

# Gallery of USAF Weapons

Note: Inventory numbers are total active inventory figures as of Sept. 30, 2011.

## ■ 2012 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:** 66.

**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:** pilot, copilot, and two WSOs (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:** max T-O 477,000 lb.

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

**Performance:** 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 CBU-87/89 cluster bombs or 30 CBU-103/104/105 WCMs; up to 24 GBU-31 or 15 GBU-38 JDAMs; up to 24 AGM-158 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, but 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 and long loiter time. Offensive avionics include SAR for tracking-targeting-engaging moving vehicles, self-targeting of stationary targets, and following terrain. GPS-aided INS lets aircrews autonomously navigate without ground-based navigation aids and engage targets with precision.

#### 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. Total production of 100 B variants, but USAF reduced inventory to 67 aircraft in 2002. One lost in 2008. First used in combat against Iraq during Desert Fox in December 1998. Equipped over the years with GPS, smart weapons



**B-1B Lancer** (SSgt. Brian Ferguson)

carriage, improved onboard computers, improved communications. Sniper targeting pod added in mid-2008. Receiving Fully Integrated Data Link (FIDL) upgrade to include Link 16 and Joint Range Extension data link, enabling permanent LOS and BLOS C2 connectivity. FIDL mod also improves rear cockpit displays and adds an Ethernet infrastructure to provide high-speed transfer of aircraft data among all four crew stations and on-board weapons, enabling rapid airborne retargeting. Also undergoing radar reliability and maintainability improvement program (RMIP) enhancement to preclude diminishing manufacturing sources problem for offensive avionics.

#### B-2 Spirit

**Brief:** Stealthy, long-range multirole bomber that can deliver nuclear and conventional munitions anywhere on the globe.

**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



**B-2A Spirit** (USAF photo)



**B-52H Stratofortress** (MSgt. Lance Cheung)

turbofans, each 17,300 lb thrust.

**Accommodation:** two pilots, on zero/zero ejection seats.

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

**Weight:** max T-O 336,500 lb.

**Ceiling:** 50,000 ft.

**Performance:** speed high subsonic, 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 various combinations, up to nearly 60,000 pounds over two weapons bays. Nuclear weapons on rotary launcher assemblies (RLAs) (one RLA per each bay): up to 16 B61-7, 16 B83, or 8 B61-11 bombs. Conventional weapons on bomb rack assemblies (BRAs) (two BRAs per bay): 80 Mk 62 (500-lb) sea mines, 80 Mk 82 (500-lb) bombs, 80 GBU-38 JDAMs, or 34 CBU-87/89 munitions; on RLAs: 16 GBU-31 JDAMs, 16 Mk 84 (2,000-lb) bombs, 16 AGM-154 JSOWs, 16 AGM-158 JASSMs, or eight GBU-28 LGBs. Future weapons incl JASSM-ER, GBU-53 SDB II, and GBU-57 MOP.

#### COMMENTARY

Based on the flying wing concept. Combination of advanced technologies, 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 up to nearly 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 have been upgraded to Block 30, with greatly enhanced weapons capability. Can employ either RLAs or BRAs in its weapons bays, carrying a combination of weapons (see above). 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. Planned upgrades include replacement of the aging UHF military satcom terminal system with the AEHF satcom system, enabling compatibility with legacy Milstar satellite constellations and future AEHF constellations.

#### B-52 Stratofortress

**Brief:** A long-range, heavy multirole bomber that can carry nuclear or conventional ordnance or cruise missiles.

**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:** 76.

**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 EWO.

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

**Weight:** max T-O 488,000 lb.

**Ceiling:** 50,000 ft.

**Performance:** speed 650 mph, range 10,000+ miles.

**Armament:** 12 AGM-86B ALCMs externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons incl AGM-86C/D CALCMs, Mk 62 sea mines, Mk 82/84 bombs, CBU-87/89 cluster bombs, CBU-103/104/105 WCMDs, GBU-31/38 JDAMs, AGM-158 JASSMs, and GBU-10/12/28 LGBs. Future weapons incl the JASSM-ER, Miniature Air Launched Decoy (MALD), and MALD-J jammer variant.

