

Gallery of USAF Weapons

Note: Inventory numbers are total active inventory figures as of Sept. 30, 2010.

By Susan H. H. Young

■ 2011 USAF Almanac

Bombers

B-1 Lancer

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

Function: Long-range conventional bomber.

Operator: ACC, AFMC.

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

Delivered: June 1985-May 1988.

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

Production: 104.

Inventory: 65.

Aircraft Location: Dyess AFB, Tex.; Edwards AFB, Calif.; Eglin AFB, Fla.; Ellsworth AFB, S.D.

Contractor: Boeing, AIL Systems, General Electric.

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

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

Dimensions: span 137 ft (spread forward) to 79 ft (swept aft), length 146 ft, height 34 ft.

Weight: empty 192,000 lb, max operating weight 477,000 lb.

Ceiling: more than 30,000 ft.

Performance: max speed 900+ mph (at S/L), range intercontinental.

Armament: three internal weapons bays capable of accommodating a wide range of weapons incl up to 84 Mk 82 (500-lb) or 24 Mk 84 (2,000-lb) general-purpose bombs; up to 84 Mk 62 (500-lb) or 8 Mk 65 (2,000-lb) Quick Strike naval mines; up to 30 cluster munitions (CBU-87/89/97) or 30 Wind-Corrected Munitions Dispensers (WCMD) (CBU 103/104/105); up to 24 GBU-31 (2,000-lb) or 15 GBU-38/54 (500-lb) Joint Direct Attack Munitions (JDAMs); up to 24 AGM-158A Joint Air-to-Surface Standoff Missiles (JASSMs); or any mix of these weapons (a different type of weapon in each of three weapons bays).

COMMENTARY

Proposed as replacement for the B-52. Four B-1A prototypes developed and tested in 1970s. Program canceled in 1977, though flight test continued. Program revived in 1981 as B-1B variant. Blended wing/body configuration, variable-geometry design, and turbofan engines provide long range, maneuverability, high speed, and survivability. Substantial payload, excellent radar targeting system, and long loiter time. Offensive avionics include synthetic aperture radar (SAR) for tracking-targeting-engaging moving vehicles, self-targeting of stationary targets, and terrain following. GPS-aided inertial navigation system (INS) lets aircrews autonomously navigate without ground-based navigation aids and engage targets with precision. Digital Communications Improvement program allows aircrews to receive targeting data from Combined Air and Space Operations Center (CAOC) and update mission data in the offensive



B-1 Lancer (Clive Bennett)

avionics system. Onboard self-protection electronic jamming equipment includes ALQ-161 radar warning receiver, expendable countermeasures, ALE-50 towed decoy.

Extant Variant(s)

■ B-1B. Vastly upgraded B-1A, with 74,000 lb increase in useable payload, improved radar, and reduction in radar cross section, but max speed cut to Mach 1.2. Production model flown in October 1984. Total production of 100 B variants. Inventory reduced to 67 aircraft in 2002. One lost since then. First used in combat against Iraq during Desert Fox in December 1998. Equipped over the years with GPS, smart weapons carriage, improved onboard computers, improved communications. Sniper targeting pod added in mid-2008. Receiving radar upgrades, fully Integrated Data Link to add Link 16 data sharing.

B-2 Spirit

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

Function: Long-range heavy bomber.

Operator: AFGSC, ANG.

First Flight: July 17, 1989.

Delivered: Dec. 17, 1993.

IOC: April 1997, Whiteman AFB, Mo.

Production: 21.

Inventory: 20.

Aircraft Location: Whiteman AFB, Mo.

Contractor: Northrop Grumman, Boeing, Vought.

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

Accommodation: two, mission commander and



B-2A Spirit (Northrop Grumman)

pilot, on zero/zero ejection seats.

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

Weight: empty 160,000 lb, typical T/O 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 CBU-87/89, 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 GBU-31 (2,000-lb) JDAMs, or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; 16 Joint Standoff Weapons (JSOWs), 16 JASSMs, or eight 4,700-lb GBU-37/GBU-28C/B guided weapons. Future weapons include Small Diameter Bomb (SDB) II and the 30,000-lb Massive Ordnance Penetrator (MOP).

COMMENTARY

Based on the flying wing concept. Combination of advanced technologies, low observable (LO) stealth design, and high aerodynamic efficiency. Able to attack heavily defended targets and neutralize enemy defenses. First use of B-2s in combat on March 24, 1999, against Serb targets in Allied Force, with two aircraft each dropping 16 JDAMs. Smoothly blended "fuselage" section has two large weapons bays capable of carrying rotary launchers or bomb rack assemblies with up to 60,000 lb of weapons. No vertical tail surfaces. Quadruple-redundant fly-by-wire digital flight-control system, actuating moving surfaces at the wing trailing edges that combine aileron, elevator, and rudder functions.

Extant Variant(s)

■ B-2A Block 30. B-2 production went in three successive blocks of capability: Blocks 10, 20, and 30. All Block 10 and 20 aircraft were upgraded to Block 30, with greatly enhanced weapons capability. Using 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/Bs. All B-2A Block 30s are also capable of using bomb rack assemblies in place of rotary launchers, providing the capability to employ 80 500-lb Mk 82s. Modifications to bomb racks add carriage of 80 independently targeted GBU-38 (500-lb) JDAMs. Has fully operational defensive and offensive avionics, a sophisticated mission planning system, and many operating modes for the SAR. Link 16 digital data sharing capability added and radar being replaced. A new stealth coating introduced under the Alternative High Frequency Material program dramatically improves combat readiness.

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: AFGSC, AFMC, AFRC.

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

Delivered: November 1955-October 1962.

IOC: June 19, 1955.

Production: 744.

Inventory: 74.

Aircraft Location: Barksdale AFB, La.; Edwards AFB, Calif.; 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: max level speed 650 mph, range more than 10,000 miles.

Armament: 12 AGM-86B Air Launched Cruise



B-52H Stratofortress (Clive Bennett)

Missiles (ALCMs) externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons incl AGM-86C/D Conventional ALCMs (CALCMs), Mk-62 naval mines, Mk-82/84 GP bombs, CBU 87/89/97 unguided munitions, CBU-103/104/105 Wind-Corrected Munitions Dispenser (WCMD) guided munitions, GBU-31 and GBU-38 JDAMs, AGM-158 JASSMs, and GBU-10/12/28 laser guided bombs. Future weapons incl the Miniature Air Launched Decoy (MALD), jammer variant MALD-J, and the JASSM-ER.

COMMENTARY

Many variants; all but one retired. Multimission capability includes long-range precision strike, close air support (CAS), offensive counterair, air interdiction, defense suppression, maritime surveillance. Equipped with GPS, ARC-210 radio with Have Quick II anti-jam feature; secure voice and data transmission; Combat Track II radio; electro-optical (EO) viewing system using forward-looking infrared (FLIR) and high-resolution low-light-level television (LLLTV) sensors; night vision goggles (NVG). Can carry weapons targeting pods. Future plans include modification of the entire fleet with an integrated self-targeting and battle damage assessment capability and a new radar system. ECM suite uses a combination of electronic detection, jamming, and infrared (IR) countermeasures to defeat air defenses.

Extant Variant(s)

■ B-52H. TF33 turbofans, providing increased unrefueled range, improved defensive armament. First flown July 1960. Total production of 102 aircraft, with deliveries between May 1961 and October 1962. Employable for both conventional and nuclear missions. USAF's only nuclear/conventional cruise missile carrier. Can conduct CAS using GPS/INS guided weapons. First delivered laser guided bombs in Operation Iraqi Freedom in 2003, with Litening targeting pods. ALCMs and CALCMs carried on unique pylons or internally on a rotary launcher. Undergoing Avionics Midlife Improvement Program and ECM upgrade to the

ALQ-172 set. Combat Network Communications Technology improvement aims to provide modern cockpit information avionics architecture, color displays, and enhanced situational awareness, fully integrated line-of-sight and beyond-line-of-sight data link capabilities, and mission/weapon reprogramming capability.

Fighter and Attack Aircraft

A-10 Thunderbolt II

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

Function: Attack aircraft.

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

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

Delivered: October 1975-March 1984.

IOC: October 1977.

Production: 713.

Inventory: 42 A-10A; 292 A-10C.

Aircraft Location: Barksdale AFB, La.; Boise Air Terminal, Idaho; Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; Fort Smith Arpt., Ark.; Fort Wayne Arpt., Ind.; Martin State Arpt., Md.; Moody AFB, Ga.; Nellis AFB, Nev.; Osan AB, South Korea; Selfridge ANGB, Mich.; Spangdahlem AB, Germany; White-man AFB, Mo.

Contractor: Fairchild Republic, now Lockheed Martin.

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

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

Dimensions: span 57.5 ft, length 53.3 ft, height 14.7 ft.

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

Ceiling: 45,000 ft.



A-10 Thunderbolt II (SSgt. Aaron Allmon)

Performance: speed 518 mph, combat range with 9,500 lb of weapons and 1.7 hr loiter, 20 min reserve, 288 miles.

Armament: one 30 mm, seven-barrel, 1,174-rd capacity GAU-8 Gatling gun capable of carrying inert target practice (TP) rd, straight high-explosive incendiary (HEI), or anti-armor tailored HEI/armor-piercing incendiary (API) combat mix; 11 hardpoints for up to 16,000 lb of ordnance, incl various types of free-fall or guided bombs, such as Mk 82, Mk 84, GBU-10/12/16/38, CBU-87 Combined Effects Munition (CEM), WCMD, 2.75-in high-explosive, white phosphorous, and overt/covert illumination rockets, SUU-25 overt/covert flare dispensers, up to six AGM-65B/D/E/G/H/K Maverick missiles, and up to four AIM-9 Sidewinder missiles. Up to 480 chaff and flares carried internally to counter radar or IR threats. Up to three 600-gallon fuel tanks can also be carried.

COMMENTARY

Deadly combination of large and diverse weapons payload, long loiter times, austere airfield capability, maneuverability, and wide combat radius. Can operate under 1,000 ft ceilings, above 25,000 ft with advanced targeting pods and GPS guided munitions, in darkness with NVG. Performs missions of CAS, airborne FAC, interdiction, CSAR, and special operations forces (SOF) support. Prized for its ability to linger in target area. The 30 mm GAU-8 gun can kill heavily armored tanks. Cockpit protected by titanium armor. First used in combat in 1991 Gulf War.

Extant Variant(s)

■ A-10A. Equipped with enhanced GPS/INS, head-up display (HUD), NVG, and an Integrated Flight and Fire Control Computer to enhance weapons delivery accuracy, cockpit presentations, targeting pod integration, and terrain avoidance. Carries Pave Penny laser target identification pod and self-protection/penetration aids, including ALQ 131/184 ECM pods, ALR-69 radar warning receiver, AAR-47 missile warning system, and countermeasures system to digitally integrate the ALE-40 chaff-flare dispenser.

■ A-10C. Upgraded with precision engagement modification, new multifunction color displays, hands-on throttle and stick system, digital stores management, JDAM/WCMD integration, Sniper targeting pod capability, Situational Awareness Data Link, and integration of sensors with aircraft systems. IOC in August 2007. First combat deployment September 2007. Plans for enhanced communication and situational awareness systems.

F-15 Eagle

Brief: A supersonic, all-weather, highly maneuverable tactical fighter designed to permit USAF to swiftly gain and maintain air superiority in aerial combat.

Function: Air superiority fighter.

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

First Flight: July 27, 1972.

Delivered: November 1974-85.

IOC: September 1975.

Production: 874.

Inventory: 254.

Aircraft Location: Barnes Arpt., Mass.; Eglin AFB, Fla.; Great Falls Arpt., Mont.; Jacksonville Arpt., Fla.; Kadena AB, Japan; Kingsley Field (Klamath Falls), Ore.; NAS JRB New Orleans, La.; Nellis AFB, Nev.; Portland Arpt., Ore.; RAF Lakenheath, UK.

Contractor: McDonnell Douglas (now Boeing), Raytheon.

Power Plant: Two Pratt & Whitney F100-PW-220 turbofan engines with afterburners, producing 29,000 lb of thrust from each engine.

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

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

Weight: empty 37,500 lb, gross 68,000 lb.

Ceiling: 60,000 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 (940 rd); up to four AIM-9M/X Sidewinder with four AIM-120B/C Advanced



F-15E Strike Eagle (Clive Bennett)

Medium-Range Air-to-Air Missiles (AMRAAMs), or up to eight AIM-120s, all carried externally.

COMMENTARY

World's dominant air superiority fighter for more than 30 years. Became USAF's front-line fighter upon introduction in the mid-1970s. Combines superior maneuverability and acceleration, range, weapons, and avionics. First saw combat for USAF in 1991 Gulf War, accounting for 34 of the 37 USAF air-to-air victories. Before that, flown in combat by Israeli Air Force in the 1982 Bekaa Valley War. Has amassed a total of 101 air-to-air victories.

Extant Variant(s)

■ F-15C/D (C= single-seat, D= two-seat). Introduced in June 1979, with an internal electronic warfare (EW) countermeasures suite, an additional 2,000 lb of internal fuel, and provision for conformal fuel tanks. Tactical capabilities were enhanced with the initiation of the Multistage Improvement Program (MSIP). The final 43 aircraft were delivered with the APG-70 radar designed for the follow-on F-15E. Some F-15C/Ds will remain in service until 2025, upgraded with APG-63(V3) active electronically scanned array (AESA) radars and beyond-line-of-sight (BLOS) satellite communication (SATCOM) radios. Other upgrades include the Joint Helmet Mounted Cueing System (JHMCS), AIM-9X missile, improved engines, Embedded GPS/INS (EGI) equipment, and Link 16 data link.

F-15 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, USAF, AFRC.

First Flight: Dec. 11, 1986.

Delivered: April 1988-2004.

IOC: September 1989.

Production: 236.

Inventory: 213.

Aircraft Location: Eglin AFB, Fla.; Mountain Home AFB, Idaho; Nellis AFB, Nev.; RAF Lakenheath, UK; Seymour Johnson AFB, N.C.

Contractor: McDonnell Douglas (now Boeing), Raytheon.

Power Plant: two Pratt & Whitney F100-PW-220, each 25,000 lb thrust; or F100-PW-229 turbofans, each 29,000 lb thrust 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 37,500 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-120 AMRAAMs or up to eight AIM-120 AMRAAMs; AGM-130; EGBU-15 and GBU 10/12/15/24/28/31/38/54 guided munitions; CBU 87/89/97 unguided munitions; CBU-103/104/105

WCMD guided munitions; GBU-39 SDB; and nuclear weapons.

COMMENTARY

Basic F-15 airframe strengthened and upgraded for heavyweight multirole capability. Saw first combat in Desert Storm in 1991, when 48 F-15Es deployed to Gulf and focused on hunting Scud launchers and Iraqi artillery sites. Can maneuver at nine Gs throughout flight envelope.

Extant Variant(s)

■ F-15E. Has advanced cockpit controls, displays, and a wide-field-of-view HUD. Array of integrated avionics and electronics to permit flight at low, medium, or high altitude, day or night, and in all weather conditions. Carries LANTIRN night-attack pods and advanced targeting pods on dedicated sensor stations. SAR radar pod provides surveillance and reconnaissance support to ground operations. Potent ground attack capability supplied by GPS-aided and precision weapons and by 20 mm gun for strafing. Air-to-air capability based on array of radar guided and IR homing weapons. Carries a large and varied ordnance load. Equipped with Link 16 and ARC-210 SATCOM. Current mod plan calls for addition of AESA radar.

F-16 Fighting Falcon

Brief: A compact, versatile, and low-cost multirole fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air combat, suppression of enemy air defenses (SEAD), and air-to-surface attack.

Function: Multirole fighter.

Operator: ACC, AETC, AFMC, PACAF, USAF, ANG, AFRC.

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

Delivered: January 1979-2005.

IOC: October 1980, Hill AFB, Utah.

Production: 2,206.

Inventory: 1,004.

Aircraft Location: Aviano AB, Italy; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Hill AFB, Utah; Homestead ARB, Fla.; Kunsan AB, South Korea; Luke AFB, Ariz.; Misawa AB, Japan; NAS JRB Fort Worth, Tex.; Nellis AFB, Nev.; Osan AB, South Korea; Shaw AFB, S.C.; Spangdahlem AB, Germany; and ANG in Alabama, Arizona, California, Colorado, Florida, Indiana, Iowa, Maryland, Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, Texas, Vermont, Wisconsin.

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).

Accommodation: 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 with two 2,000-lb bombs, two AIM-9 missiles, and external fuel, hi-lo-lo-hi 852 miles, combat range 575 miles.

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

COMMENTARY

Workhorse of the USAF fighter fleet. A lightweight fighter supporting the majority of precision guided munitions taskings in combat operations. Among the most maneuverable fighters ever built. First flown by USAF in combat in 1991 Gulf War; USAF F-16s flew 13,500 missions, more than any other type. F-16 Common Configuration Implementation Program (CCIP) has been completed for bulk of F-16 fleets with Block 50/52 in 2006 and Block 40/42 in 2010. CCIP provides a new modular mission computer and color displays, Sniper XR advanced targeting pod, JHMCS, AIM-9X, Link 16, and improved weapons capabilities.

