**B-1 Lancer**

**Brief:** A long-range, air refuelable multirole bomber capable of flying missions over intercontinental range, the B-1 is configured with the largest payload of guided and unguided weapons in the Air Force inventory.

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

**Operator:** ACC, AFMC.

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

**Delivered:** June 1985-May 1988.

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

**Production:** 104.

**Inventory:** 67.

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

**Contractor:** Boeing; All 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 ACES II ejection seats.

**Dimensions:** span 137 ft, swept 79 ft, length 146 ft, height 34 ft.

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

**Ceiling:** more than 30,000 ft.

**Performance:** max speed at low level subsonic 2,500 mph; Mach 1.2 at 34,000 ft, supersonic 2,950+ mph.

**Armament:** three internal weapons bays capable of accommodating a wide range of weapons up to 84 Mk 82s (500-lb) or Mk 62 Quick Strike naval mines; up to 30 CBU-87/103 Combined Effects Munitions (CEMs), 30 CBU-90 Gator munitions, and 30 CBU-97 Sensor Fuzed Weapons (SFWs); potentially a combination of up to 30/15/15 (wind/medium/bay) CBU-103/104/105/Wind-Corrected Munitions Dispensers (WCMD); up to 24 B61-31 (2,000-lb) JDAMs, or 16 rotary launcher mounted weapons: 16 GBU-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or a penetration version of a BLU-109, or 16 MK 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.

**Armament:** in a nuclear role: up to 16 nuclear weapons (B61 Mod. 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 tactical munitions dispensers, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher mounted weapons: 16 B61-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.

**Power Plant:** four General Electric F110-GE-100 turbofans, each 17,300 lb thrust.

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

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

**Weight:** empty 125,000-153,700 lb, typical T/W weight 336,500 lb.

**Ceiling:** 50,000 ft.

**Performance:** minimum approach speed 140 mph, typical estimated unrefueled range for a hi-lo-hi mission with 16 B61 nuclear free-fall bombs is 5,000 miles, with one aerial refueling more than 10,000 miles.

**Armament:** in a nuclear role: up to 16 nuclear weapons (B61 Mod 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 tactical munitions dispensers, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher mounted weapons: 16 B61-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.

**Armament:** in a nuclear role: up to 16 nuclear weapons (B61 Mod 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 tactical munitions dispensers, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher mounted weapons: 16 B61-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.

**Armament:** in a nuclear role: up to 16 nuclear weapons (B61 Mod 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 tactical munitions dispensers, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher mounted weapons: 16 B61-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.

**Armament:** in a nuclear role: up to 16 nuclear weapons (B61 Mod 7, B61 Mod 11, B83) on rotary launchers. In a conventional role, 80 Mk 82 500-lb bombs, 34 tactical munitions dispensers, 80 Mk 62 sea mines, or 80 GBU-38 (500-lb) JDAMs mounted on bomb rack assemblies, or up to 16 rotary launcher mounted weapons: 16 B61-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 JSOWs, 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28/C/B guided weapons.
B-2 Spirit (Sgt. Bennie J. Davis III)

Bombs, as well as GPS-aided munitions (GAMs), and GBU-36B, on two rotary launcher assemblies, providing an interim, near-precision strike capability. All Block 10 and 20 aircraft have been upgraded to Block 30. (The last original Block 20 B-2, used as a test aircraft at Edwards AFB, Calif., was refurbished as an operational bomber and entered operational service in September 2002.)

Block 30 configuration added significant new weapons capability. Using the rotary launcher assembly, all B-2s are capable of employing 16 Mk 84 JDAMs, 16 JSOWs, 16 JASSMs, 16 BLU-109 JDAMs or eight GBU-37s or GBU-28C/Ds. All B-2s are also capable of substituting bomb rack assemblies in place of the rotary launchers, providing the capability to employ 80 500-lb Mk 82s, 34 tactical munitions dispensers, or 80 Mk 62 sea mines. Modifications to the bomb racks add carriage of 80 independently targeted GBU-38 (500-lb) JDAMs. Other Block 30 enhancements include fully operational defensive and offensive avionics, a more sophisticated mission planning system, and addition of a night-vision goggle interface resulting in an improved weapons capability, and system, and additional operating modes for the synthetic aperture radar. A new stealth coating introduced under the Alternate High Frequency Material (AHFM) program is dramatically improving combat readiness. The entire fleet will be converted by 2012.

Beyond Block 30, USAF plans to add UHF/EHF satellite communications systems and Link 16 digital data sharing capability and to replace the current mechanically scanned phased-array antenna with an active electronically scanned array.

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

B-52 Stratofortress

Brief: A long-range, heavy multirole bomber that can carry nuclear or conventional ordnance or cruise missiles, with worldwide precision navigation capability.

Function: Long-range heavy bomber.

Operator: ACC, AFMC, AFRC.

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


IOC: June 19, 1955.

Production: 744.

Inventory: 94.

Unit Location: Barksdale AFB, La. (ACC, AFRC), Edwards AFB, Calif. (AFMC), Minot AFB, N.D.

Contractor: Boeing.

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

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

Dimensions: span 185 ft, length 159.3 ft, height 40.7 ft.

Weight: empty approx 188,000 lb, gross 488,000 lb.

Ceiling: 50,000 ft.

Performance (approx): max level speed 449 mph, range more than 10,000 miles.

Armament: 12 AGM-88B Air Launched Cruise Missiles (ALCMs) or AGM-129A Advanced Cruise Missiles (ACMs) externally, with provision for more than eight ALCMs or gravity weapons internally. Conventional weapons include AGM-69/D/C Conventional ALCMs (CALCMs), naval mines, bombs up to 2,000 lb, CBU 87/89/97 unguided munitions, CBU-103/104/105 Wind-Corrected Munitions, and larger under-wing tanks. Powered by J57-P-19W or -29WA engines. First flown March 1956; 35 were delivered June-December 1956. Majority retired 1971.


B-52G: Introduced important design changes, including a redesigned wing containing integral fuel tanks for increased range, fixed under-wing external tanks, a shorter tail fin of greater chord, and a remotely controlled tail gun turret that allowed the gunner to be repositioned with the rest of the crew. Initial flight August 1958, with the first of 193 aircraft entering service in February 1959. Operated as the primary bomber during the first Gulf War. Retired 1994.

B-52H: The only version still in service, the H intro-

Dispenser (WCMD)-guided munitions, GBU-31 and GBU-38 JDAMs, and JASSMs. Future weapons include CBU-113/115 WCMD-Extended Range (WCMD-ER) and the Miniature Air Launched Decoy (MALD), as well as laser guided bombs.

COMMENTARY

The B-52’s still-expanding weapons capability reflects its continued ability to perform a wide range of missions, including show of force, maritime operations, long-range precision strikes, close air support (CAS), offensive counterair, air interdiction, and defense suppression. USAF still is considering whether to use B-52s as standoff electronic warfare platforms.

The B-52 currently is employable for both conventional and nuclear missions. As the Air Force’s only nuclear cruise missile carrier, it performs multiple cruise missile launches at high altitude, often followed by B-52 penetration to attack other targets. When tasked with precision weapons delivery, it conducts close air support and attacks targets using GPS/INS guided weapons.

Ongoing modernization of its conventional capabilities is extending the B-52’s service life well into the 21st century, with the ability to provide massive firepower in low- to mid-threshold environments supplemented by a standoff attack capability. Iraqi Freedom Saw B-52s delivering laser guided bombs for the first time using Litening targeting pods. Use of heavy stores adapter beams enable aircraft to carry most B-52-certified munitions. ALCMs, CALCMs, or ACMs are carried on unique pylons or internally on a rotary launcher. Avionics improvements include the avionics midlife improvement (AMI) program, which replaces the current system processors, inertial navigation unit (INU), and data transfer system (DTS) cartridges. Electronic attack improvements include the ECOM improvement upgrade to the ALQ-172 set. The Combat Network Communications Technology (CONECT) improvement will provide a modern cockpit information avionics architecture, in-flight beyond-line-of-sight (BLOS) data link connectivity, and mission/weapon reprogramming capability.

Fighter and Attack Aircraft

A-10 Thunderbolt II

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

Function: Attack aircraft.

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


Heavily armed aircraft using side-firing weapons gross 155,000 lb. Attack aircraft.

Active: Davis-Monthan AFB, Ariz.

One 30 mm, seven-barrel, 1,174-rd capacity was the initial version, deployed in Vietnam. Two 25,000 ft.

pilot only, on zero-height/518 mph. 248 (A-10); 108 (OA-10).

8 (AC-130H); 15 (AC-130U).

empty 28,000 lb, max gross 51,000 lb.

is the new designation for A model aircraft.

four Allison T56-A-15 turboprops, each 1,650 shp.

A-10/C Thunderbolt II (A1C Alexia Goosic)

phosphorous marking rockets and covert/over illumination rockets/flare to mark/illuminate targets for strike aircraft or friendly ground forces. The first OA-10 unit reached initial operational capability (IOC) in October 1987. All squadrons are now A/OA-10 mix configuration.

AC-130 Gunship

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

Function: Attack aircraft.

Operator: AFSOC.


Delivered: 1968-present.

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

Production: 43; including four recent conversions.

Inventory: eight (AC-130H); 15 (AC-130U).

Unit Location: Hurlburt Field, Fla.

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


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

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

Weight: gross 155,000 lb.

Ceiling: 25,000 ft.

Performance: speed 289 mph, range 1,500 miles, with air refueling unlimited.

Armament: two 20 mm Vulcan cannons with 3,000 rd (AC-130H); one 25 mm Gatling gun (AC-130U); one 40 mm Bofors cannon with 256 rd, and one 105 mm Howitzer with 100 rd; 30 mm Bushmaster cannon with 500 rd propellant (LBG) delivery, and first AGM-65H/K employment. The A-10 is capable of withstanding projectiles up to 23 mm. A-10s were used extensively in Desert Storm, Allied Force, Enduring Freedom, and Freedom's Sentinel.

The AC-130 is a C-130 modified with gun systems, electronic and EO sensors, fire-control systems, enhanced navigation systems, sophisticated communications, defensive systems, improved targeting capability. These systems give the gunship the crew to acquire and identify targets day or night, coordinate with ground forces and command and control (C2) agencies, and deliver surgical firepower in support of both conventional and special operations missions. During operations in Afghanistan and Iraq, the AC-130 gunships worked in conjunction with the MQ-1 Predator, the latter providing live video and target referencing information.

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-130H Spectres serve with the 1st SOW. The unit has eight, each equipped with a digital fire-control computer. They employ 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; an infrared suppression system (IRSS) overhaul is under way. In addition, USAF is evaluating wingtip tanks as replacements for the existing under-wing tanks as a means of improving performance.

AC-130U Spooky, gunship conversions by Rockwell, of which 13 were delivered to AFSOC's 4th SOS in 1994-95. Four additional aircraft are being converted by Boeing to U standard, with 30 mm Bushmaster cannons replacing the 25 mm and 40 mm guns. (Modifications of remaining AC-130U aircraft with new cannon anticipated by FY 2010). The first new AC-130U is expected to be declared operational in July 2007, with the remaining three delivered by the end of the year. These AC-130Us have greater altitude capability and combined increased firepower, reliability, and superior accuracy with the latest methods of target location. All weapons can be substituted for the APO-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for adverse weather attack operations. The AC-130U program currently is exploring Viper Strike, a small precision-attack munition already used in support of the Global War on Terrorism and capable of destroying mobile targets from standoff ranges. Although the AC-130H Spectre and AC-130U Spooky gunships use dissimilar avionics and other systems, fire support to troops on the ground is generally comparable. The AC-130U will not be required for most fire support missions but provides benefits under certain circumstances (weather, dual target attack, and defensive avionics).

F-15 Eagle

Brief: A supersonic, all-weather, highly maneuverable tactical fighter designed to permit USAF to swiftly gain phosphorous marking rockets and covert/over illumination rockets/flare to mark/illuminate targets for strike aircraft or friendly ground forces. The first OA-10 unit reached initial operational capability (IOC) in October 1987. All squadrons are now A/OA-10 mix configuration.

AC-130 Gunship

(DOD photo)
and maintain air superiority in aerial combat.  

**Function:** Air superiority fighter  
**Operator:** ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRIC  
**First Flight:** July 27, 1972.  
**Delivered:** November 1974-85.  
**IOC:** September 1975.  
**Production:** 874.  
**Inventory:** 485.  
**Contractor:** McDonnell Douglas (now Boeing); Raytheon.  

**Power Plant:** F-15C: two Pratt & Whitney F100-PW-220 turbofans, each 25,000 lb of thrust with max afterburner.  
**Accommodation:** pilot only in F-15A/C; two seats in F-15B/D.  
**Dimensions:** span 42.8 ft, length 63.8 ft, height 18.7 ft.  
**Weight:** empty 28,600 lb, gross 68,000 lb.  
**Ceiling:** 65,000 ft.  
**Performance:** F-15C: max speed Mach 2.5, T/O run 900 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles.  
**Armament:** one internally mounted M61A1 20 mm six-barrel cannon; up to four AIM-9M/X Sidewinder missiles, or up to eight AIM-7 Sparrow air-to-air missiles, or four AIM-120 Advanced Medium-Range Air-to-Air Missiles (AMRAAMs); provision for four AIM-9L/M/X Sidewinder and up to eight AIM-7 Sparrow air-to-air missiles, or four AIM-120 Advanced Medium-Range Air-to-Air Missiles (AMRAAMs).  