#### COMMENTARY

Many variants; all but one retired. Multimission capability includes long-range precision strike, CAS, offensive counterair, air interdiction, defense suppression, maritime surveillance. Can carry weapon targeting pods. Ongoing mods include tactical and global data links for real-time C2, targeting, and intelligence; navigation; sensors; additional smart weapons and improved weapons carriage; and new or upgraded EW capabilities. ECM suite uses a combination of electronic detection, jamming, and 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. USAF's only nuclear/conventional cruise missile carrier. Can conduct CAS using GPS/INS guided weapons. First delivered LGBs in Operation Iraqi Freedom in 2003, with Litening targeting pods. ALCMs and CALCMs carried on unique pylons or internally on a rotary launcher. FY13 budget decisions limit the Combat Network Communications Technology (CONNECT) program to only replacing the multifunction displays (MFDs) at each crew station with new color displays. USAF plans to retain the full CONNECT technical design/baseline pending future budget decisions. FY13 budget decisions also terminated the B-52 EHF program and Strategic Radar Replacement program.

## Fighter and Attack Aircraft

#### A-10 Thunderbolt II

**Brief:** 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.

#### Weapons Acronyms

AE	aeromedical evacuation
AEHF	Advanced Extremely High Frequency
AESA	active electronically scanned array
AGM	air-to-ground missile
AIM	air intercept missile
ALCM	Air Launched Cruise Missile
AMRAAM	Advanced Medium-Range Air-to-Air Missile
ATP	advanced targeting pod
BLOS	beyond line of sight
BLU	bomb live unit
BM	battle management
C2	command and control
C3	command, control, & communications
CALCM	Conventional ALCM
CAS	close air support
CBU	cluster bomb unit
CEM	combined effects munition
CEP	circle error probable
CFT	conformal fuel tank
COTS	commercial off the shelf
CSAR	combat search and rescue
CSO	combat systems officer
ECM	electronic countermeasures
EHF	extremely high frequency
Elint	electronic intelligence
EO	electro-optical
ER	extended range
EW	electronic warfare
EWO	electronic warfare officer
FLIR	forward-looking infrared
FMV	full-motion video
GATM	Global Air Traffic Management
GBU	glide bomb unit
GCS	ground control station
GPS	Global Positioning System
HARM	High-speed Anti-Radiation Missile
HEI	high-explosive incendiary
HUD	head-up display
IFF	identification, friend or foe
IIR	imaging IR
Imint	imaging intelligence
INS	inertial navigation system
IR	infrared
ISR	intelligence, surveillance, & reconnaissance
JASSM	Joint Air-to-Surface Standoff Missile
JDAM	Joint Direct Attack Munition
JSOW	Joint Standoff Weapon
JSUPT	joint specialized undergraduate pilot training
JTIDS	Joint Tactical Information Distribution System
LANTIRN	Low-Altitude Navigation & Targeting Infrared for Night
LCD	liquid crystal display
LGB	laser guided bomb
LO	low observable
LOS	line of sight
LRIP	low-rate initial production
Masint	measurement & signature intelligence
MFD	multifunction display
MOP	massive ordnance penetrator
NVG	night-vision goggles
PGM	precision guided munition
ROVER	Remotely Operated Video Enhanced Receiver
RPA	remotely piloted aircraft
RWR	radar warning receiver
S-L	sea level
SAR	search and rescue
SAR	synthetic aperture radar
satcom	satellite communications
SDB	Small Diameter Bomb
SEAD	suppression of enemy air defenses
SHF	super high frequency
shp	shaft horsepower
Sigint	signals intelligence
SLEP	service life extension program
TACAN	tactical air navigation
TF/TA	terrain-following/terrain-avoidance
T-O	takeoff
WCMD	Wind-Corrected Munitions Dispenser
WSO	weapon systems officer

