Bombers

B-1 Lancer
Brief: A long-range multirole bomber capable of flying missions over intercontinental range without refueling, then penetrating enemy defenses with a heavy load of ordnance.
Function: Long-range conventional bomber.
Operator: ACC, ANG.
First Flight: Dec. 23, 1974 (B-1A); October 1984 (B-1B).
IOC: Oct. 1, 1986, Dyess AFB, Texas (B-1B).
Production: 104.
Inventory: 94 (B-1B).
Ceiling: over 30,000 ft.
Contractor: Boeing North American; AIL Systems; General Electric.
Power Plant: four General Electric F101-GE-102 turbofans; each 30,780 lb thrust.
Accommodation: four pilot, copilot, and two systems officers (offensive and defensive), on zero-zero ejection seats.
Dimensions: span spread 137 ft, swept aft 78 ft, length 147 ft, height 34 ft.
Weights: empty 192,000 lb, max operating weight 477,000 lb.
Performance: max speed at low level high subsonic; Mach 1.2 at altitude; range intercontinental.
Armament: three internal weapons bays capable of accommodating in a conventional role up to 84 Mk 62 (500-lb) bombs or Mk 62 mines; and up to 36 CBU-87/89/97.

The B-1's offensive avionics include forward-looking radar and terrain-following radar (TFR), an extremely accurate inertial navigation system (INS), computer-driven avionics, strategic Doppler radar, and a radar altimeter, enabling aircrews to navigate, update mission profiles and target coordinates in flight, and precision bomb.

The current defensive avionics package, built around the ALQ-161 ECM system, is supplemented by chaff and flares to protect against radar-homing and heat-seeking missiles. Aircraft structure and radar-absorption materials reduce the aircraft's radar signature to approximately one percent of that of a B-52. The ALQ-50 towed decoy will be added by December for greater protection against RF threats.

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

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

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

B-2 Spirit
Brief: Stealthy, long-range, multirole bomber that can deliver conventional and nuclear munitions anywhere on the globe by flying through previously impenetrable defenses.
Function: Long-range heavy bomber.
Operator: ACC.
First Flight: July 17, 1989.
IOC: April 1997, Whiteman AFB, Mo.
Production: 21 planned.
Inventory: 20.
Ceiling: 50,000 ft.
Unit Location: Whiteman AFB, Mo.
Contractor: Northrop Grumman, with Boeing, LTV, and General Electric as key members of the development team.
Power Plant: four General Electric F110-GE-100 turbofans; each 17,300 lb thrust.
Accommodation: four: pilot, copilot, and two large weapon bays side by side in the lower centerbody. These bays contain two flight crew and two large weapon bays.

The B-2's improved variant initiated by the Reagan Administration in 1981. First production model flew October 1984 and USAF produced a total of 100. B-1B's speed, superior handling qualities, and large payload make it a key element of any Joint/Composite strike force, with a flexibility to deliver Mk 82 conventional general purpose bombs, Mk 62 naval mines, CBU-87 and CBU-89 cluster munitions, and CBU-97 Sensor Fuzed Weapon (to be fitted with the Wind-Corrected Munitions Dispenser kit); or to carry additional fuel, as required. The Joint Direct Attack Munition (JDAM) GPS-guided weapon will be added to the B-1B's list of weapons this fiscal year.

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Operator: ACC.
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IOC: April 1997, Whiteman AFB, Mo.
Production: 21 planned.
Inventory: 20.
Ceiling: 50,000 ft.
Unit Location: Whiteman AFB, Mo.
Contractor: Northrop Grumman, with Boeing, LTV, and General Electric as key members of the development team.
Power Plant: four General Electric F110-GE-100 turbofans; each 17,300 lb thrust.
B-52H Stratofortress (Guy Aceto)

**B-52H**

**Stratofortress**

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

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

**Operator:** ACC, AFRICOM.

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

**Delivered:** November 1955–October 1962.

**IOC:** June 19, 1955.

**Production:** 744.

**Inventory:** 94.

**Ceiling:** 55,000 ft.

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

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

**Dimensions:** span 57 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.

**Weight:** empty approx 188,000 lb, max T-O weight 488,000 lb.

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

**Armament:** eight nuclear free-fall bombs internally and 12 AGM-86B ALCMs or AGM-129A ACMs externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons include AGM-86C CARMs, AGM-84 Harpoons, and AGM-142A Have Naps. 

**COMMENTS**

A key element of USAF’s manned strategic bomber force for over 40 years, the B-52’s still-expanding weapons capability reflects its continuing ability to perform a wide range of missions, including show of force, maritime interdiction, precision strikes, and defense suppression.

The bomber is equipped with an electro-optical viewing system that uses forward-looking infrared (FLIR) and high-resolution low-light-level television (LLTV) sensors to augment the targeting, battle assessment, flight safety and terrain avoidance system, thus improving combat ability and low-level flight capability. Pilots have night-vision goggles (NVGs) to further enhance night operation.

The B-52’s electronic countermeasures (ECM) suite uses a combination of electronic detection, jamming, and infrared 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 J57-P-1 engines and provision for in-flight refueling. First flown August 5, 1954, the three aircraft built were used by Boeing for technical development purposes. Delivered to SAC November 1957.

- **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 J57-P-1W, -1W9, or -29WA engines. Retired in the mid-1960s.


- **B-5GZ, 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 of the Stratofortress still in service,** The High-speed TF33 turbofans, providing increased unrefueled range, and improved defensive armament. First flown July 1960, 102 were built, with deliveries between May 1961–October 1962.

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

An ongoing modernization program is enhancing the conventional capabilities of the remaining B-52 fleet, extending the bomber’s service life well into the next century, with the ability to provide massive firepower in low-threat environments supplemented by a standoff attack capability. Upgrades include the installation of GPS terminals, secure radios, and MIL-STD-1760 interfaces; weapons capability to include naval mines, precision guided weapons, such as Harpoon, AGM-124 Have Nap, and AGM-86C CARM (a conventional variant of the ALCM), and advanced weapons, such as JDMAM, JSOW, Wind Corrected Munitions Dispenser, and GBU-38B/B-39A. Installation of a heavy stores adapter beam will standardize aircraft to carry all B-52-certified munitions. 

Current plans envision an eventual force of around 71 aircraft.

**AC-130U Spectre (Randy Jolly)**

**AC-130U**

**Spectre**

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

**Function:** Attack aircraft.

**Operator:** ACC, PACAF, USAFE, ANG, AFRICOM.

**First Flight:** Feb. 15, 1975 (preproduction).

**Delivered:** November 1975–March 1984.

**IOC:** October 1977.

**Production:** 713.

**Inventory:** 371.

**Ceiling:** 45,000 ft.

**Unit Location:** Pope AFB, N.C., Moody AFB, Ga., Davis–Monthan AFB, Ariz., Nellis AFB, Nev., Eleventh AFB, Alaska, Osan AB, South Korea; Spangdahlem AB, Germany; Barksdale AFB, La., and Minot AFB, N.D.

**Contractor:** Boeing.

**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 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.

**Weight:** empty 28,000 lb, max gross 51,000 lb.

**Performance:** speed 420 mph, range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.

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

**COMMENTS**

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

A-10A equipment includes an inertial navigation system (INS), head-up display (HUD), night-vision goggles (NVGs), the Low-Altitude Safety and Targeting Enhancement (LASTE) system for ground collision avoidance, Pavé Penny laser target identification pod, ECM, target penetration aids, self-protection systems, and AGM-65 Maverick and AIM-9 Sidewinder missiles.

ANG A-10s (the first first-line aircraft to be assigned to the guard) have varying major night capability upgrade. Used extensively during the Persian Gulf War, A-10s deploy to Aviano AB, Italy, in support of NATO operations in Bosnia. In addition, a squadron of 24 A-10s, based permanently at Ali Al Jabir AB in southern Kuwait, provides on-call airpower, supplementing Operation Southern Watch.

OA-10As are redesignated A-10s, used for forward air control (FAC-C) of fighter aircraft, combat escort, search and rescue, and visual reconnaissance. The 30 mm GAU-8/A gun is retained, but under-wing stores are normally restricted to canisters of white phosphorous rockets for target marking. The first OA-10 unit reached IOC in October 1987.

AC-130 Spectre

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

Function: Attack aircraft.

Operator: AFSGC.


IOC: 1972 (AC-130H); 1995 (AC-130U).

Production: 39.

Inventory: 21.

Ceiling: 25,000 ft.

Unit Location: Hurlburt Field, Fla.

Operator: 1st Lombech Martin.


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

Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 6 in.

Weight: H model: gross 155,000 lb.

Performance: H model: speed 300 mph, range 1,500 miles, with air refueling unlimited.

Armament: two 20 mm Vulcan cannons with 3,000 rd, one 40 mm Bofors cannon with 256 rd, and one Howitzer with 100 rd.

COMMENTARY

AC-130 gunships perform special operations and conventional missions, including CAS, air interdiction, armed reconnaissance, escort, surveillance, and air base defense. Equipment includes a HUD, combined INS/GPS, and Spectra ceramic armor protection. Self-protection measures for the low-to-medium threat environment include ECM, chaff and flares, and infrared and radar warning receivers.

AC-130A was the initial version, deployed in Vietnam 1968–69. Eighteen produced.

AC-130E, an improved version, of which eight were built. Converted to H standard after service in Vietnam.

AC-130Hs serve with the 16th SOW. The unit has eight, each equipped with a digital fire-control computer. They employ electro-optical (EO) sensors and target-acquisition systems, including FLIR and LLLTV, and are capable of in-flight refueling. Fire-control computers, navigation, communications, and sensor suites have been upgraded.

AC-130U are the latest gunship conversions, converted by Rockwell, of which 13 were delivered to the 16th SOW’s 4th SOS in 1984–85. These aircraft have greater altitude capability and combine increased firepower, reliability, and superior accuracy, with the latest methods of target location. The final 43 aircraft comprise the H model are replaced with one trainable 25 mm Gatling gun. All weapons can be slaved to the APQ-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for adverse weather attack operations.

F-15 Eagle

Brief: A supersonic, all-weather, extremely maneuverable tactical fighter designed to perform US Air Force’s mission and maintain air superiority in aerial combat.

Function: Tactical fighter.

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


Delivered: from November 1974.

IOC: September 1975.

Production: 874.

Inventory: 592.

Ceiling: 65,000 ft.

Unit Location: Active: Langley AFB, Va., Edwards

F-15C Eagle (Ted Carlson)


Contractor: Boeing.

Power Plant: F-15C: two Pratt & Whitney F100-PW-220 turbolongs; each 23,770 lb thrust, or F100-PW-229 turbolongs; each 29,100 lb thrust.

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

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

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

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

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

COMMENTARY

F-15E has a strengthened airframe for increased gross weight at takeoff and maneuver at altitude throughout the flight envelope. Cockpit controls and displays are improved and a wide-field of-view HUD included.

For low-altitude, high-speed penetration and precision attack on tactical targets at night and in adverse weather, the F-15E carries a high-resolution APG-70 radar and LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pods, with wide-field FLIR. The digital, triple-redundant flight control system permits automatic terrain following. Other improvements include a ring-laser gyro INS, with GPS capability from 1997. Conformal Fuel Tanks (CFTs) fitted, adaptable to carry ordnance tangentially, to reduce drag.

During Desert Storm 48 USAF F-15Es were deployed to the Persian Gulf where they operated mainly at night, hunting Scud missile launchers and artillery sites using the LANTIRN system. They also forged a successful operational partnership with Joint STARS aircraft. More recent deployments include EAF missions to the Middle East and Operation Deliberate Force over Bosnia.

F-16 Fighting Falcon

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

Function: Multirole fighter.

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

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

Delivered: August 1987–present.


Production: 2,206.

