, FLIR/MIAW advanced RWR (Block 40 only). Very High Speed Integrated Circuit (VHSIC) technology in the APG-68(V5) fire-control radar, a ring-laser gyro INS, GPS, a LANTIRN nav/attack system, core avionics hardware, enhanced-envelope gunsight, digital flight controls, automatic terrain following, increased takeoff weight and maneuvering limits, an 8,000-hour airframe, IPES, and expanded envelope nine-G capability.

F-16CJ designated Block 50/52 aircraft are equipped with the High-speed Anti-Radiation Missile (HARM) targeting system (HTS) for suppression of enemy air defenses (SEAD). Block 50/52 F-16Js have MSIP Stage III improvements, which also show up in selected retrofits of earlier F-16 blocks. These aircraft incorporate the General Electric F110 and Pratt & Whitney F100 increased performance engines (IPEs), the latest cockpit control and display technology, including a wide-angle HUD. Weapons improvements include multi-shot AMRAAM compatibility, AGM-154 JSOW, and Wind-Corrected Munitions Dispenser (WCMD).

F-16C Block 50/52 aircraft, followed by Block 40/42 from 2006-10, have been undergoing a program of retrofit with a new modular mission computer developed under an F-16 common configuration implementation program (CCIP), aimed at extending operational flexibility and maintainability. This effort includes the participating European governments of the F-16 Multinational Fighter Program. CCIP also includes new color displays, Sniper XR targeting pod, JHMCS, AIM-9X, Link 16, and improved weapons capabilities. First delivery was made January 2002. The Block 50/52 aircraft will have dual/alternate carriage of HARM targeting system (HTS) and Smart Targeting and Identification via Networks Electro-optic system (STI-NET) and some future high-capacity data link. HUD displays target status, weapon status, weapon envelopes, and shoot cues. Other equipment includes AN/APG-77 radar, an electronic warfare system with radar warning receiver and missile launch detector, JTIDS, IFF, laser gyroscope inertial reference, and GPS.

The F-22A entered engineering and manufacturing development (EMD) in August 1991. Nine aircraft were built, three without avionics to explore flight characteristics, flutter, loads, propulsion, envelope expansion, and weapons separation, and six with avionics to complete integration work, refine the pilot vehicle interface, and fly guided weapons launch tests. In addition, one static and one fatigue test aircraft were built.

Initial operational test and evaluation (IOT&E) examination of the F-22A's air dominance mission concluded mid-September 2004. JDAM capability was demonstrated that same month. Follow-on OT&E (FOT&E) started in August 2005. The F-22A had achieved air-to-air and air-to-ground attack capability when it reached IOC in December 2005.

F-22A Raptor (Richard VanderMeulen)

F-35 Joint Strike Fighter (Lockheed Martin photo/Tom Reynolds)
Production aircraft have been delivered to Nellis AFB, Nev., and to Tyndall AFB, Fla., where they are used to train F-22 pilots, and to Langley AFB, Va., for the first operational base. USAF plans to put F-22s at Elmendorf AFB, Alaska, Hickam AFB, Hawaii, and Holloman AFB, N.M.

**F-35 Joint Strike Fighter**

**Brief:** An affordable, highly common family of next generation strike aircraft.

**Function:** Multitrole fighter.

**Operator:** ACC for USAF.

**First Flight:** Oct. 24, 2000 (concept demonstrator).

**Delivery:** 2009 (anticipated first production aircraft).

**IOC:** 2013 (USAF).

**Production:** planned: 1,763 total F-35A and F-35B (USAF); 450 total F-35B (USMC) and F-35C (USN), 150 (UK).

**Inventory:** TBD.

**Unit Location:** TBD.

**Contractor:** Lockheed Martin, with Northrop Grumman and BAE Systems; Pratt & Whitney is propulsion contractor for both F-35 and a second engine source contractor for the production phase.

**Power Plant:** one Pratt & Whitney F135 or General Electric F404-GE-F1D2 turbofan.

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

**Dimensions:** TBD.

**Weight:** TBD.

**Ceiling:** TBD.

**Performance** (design targets): mi power level speed at S/L, 600 miles knots calibrated airspeed (KCAS) for the F-35B short takeoff and vertical landing (STOVL) aircraft, 630 KCAS for the F-35 carrier variant (CV) and for the F-35A conventional takeoff and landing (CTOL) variant (Mach 1 max power for CTOL only), combat radius more than 590 miles for CTOL variant, 600 miles for CV, and 450 miles for STOVL.

**Armament:** (main weapons bay): CTOL: one internal gun, two AMRAAMs, and two 2,000-lb JDAMs; CV: two AMRAAMs and two 2,000-lb JDAMs; STOVL: two AMRAAMs and two 1,000-lb JDAMs. External carriage also will be available. (Note: Numerous other weapons capabilities will be added as system development continues.)

**Commentary:** The F-35 Joint Strike Fighter is a multinational cooperative development program aimed at developing and fielding an affordable, highly common family of next generation strike fighters. For USAF, the F-35 will replace its current force of F-16 and A-10 aircraft with a stealthy multirole fighter that will comprise the bulk of USAF’s fighter fleet for up to 50 years. This advanced multimission fighter is designed to penetrate high-threat enemy airspace and engage all enemy targets in any conflict. In addition to its advanced stealth design, the F-35 incorporates maneuverability, long range, and highly advanced avionics to accomplish the bulk of USAF missions. Its fully integrated avionics and weapons systems will permit simultaneous engagement of multiple targets in enemy airspace. USAF has stated intent to buy approximately 2,500 F-35s.

The concept demonstration phase (CDP) of the program commenced November 1996, with competitive contract awards to Lockheed Martin (X-35A) and Boeing (X-32A). CDP concluded in fall 2001 with Lockheed Martin declared the winner. The system development and demonstration (SDD) phase began in October 2001, focuses on system development, test and evaluation, logistics support, and LRP planning. Lockheed Martin completed assembly of the first F-35A flight-test aircraft in February 2006 with flight testing projected to begin in late 2006. The F-35 is powered by a variant of the Pratt & Whitney F119 engine, called the F135. General Electric is developing a physically and functionally interchangeable power plant, the F136, for competition in production.

**F-117 Nighthawk**

**Brief:** World’s first operational aircraft designed to exploit low observable (LO) stealth technology to expand the range of heavily defended critical targets that can be attacked.

**Function:** Attack aircraft.

**Operator:** ACC, AFMC.

**First Flight:** June 18, 1981.

**Delivered:** 1982-summer 1990.

**IOC:** October 1983.

**Production:** 59.

**Inventory:** 55.

**Unit Location:** Eglin AFB, Fla., Holloman AFB, N.M.

**Contractor:** Lockheed Martin; Raytheon.

**Power Plant:** two General Electric F404-GE-F1D2 nonafterburning turbofans, each 9,040 lb thrust.

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

**Dimensions:** span 43.3 ft, length 65.9 ft, height 12.4 ft.

**Weight:** empty (estimated) 29,500 lb, max gross 52,500 lb.

**Ceiling:** 35,000 ft.

**Performance:** high subsonic, top speed 646 mph (0.9 Mach), mission radius, unrefueled (5,000-lb weapons load) 656 miles.

**Armament:** full internal carriage of a variety of tactical weapons, incl laser- and GPS-guided 2,000-lb munitions, unguided general-purpose bombs, and cluster munitions. JDAM capability being introduced.

**Commentary:**

The F-117 is the Air Force’s primary attack aircraft for penetrating high-threat target areas with precision weapons. Its small radar signature, LO technologies, and advanced targeting system allow the aircraft to penetrate dense threat environments and to deliver precision weapons against heavily defended, high-value targets with pinpoint accuracy. Primary missions include precision attack, air interdiction, SEAD, and special operations.

Acknowledged publicly in November 1988, the F-117’s first operational deployment was to Panama in 1989 for Just Cause. 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 with the 4450th Tactical Group (redesignated 37th TFW in 1989) at Tonopah Test Range Airfield, Nev., where operations were restricted mainly to night flying to maintain secrecy. In 1992, they were transferred to the 49th FW at Holloman AFB, N.M.

To achieve the aircraft’s minimal radar signature, the skin panels of the arrowhead-shaped airframe are divided into many small, perfectly flat surfaces (facets), which deflect at a variety of angles all signals from probing hostile ground or airborne radars. In addition, much of the aircraft’s external surface is made of composites and radar-absorbent materials. The F-117’s dull black finish reflects little light, and the engine air intakes and exhaust nozzles are above the wings and rear fuselage, respectively, to shield them from IR seekers. The two nonafterburning turbofans give the aircraft low noise signature and high subsonic performance.

**Key features** include a state-of-the-art digital avionics suite integrating sophisticated navigation and attack systems, complemented by a specially developed automated mission-planning system. A high-precision INS coupled to GPS is installed. An upgraded dual-turret IR targeting system, combined with boresight laser designators and autotracker, ensures precision attack.

Other improvements since 1989 have included upgraded cockpit display and instrumentation and advanced weather capability via advanced weapons. Current and ongoing modifications provide a single, fleet-wide, optimum LO configuration, upgraded avionics to Block 2 configuration, integration of new weapons including JDAM for all-weather strike capability, and replacement of obsolete components to sustain the fleet through its service life. USAF plans to retire the F-117 over the next five years.

**J-UCAS**

**Brief:** Joint Unmanned Combat Air System program was to produce Air Force (X-45) and Navy (X-47) concept vehicles that would lead to a networked system of affordable, sophisticated stealthy weaponized unmanned combat air vehicles (UCAVs) capable of performing SEAD, strike, electronic attack, and intelligence-surveillance-reconnaissance (ISR) missions.

**Function:** Concept demonstrator UCAVs for SEAD/ strike/electronic attack/reconnaissance missions.

**First Flight:** May 22, 2002.

**Delivered:** TBD.

**Contractor:** X-45: Boeing; X-47: Northrop Grumman.

**Production:** TBD.

**Inventory:** TBD.

**Unit Location:** TBD.

**Power Plant:** X-45A Honeywell F124-GA-100 turbofan.

**Dimensions:** X-45A: span 33.8 ft, height 3.7 ft, length 26.5 ft, X-45C: span approx 48 ft; length 36 ft.

**Weight:** approx 35,000 lb.

**Commentary**

Under DOD plans released with the FY07 budget proposal and the 2005 Quadrennial Defense Review, the Navy will continue with the Joint Unmanned Combat Air System (J-UCAS) program, but the Air Force will cancel its X-45 and apply J-UCAS technology to efforts to field a new long-range strike platform.

X-45C concept featured a flying-wing-design with dual internal weapons bays capable of carrying two 2,000-lb JDAMs or eight-plus Small Diameter Bombs and stealth characteristics.

**YAL-1A Attack Airborne Laser**

**Brief:** The prototype YAL-1A, using a modified 747-400F platform, will be the world’s first operational airborne
high-energy laser weapon system.

**Function:** Airborne laser.

**Operator:** ACC, PACAF, AFRC (assoc.).

**First Flight:** July 18, 2002 (Block 04 test bed).

**Delivered:** First aircraft undergoing testing of beam control system; separate testing of COIL system, installation of laser system.

**IOC:** FY12 (planned).

**Production:** TBD.

**Inventory:** TBD.

**Unit Location:** TBD.

**Contractor:** Boeing; Northrop Grumman (radar); Lockheed Martin (beam control system).

**Power Plant:** four GE CF6-80 turbofans, each 61,500 lb thrust.

**Accommodation:** flight crew of two, plus four mission specialists.

**Dimensions:** span 211.4 ft, length 228.8 ft, height 63.7 ft.

**Weight:** empty 423,882 lb, gross 800,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** max operating speed Mach 0.83, max laser weapon range hundreds of miles, unrefueled endurance at 40,000 ft with operational laser weapon load approx six hr. Chemical fuel carried on board will enable more than 20 shots.

**COMMENTARY**

The Airborne Laser (ABL) will become the first directed energy weapon in the US arsenal. The Missile Defense Agency (MDA) assumed overall direction and budget authority for the program in summer 2001. USAF continues to man and develop the program through its Airborne Laser System Program Office at Kirtland AFB, N.M.

Air Combat Command will have operational responsibility and currently plans to base the attack laser in CONUS but could deploy the ABL with minimal airlift support to any region of the world. It will arrive in theater with its crew, laser fuel, and initial spares ready to fight.

Operational concepts call for ABLs to fly continuous patrols over deployed US forces to detect and destroy at an altitude of 40,000 ft. The aircraft will detect and shoot down any ballistic missiles launched at US forces or nearby allied nations. The ABL also will have the capability of determining hostile launch locations and passing that information to other US assets. As US forces achieve air superiority, ABL will be able to move closer to enemy territory. Once the decision is made to proceed with full production, USAF’s acquisition community will assume responsibility for procurement; fleet size has not been determined.

It will employ a Chemical-Oxygen Iodine Laser (COIL) system, running down the interior of the aircraft. Laser fire will emerge through a large ball turret in the nose. Intended targets are ballistic missiles in their boost, or very earliest, phase of flight. ABLs represent the only near-term boost-phase missile defense. The system will track ballistic missiles and maintain laser focus on their skin, which, when sufficiently heated, will cause the pressurized fuel within to explode. The ABL can target ballistic missiles hundreds of miles away and thus can remain over friendly territory to kill ballistic missiles as they are launched.

The lightweight, megawatt-class COIL technology can deliver high energy over a great distance largely because of its IR wavelength. In addition to the COIL, the ABL houses three other lasers: the active radar system, which provides preliminary tracking data; the track illuminator laser, which produces more refined data; and the beacon illuminator laser, which measures atmospheric disturbance.

Following a two-year structural modification, the ABL platform’s first flight took place July 18, 2002 from Boeing’s Wichita, Kan., facility. A 10-month laser module test was completed in 2002, and, in late 2002, the platform was flown to Edwards AFB, Calif. With YAL-1A in the hangar, tests have been conducted independently on the ABL optical system and the six laser modules that make up the complete COIL system. All six modules were successfully tested on Nov. 10, 2004.

