The fully swept position is used in supersonic flight and for high subsonic, low-altitude penetration. The bomber’s offensive avionics include synthetic aperture radar (SAR), ground moving target indicator (GMTI), ground moving target track (GMTT), and terrain-following radar (TFR), an extremely accurate Global Positioning System/inertial navigation system (GPS/INS), computer-driven avionics, and a strategic Doppler radar, enabling aircrews to navigate, update target coordinates in flight, and precision bomb.

The current defensive avionics package, built around the ALQ-161 electronic countermeasures (ECM) system, is supplemented by the AELE-50 towed decoy and chaff and flares to protect against radar-guided and heat-seeking missiles. Aircraft structure and radar-absorption materials reduce the aircraft’s radar signature to approximately one percent that of a B-52. The AELE-50 provides greater protection against RF threats.

B-1A. USAF acquired four prototype flight-test models of this new strategic bomber in the 1970s, but the improved variant B-1 flew in October 1984. USAF produced a total of 100. The B-1 was first used in combat in support of operations against Iraq during Desert Fox in December 1998. A planned reduction of the B-1B inventory from 93 to 60 aircraft began in August 2002, with fleet consolidation at Dyess AFB, Tex., and Ellsworth AFB, N.D. However, under the 2004 defense authorization bill, Congress directed USAF to return to service 23 of the retired B-1Bs. As of early spring, USAF was working with Congress to change that to just eight bombers.

B-1B’s speed, superior handling qualities, and large payload make it a key element of any joint/composite strike force, with the flexibility to deliver a wide range of weapons or to carry additional fuel, as required. The ongoing conventional mission upgrade program (CMUP) is significantly enhancing B-1B lethality and survivability. Completed Block D upgrades include GPS receivers, a MIL-STD-1760 weapon interface, secure interoperable radios, and improved computers to support precision weapons, initially the GBU-31 JDAM. Block E includes follow-on computer and software upgrades permitting simultaneous carriage of mixed guided and unguided weapons (now in production), and WCMD/JGOW/JASSM integration. Officials are continuing to assess options for future improvements to the B-1B’s defensive system. In addition, planning is underway for a network-centric upgrade program aimed at improving B-1B avionics and sensors, cockpit upgrades to enhance crew communications and situational awareness. An effort to provide a fully integrated data link capability is scheduled to begin 2006.

B-2 Spirit

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

Function: Long-range heavy bomber.

Operator: ACC.

First Flight: July 17, 1989.


IOC: April 1997, Whitman AFB, Mo.

Production: 21.

Inventory: 21.

Unit Location: Whitman AFB, Mo.

Contractor: Northrop Grumman; LTV.

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

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

Dimensions: Span: 220 ft, length 171 ft, height 58 ft.


Performance: Max speed: Mach 1.3 at 50,000 ft; range, normal operating: 6,000 miles, long-range: 7,000 miles.

Armament: In a nuclear role: up to 16 B61 nuclear free-fall bombs 5,000 miles, with one aerial refueling only 10,000 miles.

Contractor: Boeing; AIL Systems; General Electric.
B-52G. Introduced important design changes, including a redesigned wing containing integral fuel tanks for increased range, fixed under-wing external tanks, a shorter tail fin of greater chord, and a remotely controlled tail gun turret that allowed the gunner to be repositioned with the rest of the crew. Initial flight August 1958, with the first of 193 aircraft entering service in February 1959. Withdrawn 1994.

B-52H. The only version still in service, the H introduced TF33 turbofans, providing increased unreheated range, and improved defensive armament. First flown July 1960, 102 were built, with deliveries between May 1961 and October 1962.

Primary role of the B-52 is still that of cruise missile carrier with, typically, multiple cruise missile launches at high altitude, often followed by B-52 penetration to attack additional targets using GPS/INS guided weapons.

Ongoing modernization of its conventional capabilities is extending the B-52’s service life well into this century, with the ability to provide massive firepower in low- to mid-threat environments supplemented by a standoff attack capability. Iraqi Freedom saw B-52s delivering laser guided bombs for the first time using interdiction, and defense suppression. USAF plans include using some B-52s as electronic warfare platforms whilst retaining all weapons carriage capability. Equipment includes GPS, ARC-210 radios, Have Quick II antijam radio, KY-100 secure radio, an electro-optical (EO) viewing system that uses forward-looking infrared (FLIR) and high-resolution low-light-level television (LTTV) sensors to augment the targeting, battle assessment, flight safety, and terrain avoidance systems, thus improving combat capability and low-level flight capability. Pilots have night vision goggles (NVGs) to further enhance night operation. B-52s now support a MIL-STD-1760 interface resulting in an improved weapons capability including naval mines, precision guided weapons, and advanced weapons such as JDAM, JSOW, JASSM, and WCMD. The B-52’s ECM suite uses a combination of electronic detection, jamming, and infrared (IR) countermeasures to protect against hostile air defense systems. The aircraft can also detect and counter missile attack from the rear.

Several versions of the Stratofortress were produced, including:

B-52A. Initial production version, with JST-P-1W engines and provision for in-flight refueling. First flown Aug, 5, 1954, the three aircraft built were used by Boeing for technical development purposes. Delivered to SAC November 1957. Finally retired 1969.

B-52B. First operational version, 23 of which were built. Also, 27 RB-52B dual-role bomber/reconnaissance variants. First flown January 1955, with deliveries between June 1955–August 1956; powered by JST-P-1W, -1W-9W, -2W, or -29W engines. Retired in the mid-1960s.

B-52C. Multimission version with increased gross weight and larger under-wing tanks. Powered by JST-P-1W or -29W engines. First flown March 1956; 35 were delivered June–December 1956. Majority retired 1971.


B-52H Stratofortress (MSgt. Val Gempsi)

A-10 Thunderbolt II

Brief: A simple, effective, and survivable twin-engine aircraft specifically designed for close air support (CAS) of ground forces and which can be used against all ground targets, including tanks and other armored vehicles.

Function: Attack aircraft.

Operator: ACC, AFMC, PACAF, USAFE, ANG, AFRIC.


Production: 713.

Inventory: 359.


Contractor: Fairchild Republic, now Lockheed Martin.

Power Plant: Two General Electric TF34-GE-100 turbofans, each 9,065 lb thrust.

Accommodation: Pilot only, on zero-height/518 mph zero-speed ejection seat.

Dimensions: Span 57.5 ft, length 53.3 ft, height 14.7 ft.
Air Force Magazine  
May 2004  

**A-10A Thunderbolt II (MSgt Blake R. Borsic)**

Coordinated with ground forces and command and control (C2) to deliver surgical firepower in support of both conventional and special operations missions. During operations in Afghanistan and Iraq, the A-10 gunships worked in conjunction with the MQ-1 Predator, the latter, providing live video and target referencing information.

**Armament:**
- one internally mounted M61A1 20 mm cannon
- up to four AIM-9L/M 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. Deliveries of AIM-9X commenced November 2003 at Elmdorf AFB, Alaska.

**COMMENTS:**
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 establishing aerial dominancy.

**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 treecrest level and effective weapons delivery, a HUD for close-in combat, identification, friend or foe (IFF), and INS. F-15A/Bs now serve with the 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 multistaged improvement program (MISP), 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 43 F-15Ds are now receiving an APG-63 upgrade, the APG-63(V1). One squadron in Alaska has received the later APG-63(V2) featuring an active electronically steered antenna (AESA), permitting the aircraft to track multiple targets and to guide air-to-air missiles against them. F-15C/D aircraft are also to be modified with the Joint Helmet Mounted Cueing System (JHMCS), a “look and shoot” head-mounted system that, along with the AIM-9X, significantly enhances lethality in close-range aerial combat. Other modifications include improved engines, GPS equipment, and the Link 16 data link.

**F-15E Strike Eagle**

Brief: A heavily armed aircraft using side-firing weapons and special mission pods. The F-15E is a multimission aircraft capable of operating in a multirole fighter role. When equipped with advanced avionics, the F-15E can be employed in an air superiority role.

**Performance:**
- max speed Mach 2.5
- combat range with afterburner, 600 lb of external fuel, and 1.5 hour loiter

**Armament:**
- one internally mounted M61A1 20 mm cannon
- up to four AIM-9L/M 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. Deliveries of AIM-9X commenced November 2003 at Elmdorf AFB, Alaska.

**COMMENTS:**
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 establishing aerial dominancy.

**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 treecrest level and effective weapons delivery, a HUD for close-in combat, identification, friend or foe (IFF), and INS. F-15A/Bs now serve with the 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 multistaged improvement program (MISP), 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 43 F-15Ds are now receiving an APG-63 upgrade, the APG-63(V1). One squadron in Alaska has received the later APG-63(V2) featuring an active electronically steered antenna (AESA), permitting the aircraft to track multiple targets and to guide air-to-air missiles against them. F-15C/D aircraft are also to be modified with the Joint Helmet Mounted Cueing System (JHMCS), a “look and shoot” head-mounted system that, along with the AIM-9X, significantly enhances lethality in close-range aerial combat. Other modifications include improved engines, GPS equipment, and the Link 16 data link.
**F-15E Strike Eagle (Guy Aceto)**

13,500 missions. In Iraqi Freedom, the F-16 flew hund reeds 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 maneuver able fighters built. Equipment includes a multimode radar with a clutter-free look-down capability, advanced RWR, HUD, 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 update pro gram, undertaken cooperatively by USAF and NATO operators, includes improvement to the radar, fire-con trol computer, stores-management computer, and avio nics 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 F100-PW-220E turbofan.

The Multinational Staged Improvement Program, implemented in 1980, ensured the aircraft could ac cept systems under development, thereby minimizing retrofit costs. All F-16s delivered since November 1981 have had built-in structural and wiring provi sions and systems architecture that expand the single seater’s multirole flexibility to perform precision strike, night attack, and beyond-visual-range intercept mis sions.

**F-16C** (single-seat) and **F-16D** (two-seat) aircraft were introduced at production Block 25 with MSIP II improve ments in the cockpit, airframe, and core avionics and an increased-range APG-68 radar. Block 30 and 40 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-16Cs.

Block 40/42 F-16s specialize in night attack opera tions with precision guided weapons. Follow-on im provements include ALE-47 improved defensive countermeasures, ALR-56M advanced RWR (Block 40 only), Very High Speed Integrated Circuit (VHSC) technol ogy in the APG-68(V5) fire-control radar, a ring-laser gyro INS, a LANTIRN nav/attack system, and L3. System improvements also introduced at Block 40/42 include core avionics hardware, installation of a
LANTIRN nav/attack system, GPS, enhanced-envelope gunpower, digital flight controls, automatic terrain following, increased takeoff weight and maneuvering limits, an 8,000-hour airframe, and expanded envelope nine-G capability.

Block 50/52 USAF F-16C/Ds, followed by Block 40/42 from 2003, are being retrofitted with a new modular mission computer being developed under an F-16 common configuration implementation program (CCIP), aimed at restoring operational flexibility. This effort includes the participating European governments of the F-16 Multinational Fighter Program. Other improvements include color displays, Sniper XR targeting pod, JHMCS, AIM-9X, Link 16 data link, and improved weapons capabilities. First delivery made January 2002. The Block 50/ 52 aircraft will have dual/alternate carriage of High-Speed Anti-Radiation Missile (HARM) targeting system (HTS)/smart targeting and identification via networked weapons capability for the remainder of the fleet.