**COMMENTARY**

Since introduction into the inventory more than 30 years ago, the F-15 has had the ability to penetrate hostile defenses and establish air superiority over any systems through a combination superior maneuverability and acceleration, range, weapons, and avionics. F-15 fighters deployed to the Persian Gulf for Desert Storm accounted for 34 of the 37 USAF air-to-air victories, and in Iraqi Freedom F-15Cs led coalition aircraft in maintaining aerial dominance.  

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

**F-15C (single-seat) and F-15D (two-seat) models** followed in June 1979. Improvements included 2,000 lb of additional internal fuel and provision for carrying conformal fuel tanks (CFTs), reducing in-flight refueling requirements and increasing time in the combat zone. From 1983 through 1997, tactical capabilities were enhanced extensively through the multistaged improvement program (MSIP), a program of installation of new or modification of existing avionics equipment, allowing for the carriage of more advanced weapons, and increased self-protection. The last 43 aircraft were delivered with the APG-70 radar. The long-term F-15CDs that will remain in the fleet until 2025 have been subsequently upgraded with the APG-63(V)1. One squadron in Alaska received the later APG-63(V)2, featuring an active electronically scanned array (AESA), permitting the aircraft to track multiple targets and to guide air-to-air missiles against them. The Joint Helmet Mounted Cueing System (JHMCS), a ‘look and shoot’ head-mounted system, is intended, along with the AIM-9X, to significantly enhance lethality in close-range aerial combat. Other modifications include improved engines, GPS equipment, Litening targeting pods, and the Link 16 fighter data link. Flight testing of the next generation APG-63(V)3 AESA radar, projected for the F-15C, has been undertaken.  

**F-15E Strike Eagle**  
**Brief:** A heavily modified, two-seat, dual-role variant of the original F-15, with weapons systems totally integrated for all-weather deep interdiction missions as well as air-to-air combat.  
**Function:** Dual-role fighter.  
**Operator:** ACC, AFMC, PACAF, USAFE.  
**First Flight:** Dec. 11, 1986.  
**Delivered:** April 1988-2004.  
**IOC:** May 1989.  
**Production:** 236.  
**Inventory:** 223.  

**F-15 Eagle**  
(TSgt. Shane A. Cuomo)  

**Unit Location:** Eglin AFB, Fla.; Elmendorf AFB, Alaska; Mountain Home AFB, Idaho; Nellis AFB, Nev.; RAF Lakenheath, UK; Robins AFB, Ga.; Seymour Johnson AFB, N.C.  
**Contractor:** McDonnell Douglas (now Boeing); Raytheon.  
**Power Plant:** two Pratt & Whitney F100-PW-220 turbofans, each 25,000 lb thrust with max afterburner.  
**Accommodation:** crew of two, on zero/zero ejection seats.  
**Dimensions:** span 42.8 ft, length 63.8 ft, height 18.5 ft.  
**Weight:** empty 45,000 lb, gross 81,000 lb.  
**Ceiling:** 50,000 ft.  
**Performance:** max level speed at altitude Mach 2.5, ferry range with CFTs 3,000 miles.  
**Armament:** one internally mounted M61A1 20 mm six-barrel cannon; up to four AIM-9 Sidewinder and up to four AIM-7 Sparrow air-to-air missiles, or up to eight AIM-120 AMRAAMs; up to six AGM-65 Maverick air-to-surface missiles; AGM-130 EGBU-15 and GBU 10/12/15/24/28 guided munitions; GBU-31 and GBU-38 JDAM, GBU-100/104/105 Wind-Corrected Munitions Dispenser (WCMD)-guided munitions, GBU-39 SDB, and nuclear weapons.  

**COMMENTARY**

F-15E has a strengthened airframe for increased gross weight at takeoff and maneuver at nine Gs throughout the flight envelope. Cockpit controls and displays are improved, and a wide-field-of-view (WFOV) HUD is 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 which provides a high-resolution synthetic aperture radar (SAR) map and LANTIRN (Low-Altitude Navigation and Targeting Infrared for Night) pods, with wide-field FLIR. The APG-70 gives the F-15E, with its AMRAAM, AIM-7, and AIM-9 load, a true multirole capability with the inherent air-to-air capability of the F-15C. The triple-redundant digital flight-control system, in combination with the LANTIRN navigation pod and the WFOV HUD, permits automatic terrain following. Other improvements include an EGI and Link 16 data link. F-15E aircraft have been JSOW-, JDAM-, and WCMD-capable since 2003. In addition, some F-15E aircraft have been equipped with Litening and Sniper targeting pods for improved precision attack capability. External CFTs have been fitted to increase combat range while carrying ordnance. System upgrades under way include programmable armament control sets (PACS), ready-installed software for delivery of JDAM, JSOW, and WCMD, and an enhanced night vision capability. New core processors ensuring increased capability and reliability are being retrofitted to allow employment of the newly operational GBU-39 SDB. A number of F-15Es are to receive an AESA radar to improve targeting and mapping capabilities.  

During Desert Storm, 48 USAF F-15Es were deployed to the Persian Gulf where they operated mainly at night, hunting Scud missile launchers and artillery sites using the LANTIRN system; the ability to operate in conjuction with E-8 Joint STARS aircraft both then and in current operations in Iraq and Afghanistan has been critical to their ongoing success.  

**F-16 Fighting Falcon**  
**Brief:** A compact, versatile, and low-cost multimode fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air combat and air-to-surface attack.  
**Function:** Multrole fighter.  
**Operator:** ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRIC.  
**First Flight:** Dec. 8, 1976 (full-scale development).  
**Delivered:** August 1978-2005.  
**IOC:** October 1980, Hill AFB, Utah.  
**Production:** 2,206.  
**Inventory:** 1,319.  
**Unit Location:** 13 active wings, 27 ANG, and five AFRIC units (two associate).  
**Contractor:** Lockheed Martin; Northrop Grumman.  
**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. Increased performance 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).
**F-22A Raptor** (USAF photo)

**Acclmodation:** pilot only, on zero-zero ejection seat

**Dimensions:** wingspan with missiles 32.7 ft, length overall 49.4 ft, height 16.7 ft.

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

**Ceiling:** 50,000 ft.

**Performance:** max speed Mach 2, radius of action: Block 40/42, 1,093 nautical miles; Block 50/52, 1,750 nautical miles; Block 100/05/09, 1,950 nautical miles.

**Armament:** one M61A1 20 mm multibarrel cannon, with external fuel, hi-to-hi 852 miles; combat range 575 miles.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, one AIM-120 AMRAAM, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Performance:** max speed Mach 2, range more than 2,000 miles.

**Armament:** two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Performance:** max speed Mach 2, range more than 2,000 miles.

**Armament:** two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Performance:** max speed Mach 2, range more than 2,000 miles.

**Armament:** two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Performance:** max speed Mach 2, range more than 2,000 miles.

**Armament:** two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Performance:** max speed Mach 2, range more than 2,000 miles.

**Armament:** two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.

**Contractor:** Lockheed Martin; Boeing.

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

**Accommodation:** pilot only, on zero-zero ejection seat

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

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

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

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

**Armament:** one internal M61A2 20 mm gun, two AIM-9 missiles, plus maneuverable external stores for fuel tanks and a range of air-to-air and air-to-surface munitions.
receiver and missile launch detector, JTIDS, IFF, laser gyroscope inertial reference, and GPS.

The F-22A entered engineering and manufacturing development (EMD) in August 1991. Nine aircraft were built, three without avionics to explore flight characteristics, flutter, loads, propulsion, envelope expansion, and weapons separation, and six with avionics to complete integration work, refine the pilot vehicle interface, and fly guided weapons launch tests. In addition, one static and one fatigue test airframe were built. One de-engined aircraft is now used for ground maintenance training at Tyndall AFB, Fla. Initial operational test and evaluation (IOT&E) examining the Raptor’s air dominance mission concluded mid-September 2004. JDM capability was demonstrated that same month. Follow-on OT&E (FOT&E) completed in 2005. The F-22A had proved its air-to-air and air-to-ground attack capability when it reached IOC in December 2005, and on Jan. 21, 2006, it flew its first operational sortie from Langley AFB, Va., as part of Operation Noble Eagle.

Production aircraft have been delivered to Nellis AFB, Nev., and to Tyndall, where they are used to train F-22 pilots, and to Langley, the first operational base. USAF plans to put F-22s at Elmendorf AFB, Alaska, Hickam AFB, Hawaii, and Holloman AFB, N.M. All F-22 squadrons will involve Total Force integration with Guard and Reserve forces.

F-35 Lightning II
Brief: An affordable, highly common family of next generation strike aircraft.

Function: Multrole fighter.
Contractor: ACC for USAF
First Flight: Dec. 15, 2006 (F-35A prototype)
Delivery: 2009 (anticipated first production aircraft).
IOC: 2013 (JSF)
Production: planned, 1,763 (USA), 680 total F-35B (USMC) and F-35C (USN), 150 (UK)
Inventory: TBD
Contractor: Lockheed Martin, with Northrop Grumman and BAE Systems; Pratt & Whitney is propulsion contractor; General Electric is second source engine contractor for the production phase.

Power Plant: currently one Pratt & Whitney F119, in 35,000-lb thrust class.

For USAF, the F-35A will replace its current force of F-16 and A-10 aircraft with a stealthy multirole fighter that will comprise the bulk of USAF’s fighter fleet for up to 50 years. This advanced multimission fighter is designed to penetrate high-threat enemy airspace and engage all enemy targets in any conflict. In addition to its advanced stealth design, the F-35 incorporates maneuverability, long range, and highly advanced avionics to accomplish the bulk of USAF’s missions. Its fully integrated avionics and weapons systems will permit simultaneous engagement of multiple targets in enemy airspace. USAF has also stated interest in the F-35B STOVL variant.

The concept demonstration phase (CDP) of the program commenced November 1996, with competitive contract awards to Lockheed Martin (X-35A) and Boeing (X-32A). CDP concluded in fall 2001 with Lockheed Martin declared the winner. The system development and demonstration (SDD) phase, begun in October 2001, focuses on system development, test and evaluation, logistics support, and LRIP planning. A total of 22 test aircraft are being built, 14 for flight testing, seven for nonairborne activities, and one to evaluate the F-35’s radar signature. Lockheed Martin completed assembly of the first F-35A flight-test aircraft in February 2006 and flight testing commenced Dec. 15, 2006. The F-35 is powered by the F135, a derivative of the Pratt & Whitney F119 engine. General Electric has been under contract to develop an interchangeable power plant, the F136, but DOD put no money in the Fiscal 2008 budget proposal for the alternate production engine.

F-117 Lightning II
Brief: An affordable, highly common family of next generation strike aircraft.

Function: Multrole fighter.
Contractor: ACC for USAF
First Flight: Jan. 21, 1981
Delivery: mid-1980s (first production aircraft) for the system development and manufacture
IOC: Jan. 1986 for initial operational test and evaluation
Production: 51
Location: March Air Reserve Base, Calif.; Beale AFB, Calif.; Langley AFB, Va.; Holloman AFB, N.M. All F-117s to Air National Guard
Contractor: Lockheed Martin, with Northrop Grumman and BAE Systems; Pratt & Whitney is propulsion contractor; General Electric is second source engine contractor for the production phase.

Power Plant: two General Electric F100-GE-100 afterburning turbofans, each 9,040 lb thrust.

S/L, 630 knots calibrated airspeed (KCAS) for the F-35A and F-35B (USMC) and F-35C (USN), 150 (UK).CBD

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

Dimensions: approx. span 35 ft, length 50.5 ft, height 17.5 ft.
Weight: TBD.
Ceiling: TBD.
Performance (design targets): mi power level speed at S/L, 630 knots calibrated airspeed (KCAS) for the F-35A conventional takeoff and landing (CTOL) variant (Mach 1 max power for CTOL only) and the F-35C carrier variant (CV), and 600 KCAS for the F-35B short takeoff and vertical landing (STOVL) aircraft, combat radius more than 500 miles for CTOL variant, 600 miles for CV, and 450 miles for STOVL.
Armament: (main weapons bay): CTOL: one internal 25 mm gun, two AIM-120Cs, and two GBU-31 JDAMs. CV: two AMRAAMs and two GBU-31 JDAMs. STOVL: two AMRAAMs and two GBU-32 JDAMs. External carriage also will be available. (Note: Numerous other weapons capabilities will be added as system development continues.)

COMMENTARY: The F-35 Lightning II Joint Strike Fighter is a multinational development program aimed at developing and fielding an affordable, highly common family of next generation strike fighters.
Airborne Laser (ABL) has been projected as the first directed energy weapon in the US arsenal. However, the Fiscal 2007 defense budget downgraded the program to a demonstration project, culminating in a planned test of a pulsed laser weapon system in 2007.

**E-3C Sentry (SSgt. Matthew Hannen)**

- **Dimensions:** span 145.8 ft, length 152.9 ft, height 41.5 ft
- **Weight:** gross 347,000 lb
- **Ceiling:** 38,000 ft.
- **Performance:** optimum cruise Mach 0.78, endurance eight hr unrefueled.