The FY07 defense budget downgraded the program to a demonstration project, but officials said a planned test destruction of a boosting ballistic missile over the Pacific in 2008 is still planned and, if successful, could see resurrection of the program.

**Reconnaissance and Surveillance Aircraft**

**E-3 Sentry**

**Brief:** Heavily modified Boeing 707-320B aircraft, fitted with an extensive complement of mission avionics providing all-weather air surveillance and command, control, and communications for tactical and air defense forces.

**Function:** Airborne early warning, tactical battle management, and C2 of theater air forces.

**Operator:** ACC, PACAF, AFRC (assoc.).

**First Flight:** Oct. 31, 1975 (full avionics).

**Delivered:** March 1977-84.

**Production:** 34.

**Inventory:** 32.

**Unit Location:** Elmendorf AFB, Alaska, Kadena AB, Okinawa, Tinker AFB, Okla. AFRC: (assoc.) Tinker AFB, Okla.

**Contractor:** Boeing; Northrop Grumman (radar); Lockheed Martin (computer).

**Power Plant:** four Pratt & Whitney TF33-PW-100/100A turbofans, each 21,000 lb thrust.

**Accommodation:** flight crew of four; 13-19 mission specialists.

**Dimensions:** span 145.8 ft, length 152.9 ft, height 41.5 ft.

**Weight:** gross 347,000 lb.

**Ceiling:** 38,000 ft.

**Performance:** optimum cruise Mach 0.78, endurance eight hr unrefueled.

**COMMENTARY**

A critical component of the USAF inventory, the E-3 Airborne Warning and Control System (AWACS) aircraft is capable of surveillance from Earth’s surface up to the stratosphere, over land or water, at more than 200 miles. During conflict it will coordinate the actions of hundreds of strike, support, and cargo aircraft. As an integrated Air Force command control battle management (C2BM,) surveillance, tracking, and tracking platform, AWACS is directly subordinate to the joint air operations center. Its extensive range of mission avionics enables it to provide an accurate real-time battlespace picture of friendly, neutral, and hostile activity; command and control of an area of responsibility; battle management of theater forces; all-altitude/all-weather surveillance of the battlespace; and early warning of enemy actions.

AWACS may be employed alone or horizontally integrated with other C2BM and ISR elements. It provides the theater with the ability to find, fix, track, and target airborne or maritime threats and to locate and identify emitters. It can operate beyond the coverage of ground-based C2 and can exchange data with other C2 platforms and weapon systems.

**E-3A**

Of the 24 built for USAF in 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-3A’s was upgraded.

**E-3B** is the upgraded earliest version E-3A. Twenty-two product prototypes were produced. Improvements include much-enhanced computer capabilities, jam-resistant communications, austere maritime surveillance capability, additional radio communications, and five additional display consoles.

**E-3C** is an upgrade to the original 10 US/NATO Standard E-3A aircraft, with additional radio, console, and radar capabilities. Redelivered 1984.

A series of major sustainability, reliability, and availability upgrades for USAF E-3A’s has been undertaken to support the continuing demands on the system. Upgrades include new passive detection systems, known as electronic support measures (ESM), that complement the active beamng radar, enabling the aircraft to detect signals emitted by both hostile and friendly targets, improved Joint Tactical Information Distribution System (JTIDS), jam-resistant communications, increased computer capacity, and GPS capability. Radar system improvements permit AWACS aircraft operating in the pulse-Doppler mode to detect smaller, stealthier targets. Installation begun in 2005 of new air traffic management systems and advanced satellite communications will permit use of optimum altitudes and flight routes. A single, long-term contract awarded in 2001 provides for further improvement and management support.

**E-8C Joint STARS**

**Brief:** A modified Boeing 707 equipped with a large, canoe-shaped radome mounted under the forward part of the fuselage.

**Operational Concept:** Joint STARS system was designed specifically to detect and destroy enemy targets in a tactical environment. The Joint STARS can support all services and multiple contingencies. The aircraft can conduct air superiority battles, target attacks, command and control, and communications.

**Operating Environment:** The Joint STARS can operate in the air from a low altitude up to an altitude of 40,000 ft. The aircraft can operate in almost any weather condition, with a max operating speed of Mach 0.83.

**Mission Capabilities:** The Joint STARS can perform multiple missions, including air superiority, strike, support, and command and control.

**Weapon Systems:** The Joint STARS can carry a variety of weapons, including air-to-air and air-to-ground missiles.

**Operational Concepts:** The Joint STARS can fly in a variety of roles, including providing air superiority, supporting ground forces, and conducting command and control operations.

**Performance:** The Joint STARS has a max operating speed of Mach 0.83, a max ceiling of 40,000 ft, and a max range of 2,600 nm.

**Operational Effectiveness:** The Joint STARS has been operational since 1983 and has been used in numerous conflicts, including Operation Desert Storm and Operation Iraqi Freedom.

**Future Enhancements:** Future enhancements for the Joint STARS include improvements in electronic warfare, advanced avionics, and increased survivability.

**Conclusion:** The Joint STARS is a critical asset for the US military, providing air superiority, strike, support, and command and control operations in a variety of environments.

**E-3 Sentry (Richard VanderMeulen)**
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 124 miles. Such data are then transmitted via data link to ground stations or other aircraft.

Function: Ground surveillance, battle management (BM), C2 aircraft.

Operator: ACC and ANG, as the blended 116th Air Control Wing.


Delivered: May 1996-present.


Production: One.

Inventory: 18.

Unit Location: Robins AFB, Ga.

Contractor: Northrop Grumman; Motorola; Cubic; Raytheon.

Power Plant: four Pratt & Whitney TF33-102C turbojets, each 19,200 lb thrust.

Accommodation: mission crew of 21 Air Force/Army operators (can be augmented to 34).

Dimensions: span 145.8 ft, length 152.9 ft, height 55.3 ft.

Weight: gross 336,000 lb.

Ceiling: 42,000 ft.

Performance: max operating speed Mach 0.84, endurance with one in-flight refueling 20 hr.

COMMENTARY

Joint STARS (Survelliance Target Attack Radar System) is a battle management (BM) platform capable of providing commanders with transformational C2 and near-real time wide area surveillance ultimately passing targeting information to air and ground commanders. Joint STARS battle managers use the sensor and a robust communications suite to engage enemy forces in day, night, and adverse weather conditions. The radar subsystem features a multimode, side-looking, phased-array radar that provides interleaved moving target indicator (MTI) information, synthetic aperture radar (SAR) imagery, and fixed target indicator imagery. Joint STARS downlinks via a secure, jam-resistant digital data link and beyond line of sight radio communications. Multiple receivers are in use, predominantly the US Army's Common Ground Station and Joint Services Work Station.

As part of their operational test and evaluation, Joint STARS aircraft flew more than 150 operational missions during Desert Storm (with two E-8A development aircraft) and Joint Endeavor (with one E-8A and one test bed E-8C). During Desert Storm, the E-10A's radar was airborne 24 hours a day to help coalition forces maintain battlefield awareness. The E-8C's unique, long-dwell MTI capability is being used in increasingly creative ways, keeping it relevant to the joint force commander.

E-8A, Prototype version, with specialized equipment installed about two specially modified 707-300 airframes. One was converted to an in-flight pilot trainer in 1997, and the second was scrapped.

E-8C, production version, based on former commercial 707-300 airframes. Equipped with 18 operations and control consoles, two of which double as communications stations, all the aircraft have been modified to the more capable Block 20 aircraft, featuring more powerful computers and an Internet protocol local area network. The first E-8C became operational in 1996, and these aircraft are expected to remain airworthy until at least 2034. System improvements under way include Link 16 upgrades, improved control and battle management; enhanced radar modes; new satellite communications radios; upgrades to allow Joint STARS to assume the Airborne Battlefield Command and Control Center (ABCCC) mission of attack support to ground force commanders; installation of the Force XXI Battle Command Brigade and Below (FBCB2) terminal, greatly enhancing situational awareness to friendly forces; IP connectivity; and communications navigation surveillance air traffic management upgrades to permit use of optimum altitudes and flight routes in increasingly congested commercial airspace in response to new stringent international navigation standards.

E-10

Brief: A multimission sensor and control aircraft (MC2A) that will provide ground surveillance and cruise missile defense as well as battlefield management command and control (BM&C).

Function: Ground surveillance, cruise missile defense, and BM&C aircraft.

Production: TBD.

Inventory: TBD.

Unit Location: TBD.

Contractor: Northrop Grumman; Boeing; and Raytheon.

Power Plant: two General Electric CF6-80C2B6F8 or CF6-80C2B7F8 turbofans, each 19,200 lb thrust.

Accommodation: TBD.

Dimensions: span 170.3 ft, length 201.3 ft, tail height 55.3 ft.

Weight: TBD.

Ceiling: TBD.

Performance: TBD.

E-10A

The E-10A program is in a “strategic pause,” according to Air Force officials. The Air Force plans to re-examine costs and joint requirements, including the possibility of joining with the other services on a single platform.

USAF envisioned the E-10 as a replacement for the E-8 Joint STARS and possibly taking on roles currently fulfilled by the E-3 AWACS and RC-135 Rivet Joint.

In May 2003, a team comprising Northrop Grumman, Boeing, and Raytheon was awarded a presystem development and demonstration contract for weapons system integration. Development of the demonstration radar system was awarded to Northrop Grumman, with Raytheon as a major subcontractor in April 2004.

MQ-1 Predator (Richard VanderMeulen)

CF-6-80C2B6FA turbosfans.

Accommodation: TBD.

Dimensions: span 170.3 ft, length 201.3 ft, tail height 55.3 ft.

Weight: TBD.

Ceiling: TBD.

Performance: TBD.

COMMENTARY

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USAF envisioned the E-10 as a replacement for the E-8 Joint STARS and possibly taking on roles currently fulfilled by the E-3 AWACS and RC-135 Rivet Joint.

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MQ-1 Predator

Brief: A medium-altitude, long-endurance unmanned aerial vehicle (UAV), flown remotely. Joint force command and control asset, combining imaging sensors with strike capability.

Function: Unmanned reconnaissance and strike aircraft.

Operator: ACC.


Delivered: July 1994 (USAF from 1996)-present.


Production: 157 air vehicles—ongoing.

Unit Location: Creech AFB, Nev., Nellis AFB, Nev.

Contractor: General Atomics Aeronautical Systems.

Power Plant: one Rotax 914 turbocharged engine.

Accommodation: unmanned system.

Dimensions: length 27 ft, height 7.2 ft, span 48.7 ft.

Weight: empty 850 lb, gross 2,250 lb.

Ceiling: 25,000 ft.

Performance: cruise speed 80 mph, up to 138 mph, endurance 124 hr 460 miles with 16 hr on station.

Armament: Two Hellfire missiles.

COMMENTARY

Operated currently by the 11th, 15th, and 17th RSs, the Predator UAV has evolved into a vital component of USAF's warfighting inventory. A Predator system includes four air vehicles, a ground control station, a satellite link, and about 55 personnel for 24-hour operations. The Predator crew comprises a pilot and two sensor operators.

DOD first used the advanced concept technology demonstration (ACTD) Predator in 1995 to support Provide Promise. In 1997, USAF took over the Predator program, and in 1999, while the UAV was still in development, the service deployed the system operationally for surveillance missions over Bosnia and Iraq. In July 2001, USAF successfully experimented with Predators armed with Hellfire missiles, and the service has since been used to attack targets in Afghanistan, Yemen, and Iraq. USAF changed the designation for Predator A to MQ-1 to denote its multimission capability for both reconnaissance and strike. All RQ-1 aircraft have been or will be retrofitted for MQ-1 configuration.

MQ-9 Predator


Function: Unmanned reconnaissance and strike aircraft.

Operator: ACC.


Delivered: November 2003.

IOC: FY09.

Production: 60 (planned).

Unit Location: seven.

Contractor: Creech AFB, Nev.

Power Plant: one Honeywell TPE-331-101 turboprop engine.

Accommodation: unmanned system.

Dimensions: length 36.2 ft, span 64 ft.

Weight: empty 6,800 lb, gross 10,000 lb.

Ceiling: 50,000 ft.

Performance: cruise speed 172 mph, up to 230 mph, endurance 30+ hours.

Armament: Hellfire, GBU-12, JDAM, and GBU-38.

COMMENTARY

Developed initially under an internal company research and development effort, the MQ-9, acquiring two 7,500-lb gross UAV prototypes (known by General Atomics as Predator B) in October 2001 to evaluate their capability as a weapons platform and to carry an enhanced sensor payload. In June 2002, USAF issued a contract for a 10,000-lb prototype, based on the earlier models and has since committed to full production of this variant.

The MQ-9 hunter-killer UAV flies higher, faster, and has significantly greater payload capacity than the MQ-1. With its 750-lb internal payload capacity and a turboprop engine, the MQ-9 will be able to carry numerous payloads such as a larger, more capable camera system, SAR, MTI, and other detection systems. Its 3,000-lb external payload capacity will enable it to carry a combination of air-to-ground munitions. Like the MQ-1 Predator, the MQ-9 can be flown line of sight or remotely via satellite link. The official name for this version has yet to be determined.

DC-135 Open Skies

Brief: A modified C-135 aircraft that flies unarmed observation and verification flights over nations that are parties to the 1992 Open Skies Treaty.

Function: Reconnaissance aircraft.

Operator: ACC.

First Flight: June 1993.

Delivered: October 1993-96.

IOC: October 1993.

Production: three.

Unit Location: Offutt AFB, Neb.

Contractor: Boeing.

Power Plant: four Pratt & Whitney TF33-P-5 turbofans, each 16,050 lb thrust.