The F-16CG designated aircraft are equipped with LAS/AVRS for precision day or night attack. The F-16CJ designated Block 50 aircraft are equipped with the HTS for suppression of enemy air defenses (SEAD). Block 50/52 F-16 CJs have MSIP Stage III improvements, which also show in selected retrofit of earlier F-16 blocks. Those 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 WCMCD. ANG and AFRC Block 25/30 F-16s are being upgraded under the Combat Upgrade Plan Integration Details (CUPID) program to near Block 50 standard. Improvements include EGI, situation awareness data link (SADL), and an ECM management system; advanced IFF is also being retrofitted.

A number of F-16s slated for upgrade have been withdrawn from active service to release funds for new data links and weapons capability for the remainder of the fleet.

F-35 Joint Strike Fighter

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

Function: Multirole fighter.

Operator: ACC for USAF.


Delivery: 2008 (anticipated first production aircraft).

IOC: 2011 (USAF).

Production: planned; 1,763 F-35A (USAF), 480 F-35B (USMC), 609 F-35C (USN), 150 (UK).

Inventory: TBD.

Usages: Single-seat or two-seat.

Contractor: Lockheed Martin; Northrop Grumman; BAE Systems; Israel; and Turkey.

Power Plant: Pratt & Whitney F119 or General Electric F136 turbofan (production), in 35,000-lb thrust class.

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 will also 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. USAF is developing the F-35 to 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 now also intends to buy a number of F-35B STOVL variants.

The concept demonstration phase (CDP) of the program commenced November 1996, with competitive contract awards to Lockheed Martin (F-35A) and Boeing (X-32A). CDP concluded in 2001 with Lockheed Martin declared the winner. The system development and demonstration (SDD) phase, begun in October 2001, focuses on system development, test and evaluation, logistics support, and LRIP. Flight testing is projected to begin in August 2005. The F-35 is powered by a derivative of the Pratt & Whitney F119 engine, called the F135. General Electric is to develop an alternative power plant, the F136, for competitive production.

F-117 Nighthawk (SSgt. Derrick C. Goode)

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 will also be available. (Note: Numerous other weapons capabilities will be added as system development continues.)

Commentary: The F-117’s dual 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-seeking missiles. 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 autonomous mission-planning system. A high-precision INS coupled to GPS is installed. An upgraded dual-turreted 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, flexible, optimum LO configuration, integration of new weapons for all-weather strike capability, and replacement of obsolete components to sustain the fleet through its service life. The F-117 is expected to remain in USAF service into the 2020s. USAF plans to retire 10 in Fiscal 2004.
The F/A-22 Raptor

**Brief:** High-technology follow-on for the F-15C. An all-weather, multirole fighter that combines an extremely maneuverable airframe with stealth technologies, supercruise, and integrated avionics to help it penetrate through advanced air defense systems and achieve air superiority.

**Function:** Fighter.

**Operator:** ACC, AETC, AFMC.

**First Flight:** Sept. 7, 1997.

**Delivery:** 2001 (first production representative airframe); 2013 (planned).

**IOC:** December 2005.

**Production:** 381, as a stated requirement.

**Inventory:** 17.

**Location:** Langley AFB, Va. (to be first operational location), Edwards AFB, Calif., Nellis AFB, Nev., Tyndall AFB, Fla. (fighter training unit).

**Contractor:** Lockheed Martin/Boeing.

**Power Plant:** Two Pratt & Whitney F119-PW-100 turbofans, each in 35,000-lb thrust class.

**Accommodation:** Pilot only, on zero-zero ejection seat.

**Dimensions:** span 44.5 ft, length 62 ft, height 16.6 ft.

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

**Ceiling:** 50,000 ft.

**Performance (design target):** max level speed at S/L 900+ mph, range more than 2,000 miles.

**Armament:** (projected) one internal M61A2 20 mm gun, two AIM-9 Sidewinders stored internally in the side weapons bays; six AIM-120 AMRAAMS in the main weapons bay; approx eight SDBs internally; for ground attack, two 1,000-lb JDAMs replace four AMRAAMS internally.

**Y-F22**

The redesignation from F-22 to F/A-22 reflects an increased emphasis on this advanced system’s ground attack capability, in addition to its air dominance role. The F/A-22’s unparalleled combination of stealth, supercruise (ability to cruise at supersonic speed without using its afterburners), maneuverability, and integrated avionics allows it to counter multiple anti-access threats. Integrated avionics and in-flight data link permit simultaneous engagement of multiple targets. The combination of flight controls, structural integrity, and high performance engines with thrust vectoring nozzles results in exceptional maneuverability. The F/A-22 will lead the USAF’s “kick down the door force” day and night across the spectrum of missions. The F/A-22 entered engineering and manufacturing development (EMD) in August 1991. During this period nine aircraft were built, three without avionics to explore flight characteristics, flutter, loads, propulsion, envelope expansion, and weapons separation. The first aircraft is no longer flying and was used for live fire testing after completion of its flight characteristics work. The remaining six were built 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 airframe were built.

**Operational test and evaluation (OT&E) phase 1 began in October 2003, and initial operational test and evaluation (IOT&E) is expected to start this spring.** IOT&E aircraft have received a number of minor modifications and will be used to demonstrate the initial production representative. Four aircraft have been dedicated to IOT&E with one other EMD aircraft identified as backup.

**Y-A22**

The F/A-22 is in low-rate initial production (Lots 1-5) with a full-rate production decision planned before the end of 2004. Production aircraft are currently being delivered to Tyndall AFB, Fla., to train F/A-22 pilots.

**X-45 UCAV**

**Brief:** A concept demonstrator for a stealthy unmanned combat air vehicle (UCAV) that will be capable of carrying a large weapons payload for the SEAD and electronic attack mission. The system may be stored in “smart boxes” until required, then reassembled and made mission-ready within a very short period. The UCAV may also be made air refuelable for self-deployment.

**Function:** Concept demonstrator UCAV for the SEAD and electronic attack mission.

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

**Contractor:** Boeing.

**Inventory:** 2.

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

**Dimensions:** span X-45A around 34 ft, X-45C around 48 ft; length: X-45A: 26 ft, X-45C 36 ft.

**Weight:** X-45C: around 35,000 lb.

**Commentary**

The joint unmanned combat air system (J-UCAS) program, the Defense Advanced Research Projects Agency (DARPA) is developing carrier-capable UCAV technology for the Navy (X-47) and a USAF system, the X-45, for the SEAD and electronic attack mission. The initial version, this Y-shaped vehicle bears little resemblance to the operational version USAF plans to field.

**X-45B**

The X-45C more closely resembles the objective UCAV system. This flying-wing design variant will feature a new, larger airframe with dual internal weapons bays capable of carrying two 2,000-lb JDAMs and will demonstrate stealth characteristics. Block 2 flight testing currently under way includes the first multivehicle flights and release of an internally carried guided weapon. First prototype flight is expected in 2005.

**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. 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 TBMs in their boost, or very earliest, phase of flight. The system will track TBMs and maintain laser focus on their skin, which, when sufficiently heated, will cause the pressurized fuel within to explode. The Airborne Laser (ABL) can target TBMs hundreds of miles away and thus can remain over friendly territory to kill TBMs as they are launched.

**Function:** Airborne laser.

**Operator:** ACC.

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

**Delivered:** First aircraft undergoing installation of laser system.

**IOC:** FY12 (planned).

**Production:** seven planned.

**Inventory:** one.

**Unit Location:** TBD.

**Contractor:** Boeing (ABL platform; battle management (BM) system), TRW (now Northrop Grumman) (COIL and subsystems), Lockheed Martin (weapon 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:** emp 422,882 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 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 the man and develops 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 air 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, at an altitude of 40,000 feet. The aircraft will detect and shoot down any TBMs launched at US forces or nearby allied nations. The ABL will also 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. ABLS represent the only near-term boost-phase missile defense. 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.

The attack laser’s main armament is a lightweight, megawatt-class COIL. This laser 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 ranger 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. While YAL-
1A is in the hangar. Tests are being conducted independently on the ABL optical system and the six laser modules that make up the complete COIL system. Once proved effective, they will be installed on the aircraft in preparation for a rigorous series of ground and air tests of the entire ABL configuration. Initial tests are expected to culminate in a test destruction of a boosting ballistic missile over the Pacific in early 2005.

An expansion of the ABL mission to include national missile defense against ICBMs is currently under consideration.

Reconnaissance and Surveillance Aircraft

E-3 Sentry

Brief: Modified Boeing 707, fitted with a rotating radar dome 30 ft wide and 6 ft thick, which provides all-weather air surveillance and C3 for tactical and air defense forces.

Function: Airborne early warning, BM, C3 aircraft.

Operator: ACC, PACAF, AFRIC (Assoc.).


Delivered: March 1977-84.


Production: 34.

Inventory: 32.

Unit Location: Elmendorf AFB, Alaska, Kadena AB, Japan; Tinker AFB, Okla. AFRIC; (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.

Weight: 27,400 lb.

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

Accommodation: flight crew of 20, 15–21 mission specialists.

Performance: maximum operating speed Mach 0.84, endurance eight hr unrefueled.

E-4 Joint STARS

Brief: A modified Boeing 707 equipped with a large, canopied radome mounted under the forward part 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, BM, C2 aircraft.

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


Delivered: May 1996–present


Production: 17 planned.

Inventory: 16.

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 42.5 ft.

Weight: gross 336,000 lb.

Ceiling: 42,000 ft.

Performance: max operating speed Mach 0.84, endurance eight hr unrefueled.

E-5 Shadow


A series of major sustainability, reliability, and availability upgrades for USAF E-3s 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. Further improvement and management support are being handled within a single, long-term contract awarded in 2001.

E-6 Joint STARS

Brief: A modified Boeing 707 equipped with a large, canopied radome mounted under the forward part 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, BM, C2 aircraft.

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


Delivered: May 1996–present


Production: 17 planned.

Inventory: 16.

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 42.5 ft.

Weight: gross 336,000 lb.

Ceiling: 42,000 ft.

Performance: max operating speed Mach 0.84, endurance eight hr unrefueled.

E-8 Joint STARS

Brief: A modified Boeing 707 equipped with a large, canopied radome mounted under the forward part 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, BM, C2 aircraft.

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


Delivered: May 1996–present


Production: 17 planned.

Inventory: 16.

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 42.5 ft.

Weight: gross 336,000 lb.

Ceiling: 42,000 ft.

Performance: max operating speed Mach 0.84, endurance eight hr unrefueled.

E-3C Sentry

(Ted Carlson)

E-3C is an upgrade to the original 10 US/NATO

E-8C Joint STARS

Commentary

Joint STARS (Survillance Target Attack Radar System) is a BM platform capable of providing theater commanders with C2 of air-to-ground forces and simultaneous near-real-time wide area surveillance as well as downlink of targeting information to air and ground commanders. Joint STARS utilizes Joint STARS downlinks via a secure, jam-resistant digital data link. 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 Iraqi Freedom, EC-8C Joint STARS aircraft were airborne 24 hours a day to help coalition forces maintain battlefield awareness.

E-8A Prototype version, with specialized equipment installed aboard two specially modified 707-300 airframes. One was converted to an in-flight pilot trainer in 1997, and the second has been placed in long-term storage.