**COMMENTARY**

A critical component of the USAF inventory, the E-3 Airborne Warning and Control System (AWACS) aircraft is capable of surveillance from Earth's surface up to the stratosphere, over land or water, at more than 200 miles. During conflict it will coordinate the actions of hundreds of strike, support, and cargo aircraft. As an integrated Air Force command control battle management (C2BM) system, it provides battle management of theater forces; all-altitude/all-weather surveillance of the battlespace; and early warning of enemy actions.

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

**E-3A**

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

**E-3B**

- An improved US/NATO Standard E-3A configuration was initiated with the 25th USAF Sentry, delivered in December 1981, with a larger-memory computer and a maritime detection capability. Nine were built new for USAF, and one of the original E-3As was upgraded.

**E-3C**

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

**E-8 Joint STARS**

**Brief:** A modified Boeing 707 equipped with a large, canoe-shaped radome mounted under the forward part of the fuselage, housing long-range, air-to-ground radar capable of locating, classifying, and tracking vehicles moving on Earth's surface out to distances in excess of 124 miles. Such data are then transmitted via data link to ground stations or other aircraft.

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

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

**First Flight:** December 1988.

**Delivered:** May 1996-present IOC: Dec. 18, 1997.

**Production:** 18.

**Inventory:** 18

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

**Contractor:** Northrop Grumman; Motorola; Cubic; Raytheon.

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

**Accommodation:** flight crew of four; 13-19 mission specialists.
of-sight satellite radio communications. Multiple receivers are in use, predominantly the US Army's Common Ground Station and Joint Services Work Station.

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

E-8A. Prototype version, with specialized equipment installed aboard two specially modified 707-300 airframes. One was converted to an in-flight pilot trainer in 1997, and the second was scrapped. E-8C. Production version, based on former commercial 707-300 airframes. Equipped with 18 operations and control consoles, two of which double as communications stations, all the aircraft have been modified to the more capable Block 20 aircraft, featuring more powerful computers and an Internet protocol local area network. The first E-8C became operational in 1996, and these aircraft are expected to remain airworthy until at least 2034. System improvements under way include Link 16 upgrade for improved control and battle management; enhanced radar modes; new satellite communications radios; upgrades to allow Joint STARS to fly the Airborne Battle Command and Control Center (ABCCC) mission of attack support to ground force commanders; installation of the Force XXI Battle Command and Brigade and Below (FBCB2) terminal, greatly enhancing situational awareness to friendly forces; IP connectivity; and communications navigation surveillance for air traffic management upgrades to permit use of optimum altitudes and flight routes in increasingly congested commercial airspace in response to new stringent international navigation standards. USAF will seek to re-engine the E-8C to improve operational performance following cancellation of the E-10 program.

MQ-9 Reaper (SrA. Larry E. Reid Jr.)

Delivered: July 1994 (USAF from 1996)-present.
Production: 170 air vehicles—ongoing.
Operator: ACC; AFSOC; ANG.
Contractor: General Atomics Aeronautical Systems.
Power Plant: one Rotax 914 turbocharged engine.
Accommodation: unmanned system.
Dimensions: length 27 ft, height 7.2 ft, span 48.7 ft.
Weight: empty 850 lb, gross 2,250 lb.
Ceiling: 25,000 ft.
Performance: cruise speed 80 mph, up to 138 mph, endurance for 10 hours (660 miles with 16 hr on station).
Armament: Two Hellfire missiles.

COMMERCIAL
Operated by ACC's 11th, 15th, and 17th RSs, AFSOC's 3rd SOS, and ANG's 163rd RW, the Preda- tor UAV has evolved into a vital component of USAF's warfighting inventory. A Predator system includes four air vehicles, a ground control station, satellite link, and about 55 personnel for 24-hour operations. The Predator crew comprises a pilot and two sensor operators.

MQ-1 Predator


Function: Reconnaissance, interdiction, and close air support aircraft.
Operator: ACC; AFSOC; ANG.
Power Plant: one Honeywell TPE-331-10GDT turbo- prop engine.
Accommodation: unmanned system.
Dimensions: length 36 ft, span 66 ft.
Weight: empty 4,600 lb, gross 10,500 lb.
Ceiling: 30,000+ ft.
Performance: cruise speed 172 mph, up to 230 mph, endurance 14+ hours.
Armament: up to 3,000-lb external payload capacity to include Hellfire, GBU-12, JDAM, and SDB.

COMMERCIAL
The typical MQ-9 system consists of several aircraft, a ground control station, communications equipment/link, spares, and active duty and/or contractor personnel. The crew is one pilot and one sensor operator. The aircraft is flown from within the ground control station using either a C-band line-of-sight data link or a Ku- band beyond-line-of-sight link data.
The sensor suite for targeting includes a color/mono- chromatic daylight TV, infrared TV, and a long-wave infrared TV with a laser rangefinder/designator to precisely designate targets for laser guided munitions. The SAR enables GBU-38 JDAM targeting. The sensor is capable of very fine resolution in both spotlight and strip modes. The SAR also has ground moving target indicator capability.

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

Function: Reconnaissance aircraft.
Operator: ACC.
IOC: October 1993.
Production: three.
Inventory: two.
Unit Location: Offutt AFB, Neb.
Contractor: Boeing.
Power Plant: four Pratt & Whitney TF33-P-5 turbofans, each 16,050 lb thrust.

Accommodation: seating for 35, including cockpit crew, aircraft maintenance crew, foreign representatives, and crew members from the Defense Threat Reduction Agency.
Dimensions: span 131 ft, length 135 ft, height 42 ft.
Weight: gross 297,000 lb.
Ceiling: 50,000 ft (basic C-135).
Performance: speed: 500+ mph, unrefueled range 3,900 miles.

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

OC-135B modifications include one vertical and two oblique KS-87E framing cameras, used for photography approximately 5,000 ft above the ground, and one KA-910 panoramic camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography up to approximately 35,000 ft. This data is processed and recorded by a recording and annotation system.

RC-135 Brief: Specially configured variant of the Boeing C-135 Stratolifter, having an elongated nose and cheeks containing highly advanced electronic intelligence collection systems. Used to acquire real-time electronic and signals intelligence data for theater and tactical commanders.

Function: Electronic reconnaissance aircraft.
Operator: ACC.
First Flight: not available.
IOC: circa 1973 (Rivet Joint).
Production: (converted).
Inventory: 22.
Unit Location: Offutt AFB, Neb.
Contractor: Boeing (airframe); L3 Communications; Textron.
Power Plant: four CFM International F-108-CF-201 turbosfans, each 24,000 lb thrust.
Accommodation: flight crew of three; 25-35 mis- sion crew.
Dimensions: span 131 ft, length 140 ft, height 42 ft.
Weight: max gross 299,000 lb.
Maximum speed: 500+ mph.
Performance: speed 500+ mph, range with refuel- ling, unlimited.

COMMENTARY
The 55th Wing at Offutt AFB, Neb., operates a highly specialized fleet of RC-135s for worldwide reconnaissance missions. All are subject to ongoing modernization, with upgrade of avionics and primary mission equipment to expand capability and maintain effectiveness.

RC-135S Cobra Ball (CB).

Delivered: November 2003.
IOC: FY09.
Production: 60 (planned).
Inventory: eight.
Unit Location: Creech AFB, Nev.
Contractor: General Atomics Aeronautical Systems.
adept signal activity and to track missiles during boost and re-entry phases of flight. Cobra Ball can deploy anywhere in the world in 24 hours and provide on-scene EO reconnaissance for treaty verification and theater ballistic missile proliferation. Equipment includes wide-area IR sensors, long-range optical cameras, and an advanced communications suite.

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

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

TC-135S/W. Used for training purposes.

**RO-4 Global Hawk**

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

**Function:** Unmanned reconnaissance aircraft.

**Operator:** ACC.

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

**Delivered:** Seven advanced concept technology demonstrators; five production vehicles.

**IOC:** used operationally in Afghanistan and Iraq while still in development phase. Operational status achieved October 2004.

**Production:** 51 (planned).

**Inventory:** 11.

**Unit Location:** Beale AFB, Calif., Eglin AFB, Fla., (planned) Andersen AFB, Guam, by 2009.

**Contractor:** Northrop Grumman (prime); Raytheon.

**Power Plant:** one Rolls Royce-North American AE 3007H turbofan, 7,600 lb thrust.

**Accommodation:** excess of 12 hr; with aerial refueling up to 72 hr.

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

**Ceiling:** 65,000 ft.

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

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

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

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

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

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

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

**COMMENTARY**

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

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

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

**U-2S** (single-seat) and **TU-2ST** (two-seat). The current designations of all aircraft in the inventory. Conversion to S model configuration began in October 1994. Included in the ongoing $1.5 billion improvement program are new F118-GE-101 engines, a complete electrical system replacement, a new glass cockpit using multifunction displays (MFDs), a digital autopilot, an electro-optical view sight, and a new electronic warfare system. Sensor upgrades include the ASARS-2/X SAR sensor, which provides enhanced imaging modes and improves geo-location accuracy; the SERS-2 EO Imager system providing DOD’s only multispectral and IR capability; enhanced RF-intelligence capability; and new data links enabling the U-2 to connect in near real time with network-centric hubs as well as line-of-sight ground stations, airborne data relays, and beyond-line-of-sight satellite data relays simultaneously.

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

**Special Duty Aircraft**

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

**Brief:** A four-engine, swept-wing, long-range, high-altitude airplane providing a highly survivable C3 center allowing national/defense leaders to direct US forces, execute emergency war orders, and coordinate actions by civil authorities.

**Function:** Airborne operations center.

**Operator:** ACC.

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

**Delivered:** December 1974-85.

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

**Production:** four.

**Inventory:** four.

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

**Contractor:** Boeing; Rockwell; Raytheon E-Systems.

**Power Plant:** four General Electric CF6-50E2 turbofans, each 52,000 lb thrust.

**Accommodation:** up to 114 (63 crew/battle staff; 51 passengers).

**Dimensions:** span 195.7 ft, length 231.3 ft, height 63.4 ft.

**Weight:** gross 800,000 lb.

**Ceiling:** above 49,000 ft.

**Performance:** 6,800+ miles; unrestrained endurance in excess of 12 hr; with aerial refueling up to 72 hr.

**COMMENTARY**

A militarized version of the Boeing 747-200, E-4B aircraft perform the National Airborne Operations Center (NAOC) mission. The E-4B fleet provides a survivable C3 platform throughout the full threat spectrum, including sustained operations in a nuclear environment. First operational mission was flown in March 1980.

E-4Bs are hardened against the effects of nuclear explosions, including electromagnetic pulse, and have in-flight refueling capability. A 1,200-40A electrical system supports advanced system electronics as well as state-of-the-art communications and data processing.
A heavily modified C-130 used for EW and WC-130J: gross 175,000 lb. 10 (N); 23 (P). Later version C-130s modified for weather reconnaissance aircraft. The WC-130J is flown by AFRC’s “Hurricane Hunters.” The hurricane reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas.

WC-130/H. The hurricane reconnaissance aircraft. WC-130H. A variant used as an airborne communications jamming and information warfare platform. The system disrupts enemy C2 communications. Modifications include electronic attack (EA) system and air refueling capability. Programmed upgrades will expand the EC-130H’s mission by procuring a secondary EA capability against early warning and acquisition radars. Completion expected FY11.

EC-130 Commando Solo

Brief: A heavily modified C-130 used for EW and electronic combat.

Function: psychological warfare.

Operator: ANG.

First Flight: January 1990.

Delivered: March 1990 (J model from 2003).

IOC: December 1990.

Production: (no new-build E); seven (J).

Inventory: three (E); seven (J).

Unit Location: ANG: Harrisburg Arpt., Pa.

Contractor: Lockheed Martin; Raytheon; General Dynamics.

Power Plant: (EC-130E) T-56-A-1S turboprops, each 10,400 shp; (EC-130J) four Rolls Royce-Allison AE2100D turboprops, each 4,910 shp.

Accommodation: three flight crew, mission six (J).

Dimensions: EC-130J: span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: EC-130J: gross 175,000 lb.

Ceiling: EC-130J: 30,500 ft.

Performance: speed 374 mph at 20,000 ft. COMMENTARY: The EC-130J is a heavily modified C-130 for electronic combat in the military frequency spectrum.

EC-130H Compass Call

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

Function: Electronic warfare.

Operator: ACC.

First Flight: 1981.


IOC: 1983; (Block 30) February 1999.

Production: (converted).

Inventory: 14.

Unit Location: Davis-Monthan AFB, Ariz.

Contractor: Lockheed Martin.


Accommodation: standard crew 13, incl 9 mission.

Dimensions: span 132.6 ft, length 97 ft, height 38 ft.

Weight: 155,000 lb.

Ceiling: 25,000 ft.

Performance: speed 374 mph at 20,000 ft.

COMMENTARY: A variant used as an airborne communications jamming and information warfare platform. The system disrupts enemy C2 communications. Modifications include electronic attack (EA) system and air refueling capability. Programmed upgrades will expand the EC-130H’s mission by procuring a secondary EA capability against early warning and acquisition radars. Completion expected FY11.