Inventory: 1,480.
Ceiling: above 50,000 ft  
Unit Location: 14 active wings, 21 ANG, and five AFRC units.  
Contractor: Lockheed Martin.  
Power Plant: one augmented turbofan. General Electric F110-GE-100 (27,600 lb thrust) and Pratt & Whitney F100-PW-220 (23,450 lb thrust) are alternative standard engines. IPEs in aircraft delivered from late 1991; Block 50: F110-GE-129 (29,000 lb thrust); Block 52: F100-PW-229 (29,100 lb thrust).  
Acceptance: pilot only, on zero/zero ejection seat.  
Dimensions: wingspan X 32 ft 8 in, length overall 49 ft 5 in, height 16 ft.  
Weight: empty F100-PW-220 18,233 lb, F110-GE-100 19,020 lb; gross, with external load (Block 40/42) 42,300 lb.  
Performance: max speed Mach 2, radius of action: Block 40 with 2,000-lb bombs, two AIM-9 missiles, and external fuel, hi-lo-lo Hi 852 miles.  
Armament: one M61A1 20 mm multibarrel cannon, with 511 rd, mounted in fuselage; wingtip-mounted missiles; seven other external stores stations for fuel tanks and air-to-air and air-to-surface munitions.  
COMMENTS: The F-16 is the workhorse of the USAF fighter fleet. The 200+ USAF F-16 multimission fighters deployed to the Persian Gulf theater flew more sorties than any other type during Desert Storm, with 13,500 missions. F-16s are currently deployed to patrol the no-fly zones in southern Iraq and to Bosnia in support of NATO operations.  
F-16A (single-seat) and F-16B (two-seat) versions, which entered service with the 388th TFW, Hill AFB, Utah, incorporated advanced technologies from the start, making these aircraft two of the most maneuverable fighters ever built. Equipment includes a multimode radar with a clutter-free look-down capability, advanced radar warning receiver, a 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. USAF and NATO operators have cooperated in operational capabilities upgrade. Under this program the radar, fire-control computer, stores-management computer, and avionics software are improved, 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-200E turbofan. A forward-looking, three-stage plan for the aircraft, known as the Multinational Staged Improvement Program (MSIP), was implemented in 1980 to ensure the aircraft could accept systems under development, thereby minimizing retrofit costs. All F-16s delivered since November 1981 have had built-in structural and wiring provisions and systems architecture that expand the single-seat's multirole capability to perform precision strike, night attack, and beyond-visual-range intercept missions.  
F-16C (single-seat) and F-16D (two-seat) aircraft were introduced in Denel Aviation designates 25 with MSIP II improvements in the cockpit, airframe, and core avionics, and an increased-range APG-68 radar. Deliveries began in 1984. All of the active and many of the Guard and Reserve units have since converted to F-16C/Ds.  
Block 40/42 F-16s specialize in night attack operations with precision guided weapons. Follow-on improvements include ALE-47 improved defensive countermeasures, ALR-56M advanced radar warning receiver (Block 40 only), Very High Speed Integrated Circuit (VHSIC) technology in the APG-68(V5) fire control radar, a ring-laser gyro INS, a LANTIRN nav/attack system, and Increased Performance (IP) systems. System improvements were also included at Block 50: MSIP II was implemented to improve mission systems architecture that expand the single-seater's Systems and expand the single-seater's  
...could accept systems under development, thereby minimizing costs. In another program, 229 Block 50/52 USAF F-16Cs are to be retrofitted with a new modular mission computer being developed under an F-16 midlife update codevelopment and coproduction effort with the European participating government of the F-16 Multinational Fighter Program.  
Follow-on improvements to be considered as part of an MSIP Phase IV include a joint Helmet Mounted Cau - Ring System, AIM-9X, Link 16 Data Link, and improved weapons capabilities.  
F-16CG designation is being used by ACC for the suppression of Enemy Air Defenses (SEAD) role.  
F-22 Rapier  
Brief: High-technology follow-on for the F-15. An all-weather fighter that combines a highly maneuverable airframe at both sub- and supersonic speeds with stealth technologies and highly sophisticated detection equipment to penetrate enemy airspace and achieve air superiority in aerial combat.  
Function: Tactical fighter.  
Operator: ACC.  
Delivery: 2004 (anticipated).  
Production: 339 (planned).  
Inventory: one test aircraft.  
Ceiling: above 50,000 ft.  
Unit Location: TBD.  
Contractor: Lockheed Martin, with Boeing and Pratt & Whitney as key members of the development team.  
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 ft 6 in, length 62 ft 1 in, height 16 ft 7 in.  
Weight: empty 40,000 lb class, gross approx 60,000 lb.  
Performance: (design max speed; max level speed at 5,500 ft 900 mph, range more than 2,000 miles.  
Armament: (projected) one internal M61A2 20 mm gun, AIM-9 Sidewinders stored internally in the sides of the fuselage, and AIM-120 AMRAAMs in the main weapons bay for ground attack, two, 1,000-lb JDAMs will replace two AMRAAMs internally.  
COMMENTS: This ultrasophisticated multimission air superiority fighter aircraft is designed to penetrate high-threat enemy airspace and achieve air superiority with a first-look, first-kill capa - bility against multiple targets. It will cruise at supersonic speed without using its afterburners (“supercruise”). Its fully integrated avionics and weapon systems will permit simultaneous engagement of multiple targets. Extreme maneuverability is achieved through the combination of the avionics system, structural strength, and thrust vectoring nozzles. A Hughes Common Integrated Processor (CIP) will tie together various avionics functions. Two YF-22 prototypes were built for competitive evaluation with Northrop/McDonnell Douglas XF-23 prototypes. First flight was Sept. 29, 1990. YF-22 selected as winner in April 1991.  
F-22A: Production-configured version entered EMD phase in August 1991. USAF is receiving nine single-seat F-22As, three without avionics to explore flight characteristics, flutter, loads, propulsion, and envelope expansion, and six as avionics test beds. It will also receive one static test and one fatigue test airplane.  
Provision for ground-attack capability has been included since 1993. Further mission capabilities that may be explored in the future include strategic attack/interdiction, reconnaissance and surveillance, and lethal and nonlethal SEAD missions.  
F-117 Nighthawk  
Brief: World’s first operational aircraft designed to exploit low-observable stealth technology to expand the range of heavily defended strategic targets that can be attacked.  
Function: Attack aircraft.  
Operator: ACC.  
First Flight: June 1981.  
First Flight: October 1983.  
Production: 59.  
Inventory: 57.  
Ceiling: classified.  
Unit Location: Holloman AFB, N.M.  
Contractor: Lockheed Martin.  
Power Plant: two General Electric F404-GE-F102 nonafterburning turbojets; each 10,800 lb thrust.  
Accommodation: pilot only, on zero/zero ejection seat.  
Dimensions: span 43 ft 4 in, length 65 ft 11 in, height 12 ft 5 in.  
Weight: empty (estimated) 29,500 lb, max gross 52,500 lb.  
When carrying the AN/ASQ 213 HARM Targeting System (HTS), the Block 50/52 F-16 will have the ability to autonomously locate enemy threat radars and launch HARM missiles at them in the range known mode.
**F-117A Nighthawk**

*Ted Carlson*

The F-117A’s dull black fin, which reflects at a variety of angles all signals from probing hostile ground or airborne radars. In addition, much of the aircraft’s external surface is made of composite radar-absorbent materials. The F-117A’s dull black finish reflects little light, and the engine air intakes and exhaust nozzles are above the wings and rear fuselage, respectively, to shield them from IR seekers below. The two nonafterburning turbofans give the aircraft low noise signature and high subsonic performance.

Key features include a state-of-the-art digital avionics suite integrating sophisticated navigation and attack systems, complemented by a specially developed automated mission-planning system. High-precision INS is installed, with recently upgraded FLIR and DLIR (downward-looking infrared), each with a boresight laser designator and an autotracker, to ensure precision attack.

Improvements since 1989 have included upgraded cockpit display and instrumentation, GPS capability and ring-laser gyö INS. A range of middle improvements is being studied.

**YAL-1A Attack Laser**

*Brief:* The prototype YAL-1A, using a modified 747-400F platform, will be the world’s first operational high-energy laser weapon system. It will be used to kill theater ballistic missiles in their boost, or very earliest phase of flight, when the TBMs display bright plumes and are under tremendous dynamic stress, thereby increasing the high-energy laser beam’s distortions, thereby increasing the high-energy laser beam’s intensity on target and the system’s lethal range.

**E-3C Sentry**

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

**Function:** Airborne early warning, Battle Management C2.

**Operator:** ACC, PACAF, Africa.

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

**Delivered:** March 1977–84.

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

**Performance:**
- Speed: Mach 0.83, max operating speed Mach 0.87.
- Ceiling: above 29,000 ft.
- Power Plant: four Pratt & Whitney TF33-PW-100/100A turbofans; each 21,000 lb thrust.

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

**Dimensions:**
- Span: 145 ft 9 in, length: 152 ft 11 in, height: 41 ft 8 in.

**Weight:**
- Empty: 423,882 lb.
- Gross: 800,000 lb.

**Improvements since 1989:**
- Upgraded radar and sensor systems.
- Increased combat range.
- Improved avionics.

**COMMENTARY**

Air Combat Command will base the Attack Laser in the CONUS, but it has the ability to deploy with minimal airlift support to any region of the world. It will arrive in theater with its crew, laser fuel, and initial spares ready to maintain secrecy, although three aircraft were lost in much-publicized accidents.

**Performance:**
- max speed 646 mph, mission radius, unrefueled, 5,000-lb weapon load) 656 miles.

**Armament:**
- Internal carriage of what is described as a wide variety of tactical weapons, including laser-guided 2,000-lb munitions; alternatively, AGM-65 Maverick or AGM-88 HARM; provisions for AIM-9 Sidewinder.

**Operator:** ACC.

**Delivered:** First Flight: spring 2002 (planned full system).

**IOC:** Fiscal 2006 (planned).

**Production:** Seven (planned).

**Contractor:** Boeing, TRW, Lockheed Martin.

**Power Plant:** GE C2B5F turbofans; each 61,500 lb thrust.

**Inventory:** Seven (planned).

**Ceiling:** 41,000 ft.

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

**Performance:**
- max speed 530 mph, endurance six hr on station 1,000 miles from base.

**COMMENTARY**

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

**E-3A.** Of the 24 built for USAF in standard production configuration, 22 were later upgraded.

An improved US/NATO Standard E-3A configuration was initiated with the 25th USAF Sentry, delivered in December 1991, with a larger memory computer and a maritime detection capability. Nine were built new for USAF, and one of the original E-3As was upgraded.

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

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

**USAF** E-3s are undergoing major sustainability, reliability, and availability upgrades, known as Extend Sentry Program. The upgrades include new passive detection systems, known as Electronic Support Measures (ESM), that complement the active beam radar, enabling the aircraft to detect signals emitted by both hostile and friendly targets. Additional enhancements include upgrade of the Joint Tactical Information Distribution System (JTIDS), jam-resistant communication linkages, increased computer capacity, and GPS capability. Radar system improvements will permit AWACS aircraft operating in the pulse-Doppler mode to detect smaller, stealthier targets. IOC for these improvements is scheduled for Fiscal 2000, with contract completion after 2000.

**E-8 Joint STARS**

*Brief:* A modified Boeing 707 equipped with a large, canopied-shaped radome slung 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 200 km. Such data is then transmitted via data link to ground stations or other aircraft.

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

**Operator:** ACC.

**First Flight:** December 1988.

**Delivered:** May 1996–present.

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

**Production:** 13 to be delivered to USAF by 2004.

**Inventory:** Two.

**Ceiling:** 42,000 ft.

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

**Contractor:** Northrop Grumman.

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

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

**Dimensions:**
- Span: 145 ft 9 in, length: 152 ft 11 in, height: 42 ft 6 in.

**Weight:**
- Empty: 171,000 lb, gross: 336,000 lb.
Parties to the 1992 Open Skies treaty. Observation and verification flights over nations that are during Operations Desert Storm (with two E-8A develop-STARS aircraft flew more than 150 operational missions digital data link or radio.

Two E-8C aircraft returned to Europe in late 1996 to support Joint Endeavor. E-8Cs also participated in USAF and Joint exercises throughout 1997. 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-8C. 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-8C flew in March 1994 and served as the pre-production test bed. The two E-8As will be upgraded to C standard and will be the last to be delivered.

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

Function: Reconnaissance aircraft.
Operator: ACC.
First Flight: June 1993.
Delivered: October 1993.
IOC: October 1993.
Production: three.
Inventory: three.
Ceiling: 50,000 ft (basic C-135).
Unit Location: Offutt AFB, Neb.
Contractor: Boeing.
Power Plant: four Pratt & Whitney TF33-P-5 turbofans; each 18,000 lb thrust.
Accommodation: seating for 38.
Dimensions: span 131 ft, length 135 ft, height 42 ft.
Weight: gross 297,000 lb.
Performance: speed 500+ mph, unrefueled range 3,900 miles.

Commentary: Based on the WC-135, modified for specialized reconnaissance with an infrared linescanner, synthetic aperture radar, and forward- and vertical-looking video cameras, to monitor the 1992 Open Skies Treaty.

OC-135B modifications center around four cameras installed in the rear of the aircraft. Cameras installed include one vertical and two oblique KS-87 framing cameras used for low-altitude photography approximately 3,000 feet above the ground, and one KA-91 pan camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography at approximately 55,000 feet. Data is processed and recorded by the Miletus camera annotation system.

RC-135 Brief: Specially configured variants 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 data for theater and tactical commanders.

Function: Electronic reconnaissance aircraft.
Operator: ACC.
First Flight: not available.
Production: 16; two in Fiscal 1999.
Inventory: 19.
Ceiling: 45,000 ft.
Unit Location: Offutt AFB, Neb.
Contractor: Raytheon.
Power Plant: four Pratt & Whitney TF33-P-5/9 turbofans; each 18,000 lb thrust.
Accommodation: flight crew of four; 25–35 mission crew.
Dimensions: span 130 ft 10 in, length 134 ft 6 in, height 38 ft 4 in.
Weight: gross 299,000 lb.
Performance: speed 500 mph plus, range, with air refueling, unlimited.

Commentary: RC-135 aircraft are used for detailed collection of electronic intelligence over enemy air defense systems to crews of F-16 HTS aircraft launched and orth and visible wavelengths as required. Navigation is by GPS/INS. It flies autonomously from takeoff to landing, providing near real-time imagery products for tactical and theater commanders. Vehicle ground track and mission plan can be updated in real-time to respond to changing Air Traffic Control needs and/or mission collection needs.

Operator: TBD.
First Flight: TBD.
Delivered: TBD.
IOC: TBD.
Production: TBD.
Inventory: TBD.
Ceiling: 65,000 ft.
Unit Location: TBD.
Contractor: Teledyne Ryan.
Power Plant: one Allison AE 3007H turbofan, 7,050 lb thrust.
Accommodation: unmanned system.
Dimensions: length 44 ft 5 in, height 15 ft 2 in, span 116 ft 2 in.
Weight: empty 8,340 lb, gross 25,600 lb.
Performance: design goals incl endurance of up to 40 hr at a cruise speed of 400 mph and at an altitude of 65,000 ft. This would allow loiter on station 3,450 miles from base for 24 hr.

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

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

**Function:** High-altitude reconnaissance.

**Operator:** ACC.

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

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

**IOC:** circa 1956.

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

**Inventory:** 35.

**Ceiling:** above 70,000 ft.

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

**Contractor:** Lockheed.

**Power Plant:** F118-GE-101 turbojet.

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

**Dimensions:** span 132 ft 6 in, length 99 ft 4 in, height 16 ft.

**Weight:** gross 40,000 lb.

**Performance:** max cruising speed at above 70,000 ft more than 430 mph; ceiling U-2R: more than 70,000 ft, U-2S: more than 73,500 ft; range U-2R: more than 3,000 miles, U-2S: more than 4,500 miles; max endurance U-2R: around 12 hr, U-2S: around 15 hr.

**COMMENTARY**

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

The last U-2R aircraft were delivered to USAF in October 1989. In 1992, all U-2S and tactical TR-1s were consolidated under the designation U-2R.

**U-2S** (single-seat) and **U-2RT** (two-seat) aircraft are single-engine, high-altitude reconnaissance aircraft, derived from the original version that had a key role in the Cuban Missile Crisis of 1962. This model is significantly larger and more capable than the earlier aircraft.

The last U-2R aircraft were delivered to USAF in October 1989. In 1992, all U-2S and tactical TR-1s were consolidated under the designation U-2R.