■ F-16C/D. Introduced in 1984, at production Block 25. Features MSIP II improvements to cockpit, airframe, and core avionics and increased-range APG-68 radar. Block 30 and 40 aircraft incorporate F110-GE-100 engine. Block 25/30/32 variants have upgrades supporting new weapons capabilities, including GBU-31/38/54 JDAM, WCMD, AIM-9X, AIM-120 updates, MALD. Has advanced IFF, NVG capability, and Situation Awareness Data Link. Follow-on improvements include the ALQ-213 EW system, ALR-69 threat warning system, and ALE-47 improved defensive countermeasures. Aircraft equipped with Litening II/Litening ER and Sniper targeting pods.

■ F-16CM Block 40/42 aircraft specializing in night attack with PGMs and wide-angle HUD. Greater takeoff weight and maneuvering limits, expanded envelope, nine-G capability. Equipped with ALE-47 defensive countermeasures, ALR-56M advanced VHSIC technology in APG-68(V5) fire-control radar, ring-laser gyro INS, GPS, enhanced-envelope gunsight, digital flight controls, automatic terrain following.

■ F-16CM Block 50/52 aircraft optimized for Suppression of Enemy Air Defenses (SEAD). Equipped with AGM-88 HARM targeting system. MSIP Stage III improvements. Incorporates GE F110 and P&W F100 increased performance engines, latest cockpit control and display technology. Weapons improvements include AIM-9X, multishot AMRAAM compatibility, GBU-31/38/54 JDAM, WCMD, AGM-158 JASSM, and laser guided bomb variants (GBU-10/12/24) using Sniper and Litening targeting pods. Downlink capability integrates with ROVER



F-16 Fighting Falcon (Jim Dunn)

systems to support joint terminal attack controllers on the ground. Future upgrades include selective availability anti-spoofing module (SAASM), MALD with new mission planning software, and SDB integration.

F-22 Raptor

Brief: A fifth generation, multirole fighter designed to penetrate advanced anti-air threats and achieve air dominance.

Function: Air dominance multirole fighter.

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

First Flight: Sept. 7, 1997.

Delivered: 2002 (first production representative aircraft).

IOC: Dec. 15, 2005.

Production: 187 (planned).

Inventory: 158.

Aircraft Location: Edwards AFB, Calif.; Holloman AFB, N.M.; JB Elmendorf-Richardson, Alaska; JB Langley-Eustis, Va.; JB Pearl Harbor-Hickam, Hawaii; Nellis AFB, Nev.; Tyndall AFB, Fla.

Contractor: Lockheed Martin, Boeing.

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

Accommodation: pilot only, zero/zero ejection seat.

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

Weight: empty 43,340 lb, max takeoff 83,500 lb.

Ceiling: above 50,000 ft.

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

Armament: one internal M61A2 20 mm gun; two AIM-9 Sidewinders stored internally in the side weapons bays; six AIM-120 AMRAAMs or two AIM-120 AMRAAMs and two GBU-32 JDAMs for ground attack, stored internally in the main weapons bay;

beginning 2011, up to eight SDBs can replace two JDAMs.

COMMENTARY

USAF's newest operational fighter, built to operate day and night and in adverse weather, across spectrum of missions. Flew its first operational sortie from Langley AFB, Va., in 2006, as part of Noble Eagle. Combines stealth, supercruise, high maneuverability, and integrated avionics to counter and survive multiple anti-access threats and survive. Integrated avionics and intraflight data link permit simultaneous engagement of multiple targets. Advanced flight controls, heavy structure, high-performance engines, thrust vectoring nozzles yield great maneuverability. Future improvements include upgraded radar and up to eight SDBs for ground attack. Subsequent plans include the addition of AIM-9X and the Multifunction Advanced Data Link (MADL) for connectivity with B-2 and F-35 aircraft. Production capped by DOD at 187 aircraft.

Extant Variant(s)

■ F-22A. Cockpit fitted with six color LCDs. The Primary Multifunction Display provides a view of the air and ground tactical situation, including threat identity, threat priority, and tracking information, with two Secondary Multifunction Displays showing air and ground threats, stores management, and air threat information. Two additional displays give navigation, communication, identification, and flight information. A HUD shows target status, weapon status, weapon envelopes, and shoot cues. Other equipment includes AN/APG-77 radar, an EW system with radar warning receiver and missile launch detector, JTIDS, IFF, laser gyroscope inertial reference, and GPS.

F-35 Lightning II

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

Function: Multirole fighter.

Operator: AFMC. Planned: ACC, PACAF, USAF, AETC.

First Flight: Dec. 15, 2006 (F-35A prototype).

Delivered: April 2011 (first low-rate initial production aircraft).

IOC: 2016 (USAF).

Production: planned: 1,763 USAF (F-35A); 680 Department of the Navy (F-35B&C); unspecified number Britain; unspecified number to eight development partner countries.

Inventory: four.

Aircraft Location: Edwards AFB, Calif.; planned for Eglin AFB, Fla.; Ops-1 location announcement mid-2011; further operational and training locations 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 F135, in 40,000-lb thrust class.

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

Dimensions: approx span 35 ft, length 51.4 ft, height 14.2 ft.



F-22A Raptor (Erik Simonsen)

Weight: empty 29,300 lb, max takeoff 70,000 lb.
Ceiling: 50,000 ft.

Performance: mil power level speed at S/L, 630 knots calibrated airspeed (KCAS) for the F-35A conventional takeoff and landing (CTOL) variant (Mach 1.6 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 590 miles for CTOL variant, 600 miles for CV, and 450 miles for STOVL.

Armament: 11 weapons stations (four internal, seven external), capable of carrying bombs up to 2,500 lb. The CTOL will have one internal 25 mm gun; the STOVL and CV variants will have the same weapons with an external missionized gun pod. Internal weapons bay: CTOL: two AIM-120Cs AMRAAMs and two GBU-31 JDAMs. CV: two AMRAAMs and two GBU-31 JDAMs. STOVL: two AMRAAMs and two GBU-32 JDAMs. All variants will have internal and external GBU-12 and external AIM-9X. More than 30 stores are to be certified for carriage as system development continues.

COMMENTARY

The F-35 is a multinational program aimed at developing and fielding an affordable, highly common family of next generation strike fighters. For US forces, F-35A CTOL version for the Air Force, the F-35B STOVL version for USMC, and F-35C CV version for USN. USAF's F-35A will replace F-16 and A-10 fleets with a stealthy multirole fighter. Designed to be able to enter heavily defended enemy airspace and engage all enemy targets in any conflict. Features advanced stealth design, high maneuverability, long range, and advanced avionics. Total of 19 test aircraft are being built. Flight test commenced Dec. 15, 2006.

Extant Variant(s)

■ F-35A. Variant used by Air Force. First flight by a USAF test pilot on Jan. 30, 2008. An F-35A achieved supersonic speed for the first time in November 2008. The first weight-optimized F-35A, AF-1, flew for the first time Nov. 14, 2009. Still in development and test.

Special Operations Forces Aircraft

AC-130 Spectre/Spooky

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.

First Flight: 1967.

Delivered: 1968-present.

IOC: 1972 AC-130H, 1996 AC-130U.

Production: 43; incl four recent conversions.

Inventory: eight AC-130H; 17 AC-130U.

Aircraft Location: Cannon AFB, N.M. (H model); Hurlburt Field, Fla. (U model).

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

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



AC-130U Spooky (SrA. Julianne Showalter)



F-35 Lightning II (Lockheed Martin photo by Randy Crites)

Accommodation: 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 300 mph, range 1,300 miles, with air refueling unlimited.

Armament: AC-130U: one 25 mm Gatling gun, one 40 mm Bofors cannon with 256 rd, and one 105 mm Howitzer with 100 rd. AC-130H: one 40 mm Bofors cannon with 256 rd, and one 105 mm Howitzer with 100 rd.

COMMENTARY

Gunship modified with gun systems, electronic and EO sensors, fire-control systems, enhanced navigation systems, sophisticated communications, defensive systems, in-flight refueling capability. These systems give the crew the capability to acquire and identify targets day or night, coordinate with ground forces and C2 agencies, and deliver precise firepower to back conventional and SOF missions. For operations in Afghanistan and Iraq, the AC-130 gunships work in conjunction with the MQ-1 Predator, the latter providing live video and target referencing information.

Extant Variant(s)

■ AC-130H Spectre. Serves with 27th Special Operations Wing, Cannon AFB. Equipped with digital fire-control computer, EO sensors, target-acquisition systems, including FLIR and LLLTV, and are capable of in-flight refueling. Fire-control computers, navigation, communications, and sensor suites are advanced. Planned modifications include a new ground mapping/weather radar, enhanced traffic alert and collision avoidance system (ETCAS), large aircraft IR countermeasures (LAIRCM), and expanded precision weapons capability. Originally AC-130E, converted to H standard after Vietnam War. Plans call for phased replacement with J models.

■ AC-130U Spooky. Serves with 1st SOW, Hurlburt Field. Conversions of earlier gunships. Thirteen conversions by Rockwell delivered to 4th SOS

in 1994-95. Four remaining conversions done by Boeing in recent years. All weapons can be subordinated to the APQ-180 digital fire-control radar, FLIR, or all-light-level television (ALLTV) for adverse weather attack operations. Plans call for use of ETCAS, Link 16, advanced gunship multispectral sensor system (GMS2), and expanded precision weapons capability.

MC-130 Combat Talon

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

Function: SOF infiltration, exfiltration, and resupply.

Operator: AETC, AFSOC, AFRC.

First Flight: circa 1965 MC-130E; June 1984 MC-130H.

Delivered: initially 1966.

IOC: 1966 MC-130E; June 1991 MC-130H.

Production: 22 new-build MC-130Hs.

Inventory: 12 MC-130E; 20 MC-130H.

Aircraft Location: Duke Field and Hurlburt Field, Fla.; Kadena AB, Japan; Kirtland AFB, N.M.; RAF Mildenhall, UK.

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

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

Accommodation: MC-130E: crew of nine; 53 troops or 26 paratroops; MC-130H: crew of seven; 77 troops, 52 paratroops, or 57 litters.

Dimensions: span 132.7 ft, height 38.6 ft, length 100.8 ft (MC-130E), 99.8 ft (MC-130H).

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

Ceiling: 33,000 ft (MC-130H).

Performance: max speed 300 mph (MC-130H), range 3,110 miles, unlimited with refueling.

COMMENTARY

Special operations mobility aircraft. Used primarily to conduct infiltration, resupply, and exfiltration of SOF. Capable of air drop using Joint Precision Airdrop System, landing on austere and unmarked landing zones. Can support psychological operations with leaflet bundle drops. Equipped with terrain-following/terrain-avoidance (TF/TA) radars, precision navigation systems using INS/GPS, and electronic and IR countermeasures for self-protection. All models capable of aerial refueling as a receiver and tanker. The 1st, 7th, 15th SOSs support SOF in Europe, Pacific, CONUS, respectively. The 58th SOS at Kirtland AFB is responsible for MC-130H mission qualification training. The 711th SOS (AFRC), Duke Field, flies MC-130E.

Extant Variant(s)

■ MC-130E Combat Talon I. Fourteen modified C-130E aircraft were equipped with a pod-based system to air refuel SOF helicopters and tilt-rotor aircraft. Plans call for replacement by MC-130J variants.

■ MC-130H Combat Talon II. C-130H aircraft modified with an integrated glass cockpit were acquired in the late 1980s and early 1990s to

supplement the Combat Talon Is. All are modified with a state-of-the-art pod-based aerial refueling system to augment the MC-130E and MC-130P aerial refueling fleet.

MC-130 Combat Shadow

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

Function: Air refueling for SOF helicopters and tilt-rotor aircraft and airdrop.

Operator: AETC, AFSOC, ANG, AFRC.

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

Delivered: from 1965.

IOC: 1986.

Production: (converted).

Inventory: 27.

Aircraft Location: Eglin AFB, Fla.; Kadena AB, Japan; Kirtland AFB, N.M.; Moffett Field, Calif.; RAF Mildenhall, UK.

Contractor: Lockheed Martin (airframe), Boeing.

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

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.

COMMENTARY

Specialized tanker aircraft flies clandestine formation or single-ship intrusion of hostile territory missions to provide air refueling of SOF vertical-lift and tilt-rotor assets and the infiltration, exfiltration, and resupply of SOF by airdrop or air-land operations. Secondary capabilities include the ability to air-drop small teams, bundles, and rubber raiding craft. The aircraft are JPADS capable. Equipped with improved navigation, communications, threat detection, and countermeasures systems.

Extant Variant(s)

■ MC-130P Combat Shadow. Fully integrated INS/GPS and NVG-compatible interior and exterior lighting. FLIR, radar and missile warning receivers, chaff, flare dispensers, NVG-compatible HUD, satellite and data-burst communications, as well as in-flight refueling capability as a receiver. Will be modified with a cargo handling system to work with palletized cargo and heavy equipment.

MC-130 Combat Spear

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

Function: Air refueling for SOF helicopter and tilt-rotor aircraft and airdrop.

Operator: AFSOC.

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

Delivered: June 2006.

IOC: 2007.

Production: 12 (converted).

Inventory: 12.

Aircraft Location: Cannon AFB, N.M.

Contractor: Boeing.

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

Accommodation: four flight crew, plus three 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 300 mph, range with max normal payload 1,208 miles, unlimited with air refueling.

COMMENTARY

A C-130H(2) significantly modified to include an EW capability, low-light-level operational capability, and a strengthened tail to permit high-speed, low-level air-drop operations.



MC-130H Combat Talon II (SSgt. Samuel Morse)

Extant Variant(s)

■ MC-130W Combat Spear. Equipped with technically advanced refueling pods, providing the ability to refuel SOF helicopters and tilt-rotor aircraft. It also is capable of supporting limited C2 operations. Can be air refueled to extend its mission range. Select MC-130Ws will be modified to MC-130W Dragon Spear configuration with a precision strike package to support battlefield overwatch missions.

V-22 Osprey

Brief: A long-range, tilt-rotor, multimission transport aircraft designed to have the maneuverability and lift capability of a helicopter and the speed and range of a fixed wing aircraft. It can operate in adverse weather and restricted visibility.

Function: Multimission airlift.

Operator: AETC, AFSOC.

First Flight: March 19, 1989 (V-22).

Delivered: 2006.

IOC: 2009.

Production: 50 (planned).

Inventory: 16.

Aircraft Location: Hurlburt Field, Fla.; Kirtland AFB, N.M.

Contractor: Bell Boeing, Raytheon.

Power Plant: two Rolls Royce-Allison AE1107C turboshafts, 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 VTO 52,870 lb; STO 57,000 lb, self-deploy T-O 60,500 lb.

Ceiling: 25,000 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.

COMMENTARY

Multiengine, dual-piloted, self-deployable, medium-lift vertical takeoff and landing (VTOL) tilt-rotor aircraft, operated by both the US Air Force and US Marine Corps. Air Force's first operational squadron, 8th SOS at Hurlburt Field, Fla., received first aircraft in January 2007. First operational deployment, to Africa, took place in November 2008; first combat deployment, to Iraq, in summer 2009.

Extant Variant(s)

■ CV-22B. Air Force's variant of the V-22 Osprey. Operates with forces of US Special Operations Command. Mission is long-range clandestine penetration of denied areas in adverse weather and low visibility to infiltrate, exfiltrate, resupply SOF. Optimized for special missions, including in nuclear, biological, and chemical (NBC) warfare conditions. Designed to operate from land bases, austere forward operating locations, and air capable ships without reconfiguration or modification. In-flight refueling extends combat mission range. Equipped with fully integrated precision navigation suite, a digital cockpit management system,



CV-22 Osprey (SSgt. Michael B. Keller)

FLIR, integrated NVG HUD, TF/TA radar, digital map system. Has robust self-defense avionics and secure anti-jam communications.

ISR/BM/C3 Aircraft

E-3 Sentry

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

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

Operator: ACC, PACAF, AFRC.

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

Delivered: March 1977-84.

IOC: 1977.

Production: 33.

Inventory: 22 E-3B; nine E-3C.

Aircraft Location: JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Tinker AFB, Okla.

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

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

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

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

Weight: gross 347,000 lb.

Ceiling: 38,000 ft.

Performance: optimum cruise 370 mph, endurance eight hr unrefueled.

COMMENTARY

BM aircraft capable of conducting surveillance from Earth's surface to the stratosphere, over land or water, at a range of more than 200 miles. Coordinates actions of hundreds of strike, support, and cargo aircraft. Integrates C2, BM, surveillance, target detection, and tracking in one platform. Operates in direct subordination to joint or combined air operations center. Employed either alone or together with other C2BM and ISR elements. Allows theater forces to find, fix, track, target airborne or maritime threats and locate emitters.

Extant Variant(s)

■ E-3B. Upgrade of earliest E-3As. Equipped with much-enhanced computer capabilities, jam-resistant communications, austere maritime surveillance capability, upgraded radio communications, and five additional display consoles.