**IOC:** October 1977.

**Production:** 713.

**Inventory:** 345.

**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; Whiteman AFB, Mo.

**Contractor:** Fairchild Republic, now Lockheed Martin.

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

**Accommodation:** pilot.

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

**Weight:** max T-O 51,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** speed 518 mph, range 800 miles.

**Armament:** one 30 mm, seven-barrel GAU-8/A Gatling gun (1,174 rd), straight HEI, or anti-armor tailored HEI/armor-piercing incendiary (API) combat mix; 11 hardpoints for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, such as Mk 82, Mk 84, GBU-10/12/38, CBU-87, various WCMDs, illumination rockets/flares, AGM-65 Mavericks, and AIM-9 Sidewinders. 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. The 30 mm gun can destroy heavily armored tanks. Cockpit protected by titanium armor. First used in combat in 1991 Gulf War.

#### Extant Variant(s)

■ A-10C. Upgraded with precision engagement mod, new color MFDs, hands-on throttle and stick system, digital stores management, JDAM/WCMD integration, Litening and Sniper advanced targeting pod capability, Situational Awareness Data Link (SADL), and integration of sensors with aircraft systems. IOC in August 2007. First combat deployment September 2007. Undergoing wing replacements.

#### F-15 Eagle

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

**Function:** Air superiority fighter.

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

**First Flight:** July 27, 1972.

**Delivered:** November 1974-85.

**IOC:** September 1975.

**Production:** 874.

**Inventory:** 216 (F-15C); 34 (F-15D).

**Aircraft Location:** Barnes Arpt., Mass.; Eglin AFB, Fla.; Great Falls Arpt., Mont.; Jacksonville Arpt., Fla.; Kadena AB, Japan; Kingsley Field (Klamath Falls),



**A-10C Thunderbolt II** (A1C Benjamin Wiseman)

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, each 23,450 lb thrust; or two P&W F100-PW-229 turbofan engines with afterburners, each 29,000 lb thrust.

**Accommodation:** pilot (C); two pilots (D).

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

**Weight:** max T-O 68,000 lb.

**Ceiling:** 60,000 ft.

**Performance:** F-15C: speed Mach 2.5, ferry range 3,450 miles with CFTs and three external tanks.

**Armament:** one internally mounted M61A1 20 mm six-barrel cannon (940 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs or eight AIM-120s, 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.

#### Extant Variant(s)

■ F-15C/D. Introduced in June 1979, with an internal EW countermeasures suite, 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. The final 43 production aircraft received the F-15E-designed APG-70 radar. Ongoing upgrades include the APG-63(V3) AESA radar and a more capable

mission computer for 175 aircraft, enabling their effective operation through at least 2035, pending the results of full-scale fatigue testing. USAF will conclude the fatigue testing in 2014 and determine the potential for an airframe SLEP. Based on future force structure requirements, USAF may extend long-term upgrades to the remaining fleet. All long-term designated aircraft also are receiving a BLOS satcom upgrade, starting with Air Sovereignty Alert (ASA) aircraft. USAF also is modifying ASA aircraft with an advanced targeting pod and associated display upgrades. Future plans include development of an Eagle Passive/Active Warning and Survivability System.

#### F-15E Strike Eagle

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

**Function:** Dual-role fighter.

**Operator:** ACC, AFMC, USAF.

**First Flight:** Dec. 11, 1986.

**Delivered:** April 1988-2004.

**IOC:** September 1989.

**Production:** 236.

**Inventory:** 221.

**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 23,450 lb thrust; or two F100-PW-229 turbofans with afterburners, each 29,000 lb thrust.

**Accommodation:** pilot and WSO.

**Dimensions:** span 42.8 ft, length 63.8 ft, height 18.5 ft.

**Weight:** max T-O 81,000 lb.

**Ceiling:** 50,000 ft.

**Performance:** speed Mach 2.5, ferry range 2,400 miles with CFTs and three external tanks.

**Armament:** one internally mounted M61A1 20 mm six-barrel cannon (500 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs or eight AIM-120s; any air-to-surface weapon in USAF inventory (nuclear and conventional).