E-8B Production version, based on former commercial 707-300 airframes. Equipped with 18 operations and control consoles, two of which double as communications stations. The first E-8B flew in March 1994 and served as the preproduction test bed. The last seven production aircraft feature more advanced computer systems, which are to be retrofitted on the 10 earlier aircraft. Planned improvements include Link 16 upgrade for data transmission to attack aircraft; enhanced SAR; new satellite radios; upgrades to allow Joint STARS to assume the Airborne Battlefield Command and Control Center (ABCCC) mission of attack support to ground force commanders; and global air traffic management (GATM) upgrades to permit use of optimum altitudes and flight routes in European airspace.

E-10

Brief: A multisensor command and control aircraft (MC2) that will provide ground surveillance and cruise missile defense as well as battlefield management control and command (BMCC2).

Function: Ground surveillance, cruise missile defense, and BMCC2 aircraft.

Production: five planned.

Inventory: TBD.

Unit Location: TBD.

Contractor: Boeing (airframe).

Power Plant: four Pratt & Whitney PW4062 turbofans or four General Electric CF6-80C2B8F turbofans.

Accommodation: mission crew of between 30 and 50, depending on mission.

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

Weight: TBD.

Ceiling: TBD.

Performance: TBD.

Commentary

The E-10A is intended to be the central platform in USAF's new Command and Control Constellation, initially replacing the E-8 Joint STARS aircraft and, possibly, assuming missions currently performed by
other aircraft such as the RC-135 Rivet Joint and E-3 AWACS aircraft. The Command and Control Constellation is to be a fully connected system of sensors (land, air, and space) that will relay information automatically, using common standards and communications protocols.

USAF has ordered the first of five planned E-10As, which are based on the Boeing 767-400ER airframe, to serve as the program flying test bed. In May 2003, a team comprising Northrop Grumman, Boeing, and Raytheon was awarded a pre-system development and demonstration contract for weapons system integration on the initial E-10A. Contracts for the initial design of the BMC2 rear-end suite were awarded to industry teams led by Boeing, Lockheed Martin, and Northrop Grumman. The winning design was to be announced this spring.

E-10B is slated to provide cruise missile defense and advanced airborne ground surveillance and targeting capability via Northrop Grumman/Raytheon’s new active electronically scanned array (AESA), developed under the Multifunction Radar Technology Insertion Program (MP-RTIP), and an advanced BMC2 subsystem. The shape of E-10C, which includes provision of an airborne moving target indicator with a 360-degree scan, will depend on the decision whether to co-host the airborne early warning and control (AEW&C) system on the same platform or to create a dedicated AEW&C platform.

MQ-1 Predator A


Operator: ACC.
Delivered: July 1994 (USA from 1996)—present.
Production: 100 air vehicles.
Inventory: six.
Unit Location: Egin AFB, Fla.; Indian Springs AFAF, Nev.

Contractor: General Atomics Aeronautical Systems.
Power Plant: one Rotax 914 turbocharged engine.
Accommodation: unmanned system.
Dimensions: length 27 ft, height 7 ft 2 in, span 48.7 ft.
Weight: empty 950 lb, gross 2,250 lb.
Ceiling: 25,000 ft.
Performance: cruise speed 80 mph, up to 138 mph, endurance 24 hr (460 miles with 16 hr on station).
Armament: Two Hellfire missiles on multispectral cruise speed 172 mph, up to 230 mph, performance 30+ hours.

MQ-1 Designates the weaponized Predator A. It carries an MTS sensor ball supplied by Raytheon in place of the Wescam sensor ball. The MTS provides a laser target designator with EO/IR sensors in a single package, where, previously, one video camera had to be removed to house a laser designator. The SAR is removed to make room for some of the laser designator equipment.

MQ-1A, the ACTD version of Predator A; slated for retirement.

MQ-1B: The reconnaissance-only version of Predator A, with an internal 450-lb surveillance payload that includes two EO and one IR video cameras carried in a ball-shaped turret under the nose and produced by Wescam. The internal sensor payload also includes a SAR still imagery camera for a day/night, all-weather reconnaissance capability.

RC-135W Rivet Joint

Developed initially under an internal company research and development effort, USAF acquired 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 prototypes. The USAF has additionally ordered three more 10,000-lb UAVs, with the designation MQ-9. With its 750-lb internal payload capacity, the MQ-9 will be able to carry simultaneously numerous payloads such as a larger, more capable camera system, SAR, MTS, and other detection systems. Its 3,000-lb external payload capacity will enable it to carry a combination of munitions. USAF is exploring various weapons mixes and a possible air-to-air role.

OC-135 Open Skies

A medium-altitude, long-endurance unmanned system combining imagery sensors with expanded strike capabilities. USAF changed the designation for Predator A to MQ-1 to denote its multimission capability for both reconnaissance and strike.

MQ-9 Designates the weaponized Predator A. It carries an MTS sensor ball supplied by Raytheon in place of the Wescam sensor ball. The MTS provides a laser target designator with EO/IR sensors in a single package, where, previously, one video camera had to be removed to house a laser designator. The SAR is removed to make room for some of the laser designator equipment.


Function: Unmanned reconnaissance and strike aircraft.
Operator: ACC.
Delivered: November 2003.
IOC: TBD.
Production: nine (planned).
Inventory: TBD.
Unit Location: Indian Springs AFAF, Nev.
Contractor: General Atomics Aeronautical Systems.
Power Plant: one Honeywell TPE-331-10T turbo-prop engine or Williams FJ44-2A turbojet engine.
Accommodation: unmanned system.
Dimensions: length 36.2 ft, span 64 ft.
Weight: empty 6,000 lb, gross 10,000 lb.
Ceiling: 50,000+ ft.
Performance: speed 500+ mph, unrefueled range 3,900 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.

RC-135 Modification: One occasionally used as a wide sweep for each picture, evaluated for high-altitude photography up to approximately 35,000 ft. Data is processed and recorded by a recording and annotation system.

RC-135 Brief: Specialty 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.
IOC: circa 1973 (Rivet Joint).
Production: (converted).
Inventory: 21.
Unit Location: Offutt AFB, Neb.
Contractor: Boeing (airframe); Raytheon; Textron.
Power Plant: four Pratt & Whitney TF33-P-5 turbofans, each 18,000 lb thrust. (Replaced with CFM International CFM-56s in one W version.)

RC-135W:

Developed initially under an internal company research and development effort, USAF acquired 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 prototypes. The USAF has additionally ordered three more 10,000-lb UAVs, with the designation MQ-9. With its 750-lb internal payload capacity, the MQ-9 will be able to carry simultaneously numerous payloads such as a larger, more capable camera system, SAR, MTS, and other detection systems. Its 3,000-lb external payload capacity will enable it to carry a combination of munitions. USAF is exploring various weapons mixes and a possible air-to-air role.

OC-135 Open Skies

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, evaluated for high-altitude photography up to approximately 35,000 ft. Data is processed and recorded by a recording and annotation system.

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, evaluated for high-altitude photography up to approximately 35,000 ft. Data is processed and recorded by a recording and annotation system.

RC-135 Brief: Specialty 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.
IOC: circa 1973 (Rivet Joint).
Production: (converted).
Inventory: 21.
Unit Location: Offutt AFB, Neb.
Contractor: Boeing (airframe); Raytheon; Textron.
Power Plant: four Pratt & Whitney TF33-P-5 turbofans, each 18,000 lb thrust. (Replaced with CFM International CFM-56s in one W version.)
Turbofan, 7,600 lb thrust.

RQ-4 As before switching to a larger, more capable RQ-4, while still in development phase.

Systems are continuously upgraded to keep pace with new voice and data link networks. The aircraft’s reconnaissance and offensive activities to warfighters via secure circuits provide near-real-time data updates on enemy defenses. RC-135s loiter near battlefields and potential threat emitters. IOC 1967.

…analyzing foreign electronic and IR equipment. Composites, larger tailcone and fin fairing, used for measuring and analyzing foreign electronic and IR equipment. Combat Sent can deploy anywhere in the world within 24 hours and provide on-scene precision measurement of potential threat emitters.

RC-135 V/W Rivet Joint. Used for electronic surveillance. RC-135 Rivet Joint loiter near battlefields and provides near-real-time data updates on enemy defensive and offensive activities to warfighters via secure voice links. The aircraft’s current systems are continuously upgraded to keep pace with new threats.

TC-135W. Used for training purposes.

RQ-4 Global Hawk


Delivered: seven advanced concept technology demonstrations; two production aircraft.

IOC: Used operationally in Afghanistan and Iraq while still in development phase.

Performance: plans call for nine production RQ-4As before switching to a larger, more capable RQ-4B version.

Inventory: two.

Unit Location: Beale AFB, Calif., first planned operational base.

Contractor: Northrop Grumman (prime); Raytheon.

Power Plant: one Rolls Royce–Allison AE 3007H turbofan, 7,600 lb thrust.

Accommodation: unmanned system.

Dimensions: length 44 ft, height 15.2 ft, span 116 ft.

Weight: empty 9,200 lb, gross 25,600 lb.

Ceiling: 65,000 ft.

Performance: design goals include endurance of up to 40 hr at a cruise speed of 400 mph and at an altitude of 65,000 ft. It would allow loiter on station 1,380 miles from base for 24 hr. Combat range 15,525 miles.

Armament: none.

COMMENTARY

The RQ-4A is a high-altitude endurance UAV carrying a 1,960-lb payload, incorporating EO/IR and SAR sensors that permit switching among radar, IR, and visible wavelengths as required. The objective RQ-4B system will add Sigint and improved GMTI capability. Navigation is by GPS/INS. Global Hawk flies autonomously from takeoff to landing, providing near-real-time imagery products for tactical and theater commanders.

Global Hawk began as an advanced technology demonstrator. The No. 2 aircraft crashed March 29, 1999. Vehicle No. 3 was damaged Dec. 6, 1999. In February 2000, Global Hawk flew to Australia for six weeks of demonstrations. In March 2001, it entered into EMD. Although still a development system, the aircraft was fully deployed operationally to support Enduring Freedom in Afghanistan, flying more than 50 missions and 1,000 combat hours.

Global Hawk provides continuous, all-weather, day/night, wide area surveillance. It will operate in low-to-moderate air defense threat environments with the ability to fly above or stand off from enemy defenses. The Navy is also considering purchase of Global Hawk.

U-2 Dragon Lady

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

Function: High-altitude reconnaissance.

Operator: ACC.

First Flight: August 1955 (U-2); 1967 (U-2/R); October 1994 (U-2S).


IOC: circa 1955.


Inventory: 34.

Unit Location: Beale AFB, Calif.

Contractor: Lockheed Martin.


Dimensions: span 103 ft, length 63 ft, height 16 ft.

Weight: gross 40,000 lb.

Ceiling: 70,000 ft.

Performance: speed 475 mph; range more than 4,500 miles; max endurance 10 hr.

COMMENTARY

The U-2 remains the Air Force’s premier high-altitude, long-endurance reconnaissance platform, capable of carrying LITM and Sigint sensors simultaneously, making it USAF’s only truly operational multi-intelligence platform and a key performer in combat operations.