■ E-3C. Upgrade to US/NATO Standard E-3A aircraft. Equipped with additional radio, console, and radar capabilities. Delivery began 1984. Block 40/45 upgrade is a major initiative for all AWACS aircraft, significantly enhancing the Air Force's air C2BM capabilities for the 21st century battlefield. It provides increased mission effectiveness for AWACS operators, improved reliability of the mission system, and lower life-cycle costs.

E-4 National Airborne Operations Center

Brief: A four-engine, swept-wing, long-range high-altitude airplane providing a highly survivable command, control, and communications (C3) center allowing national 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.

Aircraft Location: Offutt AFB, Neb.

Contractor: Boeing, Rockwell, Raytheon E-Systems.

Power Plant: four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.

Accommodation: up to 112 crew and passengers.

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

Weight: gross 800,000 lb.

Ceiling: above 40,000 ft.



E-3 AWACS (Jim Dunn)

Performance: 6,900+ miles, unrefueled endurance in excess of 12 hr, with aerial refueling up to 72 hr.

COMMENTARY

Militarized version of the Boeing 747-200. Performs the National Airborne Operations Center mission. Provides survivable C3 platform in all situations, including sustained operations in a nuclear environment. First operational mission flown in March 1980.

Extant Variant(s)

■ E-4B. Hardened against the effects of nuclear explosions, including electromagnetic pulse (EMP). In-flight refueling capability. A 1,200-kVA electrical system supports advanced system electronics as well as state-of-the-art communications and data processing equipment such as EHF Milstar satellite terminals and six-channel International Maritime Satellite. A triband radome houses SHF communications antenna. Modernization Block 1 upgrade updates the electronic infrastructure and increases the bandwidth of external communications and onboard data transfer. Three have received MB 1 upgrade, with another to be completed in 2012.

E-8 Joint STARS

Brief: A modified Boeing 707-300 series 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.

Function: Ground surveillance, BM, C2 aircraft.

Operator: ACC and ANG.

First Flight: December 1988.

Delivered: May 1996-2005.

IOC: Dec. 18, 1997.

Production: 18.

Inventory: 18.

Aircraft Location: Robins AFB, Ga.

Contractor: Northrop Grumman, Motorola, Cubic, Raytheon.

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

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

Dimensions: span 145.8 ft, length 152.9 ft, height 42.5 ft.

Weight: gross 336,000 lb.

Ceiling: 42,000 ft.

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

COMMENTARY

Aircraft equipped with a 24-ft-long side-looking phased air-to-ground radar capable of locating, classifying, and tracking vehicles moving on Earth's surface. Data is transmitted via data link to ground stations or other aircraft. Provides theater ground and air commanders with surveillance data to support attack operations. Evolved from Army and Air Force programs to develop capability to detect, locate, and attack enemy armor at ranges beyond the forward area of troops. The first two developmental aircraft deployed in 1991 to Desert Storm. Supported Joint Endeavor in 1995 and Allied Force in 1999. Continues to fly in support of US operations in Iraq and Afghanistan.

Extant Variant(s)

■ E-8C. Production version, based on 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 Block 20, featuring more powerful computers and an Internet protocol local area network and beyond-line-of-sight connectivity. First E-8C operational in 1996. Expected to remain in service until 2034. Re-engining with improved Pratt & Whitney JT8D turbojets is under way.

EC-130 Commando Solo

Brief: A heavily modified C-130 used for psychological warfare broadcasts and information operations.

Function: Psychological warfare.

Operator: ANG.

First Flight: January 1980.

Delivered: March 1980 (J model from 2003).

IOC: December 1980.

Production: no new-build EC-130E, seven EC-130J.

Inventory: three J model.

Aircraft Location: Harrisburg Arpt., Pa.

Contractor: Lockheed Martin, Raytheon, General Dynamics.

Power Plant: four Rolls Royce-Allison AE2100D turboprops, each 6,000 shp.

Accommodation: three flight crew, six mission crew.

Dimensions: span 132.6 ft, length 97.8 ft, height 38.9 ft.



EC-130J Commando Solo II (SSgt. Tia Schroeder)

Weight: gross 175,000 lb.
Ceiling: 28,000 ft.
Performance: speed 393 mph, range 4,140 miles.
COMMENTARY

A psychological operations aircraft employed in every US war and most other contingency operations since 1980, supporting a broad spectrum of information operations and psyops missions.

Extant Variant(s)

■ EC-130J. Known as Commando Solo II. Used by ANG as a broadcasting station for psychological warfare operations. Specialized modifications included enhanced navigation systems, self-protection equipment, and worldwide color television configuration, air refueling. Entered service in 2004 with the 193rd SOW.

EC-130 Compass Call

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

Function: Electronic warfare.

Operator: ACC.

First Flight: 1981.

Delivered: 1982.

IOC: 1983; Block 30 from February 1999.

Production: (converted).

Inventory: 14.

Aircraft Location: Davis-Monthan AFB, Ariz.

Contractor: Lockheed Martin.

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

Accommodation: standard crew 13, incl nine mission.

Dimensions: span 132.6 ft, length 99 ft, height 38 ft.

Weight: 155,000 lb.

Ceiling: 25,000 ft.

Performance: speed 300 mph at 20,000 ft.

COMMENTARY

Aircraft designed to disrupt enemy C2 communications and limit adversary coordination essential for enemy force management.

Extant Variant(s)

■ EC-130H. 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.

MC-12 Project Liberty

Brief: A manned intelligence-surveillance-reconnaissance (ISR) version of the C-12, based on the Beechcraft King Air 350/350ER, providing near-real-time ISR to ground forces in Iraq and Afghanistan.

Function: Manned tactical ISR.

Operator: ACC, ANG.

First Flight: April 2009.

Delivered: April 2009.

IOC: May 2009.

Production: 42 (planned).

Inventory: 37.

Aircraft Location: Key Field, Miss. (initial weapon system training); one Expeditionary Reconnaissance Squadron (ERS) at JB Balad, Iraq; two ERSs at Bagram Airfield and Kandahar Airfield, Afghanistan. Other TBD.

Contractor: Hawker Beechcraft.

Power Plant: two Pratt & Whitney Canada PT6A-60A turboprops, each 1,050 shp.

Accommodation: two pilots and two sensor operators.

Dimensions: span 58 ft, length 46.7 ft, height 14.3 ft.

Weight: (King Air 350) gross 15,000 lb.

Ceiling: (King Air 350) 35,000 ft.

Performance: endurance: King Air 350 six hrs, King Air 350 ER 7.5 hrs.

COMMENTARY

A modified sensor-equipped version of the Beechcraft King Air 350/350ER-based C-12. Acquired by USAF to augment existing overhead ISR assets operating in Iraq and Afghanistan, providing ground forces with high-value targeting data and other tactical intelligence.

Extant Variant(s)

■ MC-12W. Modification includes full-motion video and Sigint capabilities, data links to ground forces, a state-of-the-art countermeasures system, and a Blue Force tracker. First seven aircraft are used King Air 350s; the remainder are based on the King Air



MC-12 Project Liberty (SrA. Tiffany Trojca)

350 Extended-Range model. The MC-12W began operations in Iraq in June 2009 and in Afghanistan in December 2009.

MQ-1 Predator

Brief: A medium-altitude, long-endurance unmanned aerial vehicle (UAV), flown remotely, providing joint force commanders with a multimission asset, by combining imagery sensors with strike capability.

Function: Armed reconnaissance, airborne surveillance, target acquisition.

Operator: ACC, AFSOC, ANG, AFRC.

First Flight: July 1994.

Delivered: July 1994 (USAF from 1996)-2011.

IOC: 2005.

Production: 186 air vehicles (objective force).

Inventory: 174.

Ground Control Station (GCS) Locations: Cannon AFB, N.M.; Creech AFB, Nev.; Davis-Monthan AFB, Ariz.; Ellington Field, Tex.; Hector Arpt., N.D.; Holloman AFB, N.M.; March ARB, Calif.; Nellis AFB, Nev. Planned: Whiteman AFB, Mo.

Aircraft Location: Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M.; March ARB, Calif. Planned: Grand Forks AFB, N.D.; Fort Huachuca, Ariz.

Contractor: General Atomics Aeronautical Systems.

Power Plant: one Rotax 914F turbocharged engine.
Accommodation: two in GCS (pilot, sensor operator).

Dimensions: (Block 5/10/15) length 27 ft, height 6.9 ft, span (Block 5) 48.7 ft, (Block 10/15) 55.2 ft.

Weight: empty 950 lb, gross 2,250 lb.

Ceiling: 25,000 ft.

Performance: Max speed 135 mph, cruise speed 80 mph, endurance 24 hr (460 miles with 16 hr on station).

Armament: Two Hellfire missiles.

COMMENTARY

Fully operational system comprises four air vehicles, GCS, satellite link, and about 55 personnel for 24-hour operations. Aircrew comprises a pilot and sensor operator. Became a fully USAF system in 1996. Deployed over Bosnia and Iraq in 1999. Weapons capability was developed in response to experience in the Balkans. Systems since 2002 armed with Hellfire missiles, used frequently in Afghanistan and Iraq. RQ-1 designation changed to MQ-1 to denote multimission capability. USAF forward deploys launch and recovery systems and support personnel for takeoff and landing opera-

tions, while the CONUS-based GCS conducts the mission via extended communication links.

Extant Variant(s)

■ MQ-1B. Multimission weaponized Predator A. Carries Raytheon AN/AAS-52 Multispectral Targeting System sensor. MTS-A provides a laser target designator with EO/IR sensors in a single package. Can be controlled via direct line of sight or via satellite from a remote location. Scheduled to receive new airborne signals intelligence (Sigint) sensor payload, now under development.

MQ-9 Reaper

Brief: A medium-to-high altitude, long-endurance remotely piloted UAV. Joint force commander multimission asset as a persistent hunter-killer against emerging targets.

Function: Unmanned attack and ISR aircraft.

Operator: ACC, AFSOC, ANG.

First Flight: February 2001.

Delivered: November 2003.

IOC: October 2007.

Production: 319 (planned).

Inventory: 54.

GCS Location: Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M.; Hancock Field, N.Y. Planned: Ellsworth AFB, S.D.

Aircraft Location: Cannon AFB, N.M.; Creech AFB, Nev.; Holloman AFB, N.M. Planned: Fort Drum, N.Y.
Contractor: General Atomics Aeronautical Systems.

Power Plant: one Honeywell TPE-331-10GDT turboprop engine.

Accommodation: two in GCS (pilot, sensor operator).

Dimensions: length 36.2 ft, span 66 ft.

Weight: empty 4,900 lb, gross 10,500 lb.

Ceiling: 30,000+ ft.

Performance: cruise speed 230 mph, endurance 14+ hours.

Armament: combination of AGM-114 Hellfire missiles, GBU-12/38 JDAM, and GBU-49 Paveway II.

COMMENTARY

System comprises several aircraft, GCS, communications equipment/links, spares, and active duty and/or contractor personnel. Aircrew comprises pilot and sensor operator. Delivers capabilities using mission kits that may contain various weapons and sensors payload combinations.

Extant Variant(s)

■ MQ-9B Reaper. Operational in Afghanistan since 2007. Sensor suite for targeting includes a color/monochrome daylight TV, IR image-intensified



MQ-9 Reaper (Jim Haseltine)



RC-135 Rivet Joint (MSGt. Scott Wagers)

TV with laser range finder designator to precisely designate targets for laser guided munitions. SAR enables GBU-38 JDAM targeting. Sensor capable of fine resolution in both spotlight and strip modes. SAR also has ground moving target indicator capability. Airborne surveillance capability being significantly increased with the introduction of the Gorgon Stare system.

OC-135 Open Skies

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

Function: Observation aircraft.

Operator: ACC.

First Flight: 1993.

Delivered: 1993-96.

IOC: October 1993.

Production: three.

Inventory: two.

Aircraft Location: Offutt AFB, Neb.

Contractor: Boeing.

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

Accommodation: seating for 35, incl cockpit crew, aircraft maintenance crew, foreign representatives, and crew members from the Defense Threat Reduction Agency.

Dimensions: span 131 ft, length 135 ft, height 42 ft.

Weight: gross 297,000 lb.

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

Performance: speed: 500+ mph, unrefueled range 3,900 miles.

COMMENTARY

Used for specialized arms control treaty observation and imagery collection missions with framing and panoramic optical cameras installed in the rear of the aircraft.

Extant Variant(s)

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

RC-26 Condor

Brief: Specially configured variant of the Fairchild SA227-DC C-26 Metro 23 with surveillance and communications equipment for use primarily in domestic and overseas counterdrug efforts but also increasingly for reconnaissance following natural and man-made disasters.

Function: Counterdrug-airborne day/night surveillance and C2.

Operator: ANG.

First Flight: 1990.

Delivered: C-26 first delivered 1989.

IOC: not available.

Production: 11.

Inventory: 11.

Aircraft Location: CONUS, various sites.

Contractor: Fairchild (airframe).

Power Plant: two Garrett TPE331-12UAR-701 turboprops, each 1,100 shp.

Accommodation: flight crew of three: two pilots and one navigator-mission systems operator; room for up to three law enforcement agents.

Dimensions: span 57 ft, length 59.5 ft, height 16.8 ft.

Weight: max gross T-O 16,500 lb.

Ceiling: 25,000 ft.

Performance: speed 334 mph, range 2,070 miles.

COMMENTARY

Militarized ISR platform used primarily in counterdrug operations but also during natural disasters such as hurricanes and wildfires. Provides real-time streaming video footage to ground personnel handling an emergency. Deployed to support war efforts abroad for US Central Command and US Southern Command.

Extant Variant(s)

■ RC-26B. Specialized equipment includes state-of-the-art digital aerial cameras and an IR video camera. An extensive communications suite allows communications from 29 to 960 MHz, including provisions for plugging in 800 MHz handheld radios, and air phone capabilities.

RC-135 Cobra Ball, Combat Sent, Rivet Joint

Brief: Specially configured variant of the Boeing C-135 Stratolifter, some variants having an elongated nose and cheeks and all containing highly advanced electronic signal collection systems. Used to acquire real-time electronic and signals intelligence data for theater and tactical commanders. Following data refers specifically to Rivet Joint variant.

Function: Electronic reconnaissance aircraft.

Operator: ACC.

First Flight: not available.

Delivered: circa 1973-99. Continuous equipment updates.

IOC: circa 1973.

Production: converted.

Inventory: three Cobra Ball, two Combat Sent, 17 Rivet Joint, three trainers.

Aircraft Location: Offutt AFB, Neb.; Kadena AB, Japan; RAF Mildenhall, UK.

Contractor: Boeing (airframe), L3 Communications, Textron.

Power Plant: four CFM International F-108-CF-201 turboprops, each 24,000 lb thrust.

Accommodation: flight crew of three, 14-35 mission crew.

Dimensions: span 131 ft, length 140 ft, height 42 ft.

Weight: empty gross weight 172,000 lb, max gross weight 297,000 lb.

Ceiling: 45,000 ft.

Performance: speed 500+ mph, range, with air refueling, unlimited.

COMMENTARY

Highly specialized fleet operated by 55th Wing at Offutt AFB, Neb. Performs worldwide reconnaissance missions.

Extant Variant(s)

■ RC-135S Cobra Ball. Collects measurement and signature intelligence data, providing the capability to monitor missile-associated activity. 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. Uses special Sigint suite to collect scientific and technical electronic intelligence (Elint) data against air-, land-, and sea-based emitter systems. Critical to 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/W Rivet Joint. A self-contained standoff airborne Sigint collection system. Used mostly to exploit electronic battlefield and deliver near-real-time ISR information to tactical forces, combatant commanders, and National Command Authorities. Onboard 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.

RQ-4 Global Hawk

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

Function: Unmanned surveillance and reconnaissance aircraft.

Operator: ACC.

First Flight: Feb. 28, 1998.

Delivered: from 1995 (ACTD versions)-present.

IOC: November 2001 (ACTD system in Afghanistan.)

Production: 66 (planned): seven Block 10, six Block 20, 42 Block 30, and 11 Block 40.

Inventory: 25.

Aircraft Location: Beale AFB, Calif.; Grand Forks AFB, N.D.; Andersen AFB, Guam. Planned: two other forward operating bases.



RQ-4 Global Hawk (Northrop Grumman)

Contractor: Northrop Grumman (prime), Raytheon.
Power Plant: one Rolls Royce-North American AE 3007H turbofan, 7,600 lb thrust.

Accommodation: one launch and recovery element (LRE) pilot, one mission control element (MCE) pilot, one MCE sensor operator.

Dimensions: Block 10 (RQ-4A) length 44.4 ft, height 15.2 ft, span 116.2 ft; Block 20/30/40 (RQ-4B) length 47.6 ft, span 130.9 ft.

Weight: RQ-4A gross 26,750 lb, RQ-4B 32,500 lb.

Ceiling: RQ-4A 60,000+ ft, RQ-4B up to 60,000 ft.
Performance: max endurance 35 hr. RQ-4A cruise speed 391 mph. RQ-4B cruise speed 356 mph.

Armament: none.

COMMENTARY

Provides high-altitude, persistent remotely piloted ISR capability. The system consists of an aircraft with an integrated sensor suite, LRE, MCE, and communications and mission planning equipment. Fielded in four distinctive blocks.