#### COMMENTARY

Basic F-15 airframe strengthened and upgraded for heavyweight multirole capability. Saw first combat in Desert Storm in 1991. 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 fight at low, medium, or high altitude, day or night, and in all weather conditions. Carries LANTIRN targeting pods and Sniper and Litening ATPs on dedicated sensor stations. SAR pod provides surveillance and reconnaissance support to ground operations. Potent ground attack capability supplied by GPS-



**F-15E Strike Eagle** (SSgt. Aaron Allmon)

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 BLOS satcom. Ongoing mods include upgrading to the APG-82(V)1 AESA radar. USAF plans to complete a full-scale fatigue test in 2015 to help determine the feasibility of a SLEP, but currently expects the aircraft to remain operational through at least 2035.

### F-16 Fighting Falcon

**Brief:** Multirole fighter aircraft that is highly maneuverable and proven in air-to-air combat, SEAD, and air-to-surface attack.

**Function:** Multirole fighter.

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

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

**Delivered:** January 1979-2005.

**IOC:** October 1980, Hill AFB, Utah.

**Production:** 2,206.

**Inventory:** 858 (F-16C); 162 (F-16D).

**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, District of Columbia (flying out of Maryland), Iowa, Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, Texas, Vermont, Wisconsin.

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

**Power Plant:** Block 40: one General Electric F110-GE-100 (29,000 lb thrust); Block 42: one Pratt & Whitney F100-PW-220 (24,000 lb thrust). Block 50: one F110-GE-129 (29,000 lb thrust); Block 52: one F100-PW-229 (29,000 lb thrust).

**Accommodation:** pilot.

**Dimensions:** span 32.8 ft, length 49.3 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:** speed Mach 2, ferry range 2,002+ miles.

**Armament:** one M61A1 20 mm cannon (500 rd); up to six air-to-air missiles, AGMs, and ECM pods externally.

#### COMMENTARY

Workhorse of the USAF fighter fleet. A lightweight fighter supporting the majority of PGM 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. All Block 40/42 and 50/52 F-16s upgraded with the Common Configuration Implementation Program (CCIP), providing stan-



F-16 Fighting Falcon (SSgt. Christopher Boitz)

dardized cockpit configuration with color MFDs and software, modular mission computer, helmet mounted cueing system, and Link 16 data link.

#### Extant Variant(s)

■ F-16C/D. Introduced in 1984, at production Block 25. Featured Multinational Staged Improvement Program (MSIP) II upgrades to cockpit, airframe, and core avionics plus addition of increased-range APG-68 radar. Block 25s also added the AIM-120 AMRAAM as a baseline weapon. With Block 30/32 came MSIP III mods, including expanded MFD memory; new engines (Block 30: F110-GE-100; Block 32: F100-PW-220); and additional weapons, including the AGM-88 HARM. USAF currently flies Block 40/42 and Block 50/52 aircraft, the newest variants but the majority of which are showing bulkhead cracks. Sustainment efforts to extend them to at least 2025 include a legacy SLEP and Combat Avionics Programmed Extension Suite for 300-350 aircraft.

■ F-16CG Block 40/42 aircraft, first delivered in 1988, specialize in night attack with PGMs and wide-angle HUD. Greater T-O weight and maneuvering limits, expanded envelope, nine-G capability. Introduced LANTIRN pods, including automatic terrain following, for high-speed penetration and precision attack at night and in adverse weather. Other upgrades included APG-68(V5) fire-control radar, GPS, ring-laser gyro INS, enhanced-envelope gunsight, digital flight controls, and diffracted optics HUD.

■ F-16CJ Block 50/52, first delivered in 1991, are optimized for SEAD, employing the AGM-88 HARM targeting system (HTS) and longer range APG-68 (V9) fire-control radar. Other upgrades include F110-GE-129 and F100-PW-229 increased performance engines, newer cockpit control and display technology with avionics growth capability, ring laser

gyro INS, GPS, ALR-56M radar warning receiver, ALE-47 threat adaptive countermeasures system, and advanced IFF system. Weapons improvements include use of Sniper and Litening ATPs. Downlink capability integrates with ROVER system to support joint terminal attack controllers (JTACs) on the ground.