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

**WC-130J Hercules**

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

**Function:** Weather reconnaissance aircraft.

**Operator:** AFRIC.

**First Flight:** not available

**Delivered:** not available.

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

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

**Inventory:** 10.

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

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

**Contractor:** Lockheed.

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

**Accommodation:** six.

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

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

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

**COMMENTARY**

The WC-130 is flown by AFRIC 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-130E/B.** Earlier version C-130 modifications used for weather reconnaissance. Now retired.

**WC-130H Hercules**

**Brief:** Current improved version, operated by the 53rd WRS for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements.

It is equipped with two external 1,400 gallon fuel tanks, an internal 1,800 gallon fuel tank, and uprated engines. An average weather reconnaissance mission might last 11 hours and cover almost 3,500 miles while the crew collects and reports weather data every minute. Results are transmitted via satellite to the National Hurricane Center, Miami, Fla.

**WC-130J.** Six weather-capable versions of the latest C-130 model are scheduled for delivery from Fiscal 1998.
E-9

EC-18

EC-18B Advanced Range Instrumentation Aircraft (ARIA) are modified former commercial Boeing 707-320 transports. Replacing some of the EC-135 A/E ARIA aircraft, the EC-18B is similarly equipped, with the world’s largest airborne steerable antenna housed in a bulbous nose. Range, cabin space, and fuel efficiency are all increased to provide greater support for the expanding ARIA mission, including DoD and NASA space and missile programs. EC-18D cruise missile mission control aircraft (CMMCA) are Boeing 707s, modified by Chrysler, to include an AN/APS-63 surveillance radar, telemetry receiver, and weather radar. Operated by the 452d FTS, the two aircraft support USAF and USN missile testing and are also capable of monitoring and controlling UAVs.


EC-100E ABCCC
(Airborne Battlefield Command and Control Center) is a heavily modified Boeing Canada (de Havilland) DHC-8 Dash 8M-100 aircraft. Two are operated by the 475th Weapons Evaluation Group as airborne platform telemetry relay aircraft. Each is equipped with a sensor suite that includes an AN/APS-128D sea surveillance radar in a ventral radome and a five-beam, electronically steerable, 75-square-foot, phased-array telemetry antenna in a starboard-side fuselage fairing, capable of automatically detecting, tracking, and relaying data simultaneously from five pairs of distinct targets traveling at speeds of Mach 5 or more.

EC-130E

EC-130H Compass Call

EC-130E Commando Solo

EC-130E ABCCC
is an Airborne Battlefield Command and Control Center. Seven aircraft were updated by Unisys to ABCCC III standard. EC-130s have been deployed in support of NATO operations in Bosnia. EC-130E Commando Solo. ANG uses this version as a broadcasting station for psychological warfare operations. Specialized modifications include enhanced navigation systems, self-protection equipment, and worldwide color television configuration. Commando Solo aircraft have been used in numerous missions, including support for Operations Just Cause and Desert Storm and Operation Restore Hope in Somalia. They also have a role in civil emergencies. Secondary mission is electronic attack in the military frequency spectrum.
COM, Milstar, and HF/UHF low-speed data communications capability. Continuous airborne alert status ended July 24, 1990, but at least one of these air refuelable aircraft has since flown a mission each day. All will retire by October 1998 as the USAF's E-6B aircraft take over the NCP mission.

**EC-135A/E Advanced Range Instrumentation Aircraft (ARIA)** function as telemetry data recording and relay stations to supplement land and marine telemetry stations that support DoD and NASA space and missile programs.

### Tanker Aircraft

**KC-10 Extender**

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

**Function:** Aerial refueling/transport.

**Operator:** AMC, AFRC.

**First Flight:** April 1980.

**Delivered:** March 1981—April 1990.

**IOC:** August 1982.

**Production:** 60.

**Inventory:** 59.

**Ceiling:** 42,000 ft.

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

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

**Power Plant:** Three General Electric CF6-50C2 turbofans; each 30,500 lb thrust.

**Accommodation:** Crew of four; additional seating for 25 passengers.

**Performance:** Cruising speed Mach 0.825, range with max cargo 4,370 miles.

**Commentary**

The KC-10 combines the tasks of tanker and cargo aircraft in a single unit, enabling it to support worldwide fighter deployments, strategic airlift, reconnaissance, and conventional operations. It played a key role in deployment for the Persian Gulf War and in later humanitarian and UN peacekeeping missions.

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

The KC-10 is a DC-10 Series 30CF, modified to include fuselage fuel cells, a boom operator's station, and wing-mounted air refueling pods.

Because it has both types of tanker refueling equipment installed, the KC-10A can service USAF, USN, USMC, and Allied aircraft on the same mission. Special lighting permits night operations.

**KC-135 Stratotanker**

**Brief:** A long-range tanker aircraft, meeting the air refueling needs of USAF, bomber, fighter, cargo, and reconnaissance forces. It also supports US Navy, Marine Corps, and Allied aircraft.

**Function:** Aerial refueling/airlift.

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

**First Flight:** August 1956.

**Delivered:** January 1957–66.

**IOC:** June 1957.

**Production:** 732.

**Inventory:** 552.

**Ceiling:** 42,000 ft.

**Unit Location:** MacDill AFB, Fla., McConnell AFB, Kan., Fairchild AFB, Wash., Robbins AFB, Ga., Grand Forks AFB, N.D., Offutt AFB, Neb., Mountain Home AFB, Idaho, Altus AFB, Okla., Kadena AFB, Japan, RAF Mildenhall, UK; and seven AFRC and 19 ANG units.

**Contractor:** Boeing.

**Power Plant:** KC-135R/T: four CFM International F108-CF-100 turbofans; each 22,242 lb thrust. KC-135E: four TF39-PW-102 turbofans; each 22,000 lb thrust.

**Accommodation:** Crew of four; up to 80 passengers.

**Dimensions:** Span 130 ft 10 in, length 136 ft 3 in, height 39 ft 4 in.

**Weight:** Empty 119,231 lb, gross 322,000 lb (KC-135E 301,600lb).

**Performance:** Max speed at 30,000 ft 610 mph, range with transfer fuel 11,192 miles.

**Commentary**

Backbone of the USAF tanker fleet, the long-serving 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 tankage is located in the "wet wings" and in fuel tanks below the floor in the fuselage.

**KC-135A**. Original version with JT7B turbojets. USAF built 732, since modified to other standards.

**KC-135E**. The JT3D re-engined program upgraded 163 AFRC and ANG KC-135As to KC-135E standard with JT3D turbosan removed from surplus commercial 707s; fuel carrying capacity increased by 90 percent.

**KC-135R/T**. Design of re-engined KC-135As with CFM56 turbofans. They embody modifications to major systems and subsystems and not only carry more fuel but also have reduced maintenance costs, are able to use shorter runways, and meet Stage III requirements. The first KC-135R flight was in October 1982, and deliveries began in July 1984. KC-135T aircraft are capable of refueling SR-71s. The program continues.

Ongoing modernization programs are extending KC-135 capability and operational utility well into the next century. The lower wing skin was renewed, adding 27,000 flying hours to the aircraft. A further program permits operation by a two-person flight crew. Several avionics upgrades are under way that will significantly improve systems reliability and maintainability. Under the Pacer CRAG program, the entire fleet will be fitted with improved cockpit and navigation suites, including color weather radar and integrated INS/GPS. About 45 KC-135Rs are being fitted with wing-mounted hose-and-drogue refueling pods to enhance interoperability and support to the US Navy, US Marines, NATO, and other Allied receiver aircraft.

**MC-130P Combat Shadow/HC-130**

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

**Function:** Air refueling for SOF helicopters/airdrop.

**Operator:** AFSOC, AETC, ANG, AFRC.

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

**Delivered:** from 1965.

**IOC:** 1986.

**Production:** Not available.

**Inventory:** 57.

**Ceiling:** 33,000 ft.

**Unit Location:** Active: Egin AFB, Fla., Kadena AB, Japan, RAF Mildenhall, UK, Kirtland AFB, N.M., Moody AFB, Ga., Patrick AFB, Fla. ANG: Francis S. Gabreski IAP, N.Y., Moffett Federal Airfield, Calif. AFRC: Duke Field, Fla., Portland IAP, Ore.

**Contractor:** Lockheed.

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

**Accommodation:** Four flight crew, plus four mission crew.

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

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

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

**Commentary**

Since initial introduction Combat Shadow aircraft have served a wide range of roles and missions. They are currently dedicated to special operations missions, conducting single-ship or formation flight refueling of SOF helicopters in a low-threat to selected medium-threat environment. In 1989, during Operation Desert Storm, they provided air refueling of SOF helicopters over friendly and hostile territory as well as psychological operations and leaflet drops.

**MC-130P**. Active duty forces have 28 MC-130P (formerly HC-130N/P) in service. All are modified with new secure communications, self-contained inertial navigation, and countermeasures systems, and NVG-compatible lighting. NVG-low-level flights use minimal lighting and communications-out procedures. Additional modifications include advanced integrated navigation equipment, including digital scan radar, ring-laser gyro INS, FLIR, GPS, and dual nav stations, as well as new missile warning systems and countermeasures for refueling missions in hostile environments. Fifteen have been fitted with an in-flight refueling receptacle to extend their range indefinitely.

**HC-130**. Nine of these 130 tankers serving with active,
Asian, and AFRC search-and-rescue units still retain the HC-130 designation. Four were modified to JKC-130H for aerial recovery of re-entering spacecraft.

**Strategic Transports**

**C-5 Galaxy**

**Brief:** A heavy-cargo transport designed to provide massive strategic airlift over long ranges for deployment and supply of combat and support forces.

**Function:** Strategic airlift.

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

**First Flight:** June 30, 1968.

**Delivered:** October 1969–April 1989.

**IOC:** September 1970.

**Production:** 131.

**Inventory:** 126.

**Ceiling:** 34,000 ft with a 605,000-lb load.

**Unit Location:** Altus AFB, Okla., Travis AFB, Calif., Dover AFB, Del., Kelly AFB, Texas, ANG–Stewart IAP, N.Y. AFRC–Westover ARB, Mass.

**Contractor:** Lockheed.

**Power Plant:** Four General Electric TF39-GE-1C turbofans; each 41,000 lb thrust.

**Accommodation:**
- crew of six, rest area for 15 (relief crew, etc.); seating for 75, and 36 standard 463-L pallets or assorted vehicles, such cargo as two M60 tanks or three CH-47 Chinook helicopters, or a maximum of 340 passengers in an Airbus configuration.

**Dimensions:**
- span 221 ft 9 in, length 247 ft 10 in, height 65 ft 1 in.
- Weight: empty 374,000 lb, gross 769,000 lb (wartime 840,000 lb).
- Performance: max speed at 25,000 ft 571 mph, 35,750 ft, T-O run at SL 8,300 ft, landing run, max landing weight at SL 2,380 lb, range with max payload 3,434 miles, range with max fuel 4,649 miles.

**COMMENTARY**

This long-range, air-refuelable heavy transport is one of the world’s biggest aircraft, able to carry unusually large and heavy cargo for intercontinental ranges at jet speeds. It can take off and land in relatively short distances and taxi on substandard surfaces during emergency operations. Front and rear cargo openings permit simultaneous drive-through loading and off-loading. Its special capabilities have made the C-5 a valuable asset in humanitarian and relief missions and in support of combat operations.

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

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

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

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

C-5C. Two C-5As assigned to Travis AFB, Calif., were modified to carry outsize space cargo by extending the cargo bay and modifying the aft doors.

**C-17 Globemaster III**

**Brief:** A heavy-lift, air-refuelable cargo transport for inter- and intratheater airlift of all classes of military cargo, including outsize items.

**Function:** Cargo and troop transport.

**Operator:** AMC, AETC, AFRC.

**First Flight:** Sept. 15, 1991.

**Delivered:** June 1993–present.

**IOC:** Jan. 17, 1995.

**Production:** 120 minimum planned.

**Inventory:** 37 as of January 1998.

**Ceiling:** 45,000 ft.

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

**Contractor:** Boeing.

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

**Accommodation:**
- normal flight crew of three (two pilots plus loadmaster).
- Provisions for the full range of military airlift missions, incl capacity for up to 102 passengers/paratroops, or 36 litters; range of military cargo incl tanks, jeep missions, up to 63 AH-64A helicopters; air-drop capability for up to 60,000 lb single platforms or 110,000-lb multiple platforms.

**Dimensions:**
- span 215 ft 6 in, length 225 ft 0 in, height 65 ft 9 in.
- Weight: empty 374,000 lb, gross 789,000 lb (wartime 840,000 lb).
- Performance: max speed at 25,000 ft 571 mph, range 3,200 miles, unlimited with refueling.
- Ceiling: 20,700 ft.

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

**Contractor:** Boeing.

**Power Plant:** (C-17B) four Pratt & Whitney TF33-P-5 turbofans; each 18,000 lb thrust.

**Accommodation:** (C-17B): 60 passengers.

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

**Weights:** (C-17B): operating empty 102,300 lb, gross 275,500 lb.

**Performance:** (C-17B): max speed 600 mph, range with 56,000 lb payload 4,625 miles.

**COMMENTARY**

Several C-17s transport and variants, without the KC-135’s refueling equipment, remain operational within USAF. They were ordered originally to serve as interim jet passenger or cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratollifters in two versions.

The first 15 aircraft were equipped with J57-P-9W turbojets.

C-135. The next version included upgraded Pratt & Whitney turboprop. USAF retrofitted 11 Bs with revised interior for VIP transportation.

**C-141 Starlifter**

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

**Function:** Long-range troop and cargo airlift.

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

**First Flight:** Dec. 17, 1963.

**Delivered:** October 1964–June 1982.

**IOC:** May 1965.

**Production:** 285.

**Inventory:** 207.

**Ceiling:** 41,600 ft.


**Contractor:** Lockheed.

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

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

**Dimensions:** span 159 ft 11 in, length 168 ft 4 in, height 39 ft 3 in.

**Weights:** operating 150,000 lb; max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb.
lb normal, 344,900 lb emergency war planning.