Accommodation: seating for 36, incl cockpit crew, aircraft maintenance crew, foreign representatives, and crew
members from the Defense Threat Reduction Agency.

**Dimensions:** span 131 ft, length 135 ft, height 42 ft.
**Weight:** gross 297,000 lb.
**Ceiling:** 50,000 ft (basic C-135).

**Performance:** speed: 500+ mph, unrefueled range 3,000 miles.

**COMMENTARY**

A modified version of the WC-135, used for specialized arms control treaty observation and imagery collection missions with vertical-looking and panoramic optical cameras installed in the rear of the aircraft.

**OC-135B modifications include one vertical and two oblique KS-87E framing cameras, used for photography approximately 5,000 ft above the ground, and one KA-91C panoramic camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography up to approximately 35,000 ft. Data is processed and recorded by a recording and annotation system.

**RC-135**

Boeing’s specially configured variant of the Boeing C-135 Stratolifter, having an elongated nose and cheeks containing highly advanced electronic signal collection systems. Used to acquire real-time electronic intelligence (Elint) data for theater and tactical commanders.

**Function:** Electronic reconnaissance aircraft.
**Operator:** ACC.
**First Flight:** not available.
**Delivered:** circa 1973–99.
**IOC:** circa 1973 (Rivet Joint).
**Production:** (converted).
**Inventory:** 22.
**Unit Location:** Offutt AFB, Neb.
**Contractor:** Boeing (airframe); Raytheon; Textron.
**Power Plant:** four Pratt & Whitney TF33-P-5/9 turbofans, each 18,000 lb thrust. (Replaced with CFM International CFM-56s in one W version.)

**Accommodation:** flight crew of four; 25-35 mission crew.
**Dimensions:** (Cobra Ball) span 131 ft, length 140 ft, height 42 ft; (Cobra Sent) span 135 ft, length 136 ft; (Rivet Joint) height 38 ft.
**Weight:** max gross 299,000 lb.
**Ceiling:** 35,000 ft.
**Performance:** speed 500+ mph, range with air refuel.

**Unlimited.**

**COMMENTARY**

The RC-135W version of the KF-135, now used by the Air Force, is a highly specialized fleet of RC-135s for worldwide reconnaissance missions. All are subject to ongoing modernization, with upgrades of avionics and primary mission equipment to expand capability and maintain effectiveness.

**RC-135S Cobra Ball (CB).** Three aircraft. Cobra Ball collects measurement and signature intelligence (Masint) data, providing the capability to monitor missile-associated signal activity and to track missiles during boost and re-entry phases of flight. Cobra Ball can deploy anywhere in the world in 24 hours and provide on-scene EO reconnaissance for treaty verification and theater ballistic missile proliferation. Equipment includes wide-area IR sensors, long-range optical cameras, and an advanced communications suite.

**RC-135U Combat Sent (CS).** Two aircraft. Each Combat Sent aircraft has a specifically designed signals intelligence (Sigint) suite used primarily to collect scientific and technical (S&T) electronic intelligence (Elint) data against air-, land-, and sea-based emitter systems. The accuracy of CS data is critical to the effective design, programming, and reprogramming of radar warning receivers as well as jammers, decoys, and anti-radiation missiles and to the development of effective threat simulators.

**RC-135V/Rivet Joint (RJ).** Seventeen aircraft. Rivet Joint is a self-contained standoff airborne signals intelligence (Sigint) collection system. Its primary role is to exploit the “electronic battlefield” and deliver near-real-time (NRT) intelligence-surveillance-reconnaissance (ISR) information to tactical forces, unified commanders, and national command authorities across the full spectrum of conflict. Onboard collection capabilities encompass rapid search, detection, measurement, identification, demodulation, geolocation, and fusion of data from potentially thousands of electronic emitters.

**TC-135W.** Used for training purposes.

**RQ-4A Global Hawk (Northrop Grumman photo)**

**U-2 Dragon Lady (Lockheed Martin photo)**

**RQ-4 Global Hawk**

**brief:** A high-altitude, long-range, long-endurance UAV.

**Function:** Unmanned reconnaissance aircraft.
**Operator:** ACC.
**First Flight:** Feb. 28, 1998.
**Delivered:** seven advanced concept technology demonstrators; five production vehicles.
**IOC:** Used operationally in Afghanistan and Iraq while still in development phase. Operational status achieved October 2004.
**Production:** 51 (planned).
**Inventory:** nine.
**Unit Location:** Beale AFB, Calif., Eglin AFB, Fla.
**Contractor:** Northrop Grumman (prime); Raytheon.
**Power Plant:** one Rolls Royce-North American AE 3007H turbofan, 7,600 lb thrust.
**Accommodation:** unmanned system.

**Dimensions:** (RQ-4A) span 44.4 ft, height 15.2 ft, span 116.2 ft; (RQ-4B) length 47.6 ft, span 130.9 ft.
**Weight:** gross (RQ-4A) 25,600 lb; (RQ-4B) 32,250 lb.
**Ceiling:** 65,000+ ft.
**Performance:** operational endurance up to 40 hr (RQ-4B 33 hr) at a cruise speed of 400 mph and at an altitude of 65,000 ft allowing loiter on station 1,380 miles from base for 24 hr. Combat range 15,525 miles.
**Armanent:** none.

**COMMENTARY**

The RQ-4A is a high-altitude endurance UAV carrying a 1,900-lb payload, incorporating EO/IR and SAR sensors that permit switching among radar, IR, and visible wave-lengths as required. The Global Hawk system operates in conjunction with its ground launch recovery element and mission control element for command and control.

The RQ-4B system increases payload capacity to 3,000 lb for future sensors/capabilities, including signals collection and electronics intelligence. Navigation is by GPS/INS. Global Hawk 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.

Global Hawk was a high-altitude reconnaissance platform, capable of carrying multi-int sensors simultaneously, making it USAF’s only truly operational multi-intelligence platform and a key performer in combat operations.

Although the U-2 was designed initially in the 1950s, current aircraft were produced primarily in the 1980s, when the production line was reopened to produce the TR-1, a significantly larger and more capable version than the earlier aircraft. Deliveries ended in October 1989.

**U-2R (single-seat) and U-2RT (two-seat) aircraft.** In 1992, all existing U-2s and tactical TR-1s were consolidated under the designation U-2R.

**U-2S (single-seat) and TU-2ST (two-seat).** The current designations of all aircraft in the inventory. Conversion to S model configuration began in October 1994. Included in the on-going $1.5 billion improvement program are new F-118-GE-101 engines, a complete electrical system re-placement, a new glass cockpit using multifunction displays (MFDs), a digital autopilot, an electro-optical view sight, and a new electronic warfare system. Sensor upgrades include the ASARS-2A SAR sensor, which provides enhanced imaging modes and improves geo-location accuracy; the SYERS-2 EO imagery system provides...
DOD’s only multispectral and IR capability; enhanced RF-intelligence capability; and new data links enable the U-2 to connect in near real time with network-centric hubs as well as line of sight ground stations, airborne data relays, and beyond line of sight satellite data relays simultaneously.

NASA has two ER-2 versions of the U-2 used for high-altitude scientific experiments and atmospheric research, including investigation of global ozone depletion.

**WC-130 Hercules**
**Brief:** A high-wing, medium-range aircraft flown by AFRC 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:** circa 1959.
**Production:** October 1999–2002.
**IOC:** 1959.
**Production:** no new-build WC-130H; 10 WC-130J.
**Inventory:** 10 (H); 10 (J).
**Unit Location:** AFRC: Keesler AFB, Miss.
**Contractor:** Lockheed Martin.
**Power Plant:** WC-130J: four Rolls Royce AE2100D3 turboprops, each 4,500 shp.
**Accommodation:** six.
**Dimensions:** WC-130J: span 132.6 ft, length 97.8 ft, height 38.9 ft.
**Weight:** WC-130J: gross 175,000 lb.
**Ceiling:** WC-130J: 30,500 ft.
**Performance:** speed 374 mph at 20,000 ft.

**COMMENTARY**
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/B/E.**
Early version C-130 modified for weather reconnaissance. Now retired.

**WC-130H.**
Later version C-130s modified for weather reconnaissance duties, equipped with two external 1,400-gallon fuel tanks, an internal 1,800-gallon fuel tank, and uprated Allison T56-A-15 turboprops, each 4,910 shp. The 10 WC-130H aircraft still counted in the inventory have been recycled for other operational uses.

**EC-130J Commando Solo II (Capt. Denise Boyd)**

**Special Duty Aircraft**

**E-4B National Airborne Operations Center**
**Brief:** four-engine, swept-wing, long-range, high-altitude airplane providing a highly survivable C3 center allowing national/defense leaders 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; Rockwell; Raytheon E-Systems.
**Power Plant:** four General Electric CF6-50E2 turbosfans, each 52,500 lb thrust.
**Accommodation:** up to 114 (63 crew/battle staff; 51 passengers.
**Dimensions:** span 195.7 ft, length 231.3 ft, height 63.4 ft.
**Weight:** gross 800,000 lb.
**Ceiling:** above 40,000 ft.
**Performance:** 6,300+ miles; unrefueled endurance in excess of 12 hr; with aerial refueling up to 72 hr.

**COMMENTARY**
A militarized version of the Boeing 747-300, E-4B aircraft perform the National Airborne Operations Center (NAOC) mission. The E-4B fleet provides a survivable C3 platform throughout the full threat spectrum, including sustained operations in a nuclear environment. First operational mission was flown in March 1980. E-4Bs are hardened against the effects of nuclear explosions, including electromagnetic pulse, and have in-flight refueling capability. A 1,200-kVA electrical system supports advanced system electronics as well as state-of-the-art communications and data processing equipment such as EHF Milstar satellite terminals and six-channel International Maritime Satellite (Inmarsat). A tri-band radome also houses the E-4B’s superhigh frequency (SHF) frequency division multiple access (FDMA) communications antenna, the only such system on an airborne platform.

The E-4B system is capable of linking with 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 (FEMA). In early 2000, the E-4B entered the SDD phase of a modernization program aimed at updating the electronic infrastructure supporting the aircraft’s primary mission and increasing the bandwidth of external communications and onboard data transfer. These updates, along with changes to the aircraft’s interior configuration, internal noise reduction modifications, BM improvements, and Global Air Traffic Management (GATM) avionics modifications, ensure the E-4B aircraft will effectively execute its NAOC mission, providing C3 in the homeland security environment and beyond for the foreseeable future.

**EC-130 Commando Solo**
**Brief:** A heavily modified C-130 used for EW and electronic combat.
**Function:** Psychological warfare.
**Operator:** ANG.
**First Flight:** January 1990.
**Delivered:** March 1990 (J model from 2003).
**IOC:** December 1990.
**Production:** (no new-build E); seven (J).
**Inventory:** four (E); six (J).
**Unit Location:** ANG: Harrisburg Arpt., Pa.
**Contractor:** Lockheed Martin; Raytheon; General Dynamics.
**Power Plant:** (EC-130E) T-56-A-15 turboprops, each 4,500 shp; (EC-130J) four Rolls Royce AE2100D3 turboprops, each 4,591 shp.
**Accommodation:** three flight crew, six mission (J).
**Dimensions:** EC-130J: span 132.6 ft, length 97.8 ft, height 38.9 ft.
**Weight:** EC-130J: gross 175,000 lb.
**Ceiling:** EC-130J: 30,500 ft.
**Performance:** speed 374 mph, range in excess of 2,100 miles; (C-130J) 393 mph, range 4,140 miles.

**COMMENTARY**
The EC-130 is the ABCCC Airborne Battlefield Command and Control Center. Seven aircraft were updated by Unisys to ABCCC III standard. The advanced JTIDS received data transmitted by AWACS aircraft and other systems, enabling the crew to see a real-time picture of air operations over a combat area. Now retired.

**EC-130J Commando Solo II.** Version used by the ANG as a broadcasting station for psychological warfare operations. Specialized modifications include enhanced navigation systems, self-protection equipment, and worldwide color television configuration. Now being replaced by EC-130J version.

**EC-130J Commando Solo II.** Specialized versions of the latest-model C-130 aircraft, ordered to replace E models, with current mission equipment transferred from the older E model Commando Solo aircraft. Entered service mid-2003 with the 193rd SOW (ANG).

Commando Solo aircraft have been used in numerous military operations, including Iraq Freedom. They also have a role in civil emergencies. Secondary mission is electronic attack in the military frequency spectrum.

**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; (Block 30) February 1999.
**Production:** (converted).
**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, incl 9 mission.

**KCS-135R Stratotanker (A1C Nathan Putz)**

**AIR FORCE Magazine / May 2006**
**Tanker Aircraft**

**KC-130R/T**

**Brief:** Four retired EC-130E ABCCC and 10 WC-130H aircraft provide for complete update of the HC-130 avionics.

**Accommodation:** Three-man PJs.

**Power Plant:** Four Pratt & Whitney TF33-PW-102 turbofans, each 4,910 shp.

**Dimensions:** Span 132.6 ft, length 99 ft, height 38 ft.

**Weight:** 155,000 lb.

**Ceiling:** 25,000 ft.

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

**Function:** Aerial refueling/transport.

**Contractor:** McDonnell Douglas.

**Operator:** AETC, AFRC.

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

**Production:** 60.

**Inventory:** 84.

**First Flight:** Dec. 8, 1964.

** IOC:** April 1980.

**Operator:** AFRC.

**Contractor:** Fairchild Aircraft.

**Contractor:** McDonnell Douglas.

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

**Dimensions:** Span 132.6 ft, length 99 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-10 combines the tasks of tanker and cargo aircraft in a single unit, enabling it to support worldwide fighter deployments, strategic airlift, and conventional operations.

**KC-10 Extender**

**Brief:** A modified McDonnell Douglas DC-10-30 that combines in a single aircraft the operations of aerial refueling and long-range cargo transport.