More than $1.5 billion has been invested in the U-2 since 1994. Completed or ongoing improvements include a new GE F118-101 engine, a complete electrical system, a new glass cockpit utilizing up-front controls and multifunction displays (MFDs), and a new EW system. Sensors upgrades include the ASARS-2A radar sensor, which provides enhanced imaging modes and improves geo-location accuracy; the SYERS-2 EO imagery system, which provides multispectral and IR capability; enhanced RF-intelligence capability; and new data links enabling 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.

WC-130J

WC-130J: four Rolls Royce AE2100D3 turboprops, each 4,910 shp. WC-130H aircraft are being replaced by WC-130J.

Weight: max gross 299,000 lb.

Dimensions: span 136.6 ft, length 231.3 ft, height 98.7 ft.

Weight: gross 175,000 lb.

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

WC-130H. Improved version, operated by the 53rd WRS for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements. Equipment includes two external 1,400-gallon fuel tanks, an internal 1,800-gallon fuel tank, and upcoast Allision T56-A-15 turboprops, each 4,910 shp. WC-130H aircraft are being converted to HC-130Ps.

WC-130J. Weather-reconnaissance version of the latest C-130 model, featuring improved radar, four Rolls Royce AE2100D3 turboprops, and Dowty 391 six-bladed composite propellers. First of 10 aircraft replacing the WC-130H was delivered Oct. 12, 1999. An average weather reconnaissance mission might last 12–18 hours and cover almost 3,500 miles while the crew collects and reports weather data every minute. Results are transmitted via satellite to the National Hurricane Center, Miami.
EC-130J Commando Solo II (Peter A. Torres/Lockheed Martin)

EC-130J Commando Solo II. Five specialized versions of the latest C-130 aircraft, ordered to replace aging Es, with current mission equipment transferred from the older aircraft. Entered service mid–2003 with the 193rd Special Operations Wing (ANG), Harrisburg. 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.


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.

Operator: AETC, AFMC, AMC, PACAF, USAFE, ANG, AFRC.

First Flight: August 1956.

Delivered: January 1957–66.

IOC: June 1957, Castle AFB, Calif.

Production: 732.

Inventory: 546.


Contractor: Boeing.

Power Plant: KC-135R/T: four CFM International F108-CF-100 turbofans, each 22,224 lb thrust; KC-135E: four Pratt & Whitney TF33-PW-102 turbofans, each 18,000 lb thrust.

Accommodation: crew of four; up to 80 passengers.

Dimensions: span 130.8 ft, length 136.2 ft, height 38.5 ft.

Weight: empty 119,231 lb, gross 322,500 lb (KC-135E 301,600 lb).

Ceiling: 45,000 ft.

Performance: max speed at 30,000 ft 610 mph, max speed at 45,000 ft 571 mph, max speed at 10,000 ft 518 mph, cruising speed at altitude 518 mph (Mach 0.77), unlim. ceiling 33,000 ft.

MC-130P Combat Shadow

Brief: Aircraft that flies clautistic or lowvisibility, low-level missions into denied areas to provide air refueling for Special Operations Forces (SOF) helicopters or to air-drop small special operations teams, small bundles, and Zodiac combat rubber raiding craft.

Function: Air refueling for SOF helicopters/airdrop.

Operator: AETC, AFSC, ANG, AFRC.

First Flight: Dec. 8, 1964 (as HC-130H).

Delivered: from 1965.


Production: (converted).

Inventory: 36.


Contractor: Lockheed Martin (airframe); Boeing.


Accommodation: four flight crew, plus four mission crew.

Dimensions: span 132.6 ft, length 98.8 ft, height 38.5 ft.

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

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

COMMENTARY

KC-135

The KC-135 is similar in size and appearance to commercial 707 aircraft but was designed to military specifications, incorporating different structural details and materials. The KC-135 fuel tanks are located in the "wet wings" and incorporate different structural details and materials.

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

KC-10A is a DC-10 Series 30CF, modified to include fuselage fuel cells, an air refueling operator’s station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military refueling pods. Other modifications include the addition of communications, navigation, and surveillance equipment to meet civil air traffic control requirements.

Because it has both types of tanker refueling equipment installed, the KC-10A can service USAF bomber, fighter, cargo, and reconnaissance forces. It also supports USN, USMC, and allied aircraft.

KC-135R/T: four CFM International F108-CF-100 turbofans, each 22,224 lb thrust; KC-135E: four Pratt & Whitney TF33-PW-102 turbofans, each 18,000 lb thrust.

Accommodation: crew of four; up to 80 passengers.

Dimensions: span 130.8 ft, length 136.2 ft, height 38.5 ft.

Weight: empty 119,231 lb, gross 322,500 lb (KC-135E 301,600 lb).

Ceiling: 45,000 ft.

Performance: max speed at 30,000 ft 610 mph, max speed at 45,000 ft 571 mph, max speed at 10,000 ft 518 mph, cruising speed at altitude 518 mph (Mach 0.77), unlim. ceiling 33,000 ft.

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.


IOC: September 1970.

Production: 131.

Inventory: 120 by end 2004.

Unit Location: Active: Altus AFB, Okla., Dover AFB, Del., Travis AFB, Calif. ANG: Stewart AFB., N.Y. AFRC: Dover AFB, Del., Lackland AFB, Tex., Travis AFB, Calif., Westover AFB, Mass.

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 passengers.

Dimensions: span 222.8 ft, length 247.9 ft, height 65 ft.

Weight: empty 374,000 lb, gross 769,000 (warranty 840,000) lb.

Ceiling: 45,000 ft.

Performance: max speed at 25,000 ft 571 mph, 35,750 ft, T-O run at 5,8,300 ft, landing run, max landing weight at S/L 2,360 lb, range with max payload 3,434 miles, range with max fuel 7,245 miles. Normal cruising speed at altitude 518 mph (Mach 0.77), unlim. range with in-flight air refueling.

COMMENTARY

Strategic Transports

One of the world’s largest aircraft, the C-5 is able to carry different fuels in the wing and body tanks. Eight KC-135Rs are air refuelable. Twenty KC-135Rs are being outfitted with the capability to relay Link 16 tactical information beyond other aircraft’s line of sight. Plans to replace KC-135Es, the oldest models in the KC-135 fleet, by leasing 20 and buying 80 new Boeing 767s modified as tankers were on hold as of early 1982, and redeliveries began in July 1984. KC-135T aircraft (formerly KC-135Q) were capable of refueling the now-retired SR-71s and retain the capability to carry different fuels in the wing and body tanks. Eight KC-135Rs are air refuelable. Twenty KC-135Rs have wing-mounded refueling pods for enhanced refueling of USN and NATO aircraft.

Ongoing modifications are extending the capability and operational utility of the KC-135. The recently completed Pacer CRAG avionics modernization program installed a new compass, radar, and GPS navigation systems, a traffic alert and collision avoidance system (TCAS), and new digital multifunctional cockpit displays. The Global Air Traffic Management (GATM) modification further improves the avionics, ensuring future access into premium airspace. Forty KC-135R/T aircraft are being outfitted with the capability to relay Link 16 tactical information beyond other aircraft’s line of sight. Plans to replace KC-135Es, the oldest models in the KC-135 fleet, by leasing 20 and buying 80 new Boeing 767s modified as tankers were on hold as of early spring 2004, pending results of several reviews.

MC-130P Combat Shadow

Brief: Aircraft that flies clautistic or lowvisibility, low-level missions into denied areas to provide air refueling for Special Operations Forces (SOF) helicopters or to air-drop small special operations teams, small bundles, and Zodiac combat rubber raiding craft.

Function: Air refueling for SOF helicopters/airdrop.

Operator: AETC, AFSC, ANG, AFRC.

First Flight: Dec. 8, 1964 (as HC-130H).

Delivered: from 1965.


Production: (converted).

Inventory: 36.


Contractor: Lockheed Martin (airframe); Boeing.


Accommodation: four flight crew, plus four mission crew.

Dimensions: span 132.6 ft, length 98.8 ft, height 38.5 ft.

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

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

COMMENTARY

KC-135

The KC-10 can be air refueled by a KC-135 or another KC-135, increasing its range and diminishing the need for forward bases, leaving vital fuel supplies in the theater of operations untouched. The KC-10A is a DC-10 Series 30CF, modified to include fuselage fuel cells, an air refueling operator’s station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military refueling pods. Other modifications include the addition of communications, navigation, and surveillance equipment to meet civil air traffic control requirements.
C-17 Globemaster III (Ssgt. Suzanne M. Jenkins)

carry unusually large and heavy cargo for intercontinental ranges at high speeds. It can take off and land in relatively short distances and taxi on standard surface faces 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. One ANG and 40 AFSRC organizations are C-5A-equipped. The reliability and maintainability of the C-5A version is currently under assessment. A total of 14 C-5As, including the 11 oldest, are to be retired.

C-5B. Generally similar to the C-5A but embodies all the improvements introduced since completion of C-5A production, including the strengthened wings, improved turbofans, and updated avionics, with color weather radar and triple INS. The first C-5B flew for the first time in November 1985 and was delivered to Altus AFB, Okla., in January 1986.

C-5C. Two C-5As assigned to Travis AFB, Calif., were modified to carry outsized cargo space for NASA by extending the cargo bay and modifying the aft doors. All USAF Galaxys are undergoing a complete 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 contracted an SDD for a reliability enhancement and re-engining program for C-5/C-5A/B aircraft to take advantage of an estimated service life through 2040. Prototypes to be completed in 2006, with program completion expected 2010. To enhance force protection, a number of C-5s has been equipped with a missile defense system.

C-17 Globemaster III

Brief: A heavy-lift, air refuelable cargo transport for intertheater (strategic) and intratheater (tactical) direct delivery airlift of all classes of military cargo, including outsized items.

Function: Cargo and troop transport.

Operator: AETC, AFMC, AMC, ANG, AFRC.


Production: 180 (planned).

Inventory: 109.


Power Plant: Four Pratt & Whitney TF33-P-7 turbofans, each 21,000 lb thrust.

Accommodation: crew of five; cargo on 13 standard 463L pallets. Alternative freight or vehicle payloads, 200 fully equipped troops, 155 paraatroops, or 103 litter patients plus attendants.

Dimensions: span 159.9 ft, length 168.3 ft, height 39.2 ft.

Weight: operating payload 38,000 lb; max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb normal, 344,000 lb emergency war planning.

Ceiling: 45,000 ft.

Performance: max cruising speed 466 mph, range 4,950 miles.


IOC: May 1965.

Production: 285.

Inventory: 59.


Operator: Lockheed Martin.

Power Plant: four Pratt & Whitney TF33-P-7 turbofans, each 21,000 lb thrust.

Accommodation: crew of five; cargo on 13 standard 463L pallets. Alternative freight or vehicle payloads, 200 fully equipped troops, 155 paraatroops, or 103 litter patients plus attendants.

Dimensions: span 159.9 ft, length 168.3 ft, height 39.2 ft.

Weight: operating payload 38,000 lb; max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb normal, 344,000 lb emergency war planning.

Ceiling: 45,000 ft.

Performance: max cruising speed 466 mph, range 4,950 miles.

COMMENTARY

Longtime mainstay of USAF’s airlift fleet, the C-141 was the first jet aircraft designed to meet military standards as a troop and cargo carrier. However, with the continuing deployment of C-17 aircraft, all will be retired by 2006.

C-141A entered service with MAC in April 1965; 285 were built, some of which were structurally modified to accommodate the Minuteman ICBM.