### 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:** 179.

**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 35,000 lb thrust.

**Accommodation:** pilot.

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

**Weight:** max T-O 83,500 lb.

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

**Performance:** speed Mach 2 with supercruise capability, ferry range 1,850+ miles with two external wing fuel tanks.

**Armament:** one internal M61A2 20 mm gun (480 rds); two AIM-9 Sidewinders stored in side internal weapons bays; six AIM-120 AMRAAMs (air-to-air loadout) or two AIM-120s and two GBU-32 JDAMs (air-to-ground loadout) in main internal weapons bay.

#### COMMENTARY

USAF's newest operational fighter, built to operate day and night and in adverse weather, across full spectrum of missions. Flew its first operational sortie from Langley 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.

#### Extant Variant(s)

■ F-22A. Cockpit fitted with six color LCD panels. The primary MFD provides a view of the air and ground tactical situation, including threat identity, threat priority, and tracking information, with two secondary MFDs 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 APG-77 radar, an EW system with radar warning receiver



F-22A Raptor (SrA. Zachary Wolf)

and missile launch detector, JTIDS, IFF system, laser gyroscope inertial reference, and GPS. FY 13 funding request includes continued retrofit of Increment 3.1 upgrade, including initial integration of the GBU-39B SDB I and JDAM retargeting capability.

### F-35 Lightning II

**Brief:** Next generation strike aircraft.

**Function:** Multirole fighter.

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

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

**Delivered:** April 2011 (first LRIP aircraft).

**IOC:** 2016 (USAF).

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

**Inventory:** 11 (USAF).

**Aircraft Location:** Edwards AFB, Calif.; Eglin AFB, Fla.; Nellis AFB, Nev.; other locations TBD.

**Contractor:** Lockheed Martin, with BAE Systems, Northrop Grumman, Pratt & Whitney.

**Power Plant:** F-35A: one Pratt & Whitney F135-PW-100, 40,000 lb thrust.

**Accommodation:** pilot.

**Dimensions:** span 35 ft, length 51.4 ft, height 14.4 ft.

**Weight:** max T-O 70,000 lb.

**Ceiling:** 50,000 ft.

**Performance:** speed Mach 1.6 with full internal weapons load, range 1,380 miles.

**Armament:** F-35A: one 25 mm GAU-22/A cannon and up to 18,000 lb on 10 weapons stations—four stations inside two weapons bays (for maximum stealth) and three stations on each wing; standard internal loadout: two AIM-120 AMRAAMs and two GBU-31 JDAMs.

#### COMMENTARY

The F-35 is a joint and multinational program aimed at developing and fielding an affordable, highly common family of next generation strike fighters. For US forces, F-35A conventional takeoff and landing (CTOL) variant for the Air Force, the F-35B short takeoff and vertical landing (STOVL) variant for USMC, and F-35C carrier variant (CV) variant 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.

#### Extant Variant(s)

■ F-35A. First flight by a USAF test pilot on Jan. 30, 2008. F-35A achieved supersonic speed for the first time in November 2008. First weight-optimized F-35A—dubbed AF-1—flew for the first time Nov. 14, 2009. On May 5, 2011, USAF received its first production aircraft—dubbed AF-7—built as part of Lot 1 LRIP. F-35 joint schoolhouse at Eglin received its first F-35, a production model F-35A CTOL variant, on July 14, 2011. On Feb. 28, 2012, USAF cleared



F-35 Lightning II (Lockheed Martin photo)

the F-35s at Eglin schoolhouse for initial flight operations. All variants are 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.

**Accommodation:** officer: two pilots, navigator, fire-control officer, EWO; enlisted: flight engineer, TV operator, infrared detection set operator, loadmaster, four aerial gunners.

**Dimensions:** span 132.6 ft, length 97.8 ft, height 38.5 ft.

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

**Ceiling:** 25,000 ft.

**Performance:** speed 300 mph, range 1,300 miles.

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

cannon (256 rd), and one 105 mm Howitzer (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.