**Performance:** max cruising speed 566 mph, range with max payload 2,170 miles without air refueling.

**COMMENTARY**

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

C-141A entered service with MAC in April 1965, and 280 were built, some of which were structurally modified to accommodate the Minuteman ICBM. One C-141A has been greatly modified as an Advanced Radar Test Bed (ARTB) for use as an airborne laboratory platform to test a wide range of sensors in a dynamic ECM environment.

C-141B is a stretched C-141A with in-flight refueling capability. All C-141As (except four AFRICOM aircraft used for test purposes) were lengthened by 23 ft 4 in to realize the aircraft’s full payload potential. First C-141B flew March 1977 and redeployed in December 1979 and June 1982. The modernization 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 aerodynamic systems. Modification of 13 437th AW C-141Bs is aimed at increasing their SOL (Special Operations Level) capability and survivability.

**Theater and Special Use Transports**

**C-9 Nightingale**

**Brief:** A twin-engine, medium-range, swept-wing jet aircraft used primarily for the aeromedical evacuation mission. A modified version of the DC-9, it is the only USAF aircraft specifically designed for the movement of litter and ambulatory patients.

**Function:** Aeromedical evacuation.

**Operator:** AMC, USAFE.

**First Flight:** August 1968.

**Delivered:** August 1968–February 1975.

**IOC:** circa 1983.

**Production:** 24.

**Inventory:** 23.

**Ceiling:** 35,000 ft.

**Unit Location:** Andrews AFB, Md., Yokota AB, Japan, Ramstein AB, Germany, Scott AFB, Ill.

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

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

**Accommodation:** crew of three; 40 litter patients or 40 ambulatory patients, or a combination of both, plus five medical staff.

**Dimensions:** span 93 ft 5 in, length 119 ft 3 in, height 27 ft 5 in.

**Weight:** gross 121,000 lb.

**Performance:** max cruising speed at 25,000 ft 565 mph, range more than 2,000 miles.

**COMMENTARY**

C-9A transport is a derivative of the DC-9 Series 30 commercial airliner, modified to include a special-care compartment with separate atmospheric and ventilation controls. Two C-9As also provide DE 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., for test purposes in the late 1980s. Two C-9C aircraft have been retired.

C-9D. Similar to C model and also deployed to overseas embassies, under AMC control. Two Gulfstream IV–SP aircraft, with advanced 731 turbofans; each 13,850 lb thrust.

C-21 (Ted Carlson)

**Brief:** A twin-engine, medium-range, swept-wing jet aircraft used primarily for the aeromedical evacuation mission. A modified version of the DC-9, it is the only USAF aircraft specifically designed for the movement of litter and ambulatory patients.

**Function:** Aeromedical evacuation.

**Operator:** AMC, USAFE.

**First Flight:** December 1979.

**Delivered:** from September 1983.

**IOC:** circa 1983.

**Production:** not available

**Inventory:** 13.

**Ceiling:** 45,000 ft.

**Unit Location:** Andrews AFB, Md., Ramstein AB, Germany.

**Contractor:** Gulfstream.

**Power Plant:** C-20A/B: two Rolls-Royce Spey MK511-8 turbfans; each 11,400 lb thrust; C-20H: two Rolls-Royce Tay MK611-8 turbfans; each 13,850 lb thrust.

**Accommodation:** crew of five; 14–18 passengers.

**Dimensions:** span 77 ft 10 in, length 83 ft 1 in, height 24 ft 4 in.

**Weight:** C-20A/B gross 68,200 lb; C-20H gross 74,600 lb.

**Performance:** max cruising speed 561 mph, range 4,050 miles.

**COMMENTARY**

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

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

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

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

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

**Function:** Passenger and cargo airlift.

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

**First Flight:** January 1973.

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

**IOC:** April 1984.

**Production:** 84.

**Inventory:** 80.

**Ceiling:** 45,000 ft.

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

**Contractor:** Learjet.

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

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

**Dimensions:** span 39 ft 6 in, length 48 ft 7 in, height 12 ft 3 in.

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

**Performance:** max level speed at 25,000 ft 542 mph, range with max passenger load 1,806 miles.

**C-12 Huron (Ken Hammond)**

**Brief:** A twin-engine, medium-range, swept-wing jet aircraft used primarily for the aeromedical evacuation mission. A modified version of the DC-9, it is the only USAF aircraft specifically designed for the movement of litter and ambulatory patients.

**Function:** Aeromedical evacuation.

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

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

**Delivered:** 1972–late 1980s.

**IOC:** circa 1974.

**Production:** 88.

**Inventory:** 34.

**Ceiling:** (C-12J) 25,000 ft.

**Unit Location:** Keesler AFB, Miss., Andrews AFB, Md., Elmendorf AFB, Alaska, Osan AB, South Korea, and various overseas embassies.

**Contractor:** Beech.

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

**Accommodation:** crew of two; C-12J: up to eight passengers; C-12D: up to 19 passengers.

**Dimensions:** (C-12J) span 54 ft 6 in, length 43 ft 9 in, height 15 ft.

**Weight:** (C-12J) empty 8,950 lb, gross 16,600 lb.

**Performance:** (C-12J) max cruising speed at 16,000 ft 307 mph, range with 10 passengers 1,806 miles.

**C-12A. Thirty military versions of the Beechcraft Super King Air 200 delivered to USAF. All subsequently modified.

**C-12C.** Re-engined C-12As, with PT6A-41 turboprops, deployed to overseas embassies, under AMC control.

**C-12D.** Similar to C model and also deployed to overseas embassies, under AMC control.

**C-12F.** With uprated PT6A-42 engines, can support medical airlift.

**C-12J.** A military version of the larger Beechcraft Model 1900, operated by PACAF.

**C-20 Gulfstream**

**Brief:** A twin-engine turbofan aircraft acquired to provide airlift for high-ranking government and DoD officials.

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

**Operator:** AMC, USAFE.

**First Flight:** December 1979.

**Delivered:** from September 1983.

**IOC:** circa 1983.

**Production:** not available

**Inventory:** 13.

**Ceiling:** 45,000 ft.

**Unit Location:** Andrews AFB, Md., Ramstein AB, Germany.

**Contractor:** Gulfstream.

**Power Plant:** C-20A/B: two Rolls-Royce Spey MK511-8 turbfans; each 11,400 lb thrust; C-20H: two Rolls-Royce Tay MK611-8 turbfans; each 13,850 lb thrust.

**Accommodation:** crew of five; 14–18 passengers.

**Dimensions:** span 77 ft 10 in, length 83 ft 1 in, height 24 ft 4 in.

**Weight:** C-20A/B gross 68,200 lb; C-20H gross 74,600 lb.

**Performance:** max cruising speed 561 mph, range 4,050 miles.
C-22

Brief: A Boeing 727-100 used by the Air National Guard as its primary medium-range aircraft for airlift of personnel.

Function: Passenger transportation.

Operator: ANG.

First Flight: February 1963 (commercial).


Production: four.

Inventory: three.

Ceiling: 37,400 ft.

Unit Location: Andrews AFB, Md.

Contractor: Boeing.

Power Plant: three JT9D-1 turbofans; each 14,000 lb thrust.

Accommodation: flight crew of four, plus three or four cabin crew; up to 89 passengers.

Dimensions: span 108 ft, length 133 ft 2 in, height 34 ft. Height: gross 170,000 lb.

Performance: max speed 630 mph, range 2,000 miles, 5.5 hr endurance.

C-22 Osprey

Brief: A tiltrotor, multimission transport aircraft designed to have the maneuverability and lift capability of a helicopter and the speed of a fixed-wing aircraft.

Function: Multimission airlift.

Operator: AFSC.


Delivery: 2003 (planned).

IOC: 2005 (planned).

Production: 50 (planned).

Inventory: 50 (planned).

Ceiling: 26,000 ft.

Unit Location: TBD.

Contractor: Bell/Boeing.

Power Plant: two Allison T406-AD-400 turboshfts; each 6,150 shp.

Accommodation: four flight crew, 18 troops or 8,000 lb internal cargo.

Dimensions: proprator diameter 38 ft, width, rotors turning 84 ft 7 in, fuselage length 57 ft 4 in, height over tailfin 17 ft 8 in.

Weight: normal mission weight, VTO 47,500 lb; gross, STO 60,500 lb.

Performance: max cruising speed in helicopter mode 265 mph, in airplane mode 316 mph, range with internal auxiliary tanks 1,700 miles.

C-26

Brief: A modified commuter transport aircraft.

Function: Transport and medevac.

Operator: ANG.

First Flight: not available.

Delivered: March 1989-present.


Production: not available.

Inventory: 16.

Ceiling: 26,700 ft.

Unit Location: To be located at ANG units throughout the USA.

Contractor: Fairchild.

Power Plant: two AlliedSignal TPE331-11U-612G turboprops; each 1,100 shp or TPE331-12UAR; each 1,119 shp.

Accommodation: crew of two; 19–20 passengers.

Dimensions: span 57 ft, length 59 ft 4 in, height 16 ft 8 in.

Weight: empty 9,494 lb, gross 16,000 lb.

Performance: max cruising speed at minimum weight of 250,500 lb; gross 35,500 lb, gross 16,000 lb.

C-26A

USAf acquired 13 Fairchild Metro III commuter transport aircraft, under the designation C-26A, to replace ANG C-131s. C-26As serving in the ANG Operational Support Transport Aircraft (ANGOSTA) role have a quick-change interior, enabling passenger seats to be replaced by a medevac or cargo-carrying configuration.

C-26B

Thirty C-26Bs were ordered in 1991, with deliveries from January 1992. C-26Bs have TCAS II, GPS, and microwave landing systems.

C-27 Aspen

Brief: A modified commercial airlifter used primarily for cargo operations on short, unimproved airstrips.

Function: Theater airlifter.

Operator: AMC.

First Flight: June 17, 1980.


IOC: October 1981.

Production: 10.

Inventory: seven.

Ceiling: 25,000 ft.

Unit Location: Howard AFB, Panama.

Contractor: Chrysler.

Power Plant: two Fiat-built General Electric T64-GE-P4D turboprops; each 5,400 shp.

Accommodation (C-27A): crew of three; various configurations, incl provision for 34 fully equipped troops or 14,850 lb cargo.

Dimensions: span 94 ft 2 in, length 75 ft 4 in, height 34 ft 8 in.

Weight: empty 35,500 lb, gross 56,878 lb.

Performance: max cruising speed 288 mph, ferry range with max fuel 1,727 miles.

C-27A

Ten commercially available Aerial G222 medium airlifters were modified to C-27A short takeoff and landing (STOL) intratheater transport standard. Modifications include new HF/VHF communications, autopilot, and INS. C-27As have rapid-response airlift of personnel and cargo to remote location available primarily through unimproved airfields with short, unprepared landing surfaces.

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. It also serves as a backup for Air Force One, the presidential aircraft.

Function: VIP air transport.

Operator: AMC.


Delivery: March–October 1998 (planned).


Production: four.

Inventory: two (as of March).

Unit Location: Andrews AFB, Md.

Contractor: Boeing.

Power Plant: two Pratt & Whitney PW2040 turbos on; each 41,700 lb thrust.

Accommodation: 16 crew and 45 passengers.

Dimensions: span 124 ft 10 in, length 155 ft 3 in, height 44 ft 6 in.

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

Performance: cruise speed Mach 0.8–0.86, cruise altitude 38,300 ft.

C-37A

Brief: A modified Gulfstream V utilized as part of the executive fleet, providing transportation for the vice president, cabinet, Congressional members, Secretary of Defense, service secretaries, and other prominent US and foreign officials.

Function: VIP air transport.

Operator: AMC.

First Flight: July 1998 (planned).

Delivery: through October 1998 (planned).

IOC: July 1998 (planned).

Production: two in production.

Inventory: two (planned).

Unit Location: Andrews AFB, Md.

Contractor: Gulfstream.

Power Plant: two (as of March).

Unit Location: Andrews AFB, Md.

Contractor: Gulfstream.

Power Plant: two Rolls-Royce BR710A1-10 turbos on; each 14,900 lb thrust.

Accommodation: five crew and 12 passengers.

Dimensions: span 93 ft 6 in, length 96 ft 5 in, height 25 ft 11 in.

Weight: empty 47,601 lb, gross 90,500 lb.

Performance: cruise speed Mach 0.88, cruise altitude 37,000 ft.
COMMENTARY

The C-37A, along with the C-32, will replace the VC-137/C aircraft. It will provide capability to conduct simultaneous diplomatic missions with secure communications. Capable of operations at any suitable civilian or military airfield in the world.

C-38A

Brief: A twin-engine transcontinental aircraft used to provide transportation for DVs, such as Congressional or high-ranking US military members. It can also be configured for medevac and cargo use.

Function: VIP air transport and operational support.

Operator: ANG.


IOC: 1998 (planned).

Production: two in production.

Inventory: two (planned).

Unit Location: Andrews AFB, Md.

Contractor: Tracor (Israel Aircraft Industries Ltd).

Power Plant: two AlliedSignal Garrett TF331-40R-200G engine, each 4,250 lb thrust.

Accommodation: three crew and eight passengers. In medevac role: two Spectrum 500 Life Support Units and two medical attendants. All seats removable for cargo.

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

Weight: gross 24,800 lb.

Performance: cruise speed Mach 0.87, cruise altitude 33,000 ft.

COMMENTARY

The C-38A is a military version of the Astra SPX produced by IAI and supported worldwide by Galaxy Aerospace. The first two aircraft will be flown and operated by ANG’s 201st AS. It will replace existing Learjet C-21As. The contract includes an option for two additional aircraft.

C-130 Hercules

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

Function: Intra-theater airlift.

Operator: AMC, AETC, AFSOC, USAFE, PACAF, ANG, AFRIC.

First Flight: August 1954 (C-130A).

Delivered: December 1956–present.

IOC: September 1970.

Production: more than 1,000.

Inventory: 525.

Ceiling: 100 ft 10 in (E), 99 ft 9 in (H).

Unit Location: Active: Dyess AFB, Texas, Little Rock AFB, Ark., Pope AFB, N.C., Hurlburt Field, Fla., Ramstein AB, Germany, Elmendorf AFB, Alaska, Yokota AB, Japan. ANG: 24 units. AFRIC: nine units.

Contractor: Lockheed Martin.

Power Plant: (C-130H) four Allison T56-A-15 turboprops; each 4,508 shp.