C-141B is a stretched C-141A with in-flight refueling capability. All C-141As (except four AFMC aircraft used for test purposes) were modified by 23.4 ft in to expand lift capacity. First C-141B flew March 1977 and redeliveries took place between December 1979 and June 1982. The modification gave USAF the equivalent of 90 additional C-141A aircraft. Subsequent improvements include structural upgrades, a state-of-the-art autopilot and all-weather landing system, and improved airdrop systems. Modification of 13 C-141Bs has increased their SOLL capability and survivability.

C-141C is a C-141B modified with computerized glass-cockpit instrumentation and digital flight-management system, with integrated GPS data for navigation and modern navigation safety equipment. The first version, which rolled out at Warner Robbins ALC, Ga., Oct. 1, 1997, was assigned to AFRC’s 452nd Air Mobility Wing, March ARB, Calif.

C-141B Starlifter (Tsgt. Rick Sforza)

First Flight: August 1968.


IOC: circa 1968.

Production: 24.

Inventory: six.

Unit Location: Andrews AFB, Md., Ramstein AB, Germany. AFRIC: (Assoc.) Scott AFB, Ill.
**C-12 Huron**

**Brief:** Aircraft to provide airlift support for attack and military advisory groups worldwide.

**Function:** Special airlift.

**Operator:** AFMC, PACAF.

**First Flight:** Oct. 27, 1972 (Super King Air 200).

**Delivered:** 1974–late 1980s.

**IOC:** circa 1974.

**Production:** 88.

**Inventory:** 27.

**Unit Location:** Elmendorf AFB, Alaska, Osan AB, South Korea, various overseas embassies.

**Contractor:** Beech.

**Power Plant:** (C-12J) two Pratt & Whitney Canada PT6A-65B turboprops, each 1,100 shp.

**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.

**COMMENTARY**

C-9A. A derivative of the DC-9 Series 30 commercial airliner, the recently retired C-9A was the only USAF aircraft modified specifically for the aeromedical evacuation mission, a role now undertaken by C-130, C-141, and C-17 aircraft. One remaining C-9A provides distinguished visitor (DV) airlift in Europe. Because of the critical nature of its mission, the aircraft carries a flight mechanic and a small supply of spares.

C-9C. Three specially configured C-9s were delivered to Andrews AFB, Md., in 1975 for the special air mission supporting the President and other US government officials. Upgrades include improvements to the passenger communications equipment, GATM, TAWS, and vertical separation equipment.

**C-20 Gulfstream**

**Brief:** A twin-engine turboprop aircraft acquired to provide executive airlift for high-ranking government and DOD officials.

**Function:** Operational support airlift; special air mission.

**Operator:** AMC.

**First Flight:** December 1979.

**Delivered:** September 1983–1989.

**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 turboprops, each 11,400 lb thrust; C-20H: two Rolls Royce–Tay MK611-8 turboprops, each 13,850 lb thrust.

**Dimensions:** span 77.8 ft; length (C-20A/B) 83.1 ft, (C-20H) 88.3 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.

**COMMENTARY**

C-20A. Three Gulfstream III transports were acquired to replace aging C-140B aircraft. They provided USAFE’s operational support airlift fleet with intercontinental range and ability to operate from short runways. Retired in September 2002.

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

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

Upgrade for C-20A/B/H aircraft includes GPS, vertical separation equipment, GATM, and TCAS.

**C-21**

**Brief:** Aircraft designed to provide cargo and passenger airlift and transport litters during medical evacuations.

**Function:** Pilot seasoning, passenger and cargo airlift.

**Operator:** AETC, AMC, PACAF, USAFE, ANG.

**First Flight:** January 1973.

**Delivered:** April 1984–October 1985.

**IOC:** April 1984.

**Production:** 84.

**Inventory:** 77.

**Unit Location:** Andrews AFB, Md., Keesler AFB, Miss., Langley AFB, Va., Maxwell AFB, Ala., Offutt AFB, Neb., Peterson AFB, Colo., Ramstein AB, Germany, Randolph AFB, Tex., Scott AFB, Ill., Stuttgart, Germany, Wright-Patterson AFB, Ohio, Yokota AB, Japan.

**Contractor:** Gates Learjet.

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

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

**Dimensions:** span 39.5 ft, length 48.6 ft, height 12.2 ft.

**Weight:** empty, equipped 10,119 lb, gross 18,300 lb.

**Ceiling:** 51,000 ft.

**Performance:** max level speed at 25,000 ft 542 mph, range with max passenger load 2,306 miles, with max cargo load 1,603 miles.

**COMMENTARY**

C-21A aircraft provide operational support airlift for time-sensitive movement of people and cargo throughout the US and the Pacific and European Theaters, including aeromedical missions if required. Upgrades to include GATM and TCAS.

**C-32**

**Brief:** A modified Boeing 757-200 used to provide transportation for the vice president, Cabinet, Congressional members, and other high-ranking US and foreign officials.

**Function:** VIP air transport.

**Operator:** AMC.


**Delivery:** June–December 1998.

**IOC:** 1998.

**Production:** four.

**Inventory:** five.

**Unit Location:** Andrews AFB, Md.

**Contractor:** Boeing.

**Power Plant:** two Pratt & Whitney PW2040 turbosfans, each 41,700 lb thrust.

**Accommodation:** 16 crew and 45 passengers.

**Dimensions:** span 124.8 ft, length 155.2 ft, height 44.5 ft.

**Weight:** empty 127,800 lb, gross 255,000 lb.

**Ceiling:** 41,000 ft.

**Performance:** cruise speed Mach 0.8–0.86 (530 mph), range 5,750 miles.

**COMMENTARY**

A military version of the commercial Boeing 757-200, four new C-32As were purchased as replace-ments for the C-137/C aircraft. The commercial DV inte-rior includes a crew rest area, DV stateroom, conference area, and general passenger area. The passenger communications system provides worldwide clear and secure voice and data communications. Modern flight deck avionics allow operations to any suitable airfield in the world and provide an upgrade path as new capabilities become available. Upgrades include in-stallation of a digital communications management system and broadband data transmit and receive, providing an office-in-the-sky capability.

**C-37A**

**Brief:** A modified Gulfstream V utilized as part of the executive fleet, providing transportation for the vice president, Cabinet, Congressional members, Secre-tary of Defense, Service Secretaries, and other promi-nent US and foreign officials.

**Function:** VIP air transport.

**Operator:** AMC, PACAF.

**First Flight:** USAF October 1998.

**Delivery:** October 1998–present.

**IOC:** Dec. 9, 1998.

**Production:** 10.

**Inventory:** nine.

**Unit Location:** Andrews AFB, Md.; Chievres, Bel-gium; Hickam AFB, Hawaii; MacDill AFB, Fla.
C-37A

Brief: A twin-engine transcontinental aircraft used to provide transportation for DVs such as Congressional and high-ranking military members. It can also be configured to provide transportation for GATM and continuing passenger communications support. Five C-37As are being leased from Gulfstream Aerospace as combatant commander support aircraft; three are assigned to MacDill AFB, Fla., one to Cheyres; and one to Hickam AFB, Hawaii. Upgrades include GATM and continuing passenger communications system upgrades to the Andrews-based aircraft.

ACCOMMODATION
- Dimensions: span 112 ft 7 in, length 110 ft 4 in, height 41 ft 2 in.
- Weight: gross 171,000 lb.
- Ceiling: 41,000 ft.
- Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

ม commitments, compared to earlier production C-130s, have been extended to more than 200 more aircraft. The C-130J has been modified for improved performance and increased range, with the ability to carry up to 200 more aircraft. The C-130J has been used for a variety of missions, including aerial refueling, search and rescue, and humanitarian aid. However, it is generally similar to the later C-130 models.

C-130 Hercules

Brief: A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and paradropping of troops and equipment into hostile areas.

ACCOMMODATION
- Dimensions: span 112 ft 7 in, length 110 ft 4 in, height 41 ft 2 in.
- Weight: gross 171,000 lb.
- Ceiling: 41,000 ft.
- Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-40

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-130 Hercules

Brief: A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and paradropping of troops and equipment into hostile areas.

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-40

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-130 Hercules

Brief: A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and paradropping of troops and equipment into hostile areas.

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-40

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-130 Hercules

Brief: A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and paradropping of troops and equipment into hostile areas.

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.

C-40

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: 41,000 ft.

Performance: cruise speed 0.78–0.82 Mach, range 3,450 miles.
The Joint Primary Aircraft Training System (JPATS)

**T-6A Texan II**

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

**Function:** Primary trainer.

**Operator:** AETC, AFRC, USN.

**First Flight:** July 15, 1998.

**Delivery:** May 2000–present (operational aircraft).

**IOC:** November 2001.

**Production:** USAF 372 (ordered), USN 328 (planned).

**Unit Location:** USAF: Active; Laughlin and Randolph AFBs, Tex., Vance AFB, Okla., NAS Pensacola, Fla. (forward operating station); AFRC: (Assoc.) Randolph AFB, Tex.

**Contractor:** Raytheon.

**Power Plant:** One Pratt & Whitney Canada PT6A-68 turboprop, 1,100 shp.

**Accommodation:** Two, in tandem, on zero/ezero rejection 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 Joint Primary Aircraft Training System (JPATS)
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, pressure-sivated cockpit, larger, bird-resistant canopy, and new digital avionics. The JPATS is replacing USAF’s T-37Bs and USN’s T-34Cs in primary pilot training, as well as supporting undergraduate naval flight officer and USAF navigator training. Pilot training in T-6A began at Moody AFB, Ga., in October 2001.

T-37 Tweet
A twin-engine jet used for training undergraduate pilots and undergraduate navigator and tactical navigator students in fundamentals of aircraft handling and instrument, navigation, formation, and night flying.

Function: Primary trainer.
Operator: AETC, AFRC.
First Flight: September 1955.
IOC: 1957.
Production: 985.
Inventory: 333.
Unit Location: Active: Columbus AFB, Miss., Laughlin, Randolph, and Sheppard AFBS, Tex., Vance AFB, Okla. AFRC: (Assoc.) Randolph AFB, Tex.
Contractor: Cessna.

Power Plant: Two Continental J69-T-25 turbojets, each 1,025 lb thrust.
Accommodation: Two, side by side, on ejection seats.
Dimensions: Span 33.7 ft, length 29.2 ft, height 9.1 ft.
Weight: Empty 3,870 lb, gross 6,625 lb.
Performance: Max speed at S/L 315 mph, range 460 miles.

COMMENTARY
USAF’s first purpose-built jet trainer, the T-37 has been AETC’s standard two-seat primary trainer. A distinctive blue-and-white finish is intended to help the T-37 be easily distinguished from other primary trainers. A distinctive blue-and-white finish is intended to help the T-37 be easily distinguished from other primary trainers.

T-37B. The original T-37A was superseded in November 1959 by the T-37B, with improved radio navigational equipment, UHF radio, and upgraded instrument. Kits were subsequently produced to extend the T-37’s life. All T-37s are designated as C models upon modification of the avionics system and equipment. The aircraft is used to teach supersonic techniques, aerobatics, formation, navigation, flying, and cross-country and low-level navigation. Also used to train test pilots and flight engineers at Edwards AFB, Calif., and at AFSC’s training centers. It is also used to train test pilots and flight engineers at Edwards AFB, Calif., and to train test pilots and flight engineers at Edwards AFB, Calif.