#### Extant Variant(s)

■ AC-130H Spectre. Serves with 27th Special Operations Wing at Cannon. Equipped with digital fire-control computer, EO sensors, target-acquisition systems, including FLIR sensor and low-light-level television (LLTV), and capable of in-flight refueling. Advanced fire-control computers, navigation, communications, and sensor suites. Planned mods 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.

### CV-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:** 19.

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

**Contractor:** Boeing, Bell Helicopter Textron.

**Power Plant:** two Rolls Royce-Allison AE1107C turboshafts, each 6,200 shp.

**Accommodation:** crew: officer: two pilots; enlisted: two flight engineers. Load: 24 troops seated, 32 troops on floor, or 10,000 lb cargo.

**Dimensions:** span 84.6 ft, length 57.3 ft, height 22.1 ft, rotor diameter 38 ft.

**Weight:** max vertical T-O 52,870 lb; max rolling T-O 60,500 lb.

**Ceiling:** 25,000 ft.

**Performance:** cruise speed 277 mph, combat radius 575 miles with one internal auxiliary fuel tank, self-deploy 2,100 miles with one in-flight refueling.

**Armament:** one .50-caliber machine gun on ramp.

#### COMMENTARY

Multiengine, dual-piloted, self-deployable, medium-lift vertical takeoff and landing (VTOL) tilt-rotor



AC-130H Spectre (SrA. Julianne Showalter)

aircraft, operated by both the US Air Force and US Marine Corps. 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. Equipped with fully integrated precision navigation suite, a digital cockpit management system, FLIR, integrated NVG HUD, TF/TA radar, digital map system. Has robust self-defense avionics and secure anti-jam communications. Ongoing Block 20 improvements enhance reliability/maintainability, self-deployment capability, and avionics and communications/navigation systems.

**MC-130E/H 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: officer: two pilots, two navigators, EWO; enlisted: flight engineer, radio operator, two loadmasters. MC-130E load: 53 troops or 26 paratroopers. MC-130H crew: officer: two pilots, navigator, EWO; enlisted: flight engineer, two loadmasters. MC-130H load: 77 troops, 52 paratroopers, or 57 litters.

**Dimensions:** span 132.6 ft, height 38.5 ft, length 100.8 ft (MC-130E), 99.8 ft (MC-130H).

**Weight:** max T-O 155,000 lb.

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

**Performance:** speed 300 mph (MC-130H), range 3,105 miles.

**COMMENTARY**

Special operations mobility aircraft. Used primarily to conduct infiltration, resupply, and exfiltration of SOF. Capable of airdrop using Joint Precision Airdrop System, landing on austere and unmarked landing zones. Can support psychological operations with leaflet bundle drops. Equipped with 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.

**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-130P Combat Shadow**

**Brief:** Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide air refueling for SOF helicopters or for airdrop/resupply of special operations teams.

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



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

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

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

**Delivered:** from 1965.

**IOC:** 1986.

**Production:** (converted).

**Inventory:** 27.

**Aircraft Location:** Hurlburt Field, 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:** officer: two pilots, two navigators; enlisted: flight engineer, communications systems operator, two loadmasters.

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

**Weight:** max T-O 155,000 lb.

**Ceiling:** 33,000 ft.

**Performance:** speed 290 mph, range 4,000+ miles.

**COMMENTARY**

Specialized tanker aircraft flies clandestine formation or single-ship intrusion of hostile territory missions to provide air refueling of SOF helicopters and the infiltration, exfiltration, and resupply of SOF by airdrop or air-land operations.

**Extant Variant(s)**

■ MC-130P. Mods include fully integrated INS/GPS system, NVG-compatible interior and exterior lighting, FLIR, radar and missile warning receivers, chaff and flare dispensers, satellite and data-burst communications.

**MC-130W Combat Spear/Dragon Spear**

**Brief:** Aircraft that flies clandestine or low-visibility, low-level missions into denied areas to provide (Dragon Spear) armed overwatch or (Combat Spear) air refueling and airdrop for special operations activities.