Accommodation: (C-130H) crew of five; up to 92 troops; E: crew of seven; 75 troops or 52 paratroops.

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

Weight: (C-130H) empty 80,606 lb, max payload 38,536 lb, gross 155,000 lb.

Performance: (C-130H) max cruising speed 385 mph, T-O run 3,585 ft landing run at (130,000 lb) 1,700 ft, range with 40,000-lb payload 2,240 miles.

COMMENTARY

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

C-130A, B, and D. Early versions, now retired. The initial production C-130A had four Allison T56-A-11 or -9 turboprop engines. USAF ordered a total of 219. The C-130B had improved range and higher weights and introduced Allison T56-A-7 turboprops. 134 were produced, with delivery beginning in April 1959. Six were modified in 1961 as JC-130B for air-snap satellite recovery. Twelve C-130Ds were modified as for Arctic operations.

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

C-130H is generally similar to the E model but has updated turboprops, a redesigned outer wing, updated avionics, and other minor improvements; delivery began in July 1974. More than 350 C-130Hs and derivatives were ordered for active and reserve units of the US services, including eight funded in FY 1996. Night Vision Instrumentation System was introduced from 1993, TCAS II in new aircraft from 1994. ANG and AFRIC C-130-Hs are used in fire-fighting missions. Specifically modified aircraft are used by AFRIC’s 75th AS for aerial spraying, typically to suppress mosquito-spread epidemics. Seven LC-130Hs, modified with wheel-ski gear, are operated by ANG’s 169th AW in support of Arctic and Antarctic operations. Two DC-130Hs were modified for UAV control duties.

C-130J. USAF is purchasing some of the new C-130J versions. This model features a two-crew flight system, 6,000 shp Allison AE 2100D2 engines, digital avionics and mission computers, enhanced performance, and improved reliability and maintainability. Delivery is due to start mid-1998.

MC-130 Combat Talon

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

Function: SOF infiltration, exfiltration, and resupply.

Operator: AFSOC, AETC, AFRIC.

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


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

Production: 38.

Inventory: 14 (E), 24 (H).

Ceiling: 33,000 ft.

Unit Location: MC-130E at Duke and Hurlburt Fields, Fla. MC-130H at Kadena AB, Japan, RCAF Mildenhall, UK, Hurlburt Field, Fla., Kirtland AFB, N.M.

Contractor: Lockheed Martin.

Power Plant: four Allison T56-A-15 turboprops; each 4,508 shp.

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

Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 100 ft 10 in (E), 99 ft 9 in (H).

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

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

COMMENTARY

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

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

MC-130H (Combat Talon II). Twenty-four modified new-build C-130Hs were acquired to supplement the Talon I. They include an integrated glass cockpit compatible with NVGs and improved infrared and electronic defensive countermeasures. The 1st, 7th, and 15th SOUs employ the Combat Talon II, supporting unconventional warfare units from their bases in Japan, Europe, and CONUS, respectively. The 51st SOW at Kirtland AFB, N.M., is responsible for MC-130H mission qualification training.

C-137 Stratoliner

Brief: A modified Boeing 707 that provides transport for the vice president, cabinet and Congressional delegations, and high-ranking military members. It can also be configured for medevac and cargo use.

Function: VIP air transport and operational support.

Operator: ANG.

First Flight: 1998 (planned).

Production: two in production.

Inventory: two (planned).

Unit Location: Andrews AFB, Md.

Contractor: Israel Aircraft Industries Ltd.

Power Plant: two AlliedSignal Garrett TF331-40R-200G engine, each 4,250 lb thrust.

Accommodation: three crew and eight passengers. In medevac role: two Spectrum 500 Life Support Units and two medical attendants. All seats removable for cargo.

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

Weight: gross 24,800 lb.

Performance: cruise speed Mach 0.87, cruise altitude 33,000 ft.

MC-130H Combat Talon II (Guy Aceto)
members, and other high-ranking US and foreign officials. It also serves as a backup for Air Force One, the Presidential aircraft.

**Function:** VIP air transport.
**Operator:** AMC.
**First Flight:** April 1959.
**Delivered:** from 1959.
**IOC:** 1962.
**Production:** seven.
**Inventory:** six.
**Ceiling:** 42,000 ft.
**Unit Location:** Andrews AFB, Md.
**Contractor:** Boeing.

**Power Plant:** four Pratt & Whitney JT3D-3B turbofans; each 18,000 lb thrust.

**Accommodation:** varies with mission.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in (VC-137C).

**Weight:** gross 322,000 lb (VC-137C).

**Performance:** max speed 627 mph, range 6,000 miles (VC-137C).

**Commentary**

Five specially modified Boeing 707 transports are operated by AMC’s 89th Airlift Wing for VIP duties. Replacement of these aircraft by new Boeing 757-200s, designated C-32A, is scheduled for 1998.

VC-137A. Three specially configured 707-120 aircraft, acquired by USAF for VIP duties. All modified to B standard.

C-137B. VC-137A aircraft modified with turbofan engines. One remaining.

C-137C. Four VIP-configured 707-320Bs, two of which were the original Air Force One aircraft. Aircraft tail N26000, the first VC-137C in service (Oct. 12, 1962) and the first specifically purchased for use as Air Force One, was retired this month. It is perhaps most well known as the aircraft that was used to return President John F. Kennedy’s body to Washington and to host the swearing in of President Lyndon B. Johnson in 1963. The second Air Force One, tail #27000, entered service Aug. 4, 1972.

VC-25 Air Force One

**Brief:** A specially configured Boeing 747-200B used for air transport of the President and his entourage. When the President is aboard, it has the radio call sign “Air Force One.”

**Function:** Air transport of the President.
**Operator:** AMC.
**First Flight:** First flown as Air Force One Sept. 6, 1990.
**Delivered:** August–December 1990.
**IOC:** circa 1990.
**Production:** two.
**Inventory:** two.
**Ceiling:** 45,000 ft.
**Unit Location:** Andrews AFB, Md.
**Contractor:** Boeing.

**Power Plant:** four General Electric CF6 turbofans; each 60,700 lb thrust.

**Accommodation:** crew of 26: up to 76 passengers.

**Dimensions:** span 195 ft 8 in, length 231 ft 10 in, height 63 ft 8 in.

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

**Performance:** high-speed cruise Mach 0.88–0.91, normal cruising speed Mach 0.84, unrefueled range 7,140 miles.

**Commentary**

Based on the Boeing 747-200B airframe, two VC-25A Presidential transports replaced the former primary and backup Air Force One C-137Cs. Equipment aboard the aircraft makes them practically self-sufficient, and despite their long range they are air refuelable.

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**Trainer Aircraft**

**T-1 Jayhawk**

**Brief:** A medium-range, twin-engine jet trainer version of the Beechcraft 400A. It is used by the Air Force to train student pilots to fly airlift and tanker aircraft.

**Function:** Advanced tanker/transport training.
**Operator:** AETC.
**First Flight:** Sept. 22, 1989 (Beechcraft 400A).
**IOC:** January 1993.
**Production:** 180.
**Inventory:** 179.
**Ceiling:** 41,000 ft.
**Unit Location:** Columbus AFB, Miss., Laughlin and Randolph AFBs, Texas, Vance AFB, Okla.
**Contractor:** Raytheon.

**Power Plant:** two Pratt & Whitney Canada JT15D-5B turbofans; each 2,900 lb thrust.

**Accommodation:** two side by side and one to the rear; rails are fitted to accommodate an extra four seats to permit transport of maintenance teams.

**Dimensions:** span 43 ft 6 in, length 48 ft 5 in, height 13 ft 11 in.

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

**Performance:** max speed at 27,000 ft 538 mph, range 2,222 miles.

**Commentary**

Pilots trained in the T-1 progress to transports, such as the C-5 and C-17, and tankers, such as the KC-10 and KC-135.

T-1A. The swept-wing T-1A is a version of the Beech 400A, with military avionics, used for Specialized Undergraduate Pilot Training (SUPT). Structural enhancements provide for a large number of landings per flight hour, increased bird strike resistance, and an additional fuselage fuel tank. GPS is being retrofitted.

**T-3 Firefly**

**Brief:** A propeller-driven aircraft used by the Air Force to screen pilot candidates by exposing them to military style traffic patterns and aerobatics. It is also used to teach takeoff and landing, stalls, slow flight, ground operations, and mission planning.

**Function:** Primary screener.
**Operator:** AETC.
**First Flight:** July 4, 1993.
**IOC:** March 1994.
**Production:** 113.
**Inventory:** 110.
**Ceiling:** 19,000 ft.
**Unit Location:** Hondo Airport, Texas, and USAFA, Colo.
**Contractor:** Slingsby; Northrop.
**Power Plant:** Textron Lycoming AEIO-540-D4AS engine; 260 hp.

**Accommodation:** two, side by side.

**Dimensions:** span 34 ft 9 in, length 24 ft 9 in, height 7 ft 9 in.

**Weight:** empty 1,780 lb, gross 2,550 lb.

**Performance:** max level speed 150 mph, range with max fuel, 65 percent power at 8,000 ft 469 miles.

**Commentary**

T-3A. Selected in April 1992 to replace the T-41 Mescalero, the fully aerobatic T-3A has been used since March 1994 by AETC at Hondo Airport, Texas, and since January 1995 by the US Air Force Academy to screen prospective pilots prior to SUPT.

The basic airframe is the Slingsby T67M260 Firefly built in the UK; Northrop Worldwide Aircraft Services is responsible for final assembly, test, delivery, and logistical support.

**T-6A Texan II**

**Brief:** A single engine aircraft that will be used for training undergraduate pilots, undergraduate navigators, and tactical navigator students in fundamentals of aircraft handling and instrument, formation, and night flying.

**Function:** Primary trainer.
**Operator:** AETC.
**First Flight:** May 1998 (planned).
**Delivery:** from Fiscal 1999 (planned).
**IOC:** Fiscal 2001 (planned).
**Production:** USAF 372, USN 339 (planned).
**Inventory:** USAF 372 (planned).
**Ceiling:** 35,000 ft.
**Unit Location:** Laughlin, Randolph, and Sheppard AFBs, Texas; Columbus AFB, Miss.; Vance AFB, Okla; Navy; NASs Whiting and Pensacola, Fla., and NAS Corpus Christi, Texas.
**Contractor:** Raytheon.

**Power Plant:** one Pratt & Whitney Canada PT6A-68 turboprop; 1,708 shp.

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

**Dimensions:** span 33 ft 5 in, length 33 ft 4 in, height 110 ft.

**Commentary**

T-37 Tweet (Randy Jolly)

T-3A, selected in April 1992 to replace the T-41 Mescalero, the fully aerobatic T-3A has been used since March 1994 by AETC at Hondo Airport, Texas, since January 1995 by the US Air Force Academy to screen prospective pilots prior to SUPT.

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**IOC:** Fiscal 2001 (planned).
**Production:** USAF 372, USN 339 (planned).
**Inventory:** USAF 372 (planned).
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**Unit Location:** Laughlin, Randolph, and Sheppard AFBs, Texas; Columbus AFB, Miss.; Vance AFB, Okla; Navy; NASs Whiting and Pensacola, Fla., and NAS Corpus Christi, Texas.
**Contractor:** Raytheon.

**Power Plant:** one Pratt & Whitney Canada PT6A-68 turboprop; 1,708 shp.

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

**Dimensions:** span 33 ft 5 in, length 33 ft 4 in, height 110 ft.
T-37 Tweet

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

Function: Primary trainer.

Operator: AETC.

First Flight: September 1955.

Delivered: from December 1956.

IOC: 1957.

Production: 985.

Inventory: 419.

Ceiling: 35,000 ft.

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

Contractor: Cessna.

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

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

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

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

Performance: max speed at 25,000 ft 426 mph, range at 280 mph with standard tankage 870 miles.

COMMENTARY

USAF’s first purpose-built jet trainer, the T-37 currently is AETC’s standard two-seat primary trainer. A distinctive dark blue and white finish is intended to help formation training and ease maintenance.

T-37A, with J69-T-9 turbojets; all have been modified to T-37B standards.

T-37B. The original T-37A was superseded in November 1959 by the T-37B, with improved radio navigation equipment, UHF radio, and upgraded instruments. All A models were later converted to B standard. Kits were subsequently produced to extend the capability of the T-37 by modifying or replacing critical structural components.

AETC plans to replace the T-37B with the new T-6A Texan II from 1999.

T-38 Talon

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

Function: Trainer.

Operator: AETC, ACC, AFMC.

First Flight: April 1959.


IOC: March 1961.

Production: more than 1,100.

Inventory: 471.

Ceiling: above 55,000 ft.

Unit Location: Randolph, Laughlin, and Sheppard AFBs, Texas, Vance AFB, Okla., Columbus AFB, Miss., Beale and Edwards AFBs, Calif., Egin AFB, Fla., Whiteman AFB, Mo.

Contractor: Northrop.

Power Plant: two General Electric J85-GE-5A turbojets; each 2,680 lb thrust dry, 3,850 lb thrust with afterburning.

Accommodation: two, in tandem, on ejection seats.

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

Weight: empty 7,164 lb, gross 12,093 lb.

Performance: max level speed at 36,000 ft more than 524 mph; max speed at 25,000 ft 426 mph, range with max fuel 1,100 miles.

COMMENTARY

Most of the T-38s in service are used by AETC for advanced student training. Capabilities are being enhanced through an ongoing program of modifications and structural renewal, and a full avionics upgrade is planned. As a result, coupled with the reduction in the T-38’s workload through introduction of the T-1A, the service life of the T-38 should extend to 2020.

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

T-38C. A slightly different version, with a gun sight and practice bomb dispenser, used by AETC for Introduction to Fighter Fundamentals (IFF).

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

T-43

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

Function: Navigator trainer.

Operator: ACC, AETC.

UV-18 Twin Otter

Brief: Modified utility transport used for parachute jump training.

Function: Parachute

Operator: AETC.
MH-1H is a general-purpose military version of the Bell Model 205 helicopter, first ordered by USAF in 1970. It is used for site support duties by Air Force Space Command, which operates USAF ICBM sites.