T-38 Talon
Brief: A twin-engine, high-altitude, supersonic jet trainer used primarily for training under-graduate pilot and instructor pilot training.

Function: Primary trainer.
Operator: AETC, AFRC.
First Flight: April 1959.
IOC: June 1961.
Production: 3,000.
Inventory: 1,100.

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

Accommodation: Two, in tandem, on ejection seats.

Dimensions: Span 25.3 ft, length 46.3 ft, height 12.8 ft.
Weight: Empty 7,164 lb, gross 12,500 lb.
Performance: Max level speed 812 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 in the T-38’s workload through introduction of the T-1A and JSUPT, the service life of the T-38s 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, aerobatics, formation, night and instrument flying, and cross-country and low-level navigation. Also used to train test pilots and flight engineers at Edwards AFB, Calif., by AFMC to test experimental equipment, and to train mission pilots.

T-38B. A slightly different version, with a sunroof and practice bomb dispenser, used by AETC for introduction to Fighter Fundamentals.

T-38C. All T-38A and AT-38B airframes will be redesignated as C models upon modification of the avionics systems begun in 2000. The T-38C was received late summer 2002; planned completion is 2008. Additionally, the propulsion system is being upgraded to improve performance and reliability. First modification was early 2003, and planned completion is 2011.

T-41 Mescalero
Brief: A high-performance sailplane used primarily for aerodynamic and navigation courses.

Function: Training, support.
Operator: USAFA.
Inventory: 12.
Unit Location: USAFA, Colo.
Contractor: Blanik.

Accommodation: Two; one, two, or three passengers.
Dimensions: Span 36.1 ft, length 26.5 ft, height 8.9 ft.
Weight: Empty 60 lb, gross 360 lb.
Performance: Speed 142.6 mph, glide ratio 28:1.

COMMENTARY
The T-41 is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Soar-For-All program.

T-G-108 Merlin
Brief: Two-seat medium-performance sailplane used for introductory glider training, instructor upgrade training, and basic cross-country soaring training.

Function: Trainer.
Operator: USAFA.
Delivered: May 2002.
IOC: December 2002.
Production: 12.
Inventory: 12.
Unit Location: USAFA, Colo.
Contractor: Blanik.

Accommodation: Two; one, two, or three passengers.
Dimensions: Span 55.4 ft, length 27.9 ft, height 6.2 ft.
Weight: 1,168 lb.
Performance: Speed 142.6 mph, glide ratio 28:1.

COMMENTARY
The T-G-108 is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Soar-For-All program.

T-43
Brief: A twin-engine jet used for training under-graduate pilots and undergraduate navigator and tactical navigator students in fundamentals of aircraft handling and instrument, navigation, formation, and night flying.

Function: Primary trainer.
Operator: AETC, AFRC.
Production: 19.
Inventory: 10.
Unit Location: Randolph AFB, Tex.
Contractor: Boeing.

Power Plant: Two Pratt & Whitney JT8D-9 turbofans, each 1,450 lb thrust.
Accommodation: Crew of two; 12 students and six instructors.
Dimensions: Span 25.3 ft, length 46.3 ft, height 12.8 ft.
Weight: Empty 7,164 lb, gross 12,500 lb.
Performance: Max level speed 812 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 in the T-38’s workload through introduction of the T-1A and JSUPT, the service life of the T-38s 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, aerobatics, formation, night and instrument flying, and cross-country and low-level navigation. Also used to train test pilots and flight engineers at Edwards AFB, Calif., by AFMC to test experimental equipment, and to train mission pilots.

T-38B. A slightly different version, with a sunroof and practice bomb dispenser, used by AETC for introduction to Fighter Fundamentals.

T-38C. All T-38A and AT-38B airframes will be redesignated as C models upon modification of the avionics systems begun in 2000. The T-38C was received late summer 2002; planned completion is 2008. Additionally, the propulsion system is being upgraded to improve performance and reliability. First modification was early 2003, and planned completion is 2011.

T-41 Mescalero
Brief: A high-performance sailplane used primarily for aerodynamic and navigation courses.

Function: Training, support.
Operator: USAFA.
Inventory: 12.
Unit Location: USAFA, Colo.
Contractor: Blanik.

Accommodation: Two; one, two, or three passengers.
Dimensions: Span 36.1 ft, length 26.5 ft, height 8.9 ft.
Weight: Empty 60 lb, gross 360 lb.
Performance: Speed 142.6 mph, glide ratio 28:1.

COMMENTARY
The T-41 is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Soar-For-All program.

T-G-108 Merlin
Brief: Two-seat medium-performance sailplane used for introductory glider training, instructor upgrade training, and basic cross-country soaring training.

Function: Trainer.
Operator: USAFA.
Delivered: May 2002.
IOC: December 2002.
Production: 12.
Inventory: 12.
Unit Location: USAFA, Colo.
Contractor: Blanik.

Accommodation: Two; one, two, or three passengers.
Dimensions: Span 55.4 ft, length 27.9 ft, height 6.2 ft.
Weight: 1,168 lb.
Performance: Speed 142.6 mph, glide ratio 28:1.

COMMENTARY
The T-G-108 is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Soar-For-All program.
COMMENTARY

The TG-10C is an L-31AC Blanik sailplane, produced in the Czech Republic and used primarily for sport training and aerobatic demonstrations.

TG-10D Peregrine

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

Function: Trainer.

Operator: USAFA.

First Flight: May 1965 (commercial version).

Number: four.

Production: 14.

Remarks: The TG-10C is the TG-10D Peregrine, produced in the Czech Republic and used primarily for sport training and aerobatic demonstrations.

Helicopters

HH-60F Pave Hawk

Brief: Specialized military conversion of the HH-60G Pave Hawk.

Function: Specialized military conversion of the HH-60G Pave Hawk.

Operator: USAFA.

First Flight: May 1965 (commercial version).

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.

Remarks: The HH-60G Pave Hawk is a heavily modified version of the HH-60H Pave Hawk, with significant modifications to improve its survivability and combat effectiveness.

Additional Details:

- Armament: Both the HH-60G and HH-60F Pave Hawks are equipped with a variety of armaments, including machine guns, air-to-air missiles, and air-to-ground missiles.
- Sensors: These helicopters are equipped with advanced sensor suites, including air-to-air and air-to-ground radars, advanced targeting systems, and electronic warfare systems.
- Combat Capabilities: The HH-60G and HH-60F Pave Hawks are designed for counterinsurgency, special operations, and combat search and rescue missions.

HH-60G Pave Hawk (MSgt. Dave Nolan)
the aircraft’s hydraulics, wiring, and basic airframe structure for increased gross weight, and an auto-
mated blade/pylon fold system optimized for shipboard compatibility. All aircraft modified to support aircrew
eyes/respiratory protection system.

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

UH-1 Iroquois
Brief: Modified Bell helicopter used to support Air
Force ICBM facilities and for administrative airlift.
Function: Utility helicopter. 
Operator: AETC, AFMC, AFSOC, AFSPC, AMC, PAF
First Flight: circa 1956. 
Delivered: from September 1970. 
Production: 79.

Inventory: 61. 
Contractor: Bell.

Power Plant: Pratt & Whitney Canada T400-CP-400 Turbo Twin-Pac. 1.290 shp.
Accommodation: two pilots and 14 passengers or cargo. 
Weight: gross and mission weight 11,200 lb.
Dimensions: rotor diameter (with tracking tips) 48 ft, fuselage length 42.3 ft, height 14.3 ft.
Ceiling: 13,000 ft.
Performance: max cruising speed at S/L 115 mph, max range, no reserves, 261 miles. 
Armament: (optional) two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-
tube 2.75-in rocket launchers.

COMMENTARY
UH-1N is a twin-engine version of the UH-1 utility helicopter (Bell Model 212), most of which are allo-
cated for AFSPC missile site support and for adminis-
trative/DV airlift. The UH-1N is also used by AETC’s 58th SOW, Kirkland AFB, N.M., for training purposes and by the 336th TG, Fairchild AFB, Wash., for aircrew survival training. Two UH-1N helicopters are main-
fed by the 336th TG, Fairchild AFB, Wash., for aircrew
survival training. Two UH-1N helicopters are main-
mated for AFSPC missile site support and for adminis-
tration.

Strategic Missiles

AGM-86 Air Launched Cruise Missile
Brief: A small, subsonic, winged air vehicle, de-
ployed on B-52H aircraft, 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. 
Warhead: AGM-86B: W80-1 nuclear; AGM-86C: blast/ fragmentation conventional; AGM-86D: hard target pengu
etrading warhead.
Dimensions: length 20.8 ft, body diameter 2 ft, wingspan 12 ft.
Weight: 3,150 lb (B), 3,277 lb (C). 
Performance: max range 2,277 miles; speed Mach 0.6, range 1,500+ miles (AGM-86B). 

COMMENTARY
AGM-86B. Prototype cruise missile, developed in the mid-1970s. Slightly smaller than the later versions, it never entered production.

AGM-86C. First production version, the B is pro-
grammed for strategic attack on surface targets. Small radar signature and low-level flight capability enhance the missile’s effectiveness. The last of 1,715 produc-
tion models was delivered in October 1986. Undergo-
ing SLEP to extend life to FY30.

AGM-86D. AGM-86C with Block 1A enhancements with improved range and payload capability, and hardening against over-the-horizon, near-real-time intelligence, and mis-
mission software improvements. Cockpit modifications
include three MFDs, integrated digital map, and mis-
ion commander situation awareness panel in the
cabin area.

LG-118 Peacekeeper
Brief: A solid-fuel ICBM capable of delivering a
thermonuclear payload of 10 warheads with high accu-

accuracy over great distances.
Function: Strategic surface-to-surface ballistic mis-
iles.
Operator: AFSPC.
First Flight: June 17, 1983. 
IOC: December 1986, F.E. Warren AFB, Wyo.
Production: 50. 
Unit Location: F.E. Warren AFB, Wyo.
Contractor: Lockheed Martin.

Power Plant: first three stages: solid propellant; fourth stage: storable liquid; by Thiokol, Aerojet, Her-
cules, and Rocketdyne, respectively.

Guidance: inertial guidance system.
Warheads: 10 Avco Mk 21 MIRVs.
Dimensions: length 71 ft, diameter 7.7 ft. 
Weight: approx 195,000 lb.

LG-118A
Developed initially in response to an in-
creased Soviet strategic threat, deployment was c apped to FY90 in response to the changing international political climate.

Housed in converted Minuteman III silos, Peace-
keepers are a four-stage ICBM, including up to 10 independ-
tly targetable re-entry vehicles. It is more ac-
curate and has a greater payload and range than the Minuteman III. Its greater resistance to nuclear
effects and its more capable guidance system provide a greatly improved ability to destroy very hard targets. These attributes, combined with its prompt response, provide
a decisive deterrent.

On Oct. 3, 2002, USAF began deactivation of Peace-
keeper ICBMs, scheduled for retirement under nuclear
force structure reductions. Final decommissioning is
expected to be completed by October 2005.

LGM-30 Minuteman
Brief: A solid-fuel ICBM capable of being fired from silo launchers and delivering a thermonuclear payload of one to three warheads with high accuracy over great distances.

Function: Strategic surface-to-surface ballistic mis-
iles.
Operator: AFSPC.
IOC: December 1962, Malmstrom AFB, Mont. 
Production: 1,000.