WC-130 Hercules

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

Function: Weather reconnaissance aircraft.

Operator: AFRC.

First Flight: circa 1959.


IOC: 1959.

Production: no new-build WC-130H; 10 WC-130J.

Unit Location: AFRC: Keesler AFB, Miss.; Davis-Monthan AFB, Ariz.

Contractor: Lockheed Martin.

Power Plant: WC-130J: four Rolls Royce AE2100D3 turboprops, each 4,500 shp.

Performance: speed 289 mph, range more than 4,000 miles. COMMENTARY: The WC-130 is flown by AFRC’s “Hurricane Hunters.” The hurricane reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas.

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

WC-130J. Weather reconnaissance version of the most recent C-130 model, operated by the 53rd WRS from the older E model Commando Solo aircraft. Entered service mid-2003 with the 193rd SOW (ANG). General Dynamics.

Function: as NAOC mission, providing C3 and/or equipment in hostile environments.

Operator: ACC, AETC, ANG, AFRC.

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

Delivered: from 1965.


Production: (converted).

Inventory: 10 (H); 23 (P).


Contractor: Lockheed Martin.


Accommodation: four flight crew, mission crew.

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

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

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

COMMENTARY: The HC-130 can perform extended visual/electronic searches over land or water and operate from unimproved airfields. A three-man PJ team, trained in emergency trauma medicine, harsh environment survival, and assisted evasion, is part of the normal mission crew complement. Combat air forces’ HC-130 aircraft are equipped with a role in civil emergencies. Secondary mission is electronic attack in the military frequency spectrum.

EC-130J Commando Solo II (SrA. Matt Schwartz)

Performance: speed 299 mph, range in excess of 2,100 miles; (C-130J) 393 mph, range 4,140 miles.

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

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

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

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

KC-135 Stratotanker (SSgt. Suzanne Day)
KC-10 Extender

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

Function: Aerial refueling/transport.

Operator: AMC, AFRC (assoc.).

First Flight: April 1980.


IOC: August 1982.

Production: 60.

Inventory: 59.

Unit Location: Active and AFRC assoc.: McGuire AFB, N.J., Travis AFB, Calif.

Contractor: McDonnell Douglas (now Boeing).

Power Plant: three General Electric CF6-50C2 turbofans, each 18,000 lb thrust.

Accommodation: crew of four; additional seating possible for up to 75 persons with 17 pallets; max 27 pallets; max cargo payload 169,409 lb.

Dimensions: span 130.8 ft, length 136.2 ft, height 38.3 ft.

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

Ceiling: 50,000 ft.

Performance: max speed at 30,000 ft 610 mph, range with max fuel 5,915 miles.

KC-135 is similar in size and appearance to commercial 707 aircraft.

The KC-135 fuel tanks are located in the ‘wet wings’ and in fuel tanks below the floor in the fuselage.

KC-135A. Original version with JT7 turbojets. USAF built 732, since modified to other standards.

KC-135D:

The JT3D re-engining program upgraded USAF, AFRC, and ANG KC-135As to KC-135 standard with JT3D turbofans and related components removed from surplus commercial 707s; fuel carrying capacity increased by 20 percent. The KC-135s in service with the ANG and AFRC represent some of the oldest aircraft in the USAF inventory, and USAF expects to retire some 29 aircraft this year. Four KC-135Ds are similar but have minor configuration differences as they were converted from KC-135A aircraft.

KC-135R/T:

Designation of re-engined KC-135A(E)s with F108 turbofans. They embody modifications to 25 major systems and subsystems and not only carry more fuel farther but have reduced maintenance costs, are able to use shorter runways, and meet Stage III (noise abatement) requirements. The first KC-135R flight was in October 1982, and deliveries began in July 1984.

KC-135T aircraft (formerly KC-135O) were capable of refueling the now-retired SR-71s and retain the capability to carry different fuels in the wing and body tanks. Eight KC-135Ts are air refuelable. Twenty KC-135Ts have wing-mounted refueling pods for enhanced refueling of UN and NATO aircraft.

Modifications are extending the capability and operational utility of the KC-135 well into the 21st century. The Pacer CRAG avionics modernization program installed a new compass, radar, GPS navigation systems, a traffic alert and collision avoidance system (TCAS), and new digital multifunctional cockpit displays. The Global Air Traffic Management (GATM) modification further improves the avionics, ensuring future access into premium airspace. Forty KC-135RT aircraft are outfitted with the capability to relay Link 16 tactical information beyond line of sight of other aircraft.

MC-130P Combat Shadow

Brief: Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for special operations forces (SOF) helicopters or to air-drop small special operations teams, small bundles, and zombie and combat rubber raiding craft.

Function: Air refueling for SOF helicopters/airdrop.

Operator: AETC, AFSC, ANG, AFRC.

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

Delivered: from 1965.


Production: (converted).

Inventory: 27.

Unit Location: Active: Eglin AFB, Fla., Kadena AB, Japan, McChord AFB, N.M., RAF Mildenhall, UK, ANG, Moffett Field, Calif, AFRC: Duke Field, Fla.

Contractor: Lockheed Martin (airframe); Boeing.


Accommodation: four flight crew, plus four mission crew.

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

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

Performance: speed 290 mph, range with max normal payload 1,208 miles, unlimited with air refueling.

MC-130P Combat Shadow aircraft are currently tasked with clandestine formation or single-ship intrusion of hostile territory to provide aerial refueling of special operations helicopters and the infiltration, exfiltration, and resupply of SOF by airdrop or air-land operations.

To perform these missions, depending upon the enemy threat, crews navigate using both visual and electronic means or visual means only. Primary emphasis is on NVG operations.

Modifications include improved secure communications, advanced integrated navigation equipment, including digital scan radar, ring-laser gyro INS, FLIR, GPS, and dual nav stations, and missile warning systems and countermeasures for refueling missions in hostile environments.

Some aircraft have been modified with an in-flight refueling system allowing them to be air refuelable.

MC-130W

Brief: Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for special operations forces (SOF) helicopters or to
C-17 Globemaster III (SSgt. Edward D. Holzapfel)

C-5 Galaxy

Brief: A heavy-lift, air refuelable cargo transport for massive strategic airlift over long ranges, including outsize cargo. Supports special operations missions.

Function: Cargo and troop transport.

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

First Flight: September 1970.


IOC: September 1970.

Production: 131.

Inventory: 60 (A), 49 (B), two (C).


Contractor: Lockheed.

Power Plant: four General Electric TF39-GE-1c turbofans, each 41,500 lb thrust, C-5M: four General Electric CF6-80C2 turbofans.

Accommodation: normal crew of six (two pilots, two engineers, and two loadmasters), plus rest area for 15 (relief crew, etc.) and seating for 73. There is no piece of Army combat equipment the C-5 can’t carry. Possible loads: six Apache helicopters, two M1 main battle tanks (each weighing 135,400 lb), six Bradley vehicles, three CH-47 helicopters, the 74-ton mobile bridge, a quarter-million pounds of relief supplies, or a maximum of 340 passengers in an airbus configuration. Airdrop capability for single platforms weighing up to 42,000 lb.

Dimensions: span 222.8 ft, length 247.9 ft, height 66.1 ft.

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

Ceiling: 45,000 ft.

Performance: max speed at 25,000 ft 571 mph, T-O run at S/L 3,300 ft, landing max weight at S/L 2,380 ft, range with max payload 3,434 miles, range with max fuel 7,245 miles. Normal cruising speed at altitude 518 mph (Mach 0.77).

COMMENTARY

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

C-5A, USAF took delivery of 81 of these basic models between December 1969 and May 1973. A major wing modification was subsequently undertaken, extending the aircraft’s service life by 30,000 flight hours. Additionally, the avionics subsystems developed for the C-5B have been incorporated into the C-5A fleet. USAF has proposed retiring the C-5As but is pursuing a reliability and maintainability assessment.

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

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

C-5M. All USAF Galaxys are undergoing programs aimed at extending their service life into the middle of the 21st century. A complete avionics modernization program (AMP) is installing a state-of-the-art cockpit and ensuring global access navigation safety compliance; first upgraded aircraft flew December 2002. Additionally, the Air Force has established a reliability enhancement and re-engining program (RERP) for all 111 C-5 aircraft to include the General Electric CF6-80C2 turbofan. The first of three production representative aircraft, designated C-5M, made its debut flight on June 16, 2006 at Dobbins ARB, Ga.; flight test will continue through FY07, with OT&E completing in FY08. Program completion is expected 2020. To enhance force projection, a number of C-5s have been equipped with an aerial defense system.

C-17 Globemaster III

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

Function: Cargo and troop transport.

September 1985 and was delivered to Altus AFB, Okla., in January 1986.

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

C-5M. All USAF Galaxys are undergoing programs aimed at extending their service life into the middle of the 21st century. A complete avionics modernization program (AMP) is installing a state-of-the-art cockpit and ensuring global access navigation safety compliance; first upgraded aircraft flew December 2002. Additionally, the Air Force has established a reliability enhancement and re-engining program (RERP) for all 111 C-5 aircraft to include the General Electric CF6-80C2 turbofan. The first of three production representative aircraft, designated C-5M, made its debut flight on June 16, 2006 at Dobbins ARB, Ga.; flight test will continue through FY07, with OT&E completing in FY08. Program completion is expected 2020. To enhance force projection, a number of C-5s have been equipped with an aerial defense system.

C-17 Globemaster III

September 1985 and was delivered to Altus AFB, Okla., in January 1986.

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

C-5M. All USAF Galaxys are undergoing programs aimed at extending their service life into the middle of the 21st century. A complete avionics modernization program (AMP) is installing a state-of-the-art cockpit and ensuring global access navigation safety compliance; first upgraded aircraft flew December 2002. Additionally, the Air Force has established a reliability enhancement and re-engining program (RERP) for all 111 C-5 aircraft to include the General Electric CF6-80C2 turbofan. The first of three production representative aircraft, designated C-5M, made its debut flight on June 16, 2006 at Dobbins ARB, Ga.; flight test will continue through FY07, with OT&E completing in FY08. Program completion is expected 2020. To enhance force projection, a number of C-5s have been equipped with an aerial defense system.
A derivative of the DC-9 Series 30 commercial airliner, the C-9A was the only USAF aircraft modified specifically for the aeromedical evacuation mission, a role now undertaken by C-130 and C-17 aircraft.

C-9C. Three specially configured C-9s were delivered to Andrews AFB, Md., in 1975 for the special air mission (SAM) supporting the President and other US government officials. The novel by-novel configuration included improvements to the passenger communications equipment, GATM, TAWS, and vertical separation equipment.

C-12 Huron

Brief: Aircraft to provide airift support for attache and military advisory groups worldwide.

Operator: Special afflict.


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

Weight: empty, equipped 10.119 lb, gross 18.300 lb.

Ceiling: 51,000 ft.

Performance: max level speed at 25,000 ft 542 mph, range with max passenger load 2,306 miles, with max cargo load 1,653 miles.

COMMENTARY

C-12 is an improved C-12G, with PT6A-41 turboprops, deployed to overseas embassies.

C-12D. Similar to C-12M and also deployed to overseas embassies.

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

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

C-20 Gulfstream

Brief: A twin-engine turbofan aircraft acquired to provide airift for high-ranking government and DOD officials.

Function: Operational support airift; special air missions.

Operator: AMC, USAFE.

First Flight: December 1979.

Delivered: September 1983-89.

IOC: circa 1983.

Production: not available.

Inventory: 14.

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

Contractor: Gulfstream.

Power Plant: C-20A/B: two Rolls Royce-Spy 5618A-7 turbfans, each 3,850 lb thrust.

Accommodation: crew of five; 12 passengers.

Dimensions: span 77.8 ft; length (C-20A/B) 83.1 ft, (C-20H) 88.3 ft; height 24.3 ft.

Weight: C-20A/B gross 70,700 lb, C-20H gross 74,400 lb.

Ceiling: 45,000 ft.

Performance: max cruising speed 576 mph, range 4,800 miles.

C-20A/200.

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

C-20B. Five C-20B versions, with advanced mission communications equipment and revised interior, were acquired in the late 1980s.

C-20H. Two Gulfstream IV SP aircraft, with advanced-technology mission management systems and upgraded Rolls Royce engines, were acquired by USAF to meet expanding SAM requirements. The two C-20H aircraft were reassigned to USAFE to replace retired C-20As. Upgrade for C-20/H aircraft includes GPS, vertical separation equipment, GATM, and TCAS.

C-21

Brief: Aircraft designed to provide cargo and passenger airift to military advisory groups during medical evacuations.

Function: Pilot seasoning, passenger and cargo airift.

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


Production: 84.

Unit Location: Keesler AFB, Miss., Ramstein AB, Germany, Scott AFB, Ill., Yokota AB, Japan.

Contractor: Gates 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 39.5 ft, length 48.6 ft, height 12.2 ft.

Weight: empty, equipped 10.119 lb, gross 18.300 lb.

Ceiling: 51,000 ft.

Performance: max level speed at 25,000 ft 542 mph, range with max passenger load 2,306 miles, with max cargo load 1,653 miles.

C-21A

COMMENTARY

A twin-engine transcontinental aircraft used to provide transportation for DVs such as Congressional or high-ranking military members. It can also be configured for medevac and a wide range of special missions including C3 in time of war.