**UH-1 Iroquois**

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

**Function:** Utility helicopter.

**Operator:** AFSPC, AMC, AETC, AFSC, PACAF.

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

**Delivered:** From September 1970.

**IOC:** circa 1970.

**Production:** 98.

**Ceiling:** 14,200 ft.

**Unit Location:** MH-60G at Hurlburt Field, Fla.; HH-60G at Nellis AFB, Nev.; Kirtland AFB, N.M.; Moody AFB, Ga.; Holloman AFB, N.M.; NAS Keflavik, Iceland, Kadena AB, Japan, and RAF Mildenhall, UK.

**Performance:** max cruising speed at SL 115 mph, max range, no reserves, 261 miles.

**Armament:** (optional): two General Electric 7.62 mm miniguns or any combination of three 7.62 miniguns and .50 caliber machine guns.

**MH-53 Pave Low**

**Brief:** Specially outfitted heavy-lift helicopters used by USAF special operations forces for infiltration and exfiltration as well as combat search and rescue missions.

**Function:** SOF heavy-lift helicopter.

**Operator:** ACC, AETC, AFSC, PACAF, ANG, AFRIC.

**First Flight:** October 1974.

**Delivered:** 1982.

**IOC:** circa 1982.

**Production:** 98.

**Ceiling:** 14,200 ft.

**Unit Location:** MH-60G at Hurlburt Field, Fla.; HH-60G at Nellis AFB, Nev.; Kirtland AFB, N.M., Moody AFB, Ga., Holloman AFB, N.M., NAS Keflavik, Iceland, Kadena AB, Japan, and RAF Mildenhall, UK.

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

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

**MH-60G Pave Hawk**

**Brief:** Specially outfitted heavy-lift helicopters used by Air Force special operations forces for infiltration and exfiltration as well as combat search and rescue missions.

**Function:** SOF heavy-lift helicopter.

**Operator:** ACC, AETC, AFSC, PACAF, ANG, AFRIC.

**First Flight:** October 1974.

**Delivered:** 1982.

**IOC:** circa 1982.

**Production:** 98.

**Ceiling:** 14,200 ft.

**Unit Location:** MH-60G at Hurlburt Field, Fla.; HH-60G at Nellis AFB, Nev.; Kirtland AFB, N.M., Moody AFB, Ga., Holloman AFB, N.M., NAS Keflavik, Iceland, Kadena AB, Japan, and RAF Mildenhall, UK.

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

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

**Commentary**

Ninety-eight Black Hawk helicopters were modified to MH and HH-60G Pave Hawk configuration, with aerial refueling capability and internal auxiliary fuel. Configuration varies between aircraft, but both versions are equipped with an integrated navigation system using GPS, INS, and Doppler, with inputs to a flight path-directed FLIR. Both have unsecure VHF and secure FM, HF, UHF, and satellite communications.

Further modifications include an integral rescue hoist and an external stores support system (ESSS) for weapons and additional fuel. Pave Hawk capabilities permit rapid response, long-range/loiter mission profiles requiring a broad scale of payload possibilities.

**MH-60G**

The six MH-60Gs operated by AFSC’s 16th SOW provide a wide variety of SOF mission capabilities, including infiltration/exfiltration and personnel recovery, and humanitarian relief.

**HH-60G**

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

**Strategic Missiles**

**LGM-30 Minuteman**

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

**Function:** Strategic surface-to-surface ballistic missile.

**Operator:** AFSPC.

**First Flight:** February 1961.

**Delivered:** 1962–December 1978.

**IOC:** December 1962, Malmstrom AFB, Mont.

**Production:** 1,800.

**Inventory:** 500.

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

**Contractor:** Boeing.

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

**Guidance:** inertial guidance system.

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

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

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

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

**Commentary**

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

**LGM-30A/B**

The Minuteman I version that was deployed in the early 1960s. The last Minuteman I missile was removed from its site at Malmstrom AFB, Mont., in Febru-
ary 1969. USAF had deployed 150 A and 650 B models in 16 squadrons.  
LGM-30F. The Minuteman II version that incorporated a larger second stage, an improved guidance package, had greater range and payload capability, and was hardened against the effects of nuclear blast. IOC was reached in October 1965 at Grand Forks AFB, N.D. USAF deployed 450 in nine squadrons.

LGM-30G. The current version, Minuteman III, became operational in June 1970, providing improved range, rapid retargeting, and the capability to place three multiple independent targetable reentry vehicles (MIRVs) on three targets with a high degree of accuracy. USAF deployed 550 in 11 squadrons.

A single reentry vehicle configuration has been demonstrated, and planned for, in accordance with strategic arms control negotiations. A total of 500 Minuteman IIs will be based at Minot AFB, N.D.; F.E. Warren AFB, Wyo.; and Malmstrom AFB, Mont., when START II is ratified. All 150 missiles that were at Grand Forks AFB have been transferred to Malmstrom AFB and emplaced in converted MM II silos.

An extensive life extension program is ensuring Minuteman’s viability into the next century. Major upgrades include repositioning of the aging guidance system, remanufacture of the solid-propellant rocket motors, replacement of standby power systems, repair of launch facilities, and installation of updated, survivable communications equipment and new command-and-control consoles to enhance immediate communications. USAF also plans to modify Minuteman IIIs to accept the warheads taken from deactivated Peacekeeper missiles following implementation of the START II treaty.

LGM-118 Peacekeeper  
Brief: A solid-fuel intercontinental-range ballistic missile capable of delivering a thermonuclear payload of 10 warheads with high accuracy over great distances.  
Function: Strategic surface-to-surface ballistic missile.  
Operator: AFSPC.  
First Flight: June 17, 1983.  
IOC: December 1986, F.E. Warren AFB, Wyo.  
Production: 50.  
Inventory: 50.  
Unit Location: F.E. Warren AFB, Wyo.  
Contractor: Martin Marietta.  
Power Plant: first three stages solid-propellant, fourth stage storable liquid; by Thiokol, Aerojet, Hercules, and Rocketdyne, respectively.  
Guidance: inertial guidance system.  
Warheads: 10 Avco Mk 21 MIRVs.  
Dimensions: length 71 ft, diameter 7 ft 8 in.  
Weight: approx 195,000 lb.  

**COMMENTARY**  
LGM-118A. Peacekeeper, also known as “MX,” was developed in response to an increased Soviet strategic threat. However, the ending of the Cold War caused the US to cap deployment at only 50 Peacekeeper missiles in the Fiscal 1990 budget, and development of a rail-garrison mode of deployment was terminated.  
Housed in former Minuteman III silos, Peacekeeper is a four-stage ICBM that carries up to 10 independently targetable reentry vehicles. It is more accurate, carries more warheads, and has greater 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. Peacekeeper will be scheduled for retirement under the provisions of the START II treaty already ratified by the US Senate but not by the Russian Duma, and no retirement action will occur until its terms come into force.

LGM-30G  
Unit Location: Barksdale AFB, La., Minot AFB, N.D.  
Contractor: Boeing.  
Power Plant: Williams/Teledyne CAE F107-WR-10 turbofan; 606 lb thrust.  
Guidance: AGM-86: inertial plus TERCOM; AGM-86C: inertial plus GPS.  
Warhead: AGM-86B: W80-1 nuclear; AGM-86C: blast/fragmentation conventional.  
Dimensions: length 20 ft 9 in, body diameter 2 ft, wingspan 12 ft.  
Weight: 3,200 lb.  
Performance (approx): speed Mach 0.6, range 1,555 miles.  

**COMMENTARY**  
LGM-86. A prototype cruise missile, developed in the mid-1970s. Slightly smaller than the later versions, it never entered production.  
LGM-86: B. First production version, the B is programmed for precision attack on surface targets. When launched in large numbers, its ability to dilute enemy defenses improves the capability of manned aircraft to penetrate to major targets. Small radar signature and low-level flight capability enhance the missile’s effectiveness. The last of 1,715 production models was delivered in October 1986.

AGM-86C. A non-nuclear version, developed from 1986, the Conventional Air Launched Cruise Missile, (CALCM) was first used operationally during the Persian Gulf War. One has been tested with an improved GPS, flying five hours before precisely impacting the target in a new steep terminal dive maneuver devised for delivering penetrator warheads.

**AGM-129A Advanced Cruise Missile**  
**Brief:** A stealthy, long-range, winged air vehicle equipped with a nuclear warhead and designed to evade enemy air and ground-based defenses in order to strike hard, heavily defended targets at standoff distances.  
**Function:** Strategic air-to-surface cruise missile.  
**Operator:** ACC.  
**First Flight:** July 1985.  
**Delivered:** June 1990–August 1993.  
**IOC:** circa 1991.  
**Production:** 461.  
**Inventory:** not available  
**Unit Location:** Barksdale AFB, La., Minot AFB, N.D.  
**Contractor:** General Dynamics/McDonnell Douglas (now Boeing).  
**Power Plant:** Williams International F112-WR-10 turbofan.  
**Guidance:** inertial, with TERCOM update.  
**Warhead:** W80-1 nuclear.  
**Dimensions:** length 20 ft 10 in, body width 2 ft 3 in, wingspan 10 ft 2 in.  
**Weight:** 3,709 lb.  
**Performance (approx):** range 1,865 miles.  

**COMMENTARY**  
AGM-129A. Embodying stealth technology, the AGM-129A has improved range, accuracy, survivability, and targeting flexibility compared with the AGM-86B. Developed by General Dynamics, McDonnell Douglas was awarded a contract in 1987 for technology transfer leading to second-source capability for this advanced system, which is deployed on B-52H aircraft.  

**Tactical Missiles and Weapons**  

**AIM-7 Sparrow**  
**Brief:** A radar-guided air-to-air missile with all-weather, all-altitude, and all-aspect offensive capability and a high-explosive warhead, carried by fighter aircraft.  
**Function:** Air-to-air guided missile.  
**First Flight:** December 1983 (AIM-7M).  
**Delivered:** from 1956.  
**IOC:** April 1976 (AIM-7F).  
**Production:** not available  
**Inventory:** classified  
**Contractor:** Raytheon/Hughes.  
**Power Plant:** Hercules Mk 58 Mod 0 boost–sustain rocket motor.  
**Guidance:** (AIM-7M) monopulse semi-active radar.  
**Warhead:** high-explosive, blast fragmentation, weighing 86 lb.  
**Dimensions:** length 12 ft, body diameter 8 in, wingspan 3 ft 4 in.  
**Weight:** launch weight 504 lb.  
**Performance (estimated):** max speed more than Mach 3.5, range more than 25 miles.  

**COMMENTARY**  
**Early Versions.** Production of Sparrow has been under way for more than 40 years. Approximately 34,000 early models (AIM-7AB/D/E) were produced. Compared to the earlier versions, the advanced solid-state AIM-7F, introduced in 1975, had larger motor, Doppler guidance, improved ECM, and better capability over both medium and “dogfight” ranges. USAF produced approximately 5,000, but none are now in service.  
**AIM-7M** is a monopulse version of Sparrow, aimed at reducing cost and improving performance in the ECM and look-down clutter regions. It began operational service in Fiscal 1983. This version equips USAF F-15 and F-16 (ADF).  
**AIM-7R** is designed to improve missile defenses against sophisticated ECM by means of a new IR seeker added to the guidance and control section, incorporated in a multimode seeker. During the Gulf War, 22 Iraqi fixed-wing aircraft and three helicopters were hit by Sparrow missiles.  

**AGM-17A** (Guy Aceto)
AIM-7s and AIM-9s (see below) equipped with telemetry packages in place of warheads are used in a program initiated by the USAF Air Warfare Center and linked with industry to develop passive missile-warning systems for USAF tactical aircraft.

**AIM-9 Sidewinder**

**Brief:** A supersonic, short-range, heat-seeking, air-to-air missile carried by fighter aircraft, having a high-explosive warhead and a passive infrared guidance system.

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

**First Flight:** September 1953.

**Delivered:** 1983-98 (AIM-9M current operational variant).

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

**Production:** not available

**Inventory:** not available

**Contractor:** Raytheon/Loral.

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

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

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

**Dimensions:** length 9 ft 5 in, body diameter 5 in, fin-span 2 ft 1 in.

**Weight:** launch weight 190 lb.

**Performance:** max speed above Mach 2, range more than 10 miles.

**COMMENTARY**

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

AIM-9M is an improved version of AIM-9L with all-aspect intercept capability. This version has increased infrared counter-countermeasures (IRCCM) capability, improved background discrimination, and reduced-smoke rocket motor. First flight of prototype was in February 1978. Full production began in Fiscal 1981 with an order for approximately 1,280 missiles.


AIM-9X. Development of a replacement for the AIM-9M continues, with award in 1996 of $169 million contract to Hughes for the engineering/manufacturing phase of its Evolved Sidewinder, derived from an AIM-9X demonstra-

**AIM-9X**

**Development of a new-generation radar-guided, all-weather, beyond-visual-range air-to-air missile designed for use in close air support, interdiction, and defense suppression missions, having standoff capability and high probability of strike against a wide range of targets.**

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

**First Flight:** August 1969.


**Production:** not available

**Inventory:** classified.

**Contractor:** Raytheon.

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

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

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

**Dimensions:** length 8 ft 2 in, body diameter 1 ft, wing-span 2 ft 4 in.

**Weight:** launch weight (AGM-65A) 462 lb, (AGM-65G) 677 lb.

**Performance:** range 0.6 to 14 miles.

**COMMENTARY**

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

**AIM-65A**

The basic Maverick is a launch-and-leave, TV-guided, air-to-surface missile that enables the pilot of the launch aircraft to see 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.

**AIM-65B**

A version with a "scene magnification" TV seeker that enables the pilot to identify and lock on to smaller or more distant targets.

**AIM-65D**

A version developed to overcome limitations of TV Maverick, which can be used only in daylight and clear-weather conditions. This version has an imaging-infrared (IIR) seeker as well as a lower-smoke motor; 2-21 Maverick became operational on A-10s in February 1986.