**Function:** Aerial refueling/transport.

**Operator:** AMC, AFRC.

**IOC:** January 1957.

**Operator:**后期

**Contractor:** Boeing.

**Power Plant:** Four CFM International CFM56-2 turbofans, each 16,545 lb thrust.

**Dimensions:** Span 165.4 ft, length 181.6 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-10 can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases, leaving vital fuel supplies in the theater of operations untouched.

**KC-135A**

**Brief:** A variant used as an airborne communications jamming and information warfare platform.

**Accommodation:** Three-man PJs.

**Power Plant:** Four Pratt & Whitney TF33-PW-102 turbofans, each 4,910 shp.

**Dimensions:** Span 132.6 ft, length 99 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-135 combines the tasks of tanker and cargo aircraft in a single unit, enabling it to support worldwide fighter deployments, strategic airlift, and conventional operations.

**KC-135 Stratotanker**

**Brief:** A short-to-medium-range tanker aircraft, meeting the air refueling needs of USAF bomber, fighter, cargo, and reconnaissance forces. It also supports USN, USMC, and allied aircraft.

**Accommodation:** Three-man PJs.

**Power Plant:** Four Pratt & Whitney TF33-PW-102 turbofans, each 4,910 shp.

**Dimensions:** Span 132.6 ft, length 99 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-10 can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases, leaving vital fuel supplies in the theater of operations untouched.

**KC-135T**

**Brief:** A modified McDonnell Douglas DC-10-30 that combines in a single aircraft the operations of aerial refueling and long-range cargo transport.

**Function:** Aerial refueling/transport.

**Operator:** AMC, AFRC.

**IOC:** June 1957.

**Operator:**后期

**Contractor:** Boeing.

**Power Plant:** Four CFM International CFM56-2 turbofans, each 16,545 lb thrust.

**Dimensions:** Span 165.4 ft, length 181.6 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-10 can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases, leaving vital fuel supplies in the theater of operations untouched.

**KC-135R/T**

**Brief:** Four CFM International CFM56-2 turbofans, each 16,545 lb thrust.

**Dimensions:** Span 165.4 ft, length 181.6 ft, height 38.5 ft.

**Weight:** Gross 393,000 lb.

**Ceiling:** 42,000 ft.

**Function:** Cruising speed Mach 0.825, range with max cargo 4,400 miles.

**Commentary:** The KC-10 can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases, leaving vital fuel supplies in the theater of operations untouched.
Some aircraft have been modified with an in-flight refueling system allowing them to be air refueable.

**Strategic Transports**

**C-5 Galaxy**
- **Brief:** A heavy-lift, air refuelable cargo transport for massive strategic airlift over long ranges, including outsize cargo. Supports special operations missions.
- **Function:** Cargo and troop transport.
- **Operator:** AETC, AFMC, AMC, ANG, AFRC.
- **First Flight:** June 30, 1968.
- **Delivered:** October 1969-April 1989.
- **IOC:** September 1970.
- **Production:** 131.
- **Inventory:** 112.
- **Unit Location:** Active: Altus AFB, Okla.; Dover AFB, Del.; Travis AFB, Calif.; Ang: Memphis Arpt., Tenn.; Stewart Arpt., N.Y.; AFRC-Dover AFB (assoc.), Del.; Lackland AFB, Tex., Travis AFB (assoc.), Calif.; Westover ARB, Mass.; Wright-Patterson AFB, Ohio.
- **Contractor:** Lockheed.
- **Power Plant:** Four General Electric TF39-GE-1C turbofans, each 41,000 lb thrust.
- **Accommodation:** Normal crew of six (two pilots, two engineers, and two loadmasters), plus rest area for 15 (16) crew, etc. and seating for 73. There is no piece of Army combat equipment the C-5 can't carry. Possible loads: six Apache helicopters, two M1 main battle tanks (each weighing 35,400 lb), six Bradley vehicles, three CH-47 helicopters, the 74-ton mobile bridge, a quarter-million-pounds of relief supplies, or a maximum of 340 passengers in an airbus configuration. Airdrop capability for single platforms weighing up to 42,000 lb.
- **Dimensions:** span 222.8 ft, length 247.9 ft, height 33.0 ft.
- **Weight:** empty 374,000 lb, gross 769,000 (wartime 840,000) lb.
- **Ceiling:** 45,000 ft.
- **Performance:** max speed at 25,000 ft 571 mph, 35,750 ft; T-O run at S/L 8,300 ft, landing run, max landing weight at S/L 2,380 ft, range with max payload 3,434 miles, range with max fuel 7,245 miles. Normal cruising speed at altitude 518 mph (Mach 0.77).
- **COMMENTS**

One of the world's largest aircraft, the C-5 is able to carry unusually large and heavy cargo for intercontinental ranges at jet speeds. It can take off and land in relatively short distances and taxi on standard runways during emergency operations. Front and rear cargo openings permit simultaneous drive-through loading and off-loading.

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. Additionally, the avionics subsystems developed for the C-5B have been incorporated into the C-5A fleet. USAF has proposed retaining the C-5A's but is pursuing a reliability and maintainability enhancement program. C-5B. Generally similar to the C-5A but embodies all the improvements introduced since completion of C-5A production, including 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 1988.

**C-17 Globemaster III**
- **Brief:** A heavy-lift, air refuelable cargo transport for cargo into austere operations in Afghanistan and Iraq. C-17s performed their first operational strategic brigade airborne in March 2003, when a formation of 15 aircraft delivered a US Army brigade, complete with equipment, directly into northern Iraq.
- **Function:** 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. Defensive systems include Large Aircraft Infrared Countermeasures (LAIRCM) and flares. Ongoing modernization through block upgrades continues to improve C-17 operational reliability and improve mission outcomes. Significant improvements since 2001 include: (Block 12) ERFS upgrade, a terrain awareness warning system (TAWS), and Mobility 2000 (MK2) modernization program; (Block 15) a new Communications Open System Architecture (COSA) radio system; and (Block 16) a weather radar replacement. Block 17 is scheduled for release in 2008.

**C-141 Starlifter**
- **Brief:** Workhorse of the US air lift force for 40 years, the Starlifter projected combat forces over long distances, injected those forces and their equipment either by airland or air drop, resupplied these employed forces, and extracted the sick and wounded from the hostile area to advanced medical facilities. Operated as a prime strategic airlift system.

**C-20**
- **Brief:** A twin-engine, four-place general aviation aircraft designed for personal use. Aircraft is fully pressurized and has a maximum takeoff weight of 12,500 lb. It is operated by a single pilot, and can be flown without a flight crew.
- **Function:** Personal transport.
- **Operator:** Private.
- **First Flight:** 1963.
- **Production:** 100.

**C-47 Skytrain**
- **Brief:** A twin-engine, four-place general aviation aircraft designed for personal use. Aircraft is fully pressurized and has a maximum takeoff weight of 12,500 lb. It is operated by a single pilot, and can be flown without a flight crew.
- **Function:** Personal transport.
- **Operator:** Private.
- **First Flight:** 1940.
- **Production:** 1,000.

**C-54 Skymaster**
- **Brief:** A twin-engine, four-place general aviation aircraft designed for personal use. Aircraft is fully pressurized and has a maximum takeoff weight of 12,500 lb. It is operated by a single pilot, and can be flown without a flight crew.
- **Function:** Personal transport.
- **Operator:** Private.
- **First Flight:** 1945.
- **Production:** 1,000.

**C-6A**
- **Brief:** Two C-5As assigned to Travis AFB, Calif., were modified to carry outsize space cargo for NASA by extending the cargo bay and modifying the aft doors. All USAF Galaxies are undergoing a complete avionics modernization program (AMP) that will install a state-of-the-art cockpit and ensure global access navigation safety compliance by the end of 2006; first upgraded aircraft flew December 2002. Additionally, the Air Force has established a reliability enhancement and re-engineing program (RERP) for all 112 C-5A aircraft to extend service life by 30,000 flight hours. Addition of about 50,000 hours will extend the aircraft's service life by 30,000 flight hours. Modification was subsequently undertaken, extending the aircraft's service life by 30,000 flight hours.

**C-17 Globemaster III**
- **Brief:** A heavy-lift, air refuelable cargo transport for cargo into austere operations in Afghanistan and Iraq. C-17s performed their first operational strategic brigade airborne in March 2003, when a formation of 15 aircraft delivered a US Army brigade, complete with equipment, directly into northern Iraq.

**C-141 Starlifter**
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C-20 Gulfstream
Brief: A twin-engine turbofmond 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: September 1983-89.
IOC: circa 1983.
Production: not available.
Inventory: 10.
Unit Location: Andrews AFB, MD, Ramstein AB, Germany.
Contractor: Gulfstream.
Power Plant: C-20A/B: two Rolls Royce Spey MK511-8 turbfans, each 11,400 lb thrust; C-20C: two Rolls Royce Tay MK611-8 turbfans, each 13,800 lb thrust.
Accommodation: crew of five; 12 passengers.
Dimensions: (C-20A/B) 83.1 ft; (C-20H) 86.3 ft; height 24.3 ft.
Weight: C-20A/B gross 69,700 lb; C-20H gross 74,600 lb.
Ceiling: 45,000 ft.
Performance: max cruising speed 576 mph, range 4,800 miles.

C-9 Nightingale
Brief: A twin-engined, medium-range, swept-wing jet aircraft used for DOD duties.
Function: DOD duties.
Operator: AFRC.
First Flight: August 1968.
IOC: circa 1968
Production: 24.
Inventory: 5.
Unit Location: Scott AFB, IL.
Contractor: Boeing (McDonnell Douglas).
Power Plant: two Pratt & Whitney JT3D-9A turbfans, each 12,000 lb thrust.
Accommodation: crew of three.
Dimensions: span 93.2 ft, length 119.2 ft, height 27.4 ft.
Weight: gross 108,000 lb.
Ceiling: 35,000 ft.
Performance: max cruising speed at 25,000 ft 565 mph, range 2,500 miles.

C-12 Huron
Brief: Aircraft to provide airlift support for attaché and military advisory groups worldwide.
Function: Special airlift.
Operator: AFMC, PACAF.
First Flight: Oct. 27, 1972 (Super King Air 200).
Delivered: 1974-late 1980s.
Production: 88.
Inventory: 28.
Unit Location: Elmdonf AFB, Alaska, Osan AB, South Korea, various overseas embassies.
Contractor: Beech.
Power Plant: (C-12J) two Pratt & Whitney Canada PTEA-658 turboprops, each 1,100 shp.
Accommodation: crew of two; C-12D: up to eight passengers; C-12J: up to 19 passengers.
Dimensions: (C-12J) span 45.4 ft, length 43.8 ft, height 15 ft.
Weight: (C-12J) empty 8,650 lb, gross 16,600 lb.
Ceiling: (C-12J) 25,000 ft.
Performance: (C-12J) max cruising speed at 16,000 ft 375 mph, range with 16 passengers 1,806 miles.

C-12 C-12C. Re-engined C-12As, with PTEA-41 turboprops, developed overseas embassies.
C-12D. Similar to C model and also deployed to overseas embassies.
C-12F. With updated PTEA-42 engines, can support medical airlift.
C-12J. A military version of the larger Beechcraft Model 1900, operated by PACAF.
C-130 Hercules

Function: Passenger transportation.
Operator: AMC, PACAF, USAFE, ANG.
Production: seven.
Inventory: seven.
Unit Location: Andrews AFB, Md.; Hickam AFB, Hawaii; Ramstein AB, Germany.
Contractor: Boeing.
Power Plant: Two General Electric CFM56-7 turbofans, each 24,000 lb thrust.
Accommodation: Flight crew of four, plus three or four cabin crew; up to 89 passengers.
Dimensions: Span 112 ft 7 in, length 110 ft 4 in, height 41 ft 2 in.
Weight: Gross 171,000 lb.
Ceiling: 26,000 ft.
Performance: Cruise speed 0.78-0.82 Mach, range 3,450 miles.

C-130J

Function: Multirole airlift.
Operator: AFSOC.
First Flight: March 19, 1999 (V-22).
Delivery: 2006.
IOC: 2009 (planned).
Production: 50 (planned).
Inventory: one.
Unit Location: Hurlburt Field, Fla.; Kirtland AFB, N.M.
Contractor: Bell Boeing; Raytheon.
Power Plant: Two Rolls Royce-Allison AE1107C turbo shafts, each 2,240 shp.
Accommodation: Two (two pilots, two flight engineers); additional pilot for extended duration missions; up to 10 troops or 8,000 lb internal cargo.
Dimensions: Proprotor diameter 38 ft, width, rotors turning 84.6 ft, fuselage length 57.3 ft, height 22 ft.
Weight: Gross weight 34,900 lb, max VTO 52,870 lb; STO 37,000 lb, self-dep T-O 60,500 lb.
Ceiling: 26,000 ft.
Performance: Typically will carry troops or cargo over a 500-mile combat radius at 265 mph. Self-deployment range with one air refueling 2,417 miles.

CV-22

Function: Multimission airlift.
Operator: AFSOC.
First Flight: March 19, 1999 (V-22).
Delivery: 2006.
IOC: 2009 (planned).
Production: 50 (planned).
Inventory: one.
Unit Location: Hurlburt Field, Fla.; Kirtland AFB, N.M.
Contractor: Bell Boeing; Raytheon.
Power Plant: Two Rolls Royce-Allison AE1107C turbo shafts, each 2,240 shp.
Accommodation: Four (two pilots, two flight engineers); additional pilot for extended duration missions; up to 18 troops or 8,000 lb internal cargo.
Dimensions: Proprotor diameter 38 ft, width, rotors turning 84.6 ft, fuselage length 57.3 ft, height 22 ft.
Weight: Gross weight 34,900 lb, max VTO 52,870 lb; STO 37,000 lb, self-dep T-O 60,500 lb.
Ceiling: 26,000 ft.
Performance: Typically will carry troops or cargo over a 500-mile combat radius at 265 mph. Self-deployment range with one air refueling 2,417 miles.