Function: VIP air transport and operational support.

Operator: ANG.


Production: two.

Inventory: two.

Unit Location: Andrews AFB, Md.

Contractor: TRACor (Israel Aircraft Industries Ltd.).

Power Plant: Two AlliedSignal TFE731-40R-200G, each 4,250 lb thrust.

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

Dimensions: span 54.6 ft, length 55.6 ft, height 18.2 ft.

Weight: gross 24,800 lb.

Ceiling: cruise, 33,000 ft.

Performance: cruise speed Mach 0.87.

C-22

COMMENTARY

The C-3A is a military variant of the Astra SPX produced by IAI and supported worldwide by Galaxy Aerospace. Equipment includes the mature SPX-flight, communication, vertical separation, and safety equipment as well as state-of-the-art avionics.

C-32

Brief: A modified Boeing 757-200 used to provide backup transportation for the President. It is the primary means of travel for the vice president, Cabinet, Congressional members, and other high-ranking US and foreign officials.

Function: VIP air transport.

Operator: AFRC.


Delivery: June-December 1998.


Production: six.

Inventory: six.

Unit Location: Andrews AFB, Md.

Contractor: Boeing.

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

Accommodation: 16 crew and 45 passengers.

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

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

Ceiling: 41,000 ft.

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

C-37

COMMENTARY

A military version of the commercial Boeing 757-200, four new C-32As were purchased as replacements for C-137B/C aircraft. The commercial DV interior includes a crew rest area, DV stateroom, conference area, and general passenger area. The passenger communications system provides worldwide clear and secure voice and data communications. Modern flight deck avionics allow operational managers to allocate suitable airfields in the world and provide an upgrade path as new capabilities become available.

Upgrades include installation of a digital communications management system and broadband communications transmitters, and receiver, providing an office-in-the-sky capability.

C-37A

Brief: A modified Gulfstream V utilized as part of the Lockheed Martin.


Production: two.

Unit Location: Andrews AFB, Md.

Contractor: Lockheed.

Power Plant: two AlliedSignal TFE731-40R-200G, each 4,250 lb thrust.

Accommodation: typically two crew and eight passengers.

Dimensions: span 77.8 ft, length 110 ft 4 in, height 41 ft 2 in.

Weight: gross 171,000 lb.

Ceiling: 41,000 ft.

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

C-38A

COMMENTARY

The C-40 is the military version of the commercial Boeing 737-700 increased gross weight aircraft. C-40s are used for transporting senior government officials and regional combatant commanders.

C-40B. The B model is equipped with a DV suite, staff work area, conference area, and worldwide secure communications and data capability. USAF purchased three and leased one C-40B. Two are assigned to Andrews and one each to Hickam and Ramstein.

C-40C. The C model has a DV seating area, general passenger seating area and secure communications capability. Three leased C-40Cs operate from Andrews.

C-130 Hercules

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

Function: Intra- and interairlift airift.

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

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

Delivered: December 1956-present (C-130J).


Production: more than 2,200.

Inventory: 170 (E); 290 (H): 36 (J).

Unit Location: Active: Dyess AFB, Tex., Elmendorf AFB, Ala., Altus AFB, Little Rock AFB, Ark., Pope AFB, N.C., Ramstein AB, Germany, Yokota AB, Japan. ANG: 24 units. AFRC: 10 units.

Contractor: Lockheed Martin.

Power Plant: C-130H four Rolls Royce-Allison T56- A-15 turboprops, each 4,300 shp. (C-130J) four Rolls
Royce-Allison AE2100D turboprops, each 4,591 shp. Accommodation: (C-130H) crew of five; up to 92 ground troops or 8,000 lb internal cargo. Dimensions: span 132.6 ft, length 97.8 ft, height 38.1 ft. Weight: C-130H: empty 81,000 lb, loaded max gross 155,000 lb; C-130J: gross 175,000 lb. Ceiling: 33,000 ft at 100,000 lb T-O weight. Performance: (C-130H) max cruising speed 430 mph, T-O run 3,585 ft, landing run (at 130,000 lb) 1,700 ft, range 4,000 lb payload 2,417 miles. A modified C-130 able to provide global, day, or night, and adverse weather capability to air-drop personnel and equipment to support US and allied SOF. Function: SOF infiltration, exfiltration, and resupply. Operator: AETC, AFSC, AFRC. First Flight: circa 1965 (E); January 1990 (H). Delivered: initially 1966; IOC: 1966 (E); June 1991 (H). Production: 22 new-build Hs. Inventory: 14 (E); 20 (H). Unit Location: Active (assoc.) and AFRC MC-130Es at Duke Field, Fla. Active: MC-130H at Hurlburt Field, Fla., Kirtland AFB, N.M. Contractor: Lockheed Martin (airframe); Boeing integrated weapons system support. Power Plant: four Allison T56-A-15 turboprops, each 9,410 shp. Accommodation: E: crew of nine; 53 troops or 26 paratroops; H: crew of seven; 77 troops, 52 paratroops, or 57 litter cases. Dimensions: span 132.7 ft, length 38.6 ft, height 100.8 ft (E), 99.8 ft (H). Weight: empty 72,692 lb, gross 155,000 lb. Ceiling: 30,000 ft. Performance: max speed 289 mph, range 3,110 miles.

CV-22 Brief: A tilt-rotor, multismulation transport aircraft designed to have the maneuverability and lift capability of a helicopter and the speed of a fixed-wing aircraft. Function: Multimission aircraft. Operator: AETC, AFSC. First Flight: March 19, 1989 (V-22). Delivery: 2006. IOC: 2009 (planned). Production: 50 (planned). Inventory: four. Unit Location: Hurlburt Field, Fla., Kirtland AFB, N.M. Contractor: Bell Boeing; Raytheon. Power Plant: two Rolls Royce-Allison AE1107C turbo-shafts, each 6,200 shp. Accommodation: four (two pilots, two flight engineers); additional pilot for extended duration missions: up to 18 troops or 8,000 lb internal cargo. Dimensions: proprotor diameter 38 ft, width, rotors turning 84.6 ft, fuselage length 57.3 ft, height 22 ft. Weight: gross weight 34,900 lb, max T-O 52,870 lb; STO 57,000 lb, self-deploy T-O 60,500 lb. Ceiling: 26,000 ft. Performance: typically will carry troops or cargo over a 500-mile combat radius at 265 mph. Self-deployment range with one air refueling 2,417 miles. CV-22 is the designation for the US Special Operations Command variant of the V-22 Osprey. The CV-22 is a multi-engine, dual-piloted, self-deployable, medium-lift vertical combat-tandem-to-tandem (VCTT) tiltrotor aircraft for the conduct of special operations, including nuclear, biological, and chemical (NBC) warfare conditions. It will operate from land bases and austere forward operating locations, as well as air capable ships without reconfiguration or modification. An in-flight refueling capability extends combat mission range when required, and the aircraft will be self-supporting to the maximum practical extent. The CV-22’s mission is long-range clandestine penetration of denied areas in adverse weather and low visibility to infiltrate, exfiltrate, and resupply SOF. CV-22 avionics include a fully integrated precision navigation suite, with GPS and INS; a digital cockpit management system oriented around four multifunction displays (MFDs); FLIR; an integrated NVG HUD; terrain-following/terrain-avoidance (TF/TA) radar; and digital map system. Additionally, it is equipped with robust self-defensive avionics and secure antijam, redundant communications compatible with current and planned systems used by command and control agencies and ground forces. The CV-22 unrefueled combat range satisfies current and emerging major theater war (MTW) requirements, as well as national mission tasks. The aircraft is capable of completing most assigned missions during one period of darkness.

A third aircraft joined the two test aircraft based at Edwards AFB, Calif., in February 2005. The first production example was delivered to USAF in September 2005 and the first combat-configured aircraft in March 2006. Operational utility evaluation was completed in summer 2006 and flight crew training began in late 2006 at Kirtland AFB, N.M. Operational test and evaluation is scheduled for fall 2007. IOC is anticipated for early 2009 at Hurlburt Field, Fla. USAF may place detachments of CV-22s in US European Command and US Pacific Command theaters.

MC-130E/H Combat Talon Brief: A modified C-130 to provide global, day, night, and adverse weather capability to air-drop personnel and to deliver personnel and equipment to support US and allied SOF. Function: SOF infiltration, exfiltration, and resupply. Operator: AETC, AFSC, AFRC. First Flight: circa 1965 (E); January 1990 (H). Delivered: initially 1966; IOC: 1966 (E); June 1991 (H). Production: 22 new-build Hs. Inventory: 14 (E); 20 (H). Unit Location: Active (assoc.) and AFRC MC-130Es at Duke Field, Fla. Active: MC-130H at Hurlburt Field, Fla., Kadena AB, Japan, Kirtland AFB, N.M., RAF Mildenhall, UK. Contractor: Lockheed Martin (airframe); Boeing integrated weapons system support. Power Plant: four Allison T56-A-15 turboprops, each 9,410 shp. Accommodation: E: crew of nine; 53 troops or 26 paratroops; H: crew of seven; 77 troops, 52 paratroops, or 57 litter cases. Dimensions: span 132.7 ft, length 38.6 ft, height 100.8 ft (E), 99.8 ft (H). Weight: empty 72,692 lb, gross 155,000 lb. Ceiling: 30,000 ft. Performance: max speed 289 mph, range 3,110 miles. C-130 Hercules (SSgt. Michael R. Holzworth)
unlimited with refueling.

**COMMENTARY**

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

**MC-130E Combat Talon I.** Fourteen modified C-130E aircraft were additionally equipped with a pod-based system to air refuel SOF helicopters.

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

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**T-6A Texan II**

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

**Function:** Primary trainer.

**Operator:** AETC, AFRC.

**First Flight:** September 1955.

**Delivered:** December 1956-68.

**IOC:** 1957.

**Production:** 985.

**Inventory:** 171.

**Unit Location:** Active: Columbus AFB, Miss., Randolph AFB and Sheppard AFB, Tex., AETC (assoc.) Randolph AFB, Tex.

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

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

**Dimensions:** span 33.7 ft, length 29.2 ft, height 9.1 ft.

**Weight:** empty (approx) 4,707 lb; gross 6,602 lb.

**Ceiling:** 35,000 ft.

**Performance:** max speed at SL 292 ft, height 9.1 ft.

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**T-6A Texan II (Maj. David Richards)**

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**T-1A Jayhawk**

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

**Function:** Advanced pilot training.

**Operator:** AETC, AFRC.

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


**IOC:** January 1993.

**Production:** 180.

**Inventory:** 179.

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

**Contractor:** Hawker Beechcraft (formerly Raytheon).

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

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

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

**Weight:** empty (approx) 4,707 lb; gross 6,602 lb.

**Ceiling:** 35,000 ft.

**Performance:** max speed at SL 315 mph, range 460 miles.

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**T-6A Texan II (MSgt. David Richards)**

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**T-1A Jayhawk**

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

**Function:** Advanced pilot training.

**Operator:** AETC, AFRC.

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


**IOC:** January 1993.

**Production:** 180.

**Inventory:** 179.

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

**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 43.5 ft, length 48.4 ft, height 13.9 ft.

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

**Ceiling:** 41,000 ft.

**Performance:** max speed at 27,000 ft 538 mph, range 2,400 miles.
T-38 Talon

COMMENTARY
USAF’s first purpose-built jet trainer, the T-38 has been AETC’s standard two-seat primary trainer for several decades. Its distinctive 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 navigational equipment, UHF radio, and upgraded instruments. Kits were subsequently produced to extend the capability of the T-37 by modifying or replacing critical structural components. AETC has been replacing the T-37B with the T-6A Texan II since 2000.

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: ACC, AETC, AFMC, AFRC.

First Flight: April 1959.


IOC: March 1961.

Production: more than 1,100.

Inventory: 489.

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

Contractor: Northrop Grumman.


Accommodation: Two, in tandem, on ejection seats.

Dimensions: Span 25.3 ft, length 46.3 ft, height 12.8 ft.

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

Ceiling: Above 55,000 ft.

Performance: Max level speed 812 mph, range 1,000 miles.


Production: 19.

Inventory: Eight.

Unit Location: Randolph AFB, Tex.

Contractor: Boeing.

Power Plant: Two Pratt & Whitney J75-9 turbofans, each 14,500 lb thrust.

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

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

Weight: Gross 115,500 lb.

Ceiling: 37,200 ft.

Performance: Econ cruising speed 535 mph (Mach 0.7), operational range 2,995 miles.

COMMENTARY
T-43A. The T-43A was derived from the commercial Boeing Model 737-200 and was equipped with the same onboard avionics as most USAF operational aircraft, including mapping radar, VHF omnidirectional radio and Tacan radio systems, INS, radar altimeter, all required communications equipment, and celestial navigation capability. A number of T-43s are configured for passengers and provide operational support to assigned commands.

T-51

Brief: A light aircraft used by USAFA flying team for training and competition.

Function: Training, competition.

Operator: AETC.

Unit Location: USAFA, Colo.

Contractor: Cessna.

Power Plant: One Lycoming 0-320 E2D piston engine, 150 hp.

Accommodation: Two, side by side.