**AIM-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.

**AIM-65H**

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

**AIM-84 Sparrow**

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

**First Flight:** December 1984.

**Delivered:** 1988–present.

**IOC:** September 1991.

**Production:** more than 12,000 planned for USAF/USN.

**Inventory:** classified.

**Contractor:** Raytheon.

**Power Plant:** Gencorp Aerojet two-stage solid-propellant rocket motor.

**Guidance:** inertial and command inertial with active radar terminal homing.

**Warhead:** high-explosive directed fragmentation weighing 48 lb.

**Dimensions:** (A/B models) length 12 ft, body diameter 7 in, span of tail control fins 2 ft 1 in.

**Weight:** 335 lb.

**AIM-84 Harpoon**

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

**Power Plant:** Raytheon.

**Contractor:** McDonnell Douglas (now Boeing).
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 andhomes in on enemy radar emissions.

**Function:** Air-to-surface anti-radiation missile.

**First Flight:** April 1979.

**Delivered:** 1982–1984.

**Production:** Not available

**Inventory:** Not available.

**Contractor:** Raytheon.

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

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

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

**Dimensions:** Length 13 ft 8 in, body diameter 1 in, wingspan 3 ft 8.5 in.

**Weight:** 807 lb.

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

**Commentary**

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

Agm-88B.

A factory-programmed version used to equip the now-retired F-4G Wild Weasel to increase its lethality against Iraqi defenses as part of Operation Southern Watch.

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 USAF, PACAF, and ACC HARMs, permitting changes to missile memory in the field.

Agm-130

**Brief:** A powered TV or IR-guided air-to-surface missile, carried by fighters and designed for high- and low-altitude strike to standoff ranges against heavily defended targets.

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

**First Flight:** 1984.

**Delivered:** November 1992–present.

**IOC:** 1994.

**Production:** Approx 600.

**Inventory:** Classified

**Contractor:** Rockwell.

**Guidance:** TV or IR seeker, or DM transponder.

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

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

**Weight:** Launch weight 2,917 lb.

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

**Commentary**

AGM-130 is a product improvement to the GBU-15 glide bomb, with a guidance system designed to give pinpoint accuracy from low to medium altitudes. The AGM-130 adds a rocket motor, radar altimeter, and digital control system, providing it with triple the standoff range of the GBU-15. Upgrades include a new solid-state TV seeker, an improved IR seeker, and INS/GPS guidance that permit operation in adverse weather and improve target acquisition.

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

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

AGM-142 Have Nip

**Brief:** A medium-range standoff attack missile, carried by Air Force heavy bombers, that gives these long-range aircraft a conventional precision strike capability.

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

**First Flight:** Not available.

**Delivered:** Not available.

**IOC:** Circa 1990.

**Production:** Not available.

**Inventory:** Not available.

**Contractor:** Rafael (Israel).

**Power Plant:** Solid-propellant rocket motor.

**Guidance:** Inertial, with data link, TV, or IR homing.

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

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

**Weight:** 2,998 lb.

**Performance:** Range 50 miles.

**Commentary**

This medium-range standoff missile was derived from the Israeli-built Popeye missile. Initial operational test and evaluation launches were completed in May 1990.

Agm-154 Joint Standoff Weapon

**Brief:** In a Joint USAF and Navy family of low-cost, highly lethal glide weapons with a standoff capability, usable against heavily defended targets.

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

**First Flight:** December 1994.

**Delivered:** From 1998.

**IOC:** 1998 (Navy); 2000 (USAF).

**Production:** Not available.

**Inventory:** Not available.

**Contractor:** Raytheon.

**Guidance:** AGM-154A and JSOW/BLU-108 tightly coupled INS/GPS, JSOW/Unitary tightly coupled INS/GPS midcourse, IR terminal with data link.

**Dimensions:** Length 13 ft 4 in.

**Weight:** 1,065–1,500 lb.

**Performance:** Range in low-altitude launch 17 miles, high-altitude launch 46 miles.

**Commentary**

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

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


**AGM-154C.** The third variant, JSOW/Unitary entered EMD in the middle of 1995 and integrates an IR terminal seeker, the AW-13 data link, and a 500–800-lb unitary warhead. A wide range of testing has been completed on the F-15E and F-16, as well as fit checks on F-15E, F-16, F-117A, F/A-18, A-6E, AV-8B, B-1, B-52, Tornado, and Jaguar. JSOW will also equip B-2 bombers.

**CBU-97 Sensor Fuzed Weapon**

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

**Function:** Wide area cluster munition.

**First Flight:** Circa 1990.

**Delivered:** 1996–present.

**IOC:** 1997.

**Contractor:** TBD

**Inventory:** TBD

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

**Dimensions:** Length 92 in; diameter 16 in.

**Weight:** 927 lb.

**Performance:** Delivers 40 lethal projectiles.

**Commentary**

The CBU-97 Sensor Fuzed Weapon comprises a SUU-66/B tactical munitions dispenser with an FZU-39 fuze. Each tactical munitions dispenser contains 15 BLU-108/B submunitions, and each submunition contains four projectiles that, upon being thrown out, seek out their target and deliver a warhead. Each SFW can deliver a total of 40 lethal projectiles. The projectiles’ IR sensors can detect a
GBU-15

**Brief:** An unpowered glide weapon carried by fighters and used to destroy high-value enemy targets from short standoff distances.

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

**First Flight:** 1975.


**Production:** not available

**Contractor:** Boeing.

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

**Warhead:** BLU-109 (Erik Simonsen)

**Dimensions:** length 12 ft 10 in, diameter 1 ft 6 in, cruising speed subsonic.

**Weight:** 2,450 lb.

**Performance:** cruising speed subsonic.

**COMMENTARY**

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

The weapon has two modes of attack. In direct attack, the weapon is locked on to the target before launch and flies a near line-of-sight profile to impact. In the indirect mode, the seeker can be locked on to the target after launch, or the operator can fly the weapon manually to impact, using guidance updates provided through the data link. This profile uses a midcourse glide phase and extends standoff range.

A “buddy” system may be operated whereby the weapon is launched from one aircraft and controlled by another. The GBU-15 is deployed with the F-15E.

GBU-15(V)/B, TV-guided variant, qualified for operational service in 1983 (production complete).


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**GBU-24/B:** This is an air-to-ground weapon equipped with a third-generation Laser-Guided Bomb guidance kit, called Paveway III, integrated with a BLU-109 penetrating warhead.

The kit consists of an advanced guidance section and a highly sensitive scanning seeker. It also has a standoff capability. Development began in 1974, based on the experience gained in Vietnam with the earlier Paveway Strike GBU-8 HOBO MOD II guided weapon. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. The target-detecting device is carried on the front of the warhead. The control module, with autopilot and data link module, attaches to the rear.

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

**Brief:** A Joint USAF/Navy INS/GPS-guided 1,000- or 2,000-lb weapon, carried by fighters and bombers, that will provide highly accurate, autonomous, all-weather, conventional bombing capability.

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

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

**Delivered:** 1997–present.

**IOC:** 1998.

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

**Inventory:** not available

**Contractor:** Boeing.

**Power Plant:** not available

**Dimensions:** Mk 84 with JDAM 157.5 in; Mk 83 with JDAM 119.5 in.

**Weight:** 2,350 lb.

**Performance:** not available

**COMMENTARY**

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

**GBU-31:** Variant that adds an INS/GPS guidance kit to the 2,000-lb general-purpose Mk 84 bomb or the 2,000-lb BLU-109 penetrator.

**GBU-32:** Variant that adds an INS/GPS guidance kit to the 1,000-lb general-purpose Mk 83 bomb.

**GPS-Aided Munition (GAM)**

**Brief:** A conventional 2,000-lb weapon, carried by B-2 bombers, which uses signal emanating from the Global Positioning System satellites to attack targets with extreme accuracy.

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

**First Flight:** 1995.

**Delivered:** July 1996–present.

**IOC:** 1996.

**Production:** not available

**Inventory:** not available

**Contractor:** Northrop Grumman/Hughes.

**Weight:** 2,000 lb (basic bomb).

**Performance:** near precision capability.
**Launch Vehicles**

**Atlas**
- Brief: An expendable, medium-lift launch vehicle whose primary mission is the launch into space of the Defense Satellite Communications System (DCS) satellite.
- Function: Medium-class spacecraft.
- Operator: AFSPC.
- IOC: September 1959.
- Dimensions: Atlas stage: length 81 ft 7 in, max body diameter 10 ft. Atlas IIA: length 81 ft 7 in, max body diameter 10 ft.
- Weight: Launch Weight: 416,000 lb.
- Performance: (approx) 53,000 lb. (Sea level). (Approx) 4,000 lb thrust (Cutoff).

**Atlas IIA**
- Atlas with Centaur upper stage
- Production: 32
- Inventory: 32
- Contractor: British Aerospace (now BAE Systems Dynamics).
- Power Plant: IIM two-stage solid-propellant rocket motor.
- Performance: max speed more than Mach 2, range 4 miles.
- Range: approx 94 lb.

**RAPID**
- Brief: A 24-hour, highly mobile surface-to-air missile system designed to defend airfields against high-speed, low-level air threats.
- Function: Surface-to-air missile.
- Range: approx 94 lb.
- Performance: max speed more than Mach 2, range 4 miles.

**RAPIER**
- Brief: A man-portable, tube-launched, surface-to-air missile designed to defend airfields against high-speed, low-level air threats.
- Function: Surface-to-air missile.
- Range: approx 94 lb.
- Performance: max speed more than Mach 2, range 4 miles.

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- Range: approx 94 lb.
- Performance: max speed more than Mach 2, range 4 miles.
The Delta program has had more than 200 successful domestic and foreign military and commercial launches.

**Delta I.** Delta launch vehicle family began in 1959 with a contract to Douglas Aircraft Co. (now Boeing) for the production and integration of 12 space-launch vehicles. The Delta used components from USAF's Thor intermediate-range ballistic missile as its first stage and the Navy’s Vanguard launch vehicle program as its second. The first Delta was launched from Cape Canaveral and had the ability to deliver a 100-lb spacecraft into geostationary transfer orbit.

**Delta II.** Selected by the Air Force in 1987 to launch the Navstar GPS satellites, the Delta II is slightly larger than the earlier Delta rocket, to satisfy USAF’s medium-payload requirement. The first launch took place in February 1989, and 25 operational GPS satellites had been launched before an accident destroyed a launcher in January 1997. The program has since resumed.

Delta II is a three-stage booster surrounded by nine solid-propellant, graphite epoxy motors. For low Earth orbit missions, the third stage is typically not used. In December 1995, a newly assigned vehicle, complete with new avionics, an increased expansion ratio on three of the graphite epoxy motors (GEMs), and a new launch control system, successfully placed a NASA payload into orbit. Delta II will continue to support GPS into the next century by replenishing aging satellites as they fail and is supporting other DoD payloads.

**Evolved Expendable Launch Vehicle**

Brief: EELV is USAF’s space lift modernization program aimed at a 25 to 50 percent reduction over current systems in the cost to launch the government’s medium to heavy payloads. The requirement is to place payloads of 2,500 to 45,000 lb into low Earth orbit.

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

**Operator:** AFSPC.

**IOC:** 2003 (planned).

**Launches Scheduled:** TBD

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

**Contractor:** pre-EMD: Lockheed Martin and Boeing.

**Power Plant:** aft core: Aerojet hypergolic propellant rocket engines; first stage 1,900,000 lb thrust; second stage 1,900,000 lb thrust; Titan IVA.

**Dimensions:** length 374 ft, diameter 7 ft 10 in.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 5,900,000 lb.

**Guidance:** inertial.

**Configuration:** two- or three-stage (Titan IV is three-stage).

**Power Plant:** first and second stages: Aerojet liquid hypergolic rocket engines; first stage, two engines 1,900,000 lb thrust each; second stage 1,900,000 lb thrust.

**Dimensions:** length 374 ft, diameter 7 ft 10 in.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 5,900,000 lb.

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

**Titan II.** Provided many structural and propulsion technologies that were later incorporated into the Titan II. The launcher was used in the 1960s for the manned Gemini flights.

Fourteen Titan II ICBMs have since been refurbished and modified to provide expendable space launch capability. Six successful launches have included the launch of the space probe Clementine I toward the Moon in June 1994, marking the first US lunar mission since Apollo 17 in December 1972. Remaining refurbished Titan IIs are assigned to place Defense Meteorological Satellite Program (DMSP), National Oceanic and Atmospheric Administration (NOAA) satellites, and other government agencies’ satellites into polar orbit through the turn of the century.

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

**Function:** Heavy space lift vehicle.

**Operator:** AFSPC.

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

**IOC:** June 14, 1989.

**Launches Scheduled:** Five (FY98); four (FY99).

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

**Contractor:** Lockheed Martin.

**Power Plant:** Aerojet liquid hypergolic rocket engines; Titan I stage: two engines 1,400,000 lb thrust each; Titan II stage: two engines 1,900,000 lb thrust each; Titan II stage: two engines 1,900,000 lb thrust each; Titan II stage: two engines 1,900,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.

**Guidance:** inertial.

**Configuration:** two-stage: Titan I stage; three-stage: Titan II stage.

**Power Plant:** first stage: two engines 1,400,000 lb thrust each; second stage: two engines 1,900,000 lb thrust each; third stage: two engines 1,900,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.

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

**Function:** Heavy space lift vehicle.

**Operator:** AFSPC.

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

**IOC:** June 14, 1989.

**Launches Scheduled:** 16 (FY98); 12 (FY99).

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

**Contractor:** AFSPC.

**Power Plant:** Aerojet liquid hypergolic rocket engines; Titan I stage: two engines 1,400,000 lb thrust each; Titan II stage: two engines 1,900,000 lb thrust each; Titan II stage: two engines 1,900,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.

**Guidance:** inertial.

**Configuration:** two-stage: Titan I stage; three-stage: Titan II stage.

**Power Plant:** first stage: two engines 1,400,000 lb thrust each; second stage: two engines 1,900,000 lb thrust each; third stage: two engines 1,900,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.

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

**Function:** Heavy space lift vehicle.

**Operator:** AFSPC.

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

**IOC:** June 14, 1989.

**Launches Scheduled:** Five (FY98); four (FY99).

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

**Contractor:** AFSPC.

**Power Plant:** Aerojet liquid hypergolic rocket engines; Titan I stage: two engines 400,000 lb thrust each; Titan II stage: two engines 1,000,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.