Extant Variant(s)

■ Block 10. An imagery intelligence configuration (EO/IR/SAR) and basically a derivative of the ACTD aircraft successfully employed in Afghanistan and Iraq. Block 10s are currently performing operational missions supporting overseas contingency operations.

■ Block 20 (Imint). A larger system, adding an enhanced integrated sensor suite (EISS) in an Imint-only configuration; two are forward deployed supporting training, development testing, or joint urgent operational needs for the battlefield airborne communications node (BACN), a theater communications relay system employed in place of the EISS.

■ Block 30 (Multi-int). Employs the EISS ground target sensors and the advanced signals intelligence program (ASIP) electronic signal collection sensor to provide a Multi-int capability. Fielding of Multi-int systems planned to start in 2011 to replace Block 10s.

■ Block 40. A multimission platform expected to provide SAR/MTI, Imint, and BMC2 support, utilizing the multiplatform radar technology insertion program (MP-RTIP) sensor to simultaneously collect imagery intelligence on stationary ground targets and track ground moving targets. Integrated Block 40 aircraft and MP-RTIP sensor flight testing slated to begin in spring 2011.

U-2 Dragon Lady

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

Function: High-altitude reconnaissance.

Operator: ACC.

First Flight: Aug. 4, 1955 (U-2), 1967 (U-2R), October 1994 (U-2S).

Delivered: 1955-October 1989.

IOC: circa 1956.

Production: 35 (U-2S/ST).

Inventory: 27 U-2; five trainers.

Aircraft Location: Beale AFB, Calif.

Contractor: Lockheed Martin.

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: max speed 475 mph, max range 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, currently making it USAF's only truly operational Multi-int platform, pending the introduction of later-block RQ-4 UAVs. 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. Conversion to S model configuration began in October 1994.

Extant Variant(s)

■ U-2S. A single-seat aircraft. Each current opera-



U-2 Dragon Lady (Lockheed Martin)

tional U-2 is in Block 20 configuration, featuring a new glass cockpit using multifunction displays, a digital autopilot, a new EW system, and new data links. Sensor upgrades include the ASARS-2A SAR sensor; SYERS-2A EO imagery system (providing multispectral and IR capability); and enhanced RF-intelligence capability. Optical bar camera is also still in use, providing broad-area synoptic imagery coverage.

■ TU-2ST. A two-seat trainer aircraft.

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. Following data refers specifically to WC-130J.

Function: Weather reconnaissance aircraft.

Operator: AFRC.

First Flight: circa 1959.

Delivered: October 1999-2002.

IOC: 1959.

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

Inventory: 10 WC-130H; 10 WC-130J.

Aircraft Location: Keesler AFB, Miss.

Contractor: Lockheed Martin.

Power Plant: four Rolls Royce AE2100D3 turbo-props, each 4,500 shp.

Accommodation: six.

Dimensions: span 132.6 ft, length 97.8 ft, height 38.9 ft.

Weight: gross 175,000 lb.

Ceiling: 30,500 ft.

Performance: speed 374 mph at 20,000 ft.

COMMENTARY

Flown by AFRC's "Hurricane Hunters." The hurricane reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas.

Extant Variant(s)

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

■ WC-130J. Weather reconnaissance version of the most recent C-130 model, operated by

the 53rd WRS for weather reconnaissance duties, including penetration of tropical storms, to obtain data for forecasting storm movements. Features include improved radar, four Rolls Royce AE2100D3 turboprops, and Dowty 391 six-bladed composite propellers.

WC-135 Constant Phoenix

Brief: Atmospheric collection aircraft that supports national authorities by collecting particulate and gaseous effluents and debris in the atmosphere in support of the 1963 Limited Nuclear Test Ban Treaty.

Function: Air sampling and air collection operations in support of Limited Test Ban Treaty.

Operator: ACC.

First Flight: 1965

Delivered: 1965-96.

IOC: December 1965.

Production: 10, plus one converted EC-135C Looking Glass.

Inventory: two.

Aircraft Location: Offutt AFB, Neb.

Contractor: Boeing.

Power Plant: four Pratt & Whitney TF33-P-9 turbofans, each 16,050 lb thrust.

Accommodation: seating for 33, incl cockpit crew.

Dimensions: span 131 ft, length 135 ft, height 42 ft.

Weight: gross 300,500 lb.

Ceiling: 50,000 ft.

Performance: speed: 500+ mph, unrefueled range 3,900 miles.

COMMENTARY

Program commissioned by Gen. Dwight D. Eisenhower on Sept. 16, 1947, using modified B-29 aircraft. WB-29 flying between Alaska and Japan detected nuclear debris from Russia's first atomic test. Today, highly specialized fleet operated by 55th Wing at Offutt AFB, Neb.

Extant Variant(s)

■ WC-135C. Tail number 62-3582 is an extensively modified former EC-135C Looking Glass aircraft. Cockpit crew comes from 45th RS at Offutt, and special equipment operators are assigned to Det. 1, Air Force Technical Applications Center at Offutt.

■ WC-135W. Tail No. 61-2667 is a modified C-135B. Collection suite allows mission crew to detect radioactive "clouds" in real time. The aircraft is equipped with external flow-through devices to collect particulates on filter paper and a compressor system for whole air samples

collected in holding spheres. Cockpit crew comes from 45th RS at Offutt, and special equipment operators are assigned to Det. 1, AFTAC at Offutt.

Tanker Aircraft

HC-130 King

Brief: An extended-range, combat search and rescue (CSAR)-configured C-130 that extends the range of rescue helicopters through in-flight refueling and performs tactical delivery of para-rescue jumper (PJ) specialists and/or equipment in hostile environments.

Function: Aerial refueling/transport.

Operator: ACC, AETC, ANG, AFRC.

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

Delivered: from 1965.

IOC: 1986.

Production: 33 covered N/P models, 11 planned J models.

Inventory: two HC-130J; 10 HC-130N; 23 HC-130P.

Aircraft Location: Davis-Monthan AFB, Ariz.; Francis S. Gabreski Arpt., N.Y.; Kirtland AFB, N.M.; JB Elmendorf-Richardson, Alaska; Moody AFB, Ga.; Patrick AFB, Fla.

Contractor: Lockheed Martin.

Power Plant: N/P version: four Allison T56-A-15 turboprops, each 4,910 shp.

Accommodation: four flight crew, plus mission crew.

Dimensions: N/P version: span 132.6 ft, length 98.8 ft, height 38.5 ft.

Weight: N/P version: gross 155,000 lb.

Ceiling: N/P version: 33,000 ft.

Performance: N/P version: speed 289 mph, range more than 4,000 miles.

COMMENTARY

Conducts extended visual/electronic searches over land or water. A three-man PJ team, trained in emergency trauma medicine, harsh environment survival, and assisted evasion, can be part of the crew complement when needed. Equipped with an integrated GPS/INS navigation package, radar/missile warning receivers, and chaff/flare countermeasures dispensers. Some aircraft have FLIR systems installed, and some are outfitted with personnel locating systems compatible with aircrew survival radios. Additional modifications include an improved digital low-power color radar, integrated satellite communications radio, NVG-compatible interior/exterior lighting, and cockpit armor.

Extant Variant(s)

■ HC-130N. H model modified with E model radome and new center wing section and modified to refuel helicopters aerially.

■ HC-130P. H model modified to refuel helicopters aerially.

■ HC-130J. Modified version of USMC KC-130J ordered to replace ACC HC-130s. IOC expected 2012.

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 and aeromedical evacuation transport.

Function: Aerial refueling/transport.

Operator: AMC, AFRC (assoc.).

First Flight: April 1980.

Delivered: March 1981-April 1990.

IOC: August 1982.

Production: 60.

Inventory: 59.

Aircraft Location: JB McGuire-Dix-Lakehurst, N.J.; Travis AFB, Calif.

Contractor: McDonnell Douglas (now Boeing).

Power Plant: three General Electric CF6-50C2 turbofans, each 52,500 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 165.4 ft, length 181.6 ft, height 58.1 ft.

Weight: gross 593,000 lb.

Ceiling: 42,000 ft.

Performance: cruising speed Mach 0.825, range with max cargo 4,400 miles.



KC-10 Extender (Clive Bennett)

COMMENTARY

USAF's largest air-refueling aircraft. Combines tasks of tanker and cargo aircraft simultaneously, enabling it to support worldwide fighter deployments. Employs an advanced aerial refueling boom or a hose and drogue system to refuel a wide variety of US and allied aircraft. Can be air refueled by a KC-135 or another KC-10, increasing its range and diminishing the need for forward bases.

Extant Variant(s)

■ KC-10A. DC-10 Series 30CF, modified to include fuselage fuel cells, an air refueling operator's station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. Equipped with wing-mounted pods to enhance capabilities. Has communications, navigation, and surveillance equipment to meet civil air traffic requirements.

KC-135 Stratotanker

Brief: A medium-range tanker aircraft, meeting the air refueling needs of USAF bomber, fighter, cargo, and reconnaissance forces, as well as any USN, USMC, and allied aircraft; also provides aeromedical evacuation transport.

Function: Aerial refueling/airlift.

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

First Flight: August 1956.

Delivered: January 1957-65.

IOC: June 1957, Castle AFB, Calif.

Production: 732.

Inventory: 363 KC-135R; 54 KC-135T.

Aircraft Location: Altus AFB, Okla.; Fairchild AFB, Wash.; Grissom ARB, Ind.; JB Andrews-NAF

Washington, Md.; Kadena AB, Japan; MacDill AFB, Fla.; March ARB, Calif.; McConnell AFB, Kan.; RAF Mildenhall, UK; Seymour Johnson AFB, N.C.; Tinker AFB, Okla.; and ANG in Alabama, Arizona, Illinois, Iowa, Kansas, Maine, Michigan, Mississippi, New Hampshire, Nebraska, New Jersey, Ohio, Oklahoma, Pennsylvania, Tennessee, Utah, Washington, Wisconsin.

Contractor: Boeing.

Power Plant: 4 CFM International CFM-56 turbofan engines.

Accommodation: crew of four, up to 80 passengers.

Dimensions: span 130.8 ft, length 136.2 ft, height 41.7 ft.

Weight: empty 119,231 lb, gross 322,500 lb.

Ceiling: 50,000 ft.

Performance: max speed 530 mph, range with max fuel 11,015 miles.

COMMENTARY

Mainstay of the USAF tanker fleet, similar in size and appearance to commercial 707 aircraft but designed to military specifications. Fuel tanks located in "wet wings" and fuel tanks below the floor in the fuselage.

Extant Variant(s)

■ KC-135R. Re-engined KC-135As with CFM turbofan engines. Can operate from relatively short runways. First flight October 1982; deliveries starting July 1984. Eight aircraft air refuelable. Twenty have wing-mounted refueling pods for enhanced refueling of US Navy and NATO aircraft. Modifications include Pacer CRAG avionics mod and Global Air Traffic Management (GATM) mod. Link 16 capability on a limited number.



KC-135 Stratotanker (SSgt. James L. Harper Jr.)



C-5M Super Galaxy (USAF)

■ KC-135T aircraft (formerly KC-135Q) with higher thrust, turbofan engines can carry different fuels in the wing and body tanks.

Transports

C-5 Galaxy

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

Function: Cargo and troop transport.

Operator: AMC, ANG, AFRC.

First Flight: June 30, 1968.

Delivered: October 1969-April 1989.

IOC: September 1970.

Production: 131.

Inventory: 59 C-5A; 46 C-5B; two C-5C; four C-5M.

Aircraft Location: Dover AFB, Del.; Eastern West Virginia Arpt., W.Va.; Lackland AFB, Tex.; Memphis Arpt., Tenn.; Stewart ANGB, N.Y.; Travis AFB, Calif.; Westover ARB, Mass.; Wright-Patterson AFB, Ohio.

Contractor: Lockheed.

Power Plant: four General Electric TF39-GE-1C turboprops, each 43,000 lb thrust; (C-5M) four General Electric CF6-80C2 turboprops.

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. Air-drop capability for single platforms weighing up to 42,000 lb.

Dimensions: span 222.8 ft, length 247.9 ft, height 65.1 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, normal cruising speed at altitude 518 mph (Mach 0.77), T-O run at S/L 8,300 ft, landing run, max landing weight at S/L 2,380 ft, range with max payload 3,434 miles, range with max fuel 7,245 miles.

COMMENTARY

USAF's largest airlifter. One of world's largest aircraft. Can carry unusually heavy cargo over intercontinental ranges at jet speeds, take off and land in relatively short distances, taxi on substandard surfaces in emergencies. Front and rear cargo openings permit simultaneous drive-through loading and off-loading.

Extant Variant(s)

■ C-5A. Basic model; 81 delivered 1969-73. Has undergone a major wing modification, extending service life by 30,000 flight hours. Incorporates new avionics subsystems developed for C-5B.

■ C-5B. Embodies all improvements since completion of C-5A production, including strengthened

wings, improved turboprops, and updated avionics, with color weather radar and triple INS. First flight September 1985. First delivery (to Altus AFB, Okla.) in January 1986. Some models equipped with defensive system.

■ C-5C. Two A variants modified to carry outside space cargo for NASA.

■ C-5M. Called Super Galaxy. Upgraded with latest avionics and new, higher performance GE CF6-80C2 turboprops. Equipped with other components installed under the Reliability Enhancement and Re-engining Program. First flight June 6, 2006. Developmental testing completed August 2008. Operational testing and evaluation concluded in 2010. Program completion is scheduled for 2017. First flight of production C-5M September 2010.

C-9 Nightingale

Brief: A twin-engine, medium-range swept-wing jet aircraft used for distinguished visitor duties.

Function: DV duties.

Operator: AFRC.

First Flight: August 1968.

Delivered: August 1968-February 1975.

IOC: circa 1968.

Production: 24.

Inventory: three.

Aircraft Location: Scott AFB, Ill.

Contractor: Boeing (McDonnell Douglas).

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

Accommodation: crew of three.

Dimensions: span 93.2 ft, length 119.2 ft, height 27.4 ft.

Weight: gross 108,000 lb.

Ceiling: 35,000 ft.

Performance: max cruising speed at 25,000 ft 565 mph, range 2,500 miles.

COMMENTARY

A specially configured derivative of the DC-9 Series 30 commercial airliner. Now shares aeromedical evacuation role with C-130 and C-17 aircraft. Only

USAF aircraft modified specifically for the aeromedical evacuation role.

Extant Variant(s)

■ C-9C. Three specially configured C-9s, delivered to Andrews AFB, Md., in 1975 for the special air mission supporting the President and other US government officials, are now in use by AFRC. Upgrades included improvements to the passenger communications equipment, GATM, terrain awareness warning system, Enhanced Mode S, and vertical separation equipment.

C-12 Huron

Brief: A twin-engine turboprop that provides diplomatic and special duty support passenger/cargo airlift and test support.

Function: Special airlift.

Operator: AFMC, PACAF.

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

Delivered: 1974-late 1980s.

IOC: circa 1974.

Production: 88.

Inventory: 27.

Aircraft Location: Edwards AFB, Calif.; Holloman AFB, N.M.; JB Elmendorf-Richardson, Alaska; Yokota AB, Japan; various overseas embassies.

Contractor: Beech.

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

Accommodation: crew of two, C-12C up to eight passengers, C-12J up to 19 passengers.

Dimensions: (C-12J) span 54.5 ft, length 43.8 ft, height 15 ft.

Weight: (C-12J) empty 9,850 lb, gross 16,600 lb.

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

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

COMMENTARY

Military version of the Beechcraft King Air A200 series. Equipment includes the most up-to-date navigation, communication, and safety equipment plus state-of-the-art avionics.

Extant Variant(s)

■ C-12C. Re-engined C-12As, with PT6A-41 turboprops, deployed to overseas embassies.

■ C-12D. Similar to C model, with cargo doors, and also deployed to overseas embassies.

■ C-12F. With updated PT6A-42 engines, to support medical airlift.

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

C-17 Globemaster III

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

Function: Cargo and troop transport.

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

First Flight: Sept. 15, 1991.

Delivered: June 1993-ongoing.

IOC: Jan. 17, 1995.

Production: 223 (planned).

Inventory: 205.

Aircraft Location: Allen C. Thompson Field, Miss.; Altus AFB, Okla.; Dover AFB, Del.; Edwards



C-17 Globemaster III (Erik Simonsen)

AFB, Calif.; JB Charleston, S.C.; JB Elmendorf-Richardson, Alaska; JB Lewis-McChord, Wash.; JB McGuire-Dix-Lakehurst, N.J.; JB Pearl Harbor-Hickam, Hawaii; March AFB, Calif.; Travis AFB, Calif. Planned: Wright-Patterson AFB, Ohio.

Contractor: Boeing.

Power Plant: four Pratt & Whitney F117-PW-100 turbofans, each 40,440 lb thrust.

Accommodation: normal flight crew of three (two pilots plus loadmaster); additional pilot may be carried. Provisions for full range of military airlift missions, incl capacity for up to 189 passengers, 102 paratroops, or 36 litters; range of military cargo incl tanks and up to three AH-64A helicopters; three Bradley vehicles; one M1A2 main battle tank with other equipment; air-drop capability for single platforms weighing up to 60,000 lb; palletized passenger seats.