C-40A

Function: Commercial.
Operator: USAF.
First Flight: 1956.
Production: 74.

C-130 Hercules

Function: Cargo transport.
Operator: AEC, AFSOC, AMC, PACAF, USAFE, ANG, AFRC.
First Flight: August 1954 (C-130A).
Delivered: December 1956-present (C-130J).
IOC: 1957.

C-130J

Function: Cargo transport.
Operator: AFRC.
First Flight: December 1956-present (C-130J).
IOC: 1999.

C-130 Hercules

Function: Cargo transport.
Operator: AEC, AFSOC, AMC, PACAF, USAFE, ANG, AFRC.
First Flight: August 1954 (C-130A).
Delivered: December 1956-present (C-130J).

C-130J

Function: Cargo transport.
Operator: AFRC.
First Flight: December 1956-present (C-130J).
IOC: 1999.

C-130 Hercules

Function: Cargo transport.
Operator: AEC, AFSOC, AMC, PACAF, USAFE, ANG, AFRC.
First Flight: August 1954 (C-130A).
Delivered: December 1956-present (C-130J).

C-130J

Function: Cargo transport.
Operator: AFRC.
First Flight: December 1956-present (C-130J).
IOC: 1999.

C-130 Hercules

Function: Cargo transport.
Operator: AEC, AFSOC, AMC, PACAF, USAFE, ANG, AFRC.
First Flight: August 1954 (C-130A).
Delivered: December 1956-present (C-130J).
MC-130H Combat Talon II

**Brief:** A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel and to deliver personnel and equipment to support US and allied SOF.

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

**Operator:** AETC, AFSOC, AFRIC.

**First Flight:** circa 1965 (E); January 1990 (H).

**Delivered:** Initially 1996.

**IOC:** 1966 (E); June 1991 (H).

**Production:** 22 new-build HS.

**Inventory:** 14 (E); 20 (H).

**Unit Location:** Active (assoc.) and AFRIC MC-130Es at Duke Field, Fla. Active: MC-130H at Hurlburt Field, Fla., Kadena AB, Japan, Kirtland AFB, N.M., RAF Mildenhall, UK.

**Contractor:** Lockheed Martin (airframe); Boeing integrated weapons system support.

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

**Accommodation:** E: crew of nine; 53 troops or 26 paratroops; H: crew of seven; 77 troops, 52 paratroops, or 57 litter.

**Dimensions:** span 132.7 ft, height 38.6 ft, length 100.8 ft (E), 99.8 ft (H).

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

**Ceiling:** 40,000 ft.

**Performance:** max speed 289 mph, range 3,110 miles, unrefueled.

**COMMENTS:**

MC-130 Combat Talon aircraft are equipped with terrain-following radars, precision navigation systems using INS/GPS, and electronic and infrared countermeasures for self-protection. Both aircraft are capable of in-flight refueling, are NVG-compatible and have a high-speed aerial delivery system. The primary mission of the aircraft is to conduct infiltration, resupply, and exfiltration of special operations forces (SOF). They are also capable of supporting psychological operations. Combat Talon aircraft are able to deliver or land on austere unmarked landing or drop zones.

MC-130 Combat Talon I. Fourteen modified C-130E aircraft are additionally equipped with a pod-based system to air refuel SOF helicopters. Two units are MC-130E-equipped, the 39th and the 711th SOS.

MC-130H Combat Talon II. New-build MC-130Hs modified with an integrated glass cockpit were acquired in the early 1990s to supplement the Combat Talon I. All are currently being modified with a state-of-the-art pod-based aerial refueling system to augment the MC-130E and MC-130P aerial refueling fleet. The 1st, 7th, and 15th SOSs provide support to SOF in Europe, the Pacific, and CONUS, respectively. The 58th SOS at Kirtland AFB, N.M., is responsible for MC-130H mission qualification training.

**Weight:** long-range mission T-O weight 803,700 lb, gross 833,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** speed 630 mph (Mach 0.92), normal cruising speed Mach 0.84, unrefueled range 7,820 miles.

**COMMENTARY**

Based on the Boeing 747-200B airframe, two VC-25As assigned to Andrews AFB, Md., support the President. Aircraft are equipped with staff work areas, a conference room, a general seating area, and an executive office. Communications capability includes worldwide secure and clear communications equipment. Upgrades include GATM and installation of a broadband data transmit and receive capability to provide video teleconferencing and office-in-the-sky capability.

**T-1A 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 and tanker aircraft.

**Function:** Advanced pilot training.

**Operator:** AETC, AFRIC.

**First Flight:** Sept. 22, 1989 (Beechcraft 400A).


**IOC:** January 1993.

**Production:** 180.

**Inventory:** 179.

**Unit Location:** Active: Columbus AFB, Miss., Laughlin AFB and Randolph AFB, Tex., Vance AFB, Okla., NAS Pensacola, Fla. (forward operating station). AFRIC: (assoc.) Randolph AFB, Tex.

**Contractor:** Raytheon.

**Power Plant:** two Pratt & Whitney Canada JT15D-5B turbfans, each 2,900 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 43.5 ft, length 48.4 ft, height 13.9 ft.

**Weight:** empty 5,200 lb, gross 16,100 lb.

**Ceiling:** 41,000 ft.

**Performance:** max speed at 27,000 ft 538 mph, range 2,400 miles.

**COMMENTARY**

The swept-wing T-1A Jayhawk is a military version of the Beech 400A used in the advanced phase of joint specialized undergraduate pilot training (JSUPT) for students selected to go on to fly transports such as the C-5 and C-17 or tankers such as the KC-10 and KC-135. It has cockpit seating for an instructor and two students. Special mission equipment includes GPS, an electronic flight instrument system (EFIS) avionics system, a single-point refueling system, an additional fuselage fuel tank, and increased bird-strike protection in the windshield and leading edges for sustained low-level operation. T-1As typically log 100,000 flying hours a year, supporting all-weather training operations at high and low altitudes.

**T-6A Texan II**

**Brief:** A single-engine turboprop aircraft used for training student pilots, combat systems officers, and naval flight officers in fundamentals of aircraft handling and instrument, formation, and night flying.

**Function:** Primary trainer.

**Operator:** AETC, AFRIC, USN.

**First Flight:** July 15, 1998.
T-38 Talon

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

Operator: AETC, AFRC.

First Flight: September 1955.

IOC: December 1956-68.

Production: 985.

Unit Location: Active: Columbus AFB, Miss., Randolph AFB, Tex., Moody AFB, Ga., Vance AFB, Okla. Planned: Columbus AFB, Miss., Sheppard AFB, Tex. USN: NAS Corpus Christi, Tex., NAS Whiting, Fla.

Contractor: Raytheon.

Power Plant: one Pratt & Whitney PT6A-68 turboprop, 1,100 shp.

Accommodation: two, in tandem, on zero/zero ejection seats.

Dimensions: span 33.5 ft, length 33.4 ft, height 10.7 ft.

Weight: empty (approx) 4,707 lb; gross 6,500 lb.

Ceiling: 31,000 ft.

Performance: max speed 368 mph, range 920 miles.

COMMENTARY

The T-38 is a twin-engine, high-altitude jet trainer produced by Convair (now General Dynamics) for the US Air Force. It is used in a variety of roles, primarily for undergraduate pilot training. The T-38 is notable for its supersonic performance and has been in service since 1955.

T-41 Mescalero

Brief: A twin-engine, high-altitude, supersonic jet trainer used in a variety of roles, primarily for undergraduate pilot and pilot instructor training.

Operator: ACC, AETC, AFMC, AFRC.

First Flight: April 1959.


Production: more than 1,100.

Unit Location: Active: Beale AFB and Edwards AFB, Calif., Columbus AFB, Miss., Holloman AFB, N.M., Laughlin AFB, Randolph AFB, and Sheppard AFB, Tex., Moody AFB, Ga., Vance AFB, Okla., Whiteman AFB, Mo. AFRC: (assoc.) Randolph AFB, Tex.

Contractor: Northrop Grumman.

Power Plant: two General Electric J85-GE-5A turbojets, each 14,500 lb thrust.

Accommodation: six, in tandem, on ejection seats.

Dimensions: span 35.3 ft, length 46.3 ft, height 12.8 ft.

Weight: empty 7,164 lb, gross 12,500 lb.

Ceiling: above 55,000 ft.

Performance: max level speed 1,000 mph, range 1,000 miles.

COMMENTARY

Most of the T-38s in service are used by AETC for advanced bomber-fighter training track in JSUPT. Capabilities are being enhanced through an ongoing program of modifications and structural renewal, including a full avionics upgrade with a HUD and integrated GPS/INS, and a propulsion modernization. As a result of the reduction of modifications and structural renewal, including a full avionics upgrade with a HUD and integrated GPS/INS, and a propulsion modernization. As a result of the reduction of the T-38's workload through introduction of the T-1A and JSUPT, the service life of the T-38 should extend well beyond 2020.

T-38A. Close 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, aero-batics, formation, night and instrument flying, and cross-country and low-level navigation. The aircraft is also used by AFMC to train test pilots and flight-test engineers at Edwards AFB, Calif., in experimental techniques, and by ACC to maintain pilot proficiency.

AT-38B. A slightly different version, with a gunsight and practice bomb dispenser, the AT-38B is used by AETC for Introduction to Fighter Fundamentals.

T-38C. AIT-38A and AT-38B airframes will be redesignated as C models upon modification of the avionics systems begun in 2000. The first T-38C was received late summer 2002; planned program completion is 2008. The propulsion system is also being upgraded to improve performance and reliability. In addition, the Escape System Upgrade program is underway to further improve safety and sustainability of the aircraft and increase aircraft accommodation. Installations are scheduled to begin in 2006.

T-43

Brief: A medium-range, swept-wing jet aircraft equipped with navigation and communications equipment to train navigators for strategic and tactical aircraft.

Function: Navigation trainer.

Operator: AETC.


Production: 19.

Inventory: eight.

Unit Location: Randolph AFB, Tex.

Contractor: Boeing.

Power Plant: two Pratt & Whitney JT8D-9A turbofans, each 14,500 lb thrust.

Accommodation: crew of two; 12 students and six instructors.

Dimensions: span 93 ft, length 100 ft, height 37 ft.

T-6A Texan II

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

Function: Primary trainer.

Operator: AETC, AFRC.


IOC: August 1965.

Production: 1,000.

Unit Location: Active: Columbus AFB, Miss., Randolph AFB, Tex., Moody AFB, Ga., Vance AFB, Okla. Planned: Columbus AFB, Miss., Sheppard AFB, Tex. USN: NAS Corpus Christi, Tex., NAS Whiting, Fla.

Contractor: Raytheon.

Power Plant: two Pratt & Whitney JT8D-9 turbofans, 1,100 shp.

Accommodation: two, side by side.

Dimensions: span 39 ft, length 46 ft, height 11 ft.

Weight: empty (approx) 7,164 lb; gross 12,500 lb.

Ceiling: above 55,000 ft.

Performance: max speed 1,000 mph, range 1,000 miles.

Comments: The T-6A Texan II is based on the Swiss Pilatus PC-9 aircraft, modified to include a strengthened fuselage, zero/zero ejection seats, increased aircrew accommodation, upgraded engine, increased fuel capacity, pressurized cockpit, larger, bird-resistant canopy, and new digital avionics. The T-6A replaces USAF's T-37Bs and USN's T-34Cs in primary pilot training, as well as supporting undergraduate naval flight officer and USAF combat systems officer training.
A single-seat high-performance advanced train

cruise speed 110 mph, glide ratio 31:1,

Single-seat medium-performance sailplane

two.

span 65.6 ft, length 28.3 ft.

two.

Two-seat medium-performance sailplane used
-

USAFA.

gross 115,500 lb.

Blanik.

speed 146.1 mph, glide ratio 26:1.

gross 1,157 lb.

- Blanik.

Trainer.

750 lb.

USAFA.

Grupo Aeromot, Brazil.

single seat.

Trainer.

Schempp-Hirth, Germany.

- Trainer/cross-country competition sail

Modified utility transport used for parachute

span 49.2 ft, length 32.3 ft, height

6.9 ft.

Weight: 1,100 lb.

Performance: speed 146.1 mph, glide ratio 26:1.

COMMENTARY

The TG-10B is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Basic Soaring program.

TG-10C Kestrel

Brief: Two-seat medium-performance sailplane used for spin and aerobatic training.

Function: Trainer.

Operator: USAFA.

Delivered: May 2002.

IOC: December 2002.

Production: five.

Inventory: five.

Unit Location: USAFA, Colo.

Contractor: Blanik.

Accommodation: two,

Dimensions: span 46.6 ft, length 27.6 ft, height 6.9 ft.

Weight: 1,100 lb.

Performance: speed 146.1 mph, glide ratio 26:1.

COMMENTARY

The TG-10C is an L-13AC Blanik dual sailplane, produced in the Czech Republic and used primarily for spin and aerobatic training.

TG-10D Peregrine

Brief: Single-seat medium-performance sailplane used for cross-country soaring training and high-altitude wave flight.

Function: Trainer.

Operator: USAFA.

Delivered: May 2002.

IOC: December 2002.

Production: four.

Inventory: four.

Unit Location: USAFA, Colo.

Contractor: Blanik.

Accommodation: single.

Dimensions: span 46.3 ft, length 21.7 ft, height 4.7 ft.

Weight: 750 lb.

Performance: speed 149.5 mph, glide ratio 33:1.

COMMENTARY

The TG-10D is an L-33 Solo Blanik sailplane produced in the Czech Republic. It is a medium performance sailplane that allows students to master basic flight maneuvers while solo, before progressing to a more advanced sailplane. It is primarily used for cross-country training and high-altitude wave flight.