Dimensions: Span 33.3 ft, length 24.8 ft, height 8.5 ft.

Weight: Gross 1,600 lb.

Performance: Speed 124 mph, range 475 miles.

COMMENTARY
The T-51 is a military version of the Cessna 150 used by students at USAFA for training and competition.

TG-108 Merlin

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

Function: Trainer.

Operator: AETC.

Delivered: May 2002.

IOC: December 2002.

Production: 12.

Inventory: 12.

Unit Location: USAFA, Colo.

Contractor: Blanken.

Accommodation: Two.

Dimensions: Span 55.4 ft, length 27.9 ft, height 6.2 ft.

Weight: 1,168 lb.

Performance: Speed 142.6 mph, glide ratio 28:1.

COMMENTARY
The TG-108 is an L-23 Super Blanik dual sailplane, produced in the Czech Republic and used by USAFA to introduce cadets to flight through the Basic Soaring program.
TG-10C Kestrel
Brief: Two-seat medium-performance sailplane used for spin and aerobatic training.
Function: Trainer.
Operator: AETC.
Delivered: May 2002.
IOC: December 2002.
Production: five.
Inventory: five.
Unit Location: USAFA, Colo.
Contractor: Blanik.
Accommodation: two.
Dimensions: span 46.6 ft, length 27.6 ft, height 6.9 ft.
Weight: 1,100 lb.
Performance: speed 146.1 mph, glide ratio 26:1.

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

TG-10D Peregrine
Brief: Single-seat medium-performance sailplane used for cross-country soaring training and high-altitude wave flight.
Function: Trainer.
Operator: AETC.
Delivered: May 2002.
IOC: December 2002.
Production: four.
Inventory: four.
Unit Location: USAFA, Colo.
Contractor: Blanik.
Accommodation: single.
Dimensions: span 46.3 ft, length 21.7 ft, height 4.7 ft.
Weight: 750 lb.
Performance: speed 149.5 mph, glide ratio 33:1.

COMMENTARY
The TG-10D is an L-13AC Blanik dual sailplane, produced in the Czech Republic. It is a medium-performance sailplane that allows students to master basic flight maneuvers while solo, before progressing to a more advanced sailplane. It is primarily used for cross-country training and high-altitude wave flight.

TG-14A
Brief: A two-place, side-by-side motorized glider for use by USAFA in its Introductory Flight Training Program (IFTP) flight screening/primary training program.
Function: Trainer.
Operator: AETC.
IOC: December 2002.
Production: 14.
Inventory: 14.
Unit Location: USAFA, Colo.
Contractor: Grupo Aeromot, Brazil.
Power Plant: one Rotax 912A, 81 hp engine.
Accommodation: two, side by side.
Dimensions: span 57.3 ft, length 26.4 ft, height 6.3 ft.
Weight: gross 1,874 lb.
Performance: cruise speed 110 mph, glide ratio 31:1, range 690 miles at high-speed cruise, max endurance seven hr.

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

TG-15B
Brief: A single-seat high-performance advanced training/cross-country sailplane for use by USAFA cadets for glider competition events nationwide.
Function: Trainer/cross-country competition sailplane.
Operator: AETC.
Unit Location: USAFA, Colo.
Inventory: three.
Contractor: Schempp-Hirth, Germany.
Accommodation: single seat.
Dimensions: span 49.2 ft, length 32.3 ft.
Weight: gross 1,157 lb.

COMMENTARY
The TG-15B is a high-performance advanced training/cross-country sailplane manufactured by Schempp-Hirth of Germany under the civilian designation Duo Discus 2b. This world-class competition glider is single seated and is intended for use nationwide by USAFA cadets for glider competition events.

UV-18 Twin Otter
Brief: Modified utility transport used for parachute jump training.
Function: Parachute.
Operator: AETC.
First Flight: May 1965 (commercial version).
Production: three.
Inventory: three.
Unit Location: USAFA, Colo.
Contractor: de Havilland Aircraft of Canada.

Power Plant: two Pratt & Whitney PT6A-27 turboprops, each 620 ehp.
Accommodation: crew of two and up to 20 passengers.
Dimensions: span 65 ft, length 51.8 ft, height 19.5 ft.
Weight: gross 12,500 lb.
Ceiling: 26,700 ft.
Performance: max cruising speed 210 mph, range with 2,500 lb payload 806 miles.

COMMENTARY
The UV-18B is a military version of the DHC-6 Twin Otter STOL utility transport used for parachute jump training at USAFA.

UV-18B
Brief: Specially modified helicopters used primarily for combat search and rescue; also aeromedical evacuation, civil SAR, and other support missions.
Function: CSAR medium-lift helicopter.
Operator: ACC, AETC, AFMC, PACAF, USAFE, ANG, AFRC.
Delivered: from 1982.
Production: 105.
Inventory: 101.
Unit Location: Davis-Monthan AFB, Ariz., Kadena AB, Japan, Kirtland AFB, N.M., Moody AFB, Ga., Nellis AFB, Nev., RAF Lakenheath, UK, ANG: Francis S. Gabreski

MH-53M Pave Low IV (DOD photo)

HH-60G Pave Hawk
Brief: Two-seat high-performance advanced training/cross-country sailplane for use by USAFA cadets for glider competition events nationwide.
Function: Trainer/cross-country competition sailplane.
Operator: AETC.
Unit Location: USAFA, Colo.
Inventory: three.
Contractor: Schempp-Hirth, Germany.
Accommodation: single seat.
Dimensions: span 49.2 ft, length 32.3 ft.
Weight: gross 1,157 lb.

COMMENTARY
The HH-60G is a high-performance advanced training/cross-country sailplane manufactured by Schempp-Hirth of Germany under the civilian designation Duo Discus. This world-class competition glider is dual seated and is intended for use nationwide by USAFA cadets for glider competition events.
### LGM-30 Minuteman III (DDD photo)

**AGM-86 Air Launched Cruise Missile**

- **Brief:** A small, subsonic, winged air vehicle, deployed on B-52H aircraft, which can be equipped with either a nuclear or conventional warhead and can be used to help dilute air defenses and complicate an enemy's air defense task.
- **Function:** Strategic air-to-surface cruise missile.
- **Operator:** ACC.
- **First Flight:** June 1979 (full-scale development).
- **Delivered:** from 1988.
- **IOC:** December 1982, Griffiss AFB, N.Y.
- **Production:** 1,700+.

### Strategic Missiles

<table>
<thead>
<tr>
<th>MISSILE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minuteman III</td>
<td>LGM-30 strategic missile, designed for strategic attack on enemy's hardened targets.</td>
</tr>
<tr>
<td><strong>Warhead</strong></td>
<td><strong>Function</strong></td>
</tr>
<tr>
<td>Nuclear, 1,300 lb</td>
<td>Nuclear or conventional warhead and can be used to complicate enemy air defenses.</td>
</tr>
<tr>
<td><strong>Guidance</strong></td>
<td><strong>Power Plant</strong></td>
</tr>
<tr>
<td>GPS, INS, T-Doppler</td>
<td>Two General Electric T73-GE-206 turbofans.</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td><strong>Dimensions</strong></td>
</tr>
<tr>
<td>142 ft (L) x 10.75 ft (D)</td>
<td>142 ft (L) x 10.75 ft (D)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td><strong>Weight</strong></td>
</tr>
<tr>
<td>248,000 lb</td>
<td>248,000 lb</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td><strong>Range</strong></td>
</tr>
<tr>
<td>3,000 nm</td>
<td>3,000 nm</td>
</tr>
<tr>
<td><strong>IOC</strong></td>
<td><strong>IOC</strong></td>
</tr>
<tr>
<td>1972</td>
<td>1972</td>
</tr>
<tr>
<td><strong>Operator</strong></td>
<td><strong>Operator</strong></td>
</tr>
<tr>
<td>ACC</td>
<td>ACC</td>
</tr>
</tbody>
</table>

**MINUTEMAN**

- A long-range, subsonic, solid-propellant, winged cruise missile.
- Equipped with a single 1,300 lb warhead.
- Used for intercontinental strategic strike and nuclear deterrence.
- First flown in June 1962.
- IOC in 1972.
- Operated by USAF.

**CALCM**

- A long-range deep penetration helicopter, effective against heavily defended targets.
- Equipped with a single AGM-86 or AGM-86B cruise missile.
- Used for strategic air-strike, reconnaissance, and close support missions.
- First flown in 1970.
- IOC in 1986.
- Operated by USAF.

**AGM-86**

- A solid-fuel cruise missile with a nuclear or conventional warhead, designed to engage hardened targets.
- Used for strategic air-strike and reconnaissance missions.
- IOC in 1986.
- Operated by USAF.
AGM-88 HARM (DOD photo)

Production: 1,800.
Unit Location: F.E. Warren AFB, Wyo., Malmstrom AFB, Mont., Minot AFB, N.D.
Contractor: Boeing.
Power Plant: stage 1: Thiokol M-55 solid-propellant motor; 210,000 lb thrust; stage 2: Aerojet General SR19-AJ-1 solid-propellant motor, 60,300 lb thrust; stage 3: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.
Guidance: Inertial guidance system.
Warheads: one-three Mk 12/12A MRVs (downloaded to one).
Dimensions: length 59.8 ft, diameter of first stage 5.5 ft.
Weight: launch weight (approx) 78,000 lb.
Performance: speed at burnout more than 15,000 mph, S/L to 40,000 ft, range more than 10 miles.

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

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

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

LGM-30G. The Minuteman III became operational in June 1970, providing improved range, rapid retargeting, and the capability to place three MRVs on its three targets with a high degree of accuracy. USAF initially deployed 550 in 11 squadrons.

A single re-entry vehicle configuration for some missiles has been demonstrated, planned for, and is being worked in accordance with strategic arms control negotiations. Currently a total of 500 Minuteman IIIIs are based at Minot AFB, N.D.; F.E. Warren AFB, Wyo.; and Malmstrom.

An extensive life extension program is ensuring Minuteman III’s viability to 2020. Major upgrades include refurbishment of liquid propulsion post-boost rocket engine, replacement of the solid-propellant rocket motors, replacement of the environmental control system, repair of launch facilities, installation of updated, survivable communications equipment, and a C2 sustainment program.

A medium-range, INS/GPS-guided, standoff air-to-ground weapon designed to attack a variety of soft and armored targets.

AGM-86B. The AGM-86B is a three-target missile, containing tungsten alloy cubes, rather than steel, and the enhanced-capability AGM-88C-1 guidance head.

Upgrade initiatives are aimed at increasing capability of both B and C versions against target shutdown, blanking, and blinking and at reducing potential damage to friendly aircraft. Production of AGM-86B is projected for the remainder of the 1990s.

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

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

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

AGM-88D. This modernized version, incorporating a solid-propellant rocket motor and increased lethality, is in production.

AGM-88E. A factory-programmed upgrade version used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.

AGM-90A. The AGM-90A is a prototype, single-target weapon.

AGM-90B. A factory-programmed version used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.

AGM-90C. A factory-programmed weapon used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.

AGM-90D. A factory-programmed weapon used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.

AGM-90E. A factory-programmed weapon used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.

AGM-90F. A factory-programmed weapon used to equip the now-retired F-16 Fighting Falcon. Further upgrades under consideration include GPS precision navigation capability through a modification of the control section known as the HARM Modification of the AGM-88.
above ground to moderately hardened buried targets. JASSM is equipped with INS/GPS guidance, an IIR terminal seeker, and a stealthy LO airframe. The system also offers low operational support costs. IOC has been declared on the B-1B, B-2, E-2C, and F-16. Integration on F-15E aircraft is contracted. The B-1B is the only aircraft capable of redirecting a JASSM route prior to launch. An extended-range version (JASSM-ER), with a range of more than 500 miles, entered development in FY04; flight testing began in 2006; operational test and evaluation is expected to begin in mid-2008.

**AIM-7 Sparrow**

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

Function: Air-to-air guided missile.

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

Delivered: from 1956.

IOC: April 1976 (AIM-7F).

Production: sustainment phase.

Contractor: Hughes; General Dynamics (now Raytheon).

Power Plant: Hercules Mk 58 Mod 0 4.5 sec boost-11 sec sustain rocket motor.

Guidance: AIM-7M: monopulse semiactive radar.

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

Dimensions: length 12 ft, body diameter 8 in, wingspan 3.3 ft.

Weight: launch weight 504 lb.

Performance: max speed Mach 2+, range 10+ miles.

**AIM-9 Sidewinder**

(USAF photo by TSgt. Jeffrey Allen)

Warhead: high-explosive, weighing 20.8 lb.

Dimensions: length 9.4 ft, body diameter 5 in, wingspan 2.1 ft.

Weight: launch weight 190 lb.

Performance: max speed Mach 2+, range 10+ miles.

**AIM-120 AMRAAM**

(ODD photo)

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

**AIM-120A** was the first production version, delivered by Hughes in 1988 to the 33rd TFW at Eglin AFB, Fla.

AIM-120B/C/D are upgraded, reprogrammable variants of the AIM-120. The AIM-120C currently in production has smaller, clipped control surfaces to provide for internal carriage capability in the F-22A and F-35, with HOBS launch capability. The latest development effort (AMRAAM Phase 4) adds GPS to improve navigational accuracy and enhanced data link capabilities in the AIM-120D version. Production began 2006.