Dimensions: span over winglet tips 169.8 ft, length 173.9 ft, height 55.1 ft.

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

Ceiling: 45,000 ft.

Performance: normal cruising speed 484 mph at 35,000 ft or 518 mph (Mach .77) at 28,000 ft, unrefueled range with 160,000 lb payload 2,760 miles, additional 690 miles with extended-range fuel containment system (ERFCS), unlimited with refueling.

COMMENTARY

Core airlifter of US military. Able to operate on small, austere airfields (3,000 ft by 90 ft) previously limited to C-130. Only aircraft able to directly air-land or air-drop outsize cargo into a tactical environment. First military transport to feature a full digital fly-by-wire control system and two-person cockpit, with two full-time, all-function HUDs and four multifunction electronic displays. Equipped with defensive systems.

Extant Variant(s)

■ C-17A. Original aircraft modernized with new block configuration to production aircraft and block upgrades to fielded aircraft. Block 17 marks the last block upgrade for the fleet; improvements include NVG-friendly combat lighting, upgraded electronic flight-control system, high-frequency data link, and formation flight system. Full retrofit up to Block 17 of previously delivered aircraft is planned for completion in 2018.

C-20 Gulfstream

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

Function: Operational support airlift, special air missions.

Operator: AMC, USAF.

First Flight: December 1979.

Delivered: September 1983-89.

IOC: circa 1983.

Production: not available.

Inventory: 11.

Aircraft Location: JB Andrews-NAF Washington, Md.; Ramstein AB, Germany.

Contractor: Gulfstream.

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

Accommodation: crew of five, 12 passengers.

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

Weight: C-20B gross 69,700 lb, C-20H gross 74,600 lb.

Ceiling: 45,000 ft.

Performance: max cruising speed 576 mph, range 4,250 miles.

COMMENTARY

Acquired in early 1980s to replace old C-140B Jetstar aircraft.

Extant Variant(s)

■ C-20B. Five C-20B versions, with advanced mission communications equipment and revised interior, were acquired in the late 1980s. Operated by 89th AW, JB Andrews-NAF Washington, Md., for worldwide special air missions.

■ C-20H. Two Gulfstream IV SP aircraft, with advanced technology flight-management systems



C-27J Spartan (SrA. Joseph Harwood)

and upgraded Rolls Royce engines. Equipped with GPS, vertical separation equipment, GATM, and traffic alert and collision avoidance system (TCAS). Operated by 86th AW at Ramstein AB, Germany, for operational support missions.

C-21 Learjet

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

Function: Pilot seasoning, passenger and cargo airlift.

Operator: AETC, AMC, USAF, ANG.

First Flight: January 1973.

Delivered: April 1984-October 1985.

IOC: April 1984.

Production: 84.

Inventory: 56.

Aircraft Location: Bradley Arpt., Mass.; Buckley AFB, Colo.; Hector Arpt., N.D.; JB Andrews-NAF Washington, Md.; Keesler AFB, Miss.; Peterson AFB, Colo.; Ramstein AB, Germany; Scott AFB, Ill.; W. K. Kellogg Arpt., Mich.; Will Rogers Arpt., Okla.

Contractor: Gates Learjet.

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

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

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

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

Ceiling: 45,000 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

Provides operational support for time-sensitive movement of people and cargo throughout the US and European Theaters, including aeromedical missions if required. Upgrades include GATM and TCAS.

Extant Variant(s)

■ C-21A. Military version of the Learjet 35A. Delivery started in April 1984 and was completed in October 1985. Dispersed throughout the Air Force, in both active force and Air National Guard. Two are being replaced with C-38s.

C-27 Spartan

Brief: A small tactical transport capable of carrying heavy loads into a wide range of airfields, including unprepared strips at high altitude.

Function: Tactical airlift.

Operator: ANG.

First Flight: September 1999 (developmental aircraft).

Delivered: 2010.

IOC: 2011 (planned).

Production: 38 (planned).

Inventory: five.

Aircraft Location: (planned) Bradley Arpt., Conn.; Hector Arpt., N.D.; Key Field, Miss.; Mansfield Lahm Arpt., Ohio; Martin State Arpt., Md.; W. K. Kellogg Arpt., Mich.

Contractor: L-3 Communications.

Power Plant: two Rolls Royce AE 2100-D2 turboprops, rated at 4,637 shp.

Accommodation: two flight crew; up to 68 troops or 24 paratroops, plus two loadmasters, or 36 litters plus six attendants; up to 25,353 lb cargo; 19,842 lb low velocity airdrop.

Dimensions: basic G.222 airframe span 94.1 ft, length 74.5 ft, height 32.1 ft.

Weight: gross 70,000 lb.

Ceiling: 30,000 ft.

Performance: T-O run 1,903 ft, range, with 22,046 lb payload 1,150 miles.

COMMENTARY

Derivative of Alenia G.222, selected in 2007 to fulfill the Joint Cargo Aircraft requirement. Acquired to support ground forces served only by the most basic airstrips, often at high altitude, or for missions where the C-130 is currently operating at half-load capacity. Considered for new gunship role. Originally a joint Army-Air Force program, now Air Force only.

Extant Variant(s)

■ C-27J. Equipped with digital avionics suite, NVG-compatible cockpit. Floor strength is equal to that of the C-130, and the cargo bay can accommodate C-130 pallets.

C-32 Air Force Two

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,



C-32 Air Force Two (SSgt. Tony R. Tolley)



C-37A Gulfstream V (A1C Brea Miller)

Cabinet, congressional members, and other high-ranking US and foreign officials.

Function: VIP air transport.

Operator: AMC, ANG.

First Flight: Feb. 19, 1982 (USAF Feb. 11, 1998).

Delivered: June-December 1998.

IOC: 1998.

Production: six.

Inventory: six.

Aircraft Location: JB Andrews-NAF Washington, Md.; JB McGuire-Dix-Lakehurst, N.J.

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: 42,000 ft.

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

COMMENTARY

Contract awarded in August 1996. Based on commercial off-the-shelf acquisition practices. First four aircraft delivered to 89th AW in June 1998.

Extant Variant(s)

■ C-32A. Commercial distinguished visitor 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 operations to any suitable airfield in the world and provide an upgrade path as new capabilities become available. Upgrades include installation of a digital communications management system and broadband data transmit and receive, providing an office-in-the-sky capability.

C-37 Gulfstream V

Brief: Modified Gulfstream aircraft utilized as part of the executive fleet, providing transportation for the vice president, Cabinet, congressional members, Secretary of Defense, service Secretaries, and other prominent US and foreign officials.

Function: VIP air transport.

Operator: AMC, PACAF, USAF.

First Flight: USAF October 1998.

Delivered: from October 1998.

IOC: Dec. 9, 1998.

Production: 10 C-37A; one C-37B.

Inventory: 10 C-37A; one C-37B.

Aircraft Location: Chievres, Belgium; JB Andrews-NAF Washington, Md.; JB Pearl Harbor-Hickam, Hawaii; MacDill AFB, Fla.

Contractor: Gulfstream.

Power Plant: two BMW-Rolls Royce BR710A1-10 turbofans, each 14,750 lb thrust.

Accommodation: five crew and 12 passengers.

Dimensions: span 93.5 ft, length 96.4 ft, height 25.8 ft.

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

Ceiling: 51,000 ft.

Performance: cruise speed Mach 0.8 (530 mph), range 6,095 miles.

COMMENTARY

Military versions of "ultralong range" Gulfstream business aircraft.

Extant Variant(s)

■ C-37A. Military version of the Gulfstream V. Interior

includes separate DV and passenger areas and a communications system capable of worldwide clear and secure voice and data. Aircraft are capable of operations at any suitable civilian or military airfield worldwide. Upgrades include GATM and continuing passenger communications system upgrades.

■ C-37B. Military version of the Gulfstream 550, modified for VIP duties. Has Honeywell Plane-View flight deck. Upgrades include a directional IR countermeasures system.

C-38 Courier

Brief: 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.

First Flight: 1998.

Delivered: April-May 1998.

IOC: 1998.

Production: two.

Inventory: two.

Aircraft Location: JB Andrews-NAF Washington, 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.

COMMENTARY

Military version of Astra SPX produced by IAI

and supported worldwide by Galaxy Aerospace.

Extant Variant(s)

■ C-38A. Acquired in 1998. Equipment includes the most up-to-date navigation, communication, vertical separation, and safety equipment, as well as state-of-the-art avionics.

C-40 Clipper

Brief: A Boeing 737-700 used for medium-range airlift of personnel.

Function: Passenger transportation.

Operator: AMC, PACAF, USAF, ANG, AFRC.

First Flight: USN C-40A: April 14, 1999.

Delivered: 2002.

Production: 10.

Inventory: four C-40B; six C-40C.

Aircraft Location: JB Andrews-NAF Washington, Md.; JB Pearl Harbor-Hickam, Hawaii; Ramstein AB, Germany; Scott AFB, Ill.

Contractor: Boeing.

Power Plant: two General Electric CFM56-7 turbofans, each 27,000 lb thrust.

Accommodation: flight crew of four, plus three or four cabin crew; up to 89 passengers. C model can accommodate 111 passengers.

Dimensions: span 117 ft 5 in, length 110 ft 4 in, height 41 ft 2 in.

Weight: gross 171,000 lb.

Ceiling: 41,000 ft.

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

COMMENTARY

Military version of the commercial Boeing 737-700 aircraft. C-40s are used for transporting senior government officials and regional combatant commanders.

Extant Variant(s)

■ C-40B. Equipped with a DV suite, staff work area, conference area, and worldwide secure communications and data capability. Four purchased. Two assigned to Andrews and one each to Hickam and Ramstein.

■ C-40C. Equipped with DV seating area, general passenger seating area, and secure communications capability. Three C-40Cs are operated by ANG's 201st Airlift Squadron from Andrews, and three by AFRC's 932nd AS at Scott.

C-130 Hercules

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

Function: Inter- and intratheater airlift.

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

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

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

IOC: circa 1958.



C-130 Hercules (SSgt. Brian Ferguson)

Production: more than 2,200.

Inventory: 45 C-130E; 279 C-130H; 74 C-130J.

Aircraft Location: Dobbins ARB, Ga.; Dyess AFB, Tex.; Keesler AFB, Miss.; Little Rock AFB, Ark.; Maxwell AFB, Ala.; Minneapolis-St. Paul Arpt./ARS, Minn.; Niagara Falls Arpt., N.Y.; Peterson AFB, Colo.; Pittsburgh Arpt., Pa.; Pope Field, N.C.; Ramstein AB, Germany; Yokota AB, Japan; and ANG in Alaska, California, Delaware, Georgia, Hawaii, Illinois, Kentucky, Maryland, Minnesota, Missouri, Nevada, New York, North Carolina, Ohio, Puerto Rico, Rhode Island, Texas, West Virginia, Wyoming.

Contractor: Lockheed Martin.

Power Plant: (C-130H) four Rolls Royce-Allison T56-A-15 turboprops, each 4,591 shp; (C-130J) four Rolls Royce-Allison AE2100D3 turboprops, each 4,700 shp.

Accommodation: (C-130H) crew of five; up to 92 ground troops, 64 paratroops, 74 litter patients plus attendants, 54 passengers on palletized seating, or up to five 463L standard freight pallets, etc.; max load, 45,000 lb.

Dimensions: span 132.6 ft, length 97.8 ft, height 38.8 ft.

Weight: (C-130H) empty 81,000 lb, fuel/cargo 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 330 mph, range with 35,000 lb payload 1,500 miles.

COMMENTARY

All-purpose theater transport that operates throughout USAF, performing diverse roles. Missions include tactical intratheater and intertheater airlift and airdrop support, Arctic resupply, aeromedical flights, aerial spraying, firefighting duties for the US Forest Service, and natural disaster and humanitarian relief missions. Replacement of wing boxes in 155 C-130s under way. Six hundred aircraft will receive landing gear modifications.

Extant Variant(s)

■ C-130E. Extended-range version of early Hercules. Total of 389 ordered, with first deliveries in 1962. Original wing modified to correct fatigue and corrosion. Self-contained nav system, with an integrated communications/navigation management suite, GPS capability, and a state-of-the-art autopilot.

■ C-130H. Model generally similar to E, with updated turboprops, redesigned outer wing, improved pneumatic systems. First delivery in July 1974. Equipped with updated avionics, improved low-power color radar, night vision instrumentation. ANG LC-130Hs modified with wheel-ski gear to support Arctic and Antarctic operations. Modernized with digital displays, flight-management systems, multifunction radar, new communications systems, and a single air data computer.

■ C-130J. Features three-crew flight operation system, Rolls Royce-Allison AE2100D engines, all composite six-blade propeller system, digital avionics, and mission computers. Flies faster, higher, and farther than earlier C-130s. ANG and AFRC units began receiving J models in 1999, active units in 2004. First wartime deployment in 2004.

■ C-130J-30. Stretch version of the J model with 15 ft added to the fuselage. Capable of transporting 128 ground troops or 92 paratroops. ANG began receiving J-30 models in 2001, active duty and AFRC units in 2004.

VC-25 Air Force One

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

Function: Air transport of the President.

Operator: AMC.

First Flight: first flown as Air Force One Sept. 6, 1990.

Delivered: August-December 1990.

IOC: circa 1990.

Production: two.

Inventory: two.

Aircraft Location: JB Andrews-NAF Washington, Md.

Contractor: Boeing.

Power Plant: four General Electric CF6 turbofans, each 56,700 lb thrust.



VC-25 Air Force One (Butch Ramsey)

Accommodation: crew of 26, up to 76 passengers.
Dimensions: span 195.7 ft, length 231.8 ft, height 63.4 ft.

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

Ceiling: 45,000 ft.

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

COMMENTARY

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

Extant Variant(s)

■ VC-25A. Flown by the Presidential Airlift Group. Assigned to 89th AW.

Helicopters

HH-60 Pave Hawk

Brief: Specially modified helicopters used primarily for CSAR, also aeromedical evacuation, casualty evacuation, civil SAR, and other support missions.

Function: Personnel recovery medium-lift helicopter.

Operator: ACC, AETC, AFMC, PACAF, USAF, ANG, AFRC.

First Flight: October 1974.

Delivered: from 1982.

IOC: circa 1982.

Production: 105; 15 Pave Hawk modifications of new-build UH-60s planned.

Inventory: 100.

Aircraft Location: Davis-Monthan AFB, Ariz.; Francis S. Gabreski Arpt., N.Y.; JB Elmendorf-Richardson, Alaska; Kadena AB, Japan; Kirtland AFB, N.M.; Moffett Field, Calif.; Moody AFB, Ga.;

Nellis AFB, Nev.; Patrick AFB, Fla.; RAF Lakenheath, UK.

Contractor: United Technologies/Sikorsky.

Power Plant: two General Electric T700-GE-700/701C turboshafts, each 1,560-1,940 shp.

Accommodation: crew of four; 8-12 troops, two litters, or internal or external cargo.

Dimensions: rotor diameter 53.6 ft, length of fuselage 64.7 ft, height 16.7 ft.

Weight: max gross 22,000 lb.

Ceiling: 14,200 ft.

Performance: max speed 184 mph; max range 373 miles (internal fuel), 500 miles (auxiliary tank).

Armament: mounts for two 7.62 mm miniguns or two .50-caliber machine guns in cabin doors.

COMMENTARY

Highly modified Black Hawk helicopter. Acquired in the early 1980s. In continuous use by active duty, ANG, and AFRC air rescue units for personnel recovery, including CSAR, humanitarian, and medevac mission activities worldwide.

Extant Variant(s)

■ HH-60G. Equipped with advanced communications/navigation suite that includes INS/GPS/Doppler navigation systems, satellite communications, secure/anti-jam communications, and a precision landing system (PLS) that provides range/steering data to survivor radios. Automatic flight-control system, NVG lighting, FLIR, color weather radar, engine/rotor blade anti-ice system, retractable in-flight refueling probe, internal auxiliary fuel tanks, and an integral external rescue hoist. Combat enhancements include RWR, IR jammer, flare and chaff countermeasures dispensing system, and two 7.62 mm or .50-caliber machine guns.

UH-1 Iroquois

Brief: Modified Bell helicopter used to provide security and support for Air Force ICBM systems, undergraduate pilot training, combat aviation advisor training, and administrative airlift.

Function: Light-lift utility and training helicopter.

Operator: AETC, AFDW, AFGSC, AFMC, AFSOC, AMC, PACAF.

First Flight: 1956.



HH-60 Pave Hawk (Osakabe Yasuo)

Delivered: from September 1970.

IOC: circa 1970.

Production: 20 TH-1H; many UH-1H; 79 UH-1N.

Inventory: 27 TH-1H; three UH-1H; 62 UH-1N.

Aircraft Location: Eglin AFB, Fla.; Fairchild AFB, Wash.; F. E. Warren AFB, Wyo.; Fort Rucker, Ala.; Hurlburt Field, Fla.; JB Andrews-NAF Washington, Md.; Kirtland AFB, N.M.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Yokota AB, Japan.