TG-14A

Brief: A two-place, side-by-side motorized glider for use by USAFA in its Introductory Flight Training Program (IFTP) flight screening/primary training program.

Function: Trainer.

Operator: USAFA.


IOC: December 2002.

Production: 14.

Inventory: 14.

Unit Location: USAFA, Colo.

Contractor: Grupo Aeromot, Brazil.

Power Plant: one Rotax 912A, 81 hp engine.

HH-60G Pave Hawk (A1C Veronica Pierce)

Accommodation: two, side by side.

Dimensions: span 57.3 ft, length 26.4 ft, height 6.3 ft.

Weight: gross 1,874 lb.

Performance: cruise speed 110 mph, glide ratio 31:1, range 690 miles at high-speed cruise, max endurance seven hr.

COMMENTARY

The TG-14A is a version of the Ximango AMT-200S Sport Grupo Aeromot selected for use at USAFA in IFTP, replacing the Enhanced Flight Screening Program performed by civilian flying schools since the grounding of the T-3A Firefly in 1997. Cockpit and avionics are arranged for military use. Students use it to practice multiple pattern, aerial maneuvers, and landing procedures, reducing by half the number of sorties needed to achieve a solo flight.

TG-15A

Brief: A two-seat high-performance advanced training/cross-country sailplane for use by USAFA cadets in support of glider competition events nationwide.

Function: Trainer/cross-country competition sailplane.

Operator: USAFA.

Unit Location: USAFA, Colo.

Inventory: two.

Contractor: Schempp-Hirth, Germany.

Accommodation: two-seat.

Dimensions: span 45.6 ft, length 28.3 ft.

Weight: gross 1,157 lb.


COMMENTARY

The TG15A is a high-performance advanced training/cross-country sailplane manufactured by Schempp-Hirth of Germany under the civilian designation Duo Discus. This world-class competition glider is dual seated and is intended for use nationwide by USAFA cadets for glider competition events.

TG-15B

Brief: A single-seat high-performance advanced training/cross-country sailplane for use by USAFA cadets for glider competition events nationwide.

Function: Trainer/cross-country competition sailplane.

Operator: USAFA.

Unit Location: USAFA, Colo.

Inventory: three.

Contractor: Schempp-Hirth, Germany.

Accommodation: single seat.

Dimensions: span 49.2 ft, length 32.3 ft.

Weight: gross 1,157 lb.


UV-18 Twin Otter

Brief: Modified utility transport used for parachute jump training.

Function: Parachute.
Helicopters

HH-60G Pave Hawk

- Modified Bell helicopter used to support Air Force special operations forces for infiltration/exfiltration, flare and chaff countermeasures dispensing system, engine/rotor blade anti-ice system, retractable in-flight control system, NVG lighting, FLIR, color weather radar, range/steering data to compatible survivor radios. Security/anti-jam communications, and a PLS that provides increased gross weight, and an automated blade/pylon/fuselage system optimized for shipboard compatibility. All aircraft modified to support aircrew eye/respiratory protection system.


MH-53J helicopters upgraded to Pave Low IV standard, delivered from 1999. Includes the interactive defensive avionics suite/multiplex advanced tactical terminal capability which integrates onboard EW systems with off-board, over-the-horizon, near-real-time intelligence, and mission software improvements. Cockpit modifications include three MFDs, integrated digital map, and mission commander situation awareness panel in the cabin area.

Armament:
- mounts for any combination of three 7.62 miniguns and .50-caliber machine guns.

Strategic Missiles

AGM-86 Air Launched Cruise Missile

- Brief: A small, subsonic, winged air vehicle, deployed on B-52H aircraft, which can be equipped with either a nuclear or conventional warhead and can be used to help dilute air defenses and complicate an enemy's air defense task.

- Function: Strategic air-to-surface cruise missile.

- Operator: ACC

- First Flight: June 1979 (full-scale development).

- Delivered: from 1981.

- IOC: December 1982, Griffiss AFB, N.Y.

- Production: 1,700+.

- Unit Location:
  - Barksdale AFB, La., Minot AFB, N.D.
  - Contractor: Boeing

- Power Plant: Williams/Teledyne CAE F107-WR-10 turbofan, 600 lb thrust.

- Guidance: AGM-86B: inertial plus Terrain Contour Matching (TERCOM); AGM-86C: inertial plus GPS.

- Armament:
  - AGM-86A: Wing: AGM-86A Warhead with laser or IR seekers.
  - AGM-86D: Hard target penetrating Warhead.

- Dimensions:
  - Length 20.8 ft, body diameter 2 ft, wingspan 12 ft.

- Weight:
  - 3,150 lb (B), 3,277 lb (C).

- Performance (approx): speed 550 mph (Mach 0.6), range 1,500+ miles (AGM-86B).

- COMMENTARY

  AGM-86A is a prototype cruise missile, developed in the mid-1970s. Slightly smaller than the later versions, it never entered production.

- ARM-86B. First production version, the B is programmed for strategic attack on surface targets. Small radar signature and low-level flight capability enhance the missile’s effectiveness. The last of 1,715 production missiles was delivered in October 1986. Undergoing SLEP to extend life to FY30.

AGM-86C. A conventional warhead version, developed from June 1986, the Conventional Air Launched Cruise Missile (CALCM) was first used operationally during Gulf War I and has since been used widely in combat operations. CALCM provides the warfighter with an adverse weather, day/night, air-to-surface, accurate, standoff outside theater defenses strike capability, with a range greater than 500 miles and a 3,000-lb class warhead. CALCM is equally effective for stand-alone, clandestine/punitive strikes and fully integrated theater warfare. From 1986, Boeing converted 622 Bs to the conventional configuration, the first of which was delivered in December 1987. The remaining CALCMs have Block 1A enhancements with improved accuracy and increased immunity to electronic jamming. Since Iraq Freedom, few CALCMs remain.

AGM-86D. A penetrator version with a Lock- heed Martin AUP-3(M) warhead. The CALCM penetrator provides the warfighter with a standoff outside theater defenses capability against a wide range of hardened, deeply buried targets. The CALCM penetrator was useful in support of Iraqi Freedom.

AGM-129 Advanced Cruise Missile

- Brief: A stealthy, long-range, winged air vehicle equipped with a nuclear warhead and designed to evade enemy air and ground-based defenses in order to strike hard, heavily defended targets at standoff distances.

- Function: Strategic air-to-surface cruise missile.

- Operator: ACC


- Production: 461.
Tactical Missiles and Weapons

**AGM-65 Maverick**
Brief: A tactical, TV- or imaging infrared (IIR)-guided air-to-surface missile designed to seek and destroy enemy radar air defenses, using an advanced guidance system that senses and homes in on enemy radar emissions.

**Function:** Air-to-surface antiradiation missile.

- **First Flight:** April 1979.
- **Delivered:** 1982-98.
- **IOC:** circa 1984.
- **Production:** sustenance phase.
- **Contractor:** Raytheon.

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

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

**Warhead:** high-explosive fragmentation, weighing 145 lb.

- **Dimensions:** length 13.7 ft, body diameter 10 in, wingspan 3.7 ft.
- **Weight:** 795 lb.
- **Performance:** cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 10 miles.

**Comments:**
- The 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 (ARM) greatly improved capability over first-generation Shrikes and Standard ARM. The AGM-88 proved highly effective against enemy ground radar in Gulf War I and in subsequent operations. HARMs equip F-16 Block 50/52s (F-16CJ) dedicated to the SEAD mission.

**AGM-88A**
A factory-programmed version used to equip the now-retired F-4G Wild Weasel to increase its lethality in electronic combat. No longer operational.

**AGM-88B**
Incorporated erasable electronically programmable read-only memory, permitting changes to missile memory in the field. Older versions of the AGM-88B have software upgrades to satisfy current-standard capability requirements.

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

Upgrade initiatives are aimed at increasing capability of both B and C versions against target shutdown, blanking, and blinking and at reducing potential damage to friendly aircraft.

**Upgrade initiatives** currently include software improvements to satisfy current-standard capability requirements.

**Upgrades**
- Enhanced guidance system.
- Improved warhead performance.
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Aim-9 Sidewinder

**Brief:** A supersonic, short-range, IR-guided air-to-air missile carried by fighter aircraft, having a high-explosive warhead.

**Function:** Air-to-air missile.

**First Flight:** September 1953.

**Delivered:** 1957-present. First production AIM-9X delivered March 2002.

**Contractor:** Raytheon; Loral.

**Power Plant:** Thiokol Mk 36 Mod 11 solid-propellant rocket motor.

**Guidance:** solid-state IR homing guidance.

**Warhead:** high-explosive, weighing 20.8 lb.

**Dimensions:** length 9.4 ft, body diameter 5 in, fin span 2.1 ft.

**Weight:** launch weight 504 lb.

**Performance:** (estimated) max speed more than 2,660 mph (Mach 3.5), range more than 34 miles.

**AIM-120 AMRAAM**

**Brief:** A new generation supersonic, medium-range, active radar-guided air-to-air missile with a high-explosive warhead.

**Guidance:** inertial/command, inertial and command-inertial guidance and 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 2.1 ft.

**Weight:** 335 lb.

**Performance:** cruising speed approx Mach 4, range more than 23 miles.

**AIM-154A Joint Air-to-Surface Standoff Missile**

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

**Function:** Air-to-surface guided weapon.

**First Flight:** April 8, 1999.

**Delivered:** through FY19 (planned).

**IOC:** September 2003.

**Contractor:** Lockheed Martin; Raytheon; Honeywell.

**Guidance:** INS, GPS, and IIR terminal seeker.

**Power Plant:** Teledyne Continental Motors.

**Dimensions:** length 14 ft.

**Weight:** 2,250 lb.

**Performance:** 1,000-lb class penetrator and blast-fragmentation warheads; standoff range greater than 200 miles.

**Commentary**

JASSM is a next generation missile that enables Air Force fighters and bombers to destroy the enemy’s war-sustaining capabilities from outside the ranges of enemy air defenses. This autonomous precision strike weapon has a range greater than 200 miles and can attack both fixed and relocatable targets, ranging from nonhardened above-ground targets to hardened underground targets. JASSM is equipped with INS/GPS guidance, an IIR terminal seeker, and a stealthy LO airframe. The system also offers low operational support costs. Required Assets Available (RAA) has been accomplished for B-2/H and F-16 threat aircraft as well as B-1B and B-2 objective aircraft. IOC has been declared on the B-2/H and B-1B. The B-1B is the only aircraft capable of redirecting a JASSM route prior to launch. Integration planning for the F/A-18E/F is ongoing. Other potential JASSM integration efforts include the F-15E and F-117 aircraft. An extended-range version (JASSM-ER), with a range of more than 500 miles, began development in FY04.

**AIM-7 Sparrow**

**Brief:** A supersonic, medium-range, semiactive radar-guided air-to-air missile with all-weather, all-altitude, and all-aspect offensive capability and a high-explosive warhead, carried by fighter aircraft.

**Function:** Air-to-air guided missile.

**First Flight:** December 1983 (AIM-7M).

**Delivered:** from 1956.

**IOC:** April 1976 (AIM-7F).

**Production:** sustainment phase.

**Contractor:** Hughes; General Dynamics (now Raytheon).

**Power Plant:** Hercules Mk 58 Mod 0.45 sec boost-11 sec sustain rocket motor.

**Guidance:** AIM-7M, multisensor semiactive radar.

**Warhead:** high-explosive, blast fragmentation, weighing 86 lb.

**Commentary**


AIM-9X. Deriving from a jointly funded Navy-USAF project, the AIM-9X entered LRIP in November 2000. USAF’s F-15 equipped 12th and 19th FS, part of the 3rd Wing at Elmendorf AFB, Alaska, became the first operational units to receive AIM-9Xs in November 2003. The first full-rate production contract was signed in November 2004. USAF plans to buy 5,097 missiles. The AIM-9X incorporates advanced technologies such as a focal plane array imaging seeker, high off-boresight sensor (HOBS), and a highly maneuverable jet-vane control system. The missile utilizes the existing AIM-9M rocket motor, warhead, and fuze. It will be integrated with the JMHCS to maximize its HOBS capability. Intended carrier aircraft include the F-15, F-16, F-22, F-35, and F/A-18.

**AIM-120 AMRAAM**

**Brief:** A new generation supersonic, medium-range, active radar-guided air-to-air missile with a high-explosive warhead.

**Function:** Air-to-air guided missile.

**First Flight:** December 1984.

**Delivered:** 1988–July 2010 (planned).

**IOC:** September 1991.

**Production:** 10,917 planned for USAF/USN.

**Contractor:** Raytheon.

**Power Plant:** Alliant boost-sustain solid-propellant rocket motor.

**Guidance:** inertial/command, inertial and command-inertial guidance and 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 2.1 ft.

**Weight:** 335 lb.

**Performance:** cruising speed approx Mach 4, range more than 23 miles.

**Commentary**

A joint project between the Navy and USAF, the AIM-120 Advanced Medium-Range Air-to-Air Missile (AMRAAM) is a replacement for the AIM-7 Sparrow. The AIM-120 equips F-15, F-16, F-22, F-35, and F/A-18 fighters. Inertial and command inertial guidance and active radar terminal homing provide launch-and-maneuver capability. Significant improvements in operational effectiveness over the AIM-7 include increased average velocity, reduced miss distance, improved fuzing, increased warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, enhanced electronic protection capability, increased maximum launch range, a reduced-smoke motor, and improved maintenance and handling.

**AIM-9M Sidewinder**

**Weight:** launch weight 190 lb.

**Performance:** max speed Mach 2+; range 10+ miles.

**Commentary**

Early versions, AIM-9A was the prototype version. The AIM-9B, initial production version, entered the inventory in 1957 and was effective only at close range during day. These shortcomings were eliminated on subsequent AIM-9E/H/J/I/P versions. The third generation Sidewinder, AIM-9L, added a more powerful solid-propellant rocket motor as well as tracking maneuvering ability. Production and delivery began in 1976; production ended in 1981.