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

Power Plant: stage 1: Thiokol M-S5 solid-propellant motor, 210,000 lb thrust; stage 2: Aerojet General SR-19 AJ-1 solid-propellant motor, 60,300 lb thrust; stage 3: Thiokol SR-73 AJ-1 solid-propellant motor, 34,400 lb thrust.

Guidance: inertial guidance system.
Warheads: one–three Mk 12/12A MIRVs (downloaded to one).

Dimensions: length 59.8 ft, diameter of first stage 5.5 ft. 
Weights: max takeoff (approx) 78,000 lb. 
Performance: speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load more than 6,000 miles.

COMMENTARY
A key element in the US strategic deterrent posture, Minuteman is a three-stage, solid-propellant ICBM, housed in an underground silo.

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

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

LGM-30G. The Minuteman III became operational in June 1970, providing improved range, retarget-
ning, and the capability to place multiple indepen-
dently targetable re-entry vehicles (MIRVs) on three
targets with a high degree of accuracy. USAF initially deployed 550 in 11 squadrons. A single re-entry vehicle configuration has been demonstrated, planned for, and is being worked in accordance with strategic arms control negotiations. Currently a total of 500 Minuteman IIs are based at Minot AFB, N.D.; F.E. Warren AFB, Wyo.; and Malmstrom.

An extensive life extension program is ensuring Minuteman III can remain a viable air-to-surface missile. This program includes refurbishment of liquid propulsion post-boost rocket engine, remanufacture of the solid-propellant rocket motor, reinstallation of the environmental control system, repair of launch facilities, installation of upgraded, survivable communications equipment, and a C2 sustainment program.

**Tactical Missiles and Weapons**

**AGM-65 Maverick**

**Brief:** A tactical, TV- or imaging-infrared (IIR)-guided air-to-surface missile carried by fighters and designed for use in CAS, interdiction, and defense suppression missions, having standoff capability and high probability of strike against a wide range of targets.

**Guidance:** Self-homing, EO guidance system (IIR on D and G models).

**Warhead:** AGM-65A/B/D/H 125-lb high-explosive, shaped charge; AGM-65G/K 298-lb blast fragmentation.

**Dimensions:** length 8.2 ft, body diameter 1 ft, wingspan 2.3 ft.

**Weight:** launch weight (AGM-65A) 462 lb, (AGM-65G) 670 lb.

**Performance:** range 9.2 miles.

**COMMENTSARY**

Maverick missiles have a long and distinguished combat record. They were first deployed by USAF in Vietnam and were used extensively during Gulf War I and II. They currently equip A-10, F-15E, and F-16 aircraft for use against tanks and columns of vehicles and in the SEAD role.

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

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

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

**AGM-65G.** Uses the IIR seeker with an alternate 298-lb blast fragmentation warhead for use against hardened targets. Software has been modified to include options for targeting ships and large land targets as well as mobile armor. This version also has a digital autopilot and a pneumatic, rather than hydraulic, actuation system. USAF received its first G model in 1989.

**AGM-65H.** AGM-65B modified with an upgraded TV seeker providing significant reliability, maintainability, and performance improvements over the AGM-65B seeker and double the standoff range.

**AGM-65K.** AGM-65G modified with the same upgraded TV seeker as in the AGM-65H to provide a TV-guided version of the Maverick with the 298-lb blast fragmentation warhead.

**AGM-84 Harpoon**

**Brief:** An adverse weather capable, sea-skimming, active radar-guided, anti-ship cruise missile system capable of being fired from B-52H aircraft, ships, and submarines.

**Function:** Air-to-surface antisubmarine.

**First Flight:** August 1969.

**Delivered:** from August 1972.

**IOC:** circa 1985 (USAF).

**Production:** sustainment phase.

**Contractor:** Boeing (McDonnell Douglas).

**Power Plant:** Thiokol TX-481 solid-propellant rocket motor.

**Guidance:** self-homing, EO guidance system (IIR on D and G models).

**Warhead:** AGM-84A/B/C/D 376-lb high-explosive, shaped charge; AGM-84F 576-lb high-explosive fragmentation, weighing 500 lb.

**Dimensions:** length 12.6 ft, body diameter 1.1 ft, wingspan 3.7 ft.

**Performance:** speed high subsonic, range more than 57 miles.

**COMMENTSARY**

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

**AGM-84D.** A variant of the USN Harpoon that has been adapted for use on B-52 bombers, which can carry eight missiles.

**AGM-88 HARM**

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

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

**First Flight:** April 1979.

**Delivered:** 1982–98.

**IOC:** circa 1984.

**Production:** sustainment phase.

**Contractor:** Raytheon.

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

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

**Warhead:** High-explosive fragmentating, 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 to 40,000 feet, range more than 10 miles.

**COMMENTSARY**

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 provides for second generation anti-radiation missile greatly improved capability over first-generation Shrikes and Standards. The AGM-88 proved highly effective against enemy ground radar during the Gulf War I and, again, 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.

**AGM-88B.** Older versions of the AGM-88B are being upgraded with the enhanced capability guidance seeker currently equipping the G version.

**AGM-88C.** This current production version has a more lethal warhead, containing tungsten alloy cubes, rather than steel, and the enhanced-capability AGM-88C-1 guidance head. Erasable electronically programmable read-only memory has been retrofitted on ACC, PACAF, and USAFE HARMs, permitting changes to missile memory in the field. 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 radars in the target area; home-on jamming capability to be added to the C. Further upgrades to include GPS precision navigation capability.

**AGM-130**

**Brief:** A ground- and air-launched powered TV- or IIR-guided air-to-surface missile, carried by the F-15E and designed for high- and low-altitude strikes against air defense and aircraft targets.

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

**First Flight:** 1984.

**Delivered:** November 1992–FY00.

**IOC:** 1994.

**Production:** sustainment phase.

**Contractor:** Boeing.

**Guidance:** TV or IIR seeker, or DME transponder.

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

**Dimensions:** length 12.8 ft, body diameter 1.5 ft, wingspan 4.9 ft.

**Weight:** launch weight 2.917 lb.

**Performance:** cruising speed subsonic, ceiling in...
**AGM-130 (Boeing)**

**Production:** Sustainment phase.

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

**Power Plant:** Hercules Mk 58 Mod 0 4.5 sec boost 11 sec. sustain rocket motor, altitude limited digital control system, providing it with double the standoff range of the GBU-15.

**Guidance:** INS/GPS, all-weather, all-altitude.

**Dimensions:** Length 12 ft, body diameter 8 in., wingspan 26 ft.

**Weight:** Launch weight 504 lb.

**Performance:** Estimated: max speed more than 2.1 Mach, range more than 34 miles.

**COMMENTARY**

Early versions. Production of Sparrow has been under way for more than 40 years. Approximately 34,000 early models (AIM-7A/B/C/D/E) were produced. Compared to the earlier versions, the advanced solid-state AIM-7F, in-flight-maintainable. USAF plans to buy 5,097 missiles.

AIM-9 Sidewinder

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

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

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

**Dimensions:** Body length 9.4 ft, body diameter 5 in., finspan 2.1 ft.

**Weight:** Launch weight 190 lb.

**Performance:** Max speed Mach 2+, range 10+ miles.

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

**AIM-9X** is the result of a Navy–Air Force program, derived from a jointly funded demonstration and validation contract. The AIM-9X entered LRIP from November 2000. USAF's F-15 equipped with 19th FS, part of the 3rd Wing at Elmendorf AFB, Alaska, became the first operational units to receive AIM-Xs in November 2003. USAF plans to buy 5,097 missiles.

**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 1994.

**Delivered:** 2000–FY13 (planned).

**IOC:** 2000 (USAF).

**Production:** 6,114 (planned).

**Contractor:** Raytheon; Loral.

**Guidance:** INS/GPS.

**Dimensions:** Length 13.3 ft. Weight: 1,065–1,500 lb.

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

**AIM-9 Sidewinder**

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

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

**Delivered:** First of 76 LRIP missiles due April 2003; through FY17 (planned).

**IOC:** September 2003

**Production:** 2,853 + 1,426 JASSM-ER (planned).

**Contractors:** Boeing; Pratt & Whitney; Honeywell.

**Dimensions:** Length 12 ft, body diameter 8 in., wingspan 26 ft.

**Weight:** 2,250 lb.

**Performance:** 1,000-lb class penetrator and blast-fragmentation warhead; standoff range greater than 230 miles.

**AIM-7 Sparrow**

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

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

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

**Delivered:** From 1965.

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

**AIM-9 Sidewinder**

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

**First Flight:** September 1953.

**Delivered:** 1983–present. First production AIM-9X delivered May 1, 2002.

**IOC:** circa 1983 (AIM-9M).

**Production:** Sustainment phase (AIM-9M); LRIP from November 2000 (AIM-9X).

**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:** Body length 9.4 ft, body diameter 5 in., finspan 2.1 ft.

**Weight:** Launch weight 190 lb.

**Performance:** Max speed Mach 2+, range 10+ miles.

**AIM-120 AMRAAM**

**Brief:** 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.

**Contractor:** Raytheon.

**Production:** July 2010 (planned).

**IOC:** September 2011.

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

**Contractor:** Raytheon.

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

**Guidance:** Inertial/command, inertial with active radar terminal homing.

**Warhead:** High-explosive directed fragmentation warhead 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-7 Sparrow**

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

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

**First Flight:** December 1963 (AIM-7M).

**Delivered:** From 1965.

**IOC:** April 1976 (AIM-7F).
GBU-24 (Guy Aceto)

GBU-31 Joint Direct Attack Munition (SSgt. Suzanne M. Jenkins)

Contractor: Honeywell; Aerojet General; Olin; Alliant Tech.

Guidance: none (GBU-89).

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 705 lb.

Performance: dispenses 72 BLU-91 anti-armor and 22 BLU-92 antipersonnel mines.

COMMENTARY
The CBU-89 Gator dispenser holds 94 mines, of which 72 are antitank and 22 are antipersonnel. The mines are dispensed over the target in a rectangular pattern. The antitank mines, which can be fused for up to a 72-hour delay, have a magnetic influence fuze to sense armor.

CBU-104. USAF is retrofitting its inventory of Gators with the WCMD tail kit, which improves the munitions delivery accuracy when released from medium to high altitude. Tail kit purchases are based on available funding.

CBU-97/105 Sensor Fuzed Weapon

Brief: The CBU-97-105 Sensor Fuzed Weapon (PAW) provides the capability to attack non-hardened surface targets, with a minimum of collateral and environmental damage.

Function: Wide-area cluster munition.

First Flight: circa 1990.


Production: 3,937 (planned).

Contractor: Textron Systems.

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

COMMENTARY
The CBU-97 Sensor Fuzed Weapon (SFW) comprises an SUU-66/B tactical munitions dispenser with an FZU-39 fuze and a payload of 10 BLU-108/B submunitions. Each tactical munitions dispenser contains a SUU-66/B submunition, and each submunition contains four “skew” projectiles that, upon being thrown out, seek out their target and deliver an explosively formed penetrator. Each SFW can deliver a total of 40 lethal projectiles. The skew IR sensors can detect a vehicle’s IR signature; if no target is detected, the warhead detonates after a preset time. The SFW’s primary targets are massed tanks, armored personnel carriers, and propelled targets. It also provides direct attack capability and interdiction against C2 centers.