Contractor: Bell (UH-1H, UH-1N), Lockheed (TH-1H).

Power Plant: TH-1H: one Honeywell T53-L-703 turboshaft, 1,800 shp. UH-1H: one Lycoming T53-L-13B turboshaft, 1,400 shp. UH-1N: Pratt & Whitney Canada T400-CP-400 Turbo "Twin-Pac," 1,290 shp.

Accommodation: two pilots and 13 passengers or cargo, or external load of 4,000 lb (UH-1H) or 5,000 lb (TH-1H and UH-1N).

Dimensions: TH-1H: rotor diameter 48.0 ft, fuselage length 57.0 ft, height 13.0 ft. UH-1H: rotor diameter 48.3 ft, fuselage length 57.1 ft, height 13.6 ft. UH-1N: rotor diameter 48.0 ft, fuselage length 57.1 ft, height 13.1 ft.

Weight: TH-1H gross 10,500 lb, UH-1H gross 9,500 lb, UH-1N gross 10,500. Max contingency 11,200 lb.

Ceiling: 15,000 ft.

Performance: Max speed at S/L 150 mph, max cruising speed at S/L 138 mph TH-1H, 115 UH-1H/N; max range varies depending on fuel tank configuration.

Armament: (optional) two General Electric 7.62 mm miniguns or two 40 mm grenade launchers; two seven-tube 2.75-in rocket launchers.

COMMENTARY

UH-1N aircraft entered the USAF inventory in 1970, initially to provide search and rescue capabilities.

Extant Variant(s)

■ UH-1H. Single-engine version of UH-1 utility helicopter. Two UH-1H maintained by AFSOC for combat aviation advisor training.

■ UH-1N. Twin-engine version of the UH-1. Most used for ICBM security and administrative/DV airlift. Also used by AETC's 58th SOW, Kirtland, for training purposes and by the 336th TRG, Fairchild, for aircrew survival training. Two UH-1N helicopters are maintained by AFSOC for combat aviation advisor training.

■ TH-1H. Modified version of the UH-1H for use by the 23rd FTS, Fort Rucker, for Air Force undergraduate helicopter pilot training.

Trainers

T-1 Jayhawk

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

Function: Advanced pilot training.

Operator: AETC, AFRC.

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

Delivered: Jan. 17, 1992-July 1997.

IOC: January 1993.

Production: 180.

Inventory: 177.

Aircraft Location: Columbus AFB, Miss.; Laughlin AFB and Randolph AFB, Tex.; Vance AFB, Okla.; NAS Pensacola, Fla.

Contractor: Hawker Beechcraft.

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.

COMMENTARY

Military version of Beech 400A used in the advanced phase of joint specialized undergraduate pilot training (JSUPT) for students selected to fly tanker, transport, electronic warfare aircraft. Used to train student combat systems officers.



T-1A Jayhawk (Lt. Col. Russell Hopkinson)

Extant Variant(s)

■ T-1A. Cockpit seating for instructor and two students. Special mission equipment includes GPS, an electronic flight instrument system avionics system, a single-point refueling system, an additional fuselage fuel tank, and strong bird-strike protection in the windshield and leading edges. Typically flown 100,000 flying hours a year.

T-6 Texan II

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

Function: Primary trainer.

Operator: AETC, USN.

First Flight: July 15, 1998.

Delivered: from May 2000 (operational aircraft).

IOC: November 2001.

Production: Planned: 452 (USAF); 315 (USN).

Inventory: 345 (USAF).

Aircraft Location: USAF: Columbus AFB, Miss.; Laughlin AFB, Randolph AFB, and Sheppard AFB, Tex.; Vance AFB, Okla. USN: NAS Corpus Christi, Tex.; NAS Whiting, Fla.; NAS Pensacola, Fla.

Contractor: Hawker Beechcraft (formerly Raytheon).

Power Plant: one 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 6,500 lb.

Ceiling: 31,000 ft.

Performance: max speed 368 mph, range 920 miles.

COMMENTARY

Trainer based on Swiss Pilatus PC-9 aircraft, modified to include a strengthened fuselage, zero/zero ejection seats, large crew accommodation, upgraded engine, increased fuel capacity, pressurized cockpit, larger, bird-resistant canopy, and new digital avionics.

Extant Variant(s)

■ T-6A. Avionics upgrade employs glass cockpit multifunction displays and backup flight instruments, HUD, hands-on-throttle-and-stick functionality, and integrated avionics computers.

■ T-6B. Newer Navy variant. Equipped with HUD.

T-38 Talon

Brief: A twin-engine, high-altitude, supersonic jet trainer used in a variety of roles, primarily for undergraduate pilot, pilot instructor training, and introduction to fighter fundamentals training (IFFT).



T-38 Talon (Jo Hunter)

Function: Trainer.
Operator: ACC, AETC, AFMC, AFRC.
First Flight: April 1959.
Delivered: 1961-72.
IOC: March 1961.
Production: more than 1,100.
Inventory: six AT-38B; 28 T-38A; 400 T-38C.
Aircraft Location: Beale AFB and Edwards AFB, Calif.; Columbus AFB, Miss.; Holloman AFB, N.M.; Laughlin AFB, Randolph AFB, and Sheppard AFB, Tex.; Vance AFB, Okla.; Whiteman AFB, Mo. Planned: JB Langley-Eustis, Va.; Tyndall AFB, Fla.
Contractor: Northrop Grumman.
Power Plant: two General Electric J85-GE-5A turbojets, each 2,680 lb thrust dry, 2,900 lb thrust with afterburning.
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.

COMMENTARY

Most now used by AETC for advanced bomber-fighter training track in JSUPT and IFFT. Used to teach supersonic techniques, aerobatics, formation, night and instrument flying, and cross-country and low-level navigation. The aircraft is also used by the USAF Test Pilot School to train test pilots and flight-test engineers at Edwards in experimental techniques, and by ACC as a companion trainer to maintain pilot proficiency. ACC to use regenerated T-38s as dedicated aggressor aircraft for F-22 training.

Extant Variant(s)

- T-38A. Close in structure to the F-5A export tactical fighter. World's first supersonic trainer aircraft. Capabilities enhanced through structural renewal, full avionics upgrade with a HUD and integrated GPS/INS, and a propulsion modernization.
- AT-38B. A slightly different version, with a gunsight and practice bomb dispenser. Used by AFMC for test and evaluation.
- T-38C. Reconfigured A and B airframes. Avionics mod includes a HUD. First model delivered

2002; last delivery 2007. Propulsion upgraded to improve performance and reliability. Escape system upgrade program is under way to further improve safety.

T-41 Mescalero

Brief: Short-range, high-wing trainer used primarily for aerodynamic and navigation courses and USAFA Flying Team support.
Function: Training, support.
Operator: AETC.
Delivered: 1968.
Inventory: four.
Aircraft Location: US Air Force Academy, Colo.
Contractor: Cessna.
Power Plant: one Continental IO-360-DB piston engine, 210 hp.
Accommodation: two, side by side.
Dimensions: span 36.1 ft, length 26.5 ft, height 8.9 ft.
Weight: gross 2,550 lb.
Ceiling: 14,000 ft.
Performance: speed 182 mph, range 630 miles.

COMMENTARY

Used primarily by US Air Force Academy.
Extant Variant(s)
 ■ T-41C. Military version of Cessna 172. All-metal, strut-braced high-wing monoplane. Equipped with modern avionics, GPS, and other equipment appropriate to its mission. Used for Aero 456 flight testing, USAFA flying team support, orientation flights.

T-51 Cessna

Brief: A short-range, high-wing aircraft used primarily by the USAFA Flying Team during intercollegiate competitions.
Function: Training, competition.
Operator: AETC.
Delivered: 1970s.
Inventory: three.
Aircraft Location: USAFA, Colo.
Contractor: Cessna.
Power Plant: one Lycoming O-320 E2D piston engine, 150 hp.
Accommodation: two, side by side.
Dimensions: span 33.3 ft, length 24 ft, height 8.5 ft.
Weight: (Cessna 150M) gross 1,760 lb.

Ceiling: 12,600 ft.
Performance: speed 162 mph, range 450 miles.
COMMENTARY
 Military designation for civilian Cessna 150. All-metal, strut-braced, high-wing monoplane.
Extant Variant(s)
 ■ T-51A. The aircraft is equipped with modern avionics, GPS, and other equipment appropriate to its mission.

TG-10 Merlin/Kestrel

Brief: TG-10B variant used as a Basic Soaring Trainer, while the TG-10C is used as an aerobic glider for competitions and demonstrations.
Function: Trainer.
Operator: AETC.
Delivered: May 2002.
IOC: December 2002.
Inventory: 12 TG-10B; five TG-10C.
Aircraft Location: USAFA, Colo.
Contractor: Blanik.
Accommodation: two.
Dimensions: span (B) 55.4 ft, (C) 46.6 ft; length (B) 27.9 ft, (C) 27.6 ft; height (B) 6.2 ft, (C) 6.9 ft.
Weight: (B) 1,168 lb, (C) 1,100 lb.
Performance: speed (B) 142.6 mph, (C) 146.1 mph; glide ratio (B) 28:1, (C) 26:1.

COMMENTARY

Both USAF models, produced in the Czech Republic, have a common cockpit and control layouts, allowing cadets to move between the two as necessary. TG-10 B gliders are used for local orientation flights and training. A few have been modified for wave soaring for the advanced Sailplane Racing Team training. The TG-10C gliders are used to compete in national competitions.
Extant Variant(s)
 ■ TG-10B Merlin. Civilian L-23 Super Blanik sailplane.
 ■ TG-10C Kestrel. Civilian L-13AC Blanik sailplane.

TG-15 Duo Discus/Duo 2B

Brief: Sailplane used for advanced cross-country training and competition.
Function: Trainer/cross-country competition sailplane.
Operator: AETC.
Inventory: two TG-15A; three TG-15B.
Aircraft Location: USAFA, Colo.
Contractor: Schempp-Hirth, Germany.
Accommodation: (A) two-seat, (B) single-seat.
Dimensions: span (A) 65.6 ft, (B) 49.2 ft; length (A) 28.3 ft, (B) 22.3 ft.
Weight: gross (A) 1,543 lb, (B) 1,157 lb.
Performance: max permitted speed 155 mph.
COMMENTARY
 Sailplanes manufactured by Schempp-Hirth of Germany. Used for cross-country soaring training and Soaring Society of America national competitions.
Extant Variant(s)
 ■ TG-15A. Two-seat variant.
 ■ TG-15B. Single-seat variant.

UV-18 Twin Otter

Brief: Modified utility transport used for parachute jump training.
Function: Paratroop.
Operator: AETC.
First Flight: May 1965 (commercial version).
Delivered: 1977 (two); 1982 (one).
IOC: 1977.
Production: three.
Inventory: three.
Aircraft Location: USAFA, Colo.
Contractor: De Havilland Aircraft of Canada.
Power Plant: two Pratt & Whitney Canada PT6A-27 turboprops, each 620 ehp.
Accommodation: crew of two and up to 20 passengers.
Dimensions: span 65 ft, length 51.9 ft, height 18.7 ft.
Weight: gross 12,500 lb.
Ceiling: 25,000 ft.
Performance: max cruising speed 210 mph, range with 2,500 lb payload 806 miles.
COMMENTARY
 Used at US Air Force Academy to support various parachuting activities and perform general utility



TG-10 Kestrel (Mike Kaplan)

missions. Used by the Air Force Parachute Team, The Wings of Blue.

Extant Variant(s)

■ UV-18B. Military variant of the civilian DeHavilland DHC-6 Twin Otter.

Strategic Missiles

AGM-86 Air Launched Cruise Missile

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

Function: Strategic air-to-surface cruise missile.

Operator: AFGSC.

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

Delivered: from 1981.

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

Production: 1,700+.

Unit Location: Andersen AFB, Guam; Barksdale AFB, La.; Minot AFB, N.D.

Contractor: Boeing.

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

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

Warhead: (AGM-86B) W80-1 nuclear, (AGM-86C) blast/fragmentation conventional, (AGM-86D) hard target penetrating warhead.

Dimensions: length 20.8 ft, body diameter 2 ft, wingspan 12 ft.

Weight: 3,150 lb (B and C).

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

COMMENTARY

Programmed to conduct strategic attack—nuclear or conventional—on surface targets. Small radar signature and low-level flight capability enhance the missile's effectiveness.

Extant Variant(s)

■ AGM-86B. First production version. Last of 1,715 delivered in 1986. Undergoing service life extension program (SLEP) to extend life to 2030. USAF to cut inventory to 528 nuclear types. Force to be consolidated at Minot.

■ AGM-86C. Conventional warhead version, called CALCM. Some 600 B models converted; initial deliveries in 1987. Few remain in inventory. First used operationally in Desert Storm; used widely in subsequent combat operations. Provides adverse weather, day/night, air-to-surface, accurate, stand-off strike capability. Range greater than 500 miles. Block 1A enhancements offer improved accuracy and increased immunity to electronic jamming.

■ AGM-86D. CALCM Block II penetrator version with AUP-3(M) warhead. Provides standoff capability against hardened, deeply buried targets. Used with success in Southwest Asia operations.

AGM-129 Advanced Cruise Missile

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

Function: Strategic air-to-surface cruise missile.

Operator: AFGSC.

First Flight: July 1985.

Delivered: June 1990-August 1993.

IOC: circa 1991.

Production: 461.

Unit Location: Barksdale AFB, La.; Minot AFB, N.D.

Contractor: General Dynamics (now Raytheon), McDonnell Douglas (now Boeing).

Power Plant: Williams International F112-WR-100 turbofan.

Guidance: inertial, with TERCOM update.

Warhead: W80-1 nuclear.

Dimensions: length 20 ft 10 in, body width 2 ft 5 in, wingspan 10 ft 2 in.

Weight: 3,700 lb.

Performance: range 2,000+ miles, speed 550 mph.

COMMENTARY

According to 2007 announcement, USAF is retiring its entire ACM inventory. All to be demilitarized by 2013.

Extant Variant(s)

■ AGM-129A. Embodies stealth technology. Offers significant improvements over the original AGM-86B cruise missile in range, accuracy, survivability. Carried only by B-52 bomber.

LGM-30 Minuteman

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

Function: Strategic surface-to-surface ballistic missile.

Operator: AFGSC.

First Flight: February 1961.

Delivered: 1962-December 1978.

IOC: December 1962, Malmstrom AFB, Mont.

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, 202,600 lb thrust; stage 2: Aerojet General SR19-AJ-1 solid-propellant motor, 60,721 lb thrust; stage 3: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.

Guidance: inertial guidance system.

Warhead: one Mk 21 RV or one-three Mk 12/12A MIRVs.

Dimensions: length 59.9 ft, diameter of first stage 5.5 ft.

Weight: launch weight 79,432 lb.

Performance: speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load more than 6,000 miles.

COMMENTARY

Three-stage, solid-propellant ICBM in underground silo. Sole remaining US land-based ICBM. Major life extension program ensures viability to 2020. Further proposed incremental upgrades intended to maintain viability to 2030. Major upgrades include refurbishment of liquid propulsion post-boost rocket engine, remanufacture 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.

Extant Variant(s)

■ LGM-30G. Called Minuteman III. Became operational in 1970, providing improved range, rapid retargeting, and the capability to place three re-entry vehicles on three targets with a high accuracy. USAF initially deployed 550, later reducing to 500 based at Warren, Malmstrom, and Minot. Deactivation of a further 50 Minuteman IIIs was completed in July 2008.

Tactical Missiles and Weapons

AGM-65 Maverick

Brief: A tactical, TV- or imaging infrared (IIR) guided



Minuteman III (USAF)

or laser guided air-to-surface missile carried by fighters and designed for use in CAS, interdiction, and defense suppression missions, having standoff capability and high probability of strike against a wide range of targets.

Function: Air-to-surface guided missile.

First Flight: August 1969.

Delivered: from August 1972.

IOC: February 1973.

Production: sustainment phase.

Contractor: Raytheon.

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

Guidance: AGM-65A/B/H/K self-homing, TV guidance system; AGM-65D/G IIR seeker; AGM-65E/E2 laser seeker.

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

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

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

Performance: range about 9.2 miles.

COMMENTARY

Boasts long and distinguished combat record. First employed during Vietnam War; used extensively in Desert Storm and Iraqi Freedom. Integrated with



AGM-65H Maverick (MSgt. Michael Ammons)

A-10 and F-16 for use against tanks and columns of vehicles and in the SEAD role.

Extant Variant(s)

■ AGM-65B. A launch-and-leave, TV guided air-to-surface missile. Equipped with "scene magnification" TV seeker allowing pilot to identify and lock on to smaller or distant targets.

■ AGM-65D. Augments TV guidance with an IIR seeker. Equipped with lower-smoke motor. Became operational in 1986 on A-10 aircraft.

■ AGM-65E. Laser guided version ordered by USN and USMC. Sometimes used by USAF in combat operations, beginning 2007.

■ AGM-65E2. State-of-the-art version of the laser guided Maverick used for precision strike against high-speed moving targets in urban settings. First delivery in 2010.