**AIM-9M.** A joint Navy-USAF project aimed at producing an improved version of AIM-9L with all-altitude, all-aspect, launch-and-leave intercept capability. Can equip: A-10, F-14, F-15, F-16, F-16 ADF, and F-18 aircraft. This version has increased infrared-countermeasure capabilities (IRCCM) capability, improved background discrimination, and a reduced-smoke rocket motor. First flight of prototype was in February 1978. Full production began in FY81.

**AIM-9M-9.** A modification to improve IRCCM capability of early missiles. Complete.

**AIM-9X.** Deriving from a jointly funded Navy-USAF project, the AIM-9X entered LRIP in November 2000. USAF’s F-15 equipped 12th and 19th FS, part of the 3rd Wing at Elmendorf AFB, Alaska, became the first operational units to receive AIM-9Xs in November 2003. The first full-rate production contract was signed in November 2004. USAF plans to buy 5,097 missiles. The AIM-9X incorporates advanced technologies such as a focal plane array imaging seeker, high off-boresight sensor (HOBS), and a highly maneuverable jet-vane control system. The missile utilizes the existing AIM-9M rocket motor, warhead, and fuze. It will be integrated with the JMHCS to maximize its HOBS capability. Intended carrier aircraft include the F-15, F-16, F-22, F-35, and F/A-18.
AIM-120A was the first production version, delivered by Hughes in 1988 to the 33rd TFW at Eglin AFB, Fla. AIM-120C/D/CM is a programmable variant of the AIM-120. The AIM-120C currently in production has smaller, clipped control surfaces to provide for internal carriage capability in the F-22A and F-35, with a HOSA launch capability. The latest development effort (AMSAM Phase 4) adds GPS to improve navigational accuracy and enhanced data link capabilities in the AIM-120D version, due to increased demand.

CBU-97/107 Combined Effects Munition

Commentary: CBU-87 CEM is an area munition effective against light armor, material, and personnel employed by the USAF and Navy fighters and bombers for interdiction. 

Function: Air-to-surface guided munition.

Production: Phase 2.

Contractor: Boeing; Raytheon.

Weight: 359 lb; length 7.7 ft; diameter 1.3 ft.

Performance: The CBU-87 CEM disperses area munitions over a circular area, with a size of the area covered depending on release parameters and flight parameters.

GBU-89/104 Gator

Commentary: The CBU-89 Gator is an anti-armor/anti-personnel munition from the USAF and Navy fighters and bombers for interdiction. 

Function: Scatters mines.

Production: Phase 2.

Contractor: Honeywell; Aerogen General; Olan; Alliant Tech.

Guidance: none (CBU-89).

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 705 lb.


CBU-107 Passive Attack Weapon

Commentary: The CBU-107 Passive Attack Weapon (PAW) is an unpowered laser guided weapon (LGB) designed to destroy nonhardened targets, with a minimum of collateral and environmental damage.

Function: Wide-area munition.


Delivered: 2002-03.

IOC: December 2002.

Performance: not available, but completed March 2003.

Contractor: General Dynamics (kinetic energy penetrator payload and canister); Lockheed Martin (WCDM); Textron (tactical munition dispenser kit).

Guidance: via WCDM.

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 1,000 lb.

Performance: delivers a high-speed volley of 3,000+ metal “cartridges” via a single canister; three types of projectiles: 350 x 15 in-long rods, 1,000 x 7 in-long rods, and 2,400 small nail-size rods.

COMMENTARY: The CBU-107 Passive Attack Weapon (PAW) was developed from September 2002 to provide USAF aircraft with a new weapon that destroys targets with kinetic energy rods rather than explosives, thereby minimizing collateral and environmental damage. Following release from an aircraft, the WCDM-equipped weapon glides toward its target. Before impact, the inner chamber containing the rods begins to rotate and the “arrows” are ejected in rapid succession by centrifugal force. The WCDM produces an effective area kill at a target within a 200-ft radius. Two CBU-107s were used during Iraq Freedom. CBU-107s are intended for use on B-2, F-15E, and F-16 aircraft.

GBU-10 Paveway II

Function: Anti-armor guided bomb (LAB) used to destroy high-value enemy targets from short standoff distances.

First Flight: circa 1990.


Production: 6,500 (planned).

Contractor: Textron Systems.

Guidance: IR sensors in each warhead search for targets, then communicate to them.

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 920 lb.

Performance: delivers 40 lethal projectiles over an area of about 500 ft by 1,200 ft.

CBU-97/105/115 Sensor Fuzed Weapon

Commentary: The CBU-97 Sensor Fuzed Weapon (SWF) is an anti-armor munition used by fighters and bombers for multiple kills per pass against armor targets. The weapon from the A-10, B-1, B-2, B-52H, F-15E, and F-16. The initial baseline SWF systems contained the BLU-108/B and BLU-108A/B submunition. A preplanned product improvement SWF submunition, the BLU-108/B, entered production in 2001, incorporating improvements such as an active laser sensor, multimissile warhead, and increased footprint.

CBU-105: Designation of an unguided CBU-97 equipped with a Wind-Corrected Munitions Dispenser (WCDM) tail kit. The CBU-105 can be accurately delivered from high altitude and in adverse weather from the B-1, B-52H, F-15E, and F-16. CBU-105s were deployed for the CBU-105 occurred April 2003, during Iraqi Freedom, from a B-52H.

CBU-115: USAF plans to install WCDM-ER wing and tail kits on F-35A weapons beginning FY06. The WCDM-ER provides increased accuracy and standoff capability from outside point defense ranges.

GBU-109 Paveway II

Function: Air-to-surface glide munition.

First Flight: 1975.


IOC: 1983.

Production: more than 2,000.

Contractor: Boeing; Raytheon.

Guidance: TV or IR seeker.

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

Dimensions: length 12.8 ft, body diameter 1.5 ft, wingspan 4 ft. Weight: 2,500 lb; length 8.6 ft, body diameter 0.9 ft, wingspan 4 ft. Weight: 1,400 lb.

Performance: cruising speed subsonic; range about 17 miles; CEP about 10 ft.

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 modular 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 fires 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 control the missile manually, 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-15(V)/1 A/B. TV-guided variant, qualified for operational service in 1988. CBU-15/201/2 A/B. IR version entered service in 1987. CBU-15/4, 6, 8, 10, 12, 14, 16, 18, 20. Combines accuracy of GBU-15 with the penetration capability of the improved 2,000-lb BLU-109/B penetrator. EGBU-15, 16. GPS-guided variant, allowing pilot to select either TV, IR, or GPS guidance over the target, depending on weather and/or threat conditions. USAF had 100 initially produced for Allied Force, with field-level upgrade of over 1,200 existing GBU-15s.

GBU-16 Paveway II

Function: Air-to-air guided missile.

First Flight: early 1970s.


Production: not available.

Contractor: Lockheed Martin; Raytheon.

Guidance: semiactive laser.

Warhead: Mk 84 bomb (2,000-lb unitary)

Dimensions: length 12.1 ft, body diameter 1.2 ft, wingspan 5.5 ft.

Weight: approx. 1,000 lb.

Performance: CEP about 20 ft; range 9.2 miles.

COMMENTARY: Folding-wing Paveway I lasers are used as a fighter's primary weapon against armored targets. GBU-16 is deployed with the F-15 and USAF 14,000; Navy 12,000.

GBU-24 Paveway III

Function: Air-to-surface guided glide bomb.


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

Contractor: Raytheon.

Guidance: semiactive laser.


Dimensions: length 14.2 ft.

Weight: 2,369 lb.

Performance: range more than 11.5 miles.

COMMENTARY: GBU-24/B/A, an air-to-ground weapon with the third generation Paveway III guidance kit, integrated with a BLU-109 penetrating warhead. The kit consists of an advanced guidance section and high-lift airframe. It is extremely precise and highly effective against a broad range of high-value hard targets. The system can be employed from low, medium, and high altitudes, providing...
ing operational flexibility through the use of an adaptive digital autopilot and large field-of-regard, highly sensitive scanner seeker. The GBU-24/A was highly successful during Desert Storm.

The GBU-24 adapts to conditions of release, files an appropriate midcourse, and provides trajectory shaping for enhanced warhead effectiveness. The weapon is deployed on USAF F-15E, F-16, and F-117 and Navy F/A-18.

**GBU-27**

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

**Function:** Air-to-surface guided glide bomb.

**First Flight:** Not available.

**Delivered:** From 1988.

**IOC:** CCB (unconfined).

**Production:** Approx. 3,000.

**Contractor:** Raytheon.

**Guidance:** Semicaptive laser.

**Dimensions:** Span 5.5 ft, length 13.9 ft.

**Weight:** 2,170 lb.

**Performance:** Range more than 11.5 miles.

**COMMENTARY**

To meet the unique requirements of the F-117A, the GBU-24/A 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 Desert Storm.

**EGBU-27**

**Integrates GPS/INS guidance into the existing GBU-27 laser seeker to provide adverse weather capability and improved target location. Entered production in FY98. First operational use was in Iraqi Freedom.

**GBU-30**

**Brief:** A large 5,000-lb class air-to-ground penetrating warhead (BLU-113/B) equipped with a advanced laser guidance kit, used for striking and destroying hardened and deeply buried targets.

**Function:** Air-to-surface guided glide bomb.

**First Flight:** February 1991.

**Delivered:** April 1991.

**IOC:** 1991.

**Production:** Approx. 500.

**Contractor:** Raytheon.

**Dimensions:** Length 19.2 ft, diameter 1.2 ft.

**Production:** Range more than 5.75 miles.

**COMMENTARY**

Using USAF’s rapid-response program, the GBU-28 bunker-busting LGB was developed for Desert Storm for use against deeply buried, hardened C2 facilities. Four of the GBU-28 systems were used during the war: two for testing and two for B-1F-111As against a bunker complex Feb. 27, 1991. Guidance is by a modified GBU-27 system.

**GBU-28/B**

**Integrates GPS/INS guidance into the existing GBU-28 guidance control unit to provide advanced weather capability and improved target location. Entered production in FY98.

**GBU-28/C**

**Utilizes the improved BLU-122/B warhead for increased penetration, lethality, and survivability. Guidance and control is provided by an improved Paveway III system with GPS/INS and laser capability. Entered production in FY05.

**GBU-31/32/38 Joint Direct Attack Munition**

**Brief:** A joint USAF-Navy INS/GPS-guided weapon, carried by fighters and bombers, that provides highly accurate, autonomous, all-weather conventional bomb capability.

**Function:** Air-to-surface guided bomb.

**First Flight:** Oct. 22, 1996.

**Delivered:** 1998-2011 (planned).

**IOC:** 1998.

**Production:** 226,064 (planned).

**Contractor:** Boeing; Textron; Honeywell.

**Guidance:** INS/GPS.

**Dimensions:** MK 84: JAMD 12.8 ft; BLU-109 with JDAM 12.4 ft; Mk 83 with JDAM 10 ft.

**Weight:** Mk 84 2,036/2,056 lb (USAF/USN); BLU-109 2,152/2,135 lb; Mk 83 1,013/1,028 lb.

**Performance:** Range up to 17 miles, CEP with GPS 42.9 ft; CEP with INS only 99 ft.

**COMMENTARY**

JDAM upgrades the existing inventory of general-purpose bombs by integrating them with a GPS/INS guidance kit to provide accurate all-weather attack from medium/high altitudes. While still aboard the launch aircraft, JDAM is passed target information through the aircraft’s avionics system. Once released, the inertial guidance kit takes over and, with periodic GPS updates to the INS, guides the weapon to its target. JDAM is intended for AV-8B, B-1, B-2, B-52, F-14, F-15E, F-16, F-22, F-35, F-117A, and F/A-18C/D/E/F aircraft.

**GBU-31**

**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. First used in combat March 24, 1999.

**GBU-32**

**Variant that adds an INS/GPS guidance kit to the 1,000-lb general-purpose Mk 83 bomb or the 1,000-lb BLU-110 penetrator.

**GBU-38**

**Variant that adds an INS/GPS guidance kit to the 500-lb general-purpose Mk 82 bomb. First production deliveries were in 2004 for the B-2. Planned upgrades include an anti-jamming GPS receiver and low-cost antennae kit.

**GBU-39B Small Diameter Bomb**

**Brief:** Extended range all-weather, day/night 250-lb class near-precision guided munition. Provides increased looout to achieve multiple kills per sortie and decreases collateral damage.

**Function:** Air-to-surface guided munition.

**First Flight:** May 23, 2003 (guided).

**Delivered:** TBD.

**IOC:** 2007.

**Production:** 24,000 munitions and 2,000 carriages (planned).

**Contractor:** Boeing.

**Guidance:** GPS/INS augmented by Differential GPS.

**Dimensions:** Length 70.8 in (munition); 126.4 in (carriage); 143.1 in (carriage with four munitions).

**Weight:** 285 lb (munition); 320 lb (carriage); 1,460 lb (carriage with four munitions).

**Performance:** Near-precision capability at standoff range up to 46 miles.

**COMMENTARY**

The Small Diameter Bomb (SDB) system employs a 91-lb smart carriage capable of carrying four 250-lb class GBU-39/B near-precision guided air-to-surface munitions. It is capable of delivering high-priority fixed and stationary targets from both fighters and bombers in internal bays or on external hardpoints. SDB munitions are targeted and released against single or multiple targets. Target coordinates are loaded in the weapon prior to release either on the ground or in the air by aircrew. Once the weapon is released, it relies on GPS/INS augmented by Differential GPS to self-navigate to the impact point. SDB increases loadout, decreases collateral damage, enhances accuracy, and self-navigates to the impact point. SDB increases loadout, decreases collateral damage, enhances accuracy, and self-navigates to the impact point.