**Function:** Armed overwatch or air refueling for SOF helicopter and tilt-rotor aircraft and airdrop.

**Operator:** AFSOC.

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

**Delivered:** June 2006.

**IOC:** 2007.

**Production:** 12 (converted).

**Inventory:** 12.

**Aircraft Location:** Cannon AFB, N.M.

**Contractor:** Lockheed Martin.

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

**Accommodation:** Combat Spear: officer: two pilots, two navigators; enlisted: flight engineer, two loadmasters. Dragon Spear: officer: two pilots, two CSOs; enlisted: flight engineer, two loadmasters/gunners.

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

**Weight:** max T-O 155,000 lb.

**Ceiling:** 33,000 ft.

**Performance:** speed 300 mph, range 3,105 miles.

**Armament:** Bushmaster II side-firing, trainable 30 mm Mk 44 cannon; PGMs.

**COMMENTARY**

A C-130H significantly modified to include an EW



MC-130J Commando II (SrA. James Bell)

capability, low-light-level operational capability, and a strengthened tail to permit high-speed, low-level air-drop operations. Converts to Dragon Spear mode with addition of roll-on/roll-off precision strike package (PSP). Mods include GPS/INS, advanced radar and missile warning receivers, chaff and flare dispensers, and active IR countermeasures.

#### 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.

■ **MC-130W Dragon Spear** (also known unofficially as AC-130W Stinger II). Configured with roll-on/roll-off PSP to perform armed overwatch and CAS reconnaissance over friendly positions for threat prevention. Still maintains limited mobility capability but also can provide strike coordination, nontraditional ISR, and C2. PSP mod includes BM system and sensors.

#### MC-130J Commando II

**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/resupply special operations forces.

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

**Operator:** AETC, AFSOC.

**First Flight:** April 20, 2011.

**Delivered:** September 2011.

**IOC:** 2011.

**Production:** (converted).

**Inventory:** four.

**Aircraft Location:** Cannon AFB, N.M.; Kirtland AFB, N.M.

**Contractor:** Lockheed Martin (airframe), Boeing.  
**Power Plant:** four Rolls Royce AE2100D3 turbo-props, each 4,591 shp.

**Accommodation:** crew: officer: two pilots, CSO; enlisted: two loadmasters. Load: not available.

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

**Weight:** max T-O 164,000 lb.

**Ceiling:** 28,000 ft with 42,000 lb payload.

**Performance:** speed 416 mph, range 3,000 miles.

#### 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. Has secondary mission of leaflets airdrop. Replacing MC-130E and MC-130P tankers. USAF officially changed name from Combat Shadow II to Commando II in March 2012.

#### Extant Variant(s)

■ **MC-130J.** Mods include fully integrated INS/GPS systems, color LCDs, NVG lighting, HUDs, integrated defensive systems, digital moving map display, EO/IR system, dual satcom for voice/data, enhanced cargo-handling system, and enhanced service life wing. Also has fully populated CSO and auxiliary flight deck stations. Improvements over MC-130P reduces crew size, leaving the CSO to handle helicopter refueling process normally run by flight engineer, and loadmasters to handle other flight engineer and communications operator functions.

## 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 C2 for tactical and air defense forces.

**Function:** Airborne early warning, tactical 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:** 21 E-3B; nine E-3C; two E-3G.



**E-3 Sentry** (SrA. Brett Clashman)

**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-100A turbofans, each 21,000 lb thrust.

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

**Dimensions:** span 145.8 ft, length 152.9 ft, height 41.8 ft.

**Weight:** max T-O 335,000 lb.

**Ceiling:** above 35,000 ft.

**Performance:** speed 360 mph, range 5,000+ miles.

#### COMMENTARY

Battle management aircraft—airborne warning and control system (AWACS)—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.