■ AGM-65G. Uses IIR seeker with an alternate 298-lb blast fragmentation warhead for use against hardened targets. Software is modified to include options for targeting ships and large land targets as well as mobile armor. Has digital autopilot and a pneumatic actuation system. First delivered in 1989.

■ AGM-65H. Equipped with upgraded TV seeker providing significant reliability, maintainability, and performance gains and double the standoff range of B variant.

■ AGM-65K. Modified G variant. Has same TV seeker as in the AGM-65H to provide a TV guided version with the 298-lb blast fragmentation warhead.

AGM-88 HARM

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

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

First Flight: April 1979.

Delivered: 1982-98.

IOC: circa 1984.

Production: sustainment phase.

Contractor: Raytheon.

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

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

Warhead: high-explosive fragmentation, weighing 145 lb.

Dimensions: length 13.7 ft, body diameter 10 in, wingspan 3.7 ft.

Weight: 780 to 810 lb.

Performance: cruising speed supersonic, altitude limits S/L to 40,000 ft, range more than 30 miles.

COMMENTARY

Joint USAF-Navy weapon. Great velocity and ability to cover wide range of frequencies with use of programmable digital processors in carrier aircraft's avionics and missile. Proven to be highly effective against enemy ground radar. Carried by F-16 Block 50/52s dedicated to SEAD mission. Upgrade initiatives aim to strengthen all versions against target shutdown, blanking, and blinking. Has demonstrated GPS precision navigation capability.

Extant Variant(s)

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

■ AGM-88C. Current production model. Has warhead more lethal than earlier variants. Equipped with enhanced-capability AGM-88C-1 guidance head.

AGM-154 Joint Standoff Weapon

Brief: Joint USAF and Navy family of low-cost glide weapons with a standoff capability.

Function: Air-to-surface guided missile.

First Flight: December 1994.

Delivered: from 2000.

IOC: 2000 (USAF).

Production: 6,114 (originally planned).

Contractor: Raytheon.

Guidance: INS/GPS.

Warhead: (see variants below).

Dimensions: length 13.3 ft.

Weight: 1,065-1,500 lb.

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



AGM-154 Joint Standoff Weapon (MSgt. Michael Ammons)

COMMENTARY

Medium-range, INS/GPS guided, standoff air-to-ground weapon. Used to attack a variety of soft and armored area targets (fixed, relocatable, mobile) during day and night, and in adverse weather conditions. Enhances aircraft survivability with launch outside range of enemy point defenses. JSOW accuracy and launch-and-leave capability allow several target kills per aircraft sortie. Arms the B-2 and F-16.

Extant Variant(s)

■ AGM-154A. The baseline BLU-97 variant for use against area targets.

■ AGM-154B. The BLU-108 variant provides anti-armor capability; development complete, production deferred.

AGM-158 Joint Air-to-Surface Standoff Missile

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

Function: Air-to-surface guided weapon.

First Flight: April 8, 1999.

Delivered: through FY19 (planned).

IOC: September 2003.

Production: 2,400, plus 2,500 JASSM-ER (planned).

Contractor: Lockheed Martin, Raytheon, Honeywell.

Power Plant: Teledyne Continental Motors; JASSM-ER, Williams Turbofan.

Guidance: INS, GPS, and IIR terminal seeker.

Warhead: J1000 1,000-lb class penetrator.

Dimensions: length 14 ft.

Weight: 2,250 lb, (ER) 2,390 lb.

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

COMMENTARY

Next generation missile allowing USAF fighter, bomber attack from outside ranges of enemy air defenses. Autonomous precision strike weapon. Can attack both fixed and relocatable targets, from nonhardened above ground to moderately hardened buried targets.

Extant Variant(s)

■ AGM-158A JASSM. Stealthy LO airframe equipped with INS/GPS guidance, IIR terminal seeker. Low operational support costs. Can be employed by B-1B, B-2, B-52H, and F-16. Integration on F-15E and F-35 proceeding. B-1B can redirect a JASSM route prior to launch.

■ AGM-158A JASSM-ER. Extended-range version, can attack at a distance of more than 500 miles. Currently in integrated flight testing. Operational test and evaluation is expected to begin in 2011.

AIM-9 Sidewinder

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

Function: Air-to-air missile.

First Flight: September 1953.

Delivered: 1957-present. First production AIM-9X delivered May 1, 2002.

IOC: circa 1983 (AIM-9M).

Production: AIM-9M, sustainment phase; AIM-9X, LRIP from November 2000, with full rate from November 2004.

Contractor: Raytheon, Loral.

Power Plant: Thiokol Hercules and Beryte Mk 36 Mod 11 solid-propellant rocket motor.

Guidance: solid-state IR homing guidance.

Warhead: high-explosive, weighing 20.8 lb.

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

Weight: launch weight 190 lb.

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

COMMENTARY

Developed by the Navy for fleet air defense, adapted by USAF for fighter aircraft use. Early versions used extensively in the Vietnam War.

Extant Variant(s)

■ AIM-9M. Joint Navy-USAF weapon. All-altitude, all-aspect, launch-and-leave intercept capability. Equips A-10, F-15, F-16, and F/A-18 aircraft. Increased IR counter-countermeasures, improved background discrimination, reduced-smoke rocket motor. First flight in 1978.

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

■ AIM-9X. A jointly funded Navy-USAF project, the AIM-9X entered service with USAF's F-15s at Elmendorf AFB, Alaska, in November 2003. USAF plans to buy 5,097 missiles. Carrier aircraft include the F-15, F-16, F-22, F-35, and F/A-18.

AIM-120 AMRAAM

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

Function: Air-to-air guided missile.

First Flight: December 1984.



AIM-120 AMRAAM (1st Lt. Shannon Collins)

Delivered: 1988.

IOC: September 1991.

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

Contractor: Raytheon.

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

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

Warhead: high-explosive directed fragmentation weighing 48 lb.

Dimensions: (B model) length 12 ft, body diameter 7 in, span of tail control fins 2.1 ft.

Weight: 335 lb.

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

COMMENTARY

Joint USAF-Navy project to replacing AIM-7 Sparrow. Equips F-15, F-16, F-22, F-35, and F/A-18 fighters. Inertial guidance and active radar terminal homing provide launch-and-maneuver capability. Missile features (compared to AIM-7) increased average velocity, reduced miss distance, improved fuzing, better warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, enhanced electronic protection capability, increased maximum launch range, reduced-smoke motor, and improved maintenance and handling.

Extant Variant(s)

■ AIM-120B. Upgraded, reprogrammable variant of AIM-120A.

■ AIM-120C. Weapon with smaller, clipped control surfaces to provide for internal carriage in F-22A and F-35, and involves high-angle off-boresight (HOBS) launch capability. In production.

■ AIM-120D. Latest development (AMRAAM Phase 4). Adds an enhanced electronic protection suite, two-way data link, and GPS-aided navigation. Production began in 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: dispenses 202 BLU-97 combined effects bomblets over an area roughly 800 ft x 400 ft.

COMMENTARY

A cluster-bomb family of weapons which can be delivered as low-accuracy free-fall weapon or with

near precision, given installation of a simple tail kit.

Extant Variant(s)

■ CBU-87. Unguided gravity weapon. Combined effects type. Dispenses BLU-97 shaped-charge anti-personnel/anti-materiel fragmentary/incendiary bomblets over the target in rectangular pattern. Delivered by USAF and Navy aircraft.

■ CBU-103. Basic CBU-87 CEM given high accuracy with retrofitted Wind-Corrected Munitions Dispenser tail kit. The WCMD improves the munitions delivery accuracy when released from medium to high altitude.

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.

Production: sustainment phase.

Contractor: Honeywell, Aerojet General, Olan, Alliant 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-92 anti-personnel mines.

COMMENTARY

Weapons system provides low-cost means to rapidly seed a battlefield with mines delivered from high-speed aircraft and able to destroy armor.

Extant Variant(s)

■ CBU-89. Gravity weapon. Dispenser holds 94 mines: 72 anti-tank and 22 anti-personnel. Dispenses mines over target in a circular pattern. Able to fuze anti-tank mines for three different time delay settings. Magnetic influence fuze senses armor.

■ CBU-104. Basic gravity-type Gator retrofitted with WCMD tail kit, improving the munitions delivery accuracy when released from medium to high altitude.

CBU-105 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.

Delivered: 1994-2013 (planned).

IOC: 1997.

Production: 6,500 (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 x 1,200 ft.

COMMENTARY

SUU-66/B tactical munitions dispenser with an FZU-39 fuze and a payload of 10 BLU-108 submunitions. Each submunition contains four "skeet" projectiles that, upon being thrown out, seek out their target and deliver an explosively formed penetrator. Each SFW can deliver a total of 40 lethal projectiles. The skeet's active laser and passive IR sensors can detect a vehicle's shape and IR signature; if no target is detected, the warhead detonates after a preset time. The SFW's primary targets are massed tanks, armored personnel carriers, and self-propelled targets.

Extant Variant(s)

■ CBU-105. Basic gravity-type CBU-97 equipped with a WCMD tail kit. Can be delivered accurately from high altitude and in adverse weather from the A-10, B-1, B-52H, F-15E, and F-16. Combat debut came in April 2003 in Iraqi Freedom.

CBU-107 Passive Attack Weapon

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

Function: Wide-area munition.

First Flight: 2002.

Delivered: 2002-03.

IOC: December 2002.

Production: not available, but completed March 2003.

Contractor: General Dynamics, kinetic energy penetrator payload and canister; Lockheed Martin, WCMD; Textron, tactical munition dispenser kit.

Guidance: via WCMD.

Dimensions: length 7.7 ft, diameter 1.3 ft.

Weight: 1,000 lb.

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

COMMENTARY

Developed to give USAF aircraft a weapon which could destroy a target but with minimum collateral and environmental damage. After release, weapon glides toward its target. Before impact, 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.

Extant Variant(s)

■ CBU-107A. Weapon destroys target with kinetic energy rather than explosive. Houses various sizes of penetrator rods inside bomb casing. Guided by a WCMD tail kit to help with accuracy. Full production completed in six months. Used during Iraqi Freedom. Equips B-52, 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.

IOC: 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-10G/H/J: BLU-109.

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/H/J 1.2 ft; wingspan 5.5 ft.

Weight: 1,985 lb.

Performance: circular error probable (CEP) 29.7 ft, range 9.2 miles.

COMMENTARY

Folding-wing laser and GPS guided weapon used primarily for precision bombing against nonhardened targets but capable of penetration. Can operate in cloud ceilings down to 2,500 ft. GBU-10 platforms include A-10, B-52, F-15E, and F-16 aircraft.

Extant Variant(s)

■ Paveway II LGB. Laser guidance provides high accuracy over distances up to 40,000 ft. More than 200,000 produced.

■ Enhanced Paveway II DMLGB. Dual-mode

laser and GPS guidance offers accurate attack out to 80,000 ft.

■ Paveway III LGB. Can be used in low-level attack, accurate at ranges up to 100,000 ft.

■ Enhanced Paveway III DMLGB. Dual-mode laser and GPS guidance offers accurate attack out to 120,000 ft.

GBU-12/49 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.

IOC: 1976.

Production: about 30,000; continuing.

Contractor: Lockheed Martin, Raytheon.

Guidance: semiactive laser.

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

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

Weight: 603 lb.

Performance: CEP 29.7 ft, range about six miles.

COMMENTARY

Improved versions of the earlier fixed wing Paveway I.

Extant Variant(s)

■ GBU-12 Paveway II. Used primarily to strike fixed armor. Can operate in cloud ceilings down to 2,500 ft. Equips A-10, B-52, F-15E, F-16, and MQ-9 aircraft.

■ GBU-49(V)/B (EGBU-12) Paveway II. Features both laser guidance and onboard GPS for all-weather, precision delivery capability. Arming MQ-9 Reaper aircraft.

GBU-15

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

Function: Air-to-surface guided munition.

First Flight: 1975.

Delivered: 1983-complete.

IOC: 1983.

Production: more than 2,000.

Contractor: Boeing, Raytheon.

Guidance: TV or IIR seeker.

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

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

Weight: 2,500 lb.

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

COMMENTARY

Air-launched, cruciform-wing glide bomb fitted with a guidance system to give it pinpoint accuracy from low or medium altitudes. Has standoff capability. Development began in 1974, based on experience gained in Vietnam with the earlier Pave Strike GBU-8 modular weapon program. The GBU-15 is intended for tactical use to suppress enemy defenses and to destroy heavily defended targets. In direct attack, weapon locks on target before launch and flies a near-line-of-sight profile to impact. In the indirect mode, the seeker can be locked on to the target after launch, or the operator can fly the weapon manually to impact.

Extant Variant(s)

■ GBU-15(V)1/B. A TV guided variant, qualified for operational service in 1983.

■ GBU-15(V)2/B. IIR version entered service in 1987.

■ GBU-15-I. Combines accuracy of GBU-15 with the penetration capability of the improved 2,000 lb BLU-109/B penetrator bomb.

■ EGBU-15. GPS guided variant, allowing pilot to select either TV, IR, or GPS guidance over the target. Entered USAF service in 1999.

GBU-24 Paveway III

Brief: A precise air-to-ground low-level LGB (LLLGB) equipped with an advanced guidance kit.

Function: Air-to-surface penetrating glide bomb.

First Flight: GBU-24A/B in service May 1985.

Delivered: from 1986.

IOC: 1986.

Production: 14,000.

Contractor: Raytheon.

Guidance: semiactive laser.

Warhead: BLU-109 (A/B).

Dimensions: length 14.2 ft.

Weight: 2,350 lb.



GBU-12 (USAF)

Performance: range more than 11.5 miles.

COMMENTARY

Precision weapon that is effective against a broad range of high-value hard targets. Can be dropped from low, medium, or high altitude. Offers operational flexibility through use of adaptive digital autopilot and large field-of-regard, highly sensitive scanning seeker.

Extant Variant(s)

■ GBU-24A/B. Air-to-ground weapon equipped with third generation Paveway III guidance kit, integrated with a BLU-109 penetrating warhead. Advanced guidance section and high-lift airframe.

GBU-28 Bunker Buster

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.

First Flight: February 1991.

Delivered: circa 1991.

IOC: 1991.

Production: approx 500.

Contractor: Raytheon.

Guidance: laser.

Dimensions: length 19.2 ft, diameter 1.2 ft.

Weight: 4,676 lb.

Performance: range more than 5.75 miles.

COMMENTARY

Developed during Desert Storm for use against Iraq's deeply buried, hardened C2 facilities. Four GBU-28 used during the war: two for testing and two by F-111Fs against a bunker complex Feb. 27, 1991. Guidance is by a modified GBU-27 system.

Extant Variant(s)

■ GBU-28B/B. Integrates GPS/INS guidance into the existing GBU-28 guidance control unit to provide poor weather capability and improved target location. Entered production in 1999.

■ GBU-28C/B. Equipped with improved BLU-122/B warhead for increased penetration, lethality. Guidance and control provided by Enhanced Paveway III system with GPS/INS and laser capability. Entered production in 2005.

GBU-31/32/38 Joint Direct Attack Munition

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

Function: Air-to-surface guided bomb.

First Flight: Oct. 22, 1996.

Delivered: 1998-2013 (planned).

IOC: 1998.

Production: 213,521 (planned).

Contractor: Boeing, Textron, Honeywell.

Guidance: INS/GPS.

Dimensions: Mk 84 with JDAM, 12.8 ft; BLU-109 with JDAM, 12.4 ft; Mk 83 with JDAM, 10 ft; Mk 82 with JDAM, 8 ft.

Weight: Mk 84 2,036/2,056 lb (USAF/USN);

BLU-109 2,115/2,135 lb; Mk 83 1,013/1,028 lb; Mk 82 552/558 lb.

Performance: range up to 17 miles, CEP with GPS 16.4 ft, CEP with INS only 98 ft.

COMMENTARY

Upgrades the existing inventory of general-purpose bombs by integrating them with a GPS/INS guidance kit to provide accurate all-weather attack from medium/high altitudes. Acquires target information through aircraft's avionics system. Guided to target by inertial guidance kit with periodic GPS updates. Equips A-10, B-1, B-2, B-52, F-15E, F-16, F-22, MQ-9, AV-8B, F/A-18, with future integration on F-35 aircraft.

Extant Variant(s)

■ GBU-31. Variant adds INS/GPS guidance kit to the 2,000-lb general-purpose Mk 84 bomb or the 2,000-lb BLU-109 penetrator. First used in combat March 24, 1999.

■ GBU-32. Variant adds an INS/GPS guidance kit to the 1,000-lb general-purpose Mk 83 bomb or the 1,000-lb BLU-110 bomb.

■ GBU-38. Variant adds an INS/GPS guidance kit to the 500-lb general-purpose Mk 82 bomb or the 500-lb BLU-111 bomb.

GBU-39 Small Diameter Bomb

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

Function: Air-to-surface guided munition.

First Flight: May 23, 2003 (guided).

Delivered: from 2006.

IOC: 2007.

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

Contractor: Boeing, SDB I; Raytheon, SDB II.

Guidance: GPS/INS augmented by Differential GPS.