**Massive Ordnance Air Blast (MOAB) Bomb**

**Brief:** A massive precision guided munition (PGM) designed to be dropped by B-1, B-2, or B-52 bombers.

**Function:** Mass bomb.

**Guidance:** GPS/INS.

**Warhead:** 18,000 lb, high explosive.

**Dimensions:** Length 30 ft, diameter 3.3 ft.

**Weight:** 21,500 lb.

**COMMENTARY**

On March 11, 2003, USAF live-tested the largest PGM developed to date. Unlike the earlier unguided “Daisy Cutter” bomb, the MOAB does not require a parachute.

**Wind-Corrected Munitions Dispenser (WCMD) and WCMD-ER**

**Brief:** A tail kit fitted to various dispenser weapons that provides inertial guidance system corrections for launch transients and wind effects to enhance accuracy.

**Function:** Guidance tail kit.

**First Flight:** February 1996.

**Delivered:** From 2000.

**IOC:** FY00.

**Production:** WCMD: 27,700 (planned). WCMD-ER: 100.

**Contractor:** Lockheed Martin.

**Dimensions:** Length 1.4 ft, diameter 1.3 ft.

**Weight:** WCMD: 100 lb. WCMD-ER: about 200 lb.

**Performance:** WCMD range about eight miles. WCMD-ER: about 40 miles.

**COMMENTARY**

WCMD: USAF is modifying standard SUU-64/66/66 tactical munition dispensers with guidance kit to compensate for wind drift on downward flight from high altitudes. The combat-proven WCMD kits include an INS guidance unit, movable tail fins that pop out in flight, and a signal processor. The kits when fitted on CBU-87/S99/97 inventory cluster weapons are designated: CEM (CBU-103), Gator (CBU-104), SFW (CBU-105), and PAW (CBU-107). Successful flight testing began in February 1996; WCMDs are now operational on B-1, B-2, F-15E, and F-16 aircraft. Objective aircraft are A-10, B-2, F-35, and F-117.

**WCMD-ER:** Augments WCMD baseline capability by adding GPS guidance and a wing kit for CBU-97 SFW dispenser weapons to provide increased accuracy and standoff capability from outside point defense ranges. First flight took place in November 2005.

**Satellite Systems**

**Advanced EHF (AEHF)**

**Brief:** Joint service satellite communications system that provides global, secure, protected, and jam-resistant communications for high priority air, ground, and sea assets.

**Function:** Near-worldwide, secure, survivable satellite communications.

**Operator:** AFSPC.

**First Launch:** April 2008 (planned).

**Constellation:** Three satellites.

**Design Life:** 14 years.

**Launch Vehicle:** Evolved Expendable Launch Vehicle (EELV).

**Unit Location:** Schriever AFB, Colo.

**Orbit Altitude:** 22,000+ miles (geosynchronous).

**Contractor:** Lockheed Martin, Northrop Grumman team for system development and demonstration.

**Dimensions:** Length 32 ft (across payload axis), width 75.8 ft (across solar array axis).

**Weight:** Approx. 13,500 lb at launch, 9,000 lb on orbit.

**Performance:** 10 times the capability of the Milstar Block II satellite.

**COMMENTARY**

The Advanced Extremely High Frequency (AEHF) system comprises three satellites in geosynchronous orbit that provide at least 10 times the capacity of the 1990s-era Milstar Block II satellites. Advanced EHF allows the President, Secretary of Defense, and combat forces to control their tactical and strategic forces at all levels of conflict.

**GBU-31 Joint Direct Attack Munition (USAF photo)**
through general nuclear war and supports the attainment of information superiority. AEHF will provide connectivity for effective implementation of worldwide military communications. It can adapt to dynamic operating conditions and perform under high jam-resistant environments; it can survive in a nuclear hardened, antijam, high data rate, long-haul communications to military users globally. The final DSCS III satellite was launched in August 2003. The modernization of satellite communications will continue with the deployment of the Wideband Gap-filler System.

Defense Support Program

Brief: An early warning spacecraft that travels in geo-
synchronous orbit and provides alert of possible ballistic missile attack.

Function: Strategic and tactical launch detection system

Operator: AFSPC.

First Launch: November 1970.

IOC: On orbit.

Design Life: 5 yr.

Launch Vehicle: Titan II (IIR, IIR-M).

Unit Location: Schriever AFB, Colo.

Orbit: 12.5 yr (approx).

Contractor: Lockheed Martin.

Power Plant: 1,200-1,300 watts solar arrays.

Weight: 5,000 lb (approx).

Performance: constellation consists of three satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65° north and 65° south latitude.

COMMENTARY

The backbone of strategic-tactical communications, Milstar is a joint service communications system that provides secure, jam-resistant EHF communications. Worldwide operations are made possible by this 24-hour, all-weather capability, ready to support any deployment at a moment's notice. The Milstar inventory was fully deployed in 2003, and modernization of satellite communications will continue with the Advanced EHF (AEHF) constellation deployment.

Polar MILSATCOM

Brief: A non-classified system that provides secure, survivable communications, supporting peacetime, contingency, and wartime operations in the North Pole region above 65° north latitude.

Function: Communications satellite

Operator: USN.

Launch Vehicle: Delta IV Heavy EELV.

First Launch: January 2006.

IOC: TBD.

Constellation: three.

Design Life: host satellite dependent.

Contractor: Northrop Grumman.

Power Plant: 410 watts consumed by payload (power from host solar array).

Dimensions: numerous items integrated throughout host.

Weight: 470 lb (payload).

COMMENTARY

Augmenting the Milstar constellation, the Polar MIL-
SATCOM payload is a cost-effective means of providing secure communications for the northern polar region. The system enables northern latitude operations by linking command authorities to ground forces, ships, submarines, and aircraft.

Space Based Infrared System High

Brief: Advanced surveillance system for missile warning, missile defense, battle space characterization, and technical intelligence. System includes satellites in geosynchronous Earth orbit (GEO) and highly elliptical orbit.

Function: IR space surveillance

Operator: AFSPC.

First Launch: (planned) High GEO; FY08.

IOC: TBD.

Constellation: High: four GEO sats, two highly elliptical orbit sats.

Design Life: not available.


Unit Location: Buckley AFB, Colo.

Orbit Altitude: High at approx 22,300 miles.

Contractor: Lockheed Martin; Boeing; TRW (now Northrop Grumman).

Power Plant: solar arrays generating 8,000 watts.

Dimensions: length 51 ft, width 116 ft with full solar array extension.

Weight: 10,000 lb.

Performance: constellation consists of three satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65° north and 65° south latitude.
A jet-powered, variable speed, recoverable target drone. Increment 1 consolidated all DSP ground processing in one CONUS master control station at Buckley AFB, Colo. IOC was declared Dec. 18, 2001. Increment 2 will field the space and ground assets. SBIRS High is in the EMD phase led by a Lockheed Martin team.

**Space Tracking and Surveillance System**

Brief: Advanced surveillance system with IR and visible sensors for detecting and tracking ballistic missiles. STSS is a follow-on to the SBIRS Low Earth orbit (LEO) that work in concert with SBIRS High and other missile defense systems.

**Function:** Missile defense.
**Operator:** Missile Defense Agency.
**First Flight:** FY07 (planned).
**IOC:** FY07.
**Constellation:** two demonstration sats; operational sats TBD.

**Design Life:** not available.
**Launch Vehicle:** Delta II.
**Unit Location:** Colorado Springs, Colo.
**Orbit Altitude:** 930 miles.
**Contractor:** Northrop Grumman (completion and launch of two R&D satellites); Raytheon (payload).
**Power Plant:** TBD.
**Dimensions:** not available.
**Weight:** not available.

**COMMENTARY**

The Missile Defense Agency manages the Space Tracking and Surveillance System (STSS), which, in December 2002, replaced the program known as SBIRS Low. In April 2002, MDA ended the SBIRS Low program definition and risk reduction competition and named TRW (purchased by Northrop Grumman) as prime contractor for a redefined space-based sensor R&D element of MDA’s Integrated Ballistic Missile Defense System (BMDS). The initial STSS contract calls for completion and launch of two LEO satellites in FY2006. New technologies will be inserted into subsequent R&D satellites under Block 2008 and beyond, leading to an operational system.

**Wideband Gap-filler System (WGS)**

Brief: Satellites that provide wideband communications for deployed tactical forces (air, land, and sea).

**Function:** Worldwide satellite communications.
**Operator:** AFSPC.
**First Launch:** 2006 (planned); two further launches planned within a year.
**IOC:** August 2007 (planned).
**Constellation:** three-five satellites.
**Design Life:** 14 years.
**Launch Vehicle:** EELV, Delta IV.
**Unit Location:** Schriever AFB, Colo.
**Orbit Altitude:** GEO.
**Contractor:** Boeing.
**Power Plant:** solar arrays generating 9,934 watts.
**Dimensions:** based on Boeing 702 Bus.
**Weight:** 13,200 lb at launch.
**Performance:** approx. 12 times the capability of a DSCS satellite.

**COMMENTARY**

The WGS constellation is planned to bridge the gap between current DSCS and GBS systems and the next generation system. It will provide two-way services for national leaders, Diplomatic Telecommunications Service, Defense Information System Network, and all military ground fixed and mobile users. In addition, it will provide direct broadcast of digital multimedia, high-bandwidth imagery, and video information directly from global and theater sites to deployed warfighters. Primarily a commercial product, the satellites will have X-band (DSCS III-like), Ka-band broadcast (GBS Phase 2-like), two-way Ka-band services, and cross-channelization between its X- and Ka-band services.

**Aerial Targets**

**BQM-34 Firebee**

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

**Function:** Aerial target.
**Operator:** ACC.
**First Flight:** 1951; 1958 (BQM-34A).
**Delivered:** from 1951.
**IOC:** circa 1951
**Production:** 1,800+.
**Inventory:** 33.
**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, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the GRDCUS, which allows multiple targets to be flown simultaneously.

**Dimensions:** length 22.9 ft, body diameter 3.1 ft, span 12.9 ft.
**Weight:** launch weight 2,500 lb.
**Performance:** max level speed at 6,500 ft 690 mph, operating height range 10 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.

**COMMENTARY**

Current BQM-34As, with an upgraded General Electric J85-100 engine that provides a thrust-to-weight ratio of 1:1, offer higher climb rates and six-G maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. BQM-34s are used for research, development, test, and evaluation of the Weapon System Evaluation Program.

**BQM-167 Skeeter**

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

**Function:** Aerial target.
**Operator:** ACC.
**First Flight:** Jan. 3, 2005.
**Production:** initial production began in 2004.
**Unit Location:** Tyndall AFB, Fla.
**Contractor:** Composite Engineering Inc.
**Power Plant:** Microturbo Tri 60-5+ turbojet.
**Guidance and Control:** X- and Ka-band services.

**Dimensions:** length 20 ft, body diameter 2 ft, span 11 ft.
**Weight:** not available.
**Performance:** max level speed Mach 0.9 mph, operating height range 20,000-50,000 ft, endurance 3 hr.

**COMMENTARY**

BQM-167A is to replace both the aging MQ-107 and BQM-34A as the Air Force’s subscale aerial target. It features an increased load capability, higher speeds and G-loads, a digital architecture for avionics, and a composite airframe making it significantly lighter than the earlier platforms. Future development on this target will take it to supersonic speeds, internalize and miniaturize many countermeasures systems, and expand the flight envelope beyond any target system in the inventory today.

**MQM-107 Striker**

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

**Function:** Aerial target.
**Operator:** ACC.
**First Flight:** not available.
**Delivered:** from 1984 (B).
**IOC:** 1987.
**Production:** 70 (B); 221 (D); 78 (E).
**Unit Location:** Tyndall AFB, Fla.

**Guidance and Control:** analog or digital, for both ground control and preprogrammed flight (D model); high-G autopilot provisions; digital autopilot and remote control by the Gulf Range Drone Control Upgrade System (GRDCUS), a multifunction C2 multilaturation system (E model).

**Dimensions:** length 18.1 ft, body diameter 1.3 ft, span 9.8 ft.
**Weight:** max launch weight (excl booster) 1,460 lb.
**Performance:** operating speed 207-630 mph, operating height 50-40,000 ft, endurance 2 hr 15 min.

**COMMENTARY**

MQM-107D. A third generation version of the MQM-107 Striker, it is a recoverable, variable-speed target drone used for research, development, test, and evaluation of the Weapon System Evaluation Program.

MQM-107E. Improved performance follow-on to the MQM-107D. In operational service, it replaces the MQM-107D and expands the flight envelope.

MQM-107 Strikers are being replaced by the BQM-167 Skeeter.

**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:** August 1993.
**IOC:** not available.
**Unit Location:** Tyndall AFB, Fla. (detachment at Holloman AFB, N.M.)
**Contractor:** Marconi (formerly Tracor).
**Power Plant:** two General Electric J79-GE-17 turbojets, each with approx. 17,000 lb thrust with afterburning.

**Guidance and Control:** remote-control methods incl the GRDCUS (Tyndall) and the Drone Formation and Control System (Holloman); will also accommodate the triservice Target Control System currently under development.

**Dimensions:** length 16 ft, height 6 ft, wingspan 38.4 ft.
**Weight:** mission operational weight 49.500 lb.
**Performance:** max speed Mach 2+; ceiling 55,000 ft, range (approx) 500 miles.

**COMMENTARY**

The QF-4 replaced the QF-106 Full-Scale Aerial Target (FSAT) in 1998 when the F-106 inventory was depleted. The QF-4 provides for a larger operational performance envelope (maneuvering) and greater payload capability compared with its predecessors.

More than 160 F-4 surplus aircraft have been converted to QF-4 FSATs since 1995. QF-4s are used for research, development, test, and evaluation and the Weapon System Evaluation Program.