**CBU-87/103 Combined Effects Munition**

Brief: The CBU-87 CEM is an area munition effective against light armor, materiel, and personnel and used by USAF and Navy fighters and bombers for interdiction.

Function: Area munition.

Production: sustainment phase.

Contractor: Aerojet General; Honeywell; Alliant Tech.

Guidance: none (CBU-87).

Dimensions: length 7.7 ft; diameter 1.3 ft.

Weight: 949 lb.

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

**CBU-89/104 Gator**

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

Function: Scatterable mines.

**CBU-89/104 Joint Combined Effects Munition (JCEM)**

Brief: The CBU-89 is an area munition active against light armor, material, and personnel and used by USAF and Navy fighters and bombers for interdiction.
Air Force Magazine
May 2007

Production: sustained phase.
Contractor: Honeywell; Aerojet General; Olin; Al-
lant Tech.
Guidance: none (CBU-89).
Dimensions: length 7.7 ft; diameter 1.3 ft.
Weight: 705 lb.
Performance: dispenses 72 BLU-91 anti-armor and
22 BLU-24 anti-personnel mines.
COMMENTARY
The CBU-89 Gator dispenser holds 94 mines, of
which 72 are BLU-91 anti-armor and 22 are anti-personnel. The 94 mines are
dispersed over the target in a circular pattern. The antitank mines, which can be
dispersed for three different limit settings, have a magnetic influence fuzes to
sense armor.
CBU-104. USAF has retrospectively a portion of it's inventory
of the Guided Anti-Tank Mine (GATM), Corrected Muntions Dispenser
(WCMD) tail kit, which improves the munitions delivery accuracy when released from medium to high altitude.

CBU-97/105/115 Sensor Fuzed Weapon
Brief: The CBU-97 SFW is an anti-armor munition used by fighters and bombers for multiple kills per pass against moving and stationary land combat vehicles.
Function: Wide-area munition.
First Flight: circa 1990.
Production: 8,500 (planned).
Contractor: Textron Systems.
Guidance: IR sensors in each warhead search for
targets; then detonate over them.
Dimensions: length 7.7 ft; diameter 1.3 ft.
Weight: 920 lb.
Performance: delivers 40 lethal projectiles over an
area of about 500 ft by 1,200 ft.

COMMENTARY
The CBU-97 Sensor Fuzed Weapon (SFW) comprises an
SLU (Small Munitions) Disperser with an FZU-398
payload and a loadout of 10 BLU-108 submunitions. Each
tactical munitions dispenser contains 10 BLU-108 submunitions, and
each submunition contains four "skeet" projectiles that, upon being thrown out, seek out their target and
deliver an explosive form of penetrator. Each SFW can deliver a total of 40 lethal projectiles. The skeet's active laser and passive IR sensors can detect a vehicle's shape
and IR signature; if no target is detected, the warhead deactivates and
explodes by timer.
The SFW's primary targets are manned tanks, armored personal carriers, and self-
propelled targets. It also provides direct attack capability and
interdiction against C2 centers.
The CBU-97 SFW is delivered as an unguided
weapon from the A-10, B-1, B-2, B-52H, F-15E, and
F-16. The initial baseline SFW systems contained the
BLU-108/B and BLU-108A/B submunition. A preplanned
product improvement SFW submunition, the BLU-108/B,
entered production in 2001, incorporating improvements such as an anti-
armor sensor, multimission warhead, and increased footprint.

CBU-105. Designation of an unguided CBU-97 equipped
with the Guided Anti-Tank Muntions Dispenser (WCMD) tail kit.
The CBU-105 can be accurately delivered from high altitude and in adverse weather from the B-1, B-52H, F-
15E, and F-16. Combat debut for the CBU-105 occurred
April 2003, during Iraq Freedom, from a B-2.

CBU-116. USAF began installing WCMD-ER wing and
tail kits on the GBU-24/28 small munition weapons in FY 2006. The WCMD-ER
provides increased accuracy and standoff capability from outside point defense ranges.

CBU-107 Passive Attack Weapon
Brief: The CBU-107 Passive Attack Weapon (PAW)
provides the capability to track and neutralize soft skin
targets, with a minimum of collateral and environmental
damage.
Function: Wide-area munition.
Delivered: 2002-03.
IOC: December 2002.
Production: delivered, but completed March 2003.
Contractor: General Dynamics (kinetic energy pene-
tration); Lockheed Martin; Raytheon; Textron Systems
(Guidance: via WCMD).
Dimensions: length 7.7 ft; diameter 1.3 ft.
Weight: 1,985 lb.
Performance: delivers a high-speed volley of 3,000+
metal "arrows" projected from a single canister; three
planes of 300 arrows each, with 15-in-long rods, 1,000 x 7-
long rods, and 2,400 small-nail size.

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

GBU-10 Paveway II
Brief: An unpowered laser guided bomb (LGB) used to
destroy high-value enemy targets from short standoff
distances.
Function: Air-to-surface guided munition.
First Flight: early 1970s.
Delivered: from 1976.
Production: 10,000; continuing.
Contractor: Lockheed Martin; Raytheon.
Guidance: semiactive laser.
Warhead: GBU-10C/D/E/F: Mk. 84 bomb (2,000-lb
unitary); GBU-12/15: 2,170 lb.
Dimensions: length 10-1/2 ft, body diameter 1.1 ft.
Weight: 1,985 lb.
Performance: CEP approximately 39 ft; range 12.73 miles.

COMMENTARY
GBU-10C and GBU-12/15 Paveway II are improved
versions of the earlier fixed-wing Paveway I. The GBU-10 is used primarily for precision bombing against non-hardened
targets but is capable of greater penetration than previous
version. It can be fired in cruise mode through 2,500 ft.
GBU-10 platforms include A-10, B-52, F-15E, F-16,
and F-117 aircraft.

GBU-12 Paveway II
Brief: An unpowered LGB used to destroy high-value
enemy targets from short standoff distances.
Function: Air-to-surface guided munition.
First Flight: early 1970s.
Production: about 30,000; continuing.
Contractor: Lockheed Martin; Raytheon.
Guidance: semiactive laser.
Warhead: Mk. 82 (200-lb unitary).
Dimensions: length GBU-10C/D/E/F: 14.1 ft; GBU-
10G/H/J: 14 ft, body diameter GBU-10C/D/E/F: 1.5 ft; GBU-10G/12: 1.2 ft, wingspan 5.5 ft.
Weight: 1,985 lb.
Performance: CEP approximately 29 ft; range 9.2 miles.

COMMENTARY
GBU-12 Paveway II weapons are improved versions
of the earlier fixed-wing Paveway I. The GBU-12 is used
primarily to strike fixed armor. Its platforms include
A-10, F-15E, and F-16 aircraft.

GBU-24 Paveway III
Brief: A precise air-to-ground low-level LGB (LLLG)
equipped with an advanced guidance kit.
Function: Air-to-surface penetrating glide bomb.
First Flight: GBU-24A/B (USAF) in service May 1985;
Production: USAF 14,000; Navy 12,000.
Contractor: Raytheon.
Guidance: semiaactive laser.
Dimensions: length 14.2 ft.
Weight: 2,350 lb.
Performance: range more than 11.5 miles.

COMMENTARY
GBU-24/A/B. An air-to-ground weapon equipped with
the GBU-24/28 Paveway III guidance kit, integrated with a BLU-109 penetrator warhead. The kit consists of an
advanced guidance section and high-lift airframe. It
is extremely precise and highly effective against a broad
range of high-value hard targets. The system can be
employed from low, medium, and high altitudes, provid-
ing operational flexibility through the use of an adaptive
digital autopilot and large field-of-gyrate, highly sensitive
scanning seeker. The GBU-24/A/B was highly successful
during Desert Storm.

GBU-24/C/D. Variant integrated with the BLU-16 ad-
vanced unitary penetrator (AUP). The GBU-24 adapts to conditions of release, flies an appropriate midcourse, and provides trajectory-shaping
enhanced warhead effectiveness. The weapon is deployed on

GBU-27
Brief: A precise air-to-ground penetrating LGB equipped
with an advanced guidance kit.
Function: Air-to-surface guided glide bomb.
First Flight: not available.
IOC: 1988 (unconfirmed).
Production: approx 3,000.
Contractor: Raytheon.
Guidance: semiaactive laser.
Dimensions: span 5.5 ft, length 13.9 ft.
Weight: 2,170 lb.
Performance: range more than 11.5 miles.

COMMENTARY
To meet the unique requirements of the F-17A, the
GBU-24/A/B was adapted to GBU-27 standard, incor-
porating specific guidance features to accomplish this
mission. The GBU-27 is extremely precise and was used to
great effect in Desert Storm.

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

GBU-28
Brief: A large 5,000-lb class air-to-ground penetrating
warhead (BLU-113/B) equipped with an advanced laser
guidance kit, used for striking and destroying hard and
deeply buried targets.
Function: Air-to-surface guided glide bomb.
GBU-32 Joint Direct Attack Munition (DOD photo)

**GBU-32 Joint Direct Attack Munition**

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

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

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

**Delivered:** 1998-2013 (planned).

**IIOC:** 1998.

**Production:** 213,521 (planned).

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

**Guidance:** INS/GPS.

**Dimensions:** Mk 84 with JDAM 12.4 ft; B-2, B-52, F-15E, F-16, F-22, F-35, F-117, and MQ-9. Boeing was awarded the contract to develop the JDAM in October 2003. Further contracts were awarded in April 2006 to Boeing and Lockheed for Increment II; following a risk reduction phase, one contractor will be selected to develop the program.

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

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

**Function:** Massive bomb.

**Guidance:** GPS/INS.

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

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

**Weight:** 215,500 lb.

**Performance:**

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

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

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

**Function:** Guidance tail kit.

**First Flight:** February 1996.

**Delivered:** from 2000.

**IIOC:** FY00.

**Production:** WCMC-1: 27,700 (planned); WCMC-ER: 100.

**Contractor:** Lockheed Martin.

**Dimensions:** length 1.4 ft; diameter 1.3 ft.

**Weight:** WCMC: 100 lb, WCMCD-ER: about 200 lb.

**Performance:** WCMCD: range about eight miles; WCMC-ER: about 40 miles.

**COMMENTARY**

UCMCD. USAF is modifying standard SUU-64/D65/66 tactical munitions dispensers with guidance kits to compensate for wind drift on downward flight from high altitudes. The combat-proven WCMCD kits include an INS guidance unit, movable tails that pop out in flight, and a signal processor. The kits when fitted on CBU-87/B/B9/89 inventory cluster weapons are designated: CEM (CBU-103), Gator (CBU-104), SFW (CBU-105), and PAW (CBU-107). Successful flight testing began in February 1996; WCMCDs are now operational on B-1, B-2, F-15E, and F-16 aircraft.

**Objectives:**

- Augments WCMCD baseline capability by adding GPS guidance to SUU-64/D65/66 WCMCD warheads to support increased accuracy and standoff capability from outside point defense ranges.

**First flight:** Took place in November 2005.

**Advanced EHF (AEHF)**

**Brief:** Joint service satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications at all levels of conflict for high priority air, ground, and sea assets.

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

**Operator:** AFSPC.

**First Launch:** April 2006 (planned).

**IIOC:** 2010 (planned).

**Constellation:** three satellites.

**Design Life:** 14 years.

**Launch Vehicle:** SV 1: Atlas V Expendable Launch Vehicle (EELV); SV 2 and 3, TBD.

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

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

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

**Dimensions:** length 62 ft (system payload axis), width 75 ft (across solar array axis).

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

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

**COMMENTARY**

AEHF was the first satellite system to provide military communications at all levels of conflict from orbit. It will provide continuous coverage across the spectrum of mission areas, including air, land, and naval warfare; special operations; strategic nuclear operations; strategic defense; theater missile defense; and space operations and intelligence.

**Defense Meteorological Satellite Program**

**Brief:** Satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations. Also shares data with civil agencies.

**Function:** Environmental monitoring satellite.

**Operator:** National Polar-orbiting Operational Environmental Satellite System (NPOESS) program office.

**First Launch:** May 23, 1962.

**IIOC:** 1965.

**Constellation/orbit:** two.

**Design Life:** 48 months.

**Launch Vehicle:** Delta IV and Atlas V.

**Unit Location:** Suitland, Md. (operations).

**Orbit Altitude:** approx. 575 miles.

**Contractor:** Lockheed Martin, Northrop Grumman.

**Power Plant:** Solar arrays generating 1,200-1,300 watts.

**Dimensions:** length 25 ft (with array deployed), width 7.2 ft.

**Weight:** 2,545 lb (including 772-lb sensor).

**Performance:** DMSP satellites orbit Earth in polar orbits and primary sensor scans an area 1,800 miles wide. Each system covers the Earth in about 12 hr.

**COMMENTARY**

- For the last 40-plus years, the DMSP constellation has provided high-quality, timely weather information to strategic and tactical warfighters worldwide. The operational linescan sensor “sees” visible and IR cloud-cover imagery to analyze cloud patterns. Secondary instruments include microwave imagers and sounders and a suite of space environment sensors that provide critical land, sea, and space environment data required by US forces across the globe. This data is also shared with civil agencies. The DMSP constellation will be replaced by the tri-agency NPOESS late in this decade.