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

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

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

COMMENTARY

Capable of destroying high-priority fixed and stationary targets from fighters and bombers in internal bays or on external hardpoints. Can be targeted and released against single or multiple targets. Acquires target coordinates prior to release. Relies on GPS/INS augmented by Differential GPS to self-navigate to the impact point. BRU-61/A smart carriage carries up to four 250-lb class GBU-39/B munitions.

Extant Variant(s)

■ GBU-39B SDB I. Went operational in 2006 on F-15E. Also equips A-10, B-1, B-2, B-52, F-16, F-22, F-35, and MQ-9. Contract to develop weapon issued in 2003. Fifty weapons for operational assessment delivered in 2008, with an additional 50 weapons in the inventory.



GBU-43/B MOAB Bomb (USAF)

■ GBU-39B SDB II. Increment 2 under development, providing a capability to attack mobile targets from standoff in all weather.

GBU-43 MOAB Bomb

Brief: A massive PGM.
Function: Massive bomb.
Guidance: GPS/INS.
Warhead: 18,000 lb, high explosive.
Dimensions: length 30 ft, diameter 3.3 ft.
Weight: 21,500 lb.

COMMENTARY

Large, powerful, and accurately delivered conventional high-explosive bomb. Developed in only nine weeks to be available for the Iraq campaign of 2003. Given name "Massive Ordnance Air Blast," or MOAB, which also is known unofficially as "Mother of All Bombs." Live-tested in 2003; dropped from the rear of a C-130 without a parachute. Provides power to attack large area targets or enemy hidden in tunnels or caves.

Extant Variant(s)

■ GBU-43B. GPS guided munition with fins and inertial gyro for pitch and roll control. Weighs 21,000 lb, of which 18,700 lb is attributed to BLU 120/B warhead. History's largest satellite guided, air delivered weapon.

GBU-54 Laser JDAM

A joint USAF-Navy INS/GPS guided weapon equipped with a laser seeker, carried by fighters, providing highly accurate, autonomous, all-weather conventional bombing capability against stationary and moving targets.

Function: Air-to-surface guided bomb.
First Flight: 2005.
Delivered: April 2008-mid-2009.
IOC: 2008.

Production: 400 laser guidance kits.
Contractor: Boeing.
Guidance: INS/GPS/laser.
Dimensions: Mk 82 with JDAM 8 ft.
Weight: 552/558 lb.
Performance: range up to 17 miles.

COMMENTARY

Developed to satisfy an urgent operational requirement for extremely accurate precision weapon capable of destroying high-speed targets in Afghanistan and Iraq. Combines a laser guidance kit with the GPS/INS-based navigation of existing 500-lb GBU-38 JDAMs. First combat deployment in Iraq in 2008.

Extant Variant(s)

■ GBU-54B Laser JDAM. Dual mode 500 lb guided weapon. Adds DSU 38/B laser seeker to the JDAM's existing GPS/INS guidance. Features ability to attack moving targets with precision. First

test in 2005; weapon released at 25,000 ft and six miles from target fell within five ft of designated impact point. Tests against moving targets showed similar accuracies.

GBU-57 Massive Ordnance Penetrator

Brief: A massive earth-penetrating weapon for use against hard and deeply buried targets.
Function: Massive bomb.
Guidance: GPS.
Warhead: 5,300 lb high explosive.
Dimensions: length 20.5 ft, diameter 31.5 in.
Weight: 30,000 lb.

COMMENTARY

Genesis of program was Iraqi Freedom, where analysis of sites hit with "bunker-buster" bombs revealed poor penetration. Development of the MOP under way at the Air Force Research Laboratory, Munitions Directorate, Eglin AFB, Fla. USAF planning to integrate weapon on B-2A stealth bomber.

Extant Variant(s)

■ GBU-57A. Original prototype of the weapon.
 ■ GBU-57B. Will equip an undisclosed number of B-2 bombers. Plans called for bomb deployment at the end of 2010. At least one successful flight-test launch.

Satellite Systems

Advanced EHF Satellite System

Brief: Joint service satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications for high-priority air, ground, and sea assets.
Function: Near-worldwide, secure, survivable satellite communications.
Operator: AFSPC.

First Launch: 2010.
IOC: Late 2013 (planned).
Constellation: four.
Design Life: 14 years.
Launch Vehicle: Atlas V.
Operational Location: Schriever AFB, Colo.
Orbit Altitude: Geosynchronous at 22,000+ miles.
Contractor: Lockheed Martin, Northrop Grumman.
Power Plant: Solar arrays generating 20,000 watts.
Dimensions: length 31 ft, width 98 ft (with full solar array extension).
Weight: 13,400 lb.

Performance: provides worldwide coverage between 65 north and 65 south latitude.

COMMENTARY

Joint service program begun during the Cold War with the fielding of Milstar and continued with the Advanced EHF (AEHF) satellite system. Backbone of strategic-tactical DOD communications. Provides

secure, anti-jam communications around the world. Uses cross-linked satellites, eliminating the need for ground relay stations. Offers 24-hour-a-day capability.

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: Space and Earth environmental data collection satellite.
Operator: National Oceanic and Atmospheric Administration (NOAA).
First Launch: May 23, 1962.
IOC: 1965.

Constellation: two low Earth orbit (LEO) with one primary spacecraft in each.
Design Life: 48 months.
Launch Vehicle: Delta IV; Atlas V.
Operational Location: NOAA Satellite Operations Facility, Suitland, Md.
Orbit Altitude: approx 527 miles.
Contractor: Lockheed Martin, Northrop Grumman.
Power Plant: solar arrays generating 1,200-1,300 watts.

Dimensions: length 25 ft (with array deployed), width 4 ft.
Weight: 2,545 lb, including 772-lb sensor; 2,270 lb with 592-lb sensor payload.

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 6 hr.

COMMENTARY

Critical system for the past 40+ years. Provides timely and high-quality weather information to strategic and tactical combat units worldwide. Uses operational linescan sensor to image cloud cover in visible and thermal IR and analyze cloud patterns. Equipped with microwave imagers and sounders and a suite of space environment sensors that provide critical land, sea, and space environment data. Data shared with civil agencies. AFSPC's Space and Missile Systems Center (SMC), Los Angeles AFB, Calif., handles development and acquisition of DMSP systems.

Extant Variant(s)

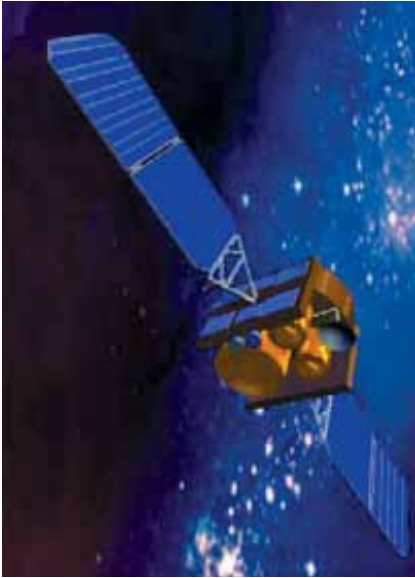
■ Block 5D-3. Improved spacecraft bus and sensors for longer and more capable missions. Six operational DMSP satellites now survey the entire Earth four times a day. Last launched in 2009. DMSP has two more spacecraft awaiting launch on need.

Defense Satellite Communications System

Brief: Joint service satellite system that provides high-capacity communications for deployed air, land, and sea forces.
Function: Communications satellite.
Operator: AFSPC.



AEHF Satellite System (Lockheed Martin)



DSCS (USAF illustration)

First Launch: DSCS II 1971; DSCS III 1982; DSCS III/SLEP 2000.
IOC: Dec. 13, 1978 (DSCS II).
Constellation: five (III); 14 deployed/eight currently operational.
Design Life: 10 yr (III).
Launch Vehicle: Atlas II and EELV.
Operational 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 980 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-rate data communications.

COMMENTARY
 Workhorse of US military's SHF communications. Provides military communications to troops in the field and commanders worldwide. SMC sustains DSCS.

Extant Variant(s)
 ■ DSCS III. Most recent configuration. Final (of 14) DSCS IIIs launched in 2003. Provides secure, uninterrupted voice and high data rate communications to military users. Used throughout Desert Storm and is the primary communications link for US forces in Bosnia and Iraq. Final four satellites received SLEP, providing higher power amplifiers, more sensitive receivers, and increased antenna connection options. Payload comprises six independent SHF transponder channels. Also carries a special-purpose single channel transponder.

Defense Support Program

Brief: An early warning spacecraft in geosynchronous orbit that 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.
IOC: circa 1972.
Constellation: classified.
Design Life: Three yr requirement and five yr goal.
Launch Vehicle: Titan IV with inertial upper stage; Delta IV Heavy EELV.
Operational Location: Buckley AFB, Colo.; Schriever AFB, Colo.
Orbit Altitude: Geosynchronous at 22,000+ miles.
Contractor: TRW (now Northrop Grumman), Aerojet.
Power Plant: solar arrays generating 1,485 watts.

Dimensions: diameter 22 ft, height 32.8 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
 Key part of North American and theater early warning systems. Capable of detecting missile launches and nuclear detonations. Originally aimed at Soviet military. Used extensively in Gulf War to detect theater missile launches against coalition forces. Successful in detecting launches, enabling timely warnings of attacks. Now accommodates 6,000 detectors, uses 1,274 watts of power, weighs some 5,200 lb. Can be used as part of early warning system for natural disasters such as forest fires. Undergone five major upgrades over the years. The 23rd and final DSP satellite launched in December 2007.

Extant Variant(s)
 ■ Phase I. Four satellites launched in period 1970-73.
 ■ Phase II. Three satellites launched in period 1975-77.
 ■ Multiorbit Satellite Performance Improvement Modification (MOS/PIM). Four satellites in period 1979-84.
 ■ Phase II Upgrade. Two satellites in period 1984-87.
 ■ DSP-1. Nine satellites in period 1989-present.

Global Positioning System

Brief: A US space-based radio-positioning system that provides 24-hour worldwide highly accurate three-dimensional location information and precision velocity and timing services to military and civilian users.
Function: Worldwide navigation, timing, and velocity satellite constellation.
Operator: AFSPC.

First Launch: Feb. 22, 1978.
IOC: Dec. 9, 1993.
Constellation: 31 spacecraft (11 IIA, 1 IIF, 12 IIR, 7 IIR-M).
Design Life: 7.5 yr (II/IIA); 12 yr (IIF); 7.5 yr (IIR/IIR-M); 15 yr (IIIA).
Launch Vehicle: Delta II, Delta IV.
Operational Location: Schriever AFB, Colo.
Orbit Altitude: 10,988 miles.
Contractor: Boeing (II, IIA, IIF), Lockheed Martin (IIR, IIR-M, IIIA).

Power Plant: solar panels generating 700 watts (II/IIA); 1,136 watts (IIR/IIR-M); 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 ft 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
 Fundamental contribution to precision bombing, CSAR, mapping, and rendezvous. Provides accurate three-dimensional (latitude, longitude, and altitude) position, velocity, and time data in an uninterrupted way.

Extant Variant(s)
 ■ GPS Block IIA. Launched first in 1997. Current constellation consist of 11 IIAs launched to replace original GPS Block I series.
 ■ GPS Block IIF. Equipped with extended design life, faster processors, and a new civil signal on a third frequency. First launched in 2010.
 ■ GPS Block IIR-M. Launched first in 2005. Offers variety of benefits such as two new signals, enhanced encryption and anti-jamming capabilities, and second civil signal.
 ■ GPS Block IIIA. Future generation expected to



GPS IIF (USAF illustration)

provide improved accuracy, availability, integrity, and resistance to jamming. Launch is slated for 2014.

Milstar 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: Military communications satellite.

Operator: AFSPC.

First Launch: Feb. 7, 1994.

IOC: July 1997 (Milstar I).

Constellation: five.

Design Life: 10 yr.

Launch Vehicle: Titan IV/Centaur.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ 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 degrees north and 65 degrees south latitude. The oldest two satellites are still operational beyond their 10-yr design life.

COMMENTARY

Joint service program begun during the Cold War. Backbone of strategic-tactical DOD communications. Provides secure, anti-jam communications around the world. Uses cross-linked satellites, eliminating the need for ground relay stations. Offers 24-hour-a-day capability. Last of six satellites launched in 2003.

Extant Variant(s)

■ Block I. Comprises two satellites—USA-99 and USA-115—launched in the period 1994-95. Both still active.

■ Block II. Comprises four satellites—USA-143, 157, 164, and 169. All launched in period 1999-2003. USA-143 suffered launch failure. Other three still active.

ORS-1 Satellite

Brief: An ISR satellite based on an existing IR platform to provide essential intelligence gathering capabilities in direct support to US national security interests.

Function: Intelligence collection for specific area of responsibility (AOR).

Operator: AFSPC.

First Launch: 2011 (planned).

IOC: TBD.

Constellation: one (with possibility of second).

Design Life: one yr.

Launch Vehicle: Minotaur.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: approx 249 miles.

Contractor: Goodrich, ATK (bus).

COMMENTARY

Developed by DOD's Operationally Responsive Space (ORS) office in response to an urgent need voiced in 2008. ORS-1 will provide multi-spectral imaging capability to support US Central Command's ISR mission needs. Commercial and government products used primarily to cut development time. Flown on the Multimission Space Operations Center ground system, which will be used for future mission-unique space systems.

Extant Variant(s)

■ ORS-1. Combines use of existing U-2 imaging technology with the proven TacSat-3 satellite bus. Tasking will come from CENTCOM, while mission execution will be accomplished by the 1st SOPS at Schriever AFB, Colo.

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.

First Launch: GEO FY11 (planned).

IOC: December 2001 (Increment 1).

Constellation: four GEO sats, two HEO sensors (planned).

Design Life: not available.

Launch Vehicle: GEO, Atlas V.

Operational Location: Buckley AFB and Schriever AFB, Colo.

Orbit Altitude: Geosynchronous and high elliptical.

Contractor: Lockheed Martin, Northrop Grumman.

Power Plant: solar array, 2,435 watts (GEO).

Dimensions: GEO 7 x 6.3 x 19.7 ft.

Weight: 5,442 lb (GEO on orbit)

COMMENTARY

Follow-on to the Defense Support Program satellite. System includes GEO satellites, HEO payloads, and ground assets. Fielded in increments: Increment 1 consolidated all DSP ground processing in one CONUS mission control station at Buckley. IOC declared Dec. 18, 2001. Increment 2 covers fielding of the space and ground assets. Following initial early on-orbit checks, HEO-1, the first SBIRS payload, was cleared for operational service in late 2008. HEO-2 was cleared for operational service in August 2009. The HEO payloads are the first components of the Increment 2 constellation. GEO-1 is expected to launch in 2011.

Space Based Surveillance System

Brief: Planned replacement for the Midcourse Space Experiment/Space Based Visible (MSX/SBV) satellite. Gives the US space-based capability to provide metric and characterization data on objects in space.

Function: Space surveillance and object identification.

Operator: AFSPC.

First Launch: September 2010.

IOC: May 2011 (planned).

Constellation: one LEO satellite.

Design Life: seven years.

Launch Vehicle: Minotaur IV.

Operational Location: Vandenberg AFB, Calif.

Orbit Altitude: 390 miles, sun-synchronous orbit.

Contractor: Boeing (system integration, ground segment, operations and sustainment); Ball Aerospace (satellite).

Power Plant: 750 watts, powered from solar arrays and batteries.

Dimensions: (approx) height 10 ft; 10 ft x 3.2 ft, plus solar panels.

Weight: (approx) 2,273 lb.

COMMENTARY

Will track and collect optical signatures of Earth-orbiting objects from a space-based platform. First operational satellite (SSBS Block 10) launched in September 2010. The satellite will be commanded and controlled by the 50th Space Wing, Schriever AFB, Colo., using the global Air Force Satellite Control Network.

Wideband Global SATCOM

Brief: Satellites that provide high-capacity communications for deployed forces (air, land, and sea).

Function: Military communications satellite.

Operator: AFSPC.

First Launch: October 2007.

IOC: April 16, 2008.

Constellation: three sats on orbit; three more planned.

Design Life: 14 years.

Launch Vehicle: Atlas V, Delta IV.

Operational Location: Schriever AFB, Colo.

Orbit Altitude: Geosynchronous at 22,000+ miles.

Contractor: Boeing.

Power Plant: solar arrays generating 9,934 watts.

Dimensions: based on Boeing 702 Bus.

Weight: 13,000 lb at launch.

Performance: approx 10 times the capability of a DSCS satellite.

COMMENTARY

Designed to augment DSCS III and the Global Broadcast System. Each WGS satellite provides approximately 10 times the capacity of each DSCS III satellite. Equipped with fully duplexed communications platform offering combat forces major increase in capacity, connectivity, and interoperability. Direct broadcast of digital multimedia, high-bandwidth imagery, and video information directly from global and theater sites to deployed combat forces. Features X-band, Ka-band broadcast, two-way Ka-band services, and cross-channelization between its X- and Ka-band services. Full operational capability is expected following the launch of the fifth satellite. ■



Milstar (Lockheed Martin illustration)