The CBU-97 is delivered as an unguided gravity weapon from the A-10, B-1, B-2, B-52H, F-15E, and F-16. A preplanned product improvement SFW variant is in full-scale production, incorporating improvements such as an active laser sensor, multimission warhead, and increased footprint.

CBU-105. Designation of a CBU-97 equipped with a WCMD tail kit. The CBU-105 can be accurately delivered from high altitude and in adverse weather from the B-1, B-2, B-52H, F-15E, and F-16. April 2003, during Iraqi Freedom, marked the combat debut of CBU-105; it was launched from a B-52 aircraft.

CBU-107 Passive Attack Weapon

Brief: The CBU-107 Passive Attack Weapon (PAW) provides the capability to attack non-hardened surface targets, with a minimum of collateral and environmental damage.

Function: Wide-area cluster munition.


Delivered: 2002–03

IOC: December 2002

Production: not available, but completed March 2003.

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

Guidance: via WCMD

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 1,000 lb.

Performance: delivers a high-speed volley of 3,000+ metal “arrows” projected from 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.

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 rather than explosives, thereby minimizing collateral and environmental damage. Following release from an aircraft, the WCMD-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, penetrating a target within a 200-ft radius. Two CBU-107s were used during Iraqi Freedom. CBU-107s are intended for use on F-16, F-15E, and B-52 aircraft.

GBU-10 Paveway II

Brief: An unpowered laser guided bomb (LGB) used to destroy high-value enemy targets from short standoff distances.

Function: Air-to-surface guided munition.

First Flight: early 1970s.

Delivered: from 1976.


Production: 10,000; continuing.

Contractor: Lockheed Martin; Raytheon.

Guidance: semiaactive laser.

Warhead: GBU-10C/D/E/F: Mk 84 bomb (2,000-lb unitary); GBU-10G/H/J: 1.2 ft, wingspan 5.5 ft.

Dimensions: length GBU-10C/D/E/F: 14.1 ft; GBU-10G/H/J: 14.8 ft, body diameter GBU-10C/D/E/F: 1.5 ft; GBU-10G/H/J: 1.2 ft, wingspan 5.5 ft.

Weight: 1,985 lb.

Performance: CEP 29.7 ft; range 9.2 miles.

COMMENTARY
Folding-wing Paveway II weapons are improved versions of the earlier fixed-wing Paveway I. The GBU-10 is used primarily for precision bombing against non-hardened targets but is capable of greater penetration than previous version. It can operate in cloud ceilings down to 2,500 ft. GBU-10 platforms include A-10, B-52, F-15E, F-16, and F-117 aircraft.

GBU-12 Paveway II

Brief: An unpowered LGB used to destroy high-value enemy targets from short standoff distances.

Function: Air-to-surface guided munition.

First Flight: early 1970s.


Production: about 30,000; continuing.

Contractor: Lockheed Martin; Raytheon.

Guidance: semiaactive laser.

Warhead: Mk 82 (500 lb) blast/fragmentation bomb.

Dimensions: length 10.9 ft, body diameter 10.7 in, wingspan 4.4 ft.

Weight: 603 lb.

Performance: CEP 29.7 ft; range about 6 miles.

COMMENTARY
Folding-wing Paveway II weapons are improved versions of the earlier fixed-wing Paveway I. The GBU-12 is used primarily to strike fixed armor, it can operate in cloud ceilings down to 2,500 ft. GBU-12 platforms include A-10, B-52, F-15E, F-16, and F-117 aircraft.

GBU-15

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

Function: Air-to-surface guided munition.

First Flight: 1975.

Delivered: 1983–complete

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-107/B.

Dimensions: length 12.8 ft, body diameter 1.5 ft, wingspan 4.9 ft.

Weight: 2,500 lb.

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

Performance: dispenses 202 BLU-97 combined effects bomblets over an area roughly 800 ft by 400 ft.

COMMENTARY
The CBU-87 Combined Effects Munition dispenses 202 BLU-97 shaped charge antipersonnel/antimateriel fragmentary/incendiary bomblets over the target in a rectangular pattern. It is currently delivered by USAF and Navy aircraft as an unguided gravity weapon. Density and size of the area covered depends on release parameters and spin rates.

CBU-103. USAF is retrofitting its inventory of CEMs with the WCMD tail kit. The WCMD improves the munitions delivery accuracy when released from medium to high altitude. Tail kit purchases are based on available funding.

CBU-89/104 Gator

Brief: The CBU-89 Gator is an antiarmor/antipersonnel mine dispenser used by USAF and Navy fighters and bombers for interdiction.

Function: Scatterable mines.

Production: sustainment phase.

GBU-24 (Guy Aceto)
GBU-15 is an air-launched, cruciform-wing glide bomb fitted with a guidance system designed to give it pinpoint accuracy. It is a small, lightweight, and versatile weapon. The GBU-15 is designed for use against soft targets. It is a precision-guided munition that can be used against a wide variety of targets, including tanks, enemy personnel, and other soft targets.

GBU-24 Paveway III: A precision air-to-ground low-level LGB equipped with an advanced guidance kit. The GBU-24 is designed to replace the GBU-15 and provide improved accuracy and standoff capability. It is capable of being dropped from high altitudes and controlled by another aircraft. The GBU-24 is used by the USAF, Navy, and Marine Corps.

GBU-28: A massive precision guided munition designed to be dropped by B-1, B-2, F-15, F-16, and F-18 aircraft. The GBU-28 is a 250-lb class weapon that is designed for use against hard targets such as bunkers, reinforced buildings, and other structures that are difficult to penetrate.

GBU-31 Small Diameter Bomb (SDB): A 250-lb class weapon that is designed for use against hard targets such as bunkers, reinforced buildings, and other structures that are difficult to penetrate. The SDB is a precision-guided munition that is designed to be dropped from high altitudes and controlled by another aircraft.

Advanced EHF (AEHF): A joint satellite communications system that provides a near-worldwide, secure, survivable, and space operations and intelligence capability against fixed and relocatable targets in all weather; standoff range up to 46 miles. It is designed to provide secure, ultra-high-speed data links for command, control, communications, and intelligence, surveillance, reconnaissance, and other critical operations.

Wind-Corrected Munitions Dispenser (WCMD): A family of precision-guided munitions that are designed to be dropped from high altitudes and controlled by another aircraft. They are used by the USAF, Navy, and Marine Corps.

Small Diameter Bomb (SDB): A 250-lb class weapon that is designed for use against hard targets such as bunkers, reinforced buildings, and other structures that are difficult to penetrate. The SDB is a precision-guided munition that is designed to be dropped from high altitudes and controlled by another aircraft.
First Launch: May 23, 1962
IOC: classified but in use during Vietnam War.
Constellation: DSCS
Design Life: 48 months (Block 5D-2); 54 months (Block 5D-3).
Launch Vehicle: Titan II.
Unit Location: Cape Canaveral, Fla.
Orbit: 35,848 km (geosynchronous orbit).
Power: solar array generating 1,000–1,200 watts.
Dimensions: length 50 ft; width 116 ft (with full solar array deployed).

**Function:**
- Spacecraft functioning as the primary communications platform within the DSCS system.
- Provides secure, jam-resistant EHF communication links with worldwide coverage.
- Used in support of military operations around the globe.
- Critical for operations requiring secure and reliable communication links.

**Development of DSCS:**
- The DSCS system was initially developed in the mid-1960s to provide secure, jam-resistant communication links.
- The first DSCS satellite was launched in 1968, with the system being fully deployed in the early 1970s.

**Adaptations and Enhancements:**
- Over time, the system has undergone numerous upgrades and adaptations to meet changing military needs.
- The DSCS system has been used in various conflicts and operations, demonstrating its critical role in military communications.

**Future of DSCS:**
- Efforts are underway to modernize and upgrade the DSCS system to meet future military requirements.
- The DSCS system will continue to play a vital role in military communications for the foreseeable future.

---

**Communications Satellite System**

**Function:**
- A spacecraft functioning as the primary communications platform within the DSCS system.
- Provides secure, jam-resistant EHF communication links with worldwide coverage.
- Used in support of military operations around the globe.
- Critical for operations requiring secure and reliable communication links.

**Description:**
- The Communications Satellite System (CSS) is a critical component of the DSCS system, providing secure, jam-resistant communication links.
- The CSS spacecrafts are designed to operate in geosynchronous orbit, providing continuous communication services.

**Key Features:**
- Geosynchronous orbit provides continuous communication services.
- Secure, jam-resistant EHF communication links.
- Worldwide coverage.

**Future Directions:**
- Efforts are underway to modernize and upgrade the CSS system to meet future military requirements.
- The CSS system will continue to play a vital role in military communications for the foreseeable future.

---

**Summary:**
- The DSCS system is a critical component of the broader US military communications infrastructure.
- The CSS spacecrafts are designed to provide secure, jam-resistant EHF communication links with worldwide coverage.
- The system has been used in various conflicts and operations, demonstrating its critical role in military communications.

---

**Conclusion:**
- The DSCS system continues to be a vital component of the US military's communications infrastructure.
- Efforts are ongoing to modernize and upgrade the system to meet future military requirements.
- The DSCS system will continue to play a critical role in supporting military operations around the globe.
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. The system will integrate the Space Tracking and Surveillance System (STSS) capabilities as they become available.

Space Tracking and Surveillance System

Brief: Advanced surveillance system with IR and visible sensors for detecting and tracking ballistic missiles. STSS (formerly SBIRS Low) will have satellites in low Earth orbit (LEO) that will work in concert with SBIRS High and other missile defense systems.

Function: Space surveillance.

Operator: AFSPC.

First Launch: FY06–07 (planned).

IOC: TBD.

Constellation: TBD (from nine up to 30 under consideration).

Design Life: not available.

Launch Vehicle: TBD.

Unit Location: TBD.

Orbit Altitude: 60–300 miles.

Contractor: Northrop Grumman (completion and launch of two R&D satellites).

Aerial Targets

MQM-107 Streaker (Tsgt. Michael Ammons)

Delivered: from 1951.

IOC: circa 1951.

Production: 1,800+.

Inventory: 33.

Unit Location: Tyndall AFB, Fla.

Contractor: Teledyne Ryan.


Guidance and Control: remote-control methods incl choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the 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-34A, with an upgraded General Electric J85–100 engine that provides a thrust-to-weight ratio of 1:1, offers higher climb rates and six–G maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. BQM-34A is used for research, development, test, and evaluation, and the Weapon System Evaluation Program.

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.

Inventory: 54.

IOC: not available.

Unit Location: Tyndall AFB, Fla. (detachment at Holloman AFB, N.M.)

Contractor: Marconi (formerly Tracor Tracer). 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 125 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.

MQM-107 Firebee

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

Function: Aerial target.

Operator: ACC.

First Flight: 1951; 1958 (BQM-34A).

MQM-107 Striker

Brief: A 30 mm cannon, remotely piloted, variable speed, recoverable target drone.

Function: Aerial target.

Operator: ACC.


Dimensions: length 8 ft, height 3.2 ft, span 7 ft.

Weight: max launch weight 2,200 lb.

Performance: operating speed 207–630 mph, operating height 50–40,000 ft, endurance 2 hr 15 min.

EDITOR'S NOTE

The MQM-107 Streaker has been used successfully for weapon system evaluation and the Weapon System Evaluation Program.