**Guidance:** inertial.

**Configuration:** two-stage: Titan I stage; three-stage: Titan II stage.

**Power Plant:** first stage: two engines 400,000 lb thrust each; second stage: two engines 1,000,000 lb thrust each; third stage: two engines 1,000,000 lb thrust each.

**Dimensions:** length 290 ft, diameter 32 ft.

**Performance:** 120,000 lb; 15,000 lb thrust.

**Launch Weight:** 2,000,000 lb.
Satellite Systems

Defense Support Program System

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

Function: Strategic and tactical launch detection system.

Operator: AFSPC.

First Launch: early 1970s.

IOC: classified.

Constellation: classified.

Design Life: three yr.

Launch Vehicle: Titan IV IUS.

Unit Location: Peterson AFB, Colo.

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

Contractor: TRW and Aerojet.

Power Plant: solar arrays generating 1,485 watts, decreasing to 418 watts after 10 yr.

Dimensions: 22 ft diameter, 32 ft 8 in, with solar paddles deployed.

Weights: 5,000 lb (approx).

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

COMMENTARY

Defense Support Program (DSP) satellites are a key part of North America’s early warning system, capable of detecting missile launches, space launches, and nuclear detonations. Warning data is fed to NORAD and US Space Command early warning centers at Cheyenne Mountain AS, Colo. Since their first launch DSP satellites have provided an uninterrupted early warning capability to the US. Though not designed to spot and track smaller missiles, the system’s capability was demonstrated during the Persian Gulf War, when the satellites provided warnings of Iraqi Scud attacks. A total of 17 DSP satellites have been launched by USAF. Procurement will end with No. 23, canceling the further satellites originally planned.

An advanced system, the Space-Based Infrared (SBIR) system is being developed to replace DSP satellites from Fiscal 1969, employing satellites in two orbits. The high will detect missile launches by the heat of their plumes, and the lower tracks the cold re-entry vehicle when it separates from its booster. The contract for the demonstration- validation phase of the low-orbit component was awarded to Rockwell (now Boeing)/Lockheed Martin in October 1996; a Lockheed Martin team including Aerojet, Honeywell, and Northrop Grumman received the contract for development and delivery of seven “high” satellites.

Defense Meteorological Satellite Program

Brief: Space vehicles that collect wide-area weather data for US military weather forecasters to use to monitor and predict regional and global weather patterns.

Function: Weather data satellite.

Operator: AFSPC.

First Launch: circa 1972.

IOC: classified but in use during Vietnam War.

Constellation/on-orbit: Two.

Design Life: three yr.

Launch Vehicle: Titan II.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: approx 500 miles.

Contractor: Lockheed Martin.

Power Plant: solar arrays generating 1,000 watts.

Dimensions: height 12 ft, width 4 ft.

Weight: 1,750 lb.

Performance: DMS satellite orbit Earth at about 500 miles altitude and scan an area 1,800 miles wide. Each system covers the Earth in about 12 hr.

COMMENTARY

Defense Meteorological Satellite Program (DMSP) space vehicles have been collecting weather data for US military operations for about two decades.

Block 5D-2. Two operational DMSP Block 5D-2 satellites survey the entire Earth four times a day, using their primary sensor, the Operational Linescan System, to take visual and IR imagery of cloud cover. Military weather forecasters use this imagery to detect developing weather patterns anywhere in the world, helping to identify, locate, and determine the severity of thunderstorms, hurricanes, and typhoons.

DMSP satellites also have sensors that measure atmospheric moisture and temperature levels, X rays, and electrons that cause auroras. The satellites can locate and determine the intensity of auroras—electromagnetic phenomena that can interfere with radar operations and long-range communications. Last USAF satellite was launched April 4, 1997. Satellite weather systems operated by DoD, NASA, and NOAA are to be merged and managed by NOAA.

Block 5D-3, with a projected first launch in 1999, will provide increased capabilities, including improved sensors and a longer life span.

Defense Satellite Communications System

Brief: A spacecraft traveling in geosynchronous orbit used to transmit SHF high-priority command-and-control communications.

Function: Communications satellite.

Operator: AFSC.

First Launch: 1971 (DSCS II).


Constellation: five (III).

Design Life: five yr (III); 10 yr (III).

Launch Vehicle: Atlas III.

Unit Location: Schriever AFB, Colo.

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

Contractor: TRW (Phase II); Lockheed Martin (Phase III).

Power Plant: solar arrays generating 531 watts, decreasing to 418 watts after 5 yr (Phase II); solar arrays generating 1,240 watts, decreasing to 980 watts after 10 yr (Phase III).

Dimensions: cylindrical body 9 ft 6 in diameter, 6 ft 13 ft with antennas deployed, high (Phase II); rectangular body 6 ft x 6 ft x 7 ft 38 ft-8 in with solar arrays deployed (Phase III).

Weight: 1,350 lb (Phase II), 2,550 lb (Phase III).

COMMENTARY

Defense Satellite Communications System (DSCS) satellites provide worldwide secure voice high-data-rate transmission, operating in superhigh frequency. The system is used for high-priority communications, such as the exchange of wartime information between defense officials and battlefield commanders. The military also uses the DSCS to transmit data on space operations and early warning to various systems and users. A program has been functional to allow more tactical users access to the DSCS.

DSCS II. Two Phase II satellites are orbiting Earth, equipped with antennas capable of providing low-gain, Earth-field-of-view coverage and steerable, high-gain area coverage.

DSCS III. The first launch of the more advanced Phase III satellites was in 1982. Nine are currently in orbit, with launches continuing until 2002. These satellites are nuclear hardened and can resist jamming. Phase III spacecraft are capable of providing flexible coverage and nulling in addition to the Phase II’s capabilities.

Navstar Global Positioning System

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

Function: Worldwide navigation satellite.

Operator: AFSPC.


Constellation: 24.

Design Life: 7.5 yr (I/IIA): 10 yr (IIR).

Launch Vehicle: Delta III.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: 11,000 miles.

Contractor: Boeing, Lockheed Martin, and Loral Fairchild.

Power Plant: solar arrays generating 700 watts.

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

Weight: 1,860 lb in orbit.

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

COMMENTARY

The 24 satellites of the Navstar Global Positioning System (GPS) provide 24-hour navigation services, including accurate, three-dimensional (latitude, longitude, and altitude) velocity and precise time; passive, all-weather operation; continuous real-time information; support to an unlimited number of users and areas; and support to civilian users currently at a slightly less accurate level. Concern over potential enemy use of GPS is being addressed under the NAVWARS initiative. There are currently 28 satellites on orbit: eight Block II, 18 IIA, one IIR, and one nonoperational IIA. Also benefiting from the GPS are such functions as mapping, aerial refueling and rendezvous, geodetic surveys, and search-and-rescue operations.

Militar Satellite Communications System

Brief: A satellite communications system that provides secure, jam-resistant worldwide communications for the essential wartime requirements for high-priority military users, linking command authorities to ships, submarines, and aircraft.

Function: Communications satellite.

Operator: AFSPC.


IOC: not available.

Constellation: six.

Design Life: 10 yr.

Launch Vehicle: Titan IV.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: 22,400 miles.

Contractor: Lockheed Martin.

Power Plant: solar arrays generating 7,000 watts.

Dimensions: 52 ft x 116 ft (with full solar array extension).

Weight: 10,000 lb.

Performance: The constellation will consist of four satellites in geosynchronous orbit at 4° inclination, providing coverage between 65° north and 65° south latitude; design lifetime of 10 yr.

COMMENTARY

Milstar is a Joint-service communications system that provides secure, jam-resistant EHF communications for all US armed services. Operated by the 50th Space Wing, the constellation will link command authorities with a wide variety of resources including ships, submarines, aircraft, and ground stations.

Currently serving tactical as well as strategic forces, the last Milstars (to be launched between 1999 and 2002) will include medium-data-rate payloads able to transmit larger amounts of data.

Fleet Satellite Communications System

Brief: A satellite communication system providing a secure link between the USAF, USN, and the Presidential command network.
Function: Communications satellite.
Operator: AFSPC, Navy.
Constellation: four.
Design Life: five yr.
Launch Vehicle: Atlas E.
Unit Location: Schriever AFB, Colo.
Orbit Altitude: 22.300 miles.
Contractor: TRW.
Power Plant: Solar arrays generating up to 1,540 watts.
Dimensions: length 50 in, diameter 8 ft.
Weight: 4,250–5,061 lb.
COMMENTARY
A constellation of four satellites, each having 23 channels (12 for Air Force, 10 for Navy, one reserved for the national command authorities). Operational since 1978 in geosynchronous orbit, the FLTSATCOM system carries a secure link among the three, providing UHF (and on the last two satellites EHF) communications.

UHF Follow-On Satellite Systems
Brief: New-generation communications satellites to replace FLTSATCOM.
Function: Communications satellite.
Operator: AFSPC.
First Launch: March 25, 1993.
Constellation: nine.
Design Life: 14 yr.
Launch Vehicle: Atlas II.
Unit Location: Schriever AFB, Colo.
Orbit Altitude: 36,000 km.
Contractor: Raytheon (Hughes).
Power Plant: two deployed three-panel solar arrays generating approx 2,400 watts.
Dimensions: length 60 ft 6 in, diameter 9 ft 6 in.
Weight: 2,600 lb.
COMMENTARY
New generation of satellites with 39 channels, providing UHF communications to replace FLTSATCOM satellites. Compatible with the terminals used by the earlier systems. UFG–4 was the first in the series to include an EHF communications package, constituting an additional 11 channels, with enhanced anti-jam telemetry, command, broadcast, and fleet interconnectivity.

Aerial Targets

MQM-107 Streaker
Brief: A jet-powered, variable speed, recoverable target drone.
Function: Aerial target.
Operator: ACC.
First Flight: not available
Delivered: 1984–86 (B).
Production: 70 (B); 221 (D).
Inventory: not available
Unit Location: Tyndall AFB, Fla.
Contractor: Raytheon (D model); Tracor (E model).
Power Plant: initially on D model, one Teledyne CAE 373-8B engine; 960 lb thrust; MQM-107Ds delivered since 1989 have 1,060 lb thrust TRI 60-5 turbojets. Microturbo TRI 60-5 engine; 1,061 lb thrust or TCAE 373-8B (E model).
Guidance and Control: analog or digital, for both ground control and preprogrammed flight; high-g autorollover provisions (D model); digital autorollover and remote control by the Gulf Range Drone Control Upgrade System (GRDCUS), a multifunction command-and-control multilateration system (E model).
Dimensions: length 18 ft 1 in, body diameter 1 ft 3 in, span 9 ft 10 in.
Weight: max launch weight (excl booster) 1,460 lb.
Performance: operating speed 230–594 mph, operating height 50–40,000 ft, endurance 2 hr 15 min (D model); operating speed 207–631 mph, operating height 50–40,000 ft, endurance 2 hr 15 min (E model).
COMMENTARY
MQM-107D. A third-generation version of the MQM-107 Streaker, it is a recoverable, variable-speed target drone used for research, development, test, and evaluation (ROTAE) and the Weapon System Evaluation Program. MQM-107E. Improved performance follow-on to the MQM-107D, the E model will be the Air Force’s standard subscale target. In operational service.

BQM-34 Firebee
Brief: A jet-powered, variable speed, recoverable target drone.
Function: Aerial target.
Operator: ACC.
First Flight: 1951.
Delivered: circa 1951.
IOC: circa 1951.
Production: 1,800+
Inventory: not available
Unit Location: Tyndall AFB, Fla.
Contractor: Teledyne Ryan.
Power Plant: one General Electric J85-GE-100 turbojet; 2,850 lb thrust.
Guidance and Control: remote-control methods incl choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the GRDCUS, which allows multiple targets to be flown simultaneously.
Dimensions: length 22 ft 11 in, body diameter 3 ft 1 in, span 12 ft 11 in.
Weight: launch weight 2,500 lb.
Performance: max level speed at 6,500 ft 690 mph, operating range 20 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.
COMMENTARY
More than 1,800 of these jet target vehicles have been delivered to USAF since initial development of the BQM-34A in the 1950s.
Current BQM-34As with uprated General Electric J85-100 engine provide a thrust-to-weight ratio of one to one, enabling this version to offer higher climb rates and 6g maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. Used for weapon system evaluation.

QF-4
Brief: A converted, remotely piloted F-4 Phantom fighter used for full-scale training or testing.
Function: Aerial target.
Operator: ACC.
IOC: not available
Inventory: not available
Unit Location: Tyndall AFB, Fla.
Contractor: Tracor.
Power Plant: two Pratt & Whitney J79-GE-17 turbojets; each with approx 17,000 lb thrust with afterburning.
Guidance and Control: remote-control methods incl the GRDCUS and the Drone Formation and Control System and also will accommodate the service's Next-Generation Target Control System currently under development.
Dimensions: length 63 ft, height 16 ft 5.5 in, wingspan 38 ft 5 in.
Weight: mission operational weight 49,500 lb.
Performance: max speed Mach 2, ceiling 55,000 ft, range (approx) 500 miles.
COMMENTARY
Replacing the QF-106 as a Joint-service full-scale aerial target (FSAT), the QF-4 has an improved flight-control system and greater payload compared with the earlier drone. Approximately 300 F-4s will be converted to FSATs.

QF-106
Brief: A converted, remotely piloted F-106 fighter used for full-scale training or testing.
Function: Aerial target.
Operator: ACC.
First Flight: not available
IOC: not available
Inventory: approx 194.
Contractor: Honeywell.
Power Plant: one Pratt & Whitney J75-P-17 turbojet; 24,500 lb thrust with afterburning.
Guidance and Control: remote-control methods incl the GRDCUS and, for Holloman AFB, N.M., operations, both the Drone Formation and Control System (the US Army's predecessor to the GRDCUS) and the Drone Tracking and Control System (a microwave command guidance system scheduled for phaseout).
Dimensions: length 70 ft 8.75 in, height 20 ft 8.5 in, wingspan 38 ft 3.5 in.
Weight: mission operational weight 40,500 lb.
Performance: max speed Mach 2, ceiling 50–65,000 ft, typical radius 575 miles.
COMMENTARY
Replacing the QF-100 in USAF service from late 1991, the QF-106 permits higher supersonic speeds while under remote control and increased maneuverability.