**Block 5D-2**

- The second Block 5D-2 satellite was launched in December 1999.

**Block 5D-3**

- Two operational DMSP Block 5D-3 satellites survey the entire Earth four times a day. DMSP P16, the first Block 5D-3 satellite, was launched successfully on Oct. 13, 2003. DMSP P15, which utilized a B-2 stealth bus but 5D-2 sensors, was launched Dec. 12, 1999 and is credited as the first 5D-3 launch. Block 5D-3 satellites
have an improved spacecraft bus and sensors that provide for longer and more capable missions. The SLEP planned for F19 and F20, and the successful flyout of the DMSP Block SD-3 satellites, will help ensure a seamless transition to the NPOESS program.

Defense Satellite Communications System Brief: A space-based communications system that provides global communications. A geosynchronous orbit used to transmit SHF high-priority C2 communication. Function: Communications satellite. Operator: AFSPC.


Design Life: 10 yr (III).

Lat. & Long. Vehicle: Atlas II.

Unit Location: Schriever AFB, Colo.

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

Contractor: Lockheed Martin.

Power Plant: solar arrays generating 1,269 watts, decreasing to 960 watts after 10 yr; 1,500 watts (SLEP).

Dimensions: rectangular body 6 x 6 x 7 ft; 38-ft span with solar arrays deployed.

Weight: 2,580 lb; 2,716 lb (SLEP).

Performance: DSCS satellites orbit Earth at about 22,000 miles altitude and employ six SHF transponder channels for secure voice and high-capacity data communications.

COMMENTARY DSCS III satellites support globally distributed DOD and national security users. The final four of 14 satellites received SLEP modifications, providing substantial capacity improvements through higher power amplifiers, more efficient solar panels, and additional antennas for improved operability. The DSCS communications payload includes six independent super high frequency (SHF) transponders that cover a 500 MHz bandwidth. Three receive and five transmit antennas provide selectable coverage for Earth coverage, area coverage, and/or spot beam coverage. A special-purpose single channel transponder is also on board. The DSCS III system provides the capabilities needed for effective implementation of worldwide military communications. It can adapt to dynamic operating conditions and perform under stressed environments, providing nuclear hardened, antennae, high data rate, long haul communications to military users globally. The final DSCS III satellite was launched in August 2003. The modernization of satellite communications will continue with the deployment of the Wideband Global SATCOM (WGS).

Defense Support Program 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: November 1970.


Constellation: classified.

Design Life: three yr requirement and five yr go-

Lat. & Long. Vehicle: Titan IV with inertial upper stage; Delta IV Heavy EELV.

Unit Location: Buckley AFB, Colo.

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

Contractor: TRW (now Northrop Grumman) and Aerojet.

Power Plant: solar arrays generating 1,485 watts.

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

Weight: 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 The incredibly flexible Defense Support Program (DSP) satellite system was used extensively in Desert Storm to detect theater missile launches against coalition forces. Though not designed to spot and track smaller missiles, the system was highly successful in detecting launches, enabling timely warnings of Iraqi Scud attacks. The Space Based Infrared System (SBIRS) mission control station (MCS), located at Buckley AFB, Colo., became operational in December 2001 and now performs both the strategic and theater missile warning missions.

DSP satellites are a key part of the North American and theater early warning systems, capable of detecting missile launches and nuclear detonations. Warning data are fed to NORAD and US Strategic Command early warning centers at Cheyenne Mountain AFS, Colo. Since the first launch, DSP satellites have provided an unprecedented early warning capability to the US. The final DSP is expected to be launched in 2007. America’s early warning capability will be modernized with the introduction of the new SBIRS to be phased in at a future date.

Global Positioning System Brief: A space-based radio-positioning system that provides 24-hour worldwide highly accurate three dimensional location information (latitude, longitude, and altitude) position, velocity, and timing services to military and civilian users. Function: World navigation satellite constellation. Operator: AFSPC.


Constellation: Nominal 24 satellites in six orbital planes; max 30 sats; currently 28 operational.

Design Life: 7.5 yr (I/IIA); 10 yr (IIR/IIR-M); 12 yr (IIF).


Unit Location: Schriever AFB, Colo.

Orbit Altitude: 10,988 miles.

Contractor: Boeing (II, IIA, IIF); Lockheed Martin (IIR, IIR-M).

Power Plant: solar panels generating 700 watts (I/IIA); 1,136 watts (IIR); up to 2,900 watts (IIF).

Dimensions: IIR/IIR-M: 5 x 6.3 x 6.25 ft, span incl solar panels 38 ft; IIF: 9.6 x 6.5 ft x 12.9 ft (span incl solar panels 43.1 ft).

Weight: on orbit: 2,370 lb (IIR/IIR-M); 3,439 lb (IIF).

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

COMMENTARY Worldwide military operations, such as precision bombing, CASAR, mapping, and rendezvous, are successful in part due to the 24-hour, worldwide position navigation and timing service provided by the Global Positioning System (GPS) navigation satellite constellation. Accurate three-dimensional (latitude, longitude, and altitude) position, velocity, and precise time are provided continuously in real time to support an unlimited number of users around the globe, both civilian and military. Concern over potential enemy denial of GPS is being addressed under GPS modernization efforts. The modified Block IIR-M satellites, launched beginning September 2005, offer a variety of enhanced features for the GPS user, such as two new signals, enhanced encryption and anti-jamming capabilities for the military user, as well as a second civil signal. Block IIF satellites will have an extended design life, faster processors, and a new civil signal on a third frequency. Launch is scheduled for 2008. Future generation GPS satellites are slated for launch 2013.

Militar Satellite Communications System Brief: A joint service satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications at all levels of conflict for high-priority air, ground, and sea assets. Function: Communications satellite.

Operator: AFSPC.


IOC: July 1997 (Militar I).

Constellation: five.

Design Life: 10 yr.


Unit Location: Schriever AFB, Colo.

Orbit Altitude: 22,300 miles.

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

Power Plant: solar arrays generating 8,000 watts.

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

Weight: 10,000 lb.

Performance: constellation consists of five satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65° north and 65° south latitude. The oldest two satellites are still working beyond their 10-yr design life.

COMMENTARY The backbone of strategic-tactical communications, Militar is a joint service communications system that provides secure, jam-resistant worldwide communications through crosslinked satellites, eliminating the need for ground relay stations. Worldwide operations are made possible by this 24-hour, all-weather capability, ready to support any deployment, 24/7, at a moment’s notice. The Militar inventory was fully deployed in 2003, and modernization of satellite communications will continue with the Advanced EHF (AEHF) constellation deployment.

Polar MILSATCOM Brief: Payload on a classified satellite that provides secure, survivable communications, supporting peacetime, contingency, and wartime operations in the North Pole region, above 65° north latitude. Function: Communications satellite.

Operator: USN.

First Launch: late 1997.


Constellation: three.

Design Life: host satellite dependent.

Lat. & Long. Vehicle: not available.

Unit Location: Schriever AFB, Colo.

Orbit Altitude: 25,300 miles.

Contractor: classified.

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

Dimensions: numerous items integrated throughout host.

Weight: 470 lb (payload).

COMMENTARY Augmenting the Militar constellation, the Polar MILSAT- COM payload is a cost-effective means of providing secure communications for the North Pole region, and the continental US. The system enables northern latitude operations by linking forces with secure, jam-resistant EHF communication links. Polar 2 availability occurred in 2006, with Polar 3 due in 2008. An improved next generation polar system is planned.

Space Based Infrared System Brief: Advanced surveillance system for missile warning, missile defense, battlespace characterization, and technical intelligence. System includes satellites in geosynchronous Earth orbit (GEO) and highly elliptical orbit (HEO). Function: IR space surveillance.

Operator: AFSPC.


IOC: TBD.

Constellation: High: four GEO sats, two HEO sensors.

Design Life: not available.


Unit Location: Buckley AFB, Colo.

Orbit Altitude: High at approx 22,300 miles.

Contractor: Lockheed Martin; Northrop Grumman.

Power Plant: solar array, 2,435 watts.

Dimensions: 6 x 7 x 17 ft.

Weight: 5,442 lb.

COMMENTARY
The Missile Defense Agency manages the Space Tracking and Surveillance System (STSS), which, in December 2007, replaced the program known as SBIRS Low. In April 2002, MDA ended the SBIRS Low program definition and risk reduction competition and named TRW (now Northrop Grumman) as prime contractor for a redesigned satellite payload. Northrop Grumman is developing an improved battlespace sensor R&D element of MDA’s integrated Ballistic Missile Defense System (BMDS). The initial STSS contract calls for one demonstration satellite and two follow-on satellites in FY07-08 under Block 2006. New technologies will be inserted into subsequent R&D satellites under Block 2008 and beyond, leading to an operational system.

Wideband Global SATCOM (WGS)

COMMENTARY
Wideband Global SATCOM, previously known as the Wideband Gap-filler System, will augment DCS/IS III and the Navy’s Global Broadcast System (GBS) Phase II. WGS is a multi-channel, multi-access, multi-service communications platform offering warfighters a significant increase in capacity, connectivity, and interoperability. It will provide two-way communications for national leaders, Diplomatic Telecommunications Service, Defense Information Network, and all military ground fixed and mobile users. In addition, it will provide direct broadcast of digital multimedia, high-bandwidth imagery, and video information directly from global and theater sites to deployed warfighters. Primarily a commercial product, the satellites will have X-band (DSCS III-like), Ka-band broadcast (GBS Phase II-like), two-way Ka-band services, and cross-communications between X-band and Ka-band services.

Aerial Targets

BQM-34 Firebee

IOC: circa 1951. Production: 1,800+. Inventory: 33. Unit Location: Tyndall AFB, Fla. Contractor: Teledyne Ryan. Power Plant: one General Electric J85-GE-100 turbojet, 2,850 lb thrust. Guidance and Control: remote-control methods incl choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the Gulf Range Drone Control Upgrade System (GRDCUS), which allows multiple targets to be flown simultaneously. Dimensions: length 22.9 ft, body diameter 3.1 ft, span 12.9 ft. Weight: launch weight 2,500 lb. Performance: max level speed at 6,500 ft 690 mph, operating range 10 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.

COMMENTARY
Current BQM-34A s, with an upgraded General Electric J85-100 engine that provides a thrust-to-weight ratio of 1.1, offer higher climb rates and six-G maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. BQM-34A s are used for research, development, test, and evaluation and the Weapon System Evaluation Program. BQM-167 Skeeter

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

MQM-107 Streaker
Brief: A jet-powered, variable speed, recoverable target drone. Function: Aerial target. Operator: ACC. First Flight: 1989 have 950 lb thrust TRI 60-5 turbos. Microturbo TPI 60-5 engine, 1,061 lb thrust or TCAE 373-88B (E model). Power Plant: initially on D model, one Teledyne CAE 373-8 low altitude (50 lb thrust); MQM-107Ds delivered since 1989 have 950 lb thrust TRI 60-5 turbos. Microturbo TPI 60-5 engine, 1,061 lb thrust or TCAE 373-88B (E model). Guidance and Control: analog or digital, for both ground control and preprogrammed flight (D model); high-G auto piloting provisions; digital autopilot and remote control by the Gulf Range Drone Control Upgrade System (GRDCUS), a multifunctional C2 multilaterrization system (E model). Dimensions: length 18.1 ft, body diameter 1.3 ft, span 9.8 ft. Weight: max launch weight (excl booster) 1,460 lb. Performance: operating speed 207-630 mph, operating height 50-40,000 ft, endurance 2 hr 15 min.

COMMENTARY
MOM-107D. A third generation version of the MOM-107 Streaker, it is a recoverable, variable-speed target drone used for research, development, test, and evaluation and the Weapon System Evaluation Program. MOM-107E. Improved performance follow-on to the MOM-107D. In operational service, it replaces the MOM-107D and expands the flight envelope. MOM-107 Streakers are being replaced by the BQM-167 Skeeter.

QF-4
Brief: A converted, remotely piloted F-4 Phantom fighter used for full-scale training or testing. Function: Aerial target. Operator: ACC. First Flight: August 1993. IOC: not available. Unit Location: Tyndall AFB, Fla. (detachment at Holloman AFB, N.M.) Contractor: Marconi (formerly Tracor). Power Plant: two General Electric J79-GE-17 turbojets, each with approx 17,000 lb thrust with afterburning. Guidance and Control: remote-control methods incl the GRDCUS (Tyndall) and the Drone Formation Control System (Holloman); will also accommodate the tisservice Target Control System currently under development. Dimensions: length 16 ft, height 6 ft, wingspan 38.4 ft. Weight: mission operational weight 49,500 lb. Performance: max speed Mach 2+, ceiling 55,000 ft, range (approx) 500 miles.

COMMENTARY
The QF-4 replaced the QF-106 Full-Scale Aerial Target (FSAT) in 1998 when the F-106 inventory was depleted. The QF-4 provides for a larger operational performance envelope (maneuvering) and greater payload capability compared with its predecessor. More than 160 F-4 surplus aircraft have been converted to QF-4 FSATs since 1995. QF-4s are used for research, development, test, and evaluation and the Weapon System Evaluation Program.