#### Extant Variant(s)

■ **E-3B.** Upgrade of earliest E-3A. Equipped with much-enhanced computer capabilities, jam-resistant communications, austere maritime surveillance capability, upgraded radio communications, and five additional mission consoles. Completed in 1994. Received Block 30/35 mods, integrating and enhancing four major subsystems; completed in 2001. Installing interim next generation IFF capability to ensure Block 30/35 aircraft meet new IFF requirements while awaiting Block 40/45 upgrade.

■ **E-3C.** Upgrade from E-3A, including five additional mission consoles and Have Quick anti-jamming equipment. Received Block 30/35 upgrades. Also receiving interim next generation IFF.

■ **E-3G.** Designation applied to Block 40/45 upgraded aircraft. Two modified as of February 2012, with entire fleet conversion planned by 2020. Considered the most comprehensive upgrade in E-3 program history, Block 40/45 mod will enhance tracking and combat identification capabilities, enhance mission effectiveness, improve mission system reliability, and lower life-cycle costs. Mods include a new mission computer system, using an open architecture with some 50 COTS computers

and 24 COTS software products and automated processes to greatly reduce operator workload; new operator consoles; improved electronic support measures (ESM) passive surveillance capability; and full next generation IFF. USAF expects Block 40/45 IOC by fall 2014.

#### E-4 National Airborne Operations Center

**Brief:** A four-engine, swept-wing, long-range high-altitude airplane providing a highly survivable 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.

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

**Accommodation:** up to 112 flight crew and mission crew.

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

**Weight:** max T-O 800,000 lb.

**Ceiling:** above 30,000 ft.

**Performance:** speed 602 mph, range 7,130 miles.

#### COMMENTARY

Militarized version of the Boeing 747-200. Performs the National Airborne Operations Center (NAOC) mission. Provides survivable C3 platform in all situations, including sustained operations in a nuclear environment.

#### Extant Variant(s)

■ **E-4B.** Hardened against the effects of nuclear explosions, including electromagnetic pulse (EMP). 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. The last aircraft has received the Modernization Block 1



**E-4B National Airborne Operations Center** (TSgt. Jerry Morrison)

upgrade, which updated the electronic and communications infrastructure, utilizing COTS hardware and software. However, this final aircraft received a different physical configuration for its Audio Infrastructure Upgrade (AIU) because of diminishing manufacturing sources, so USAF plans to retrofit the first three to ensure a standard AIU configuration.

#### E-8 JSTARS

**Brief:** A modified Boeing 707-300 series with long-range air-to-ground radar capable of locating, classifying, and tracking moving ground vehicles 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:** flight crew: four; mission crew: 15 Air Force and three Army operators (can be augmented according to mission).

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

**Weight:** max T-O 336,000 lb.

**Ceiling:** 42,000 ft.

**Performance:** speed 584 mph (optimal orbit), range 9 hr normal endurance, longer with air refueling.

#### COMMENTARY

Aircraft equipped with canoe-shaped radome under the forward fuselage housing a 24-ft-long side-looking phased array antenna capable of locating, classifying, and tracking vehicles on the ground. 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.

#### Extant Variant(s)

■ E-8C. Production version delivered from 1996 to 2005. Earlier aircraft retrofitted to final production Block 20, featuring more powerful computers, an Internet protocol local area network, and BLOS connectivity. USAF plans to retire one aircraft damaged beyond economical repair, but others expected to remain in service until 2034. Development testing of the first new production-configured Pratt & Whitney JT8D-219 engine on the JSTARS test aircraft completed in 2011, while overall system design and development continues in 2012. With some COTS mission equipment now 20 years old, USAF is pursuing new upgrades to operator workstation computers and the radar processor.

#### EC-130J 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:** seven EC-130J.

**Inventory:** three.

**Aircraft Location:** Harrisburg Arpt., Pa.

**Contractor:** Lockheed Martin, Raytheon, General Dynamics.

**Power Plant:** four Rolls Royce-Allison AE2100D3 turboprops, each 6,000 shp.

**Accommodation:** officer: two pilots, flight systems officer, mission systems officer; enlisted: two loadmasters, five electronic communications systems operators.

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

**Weight:** max T-O 164,000 lb.

**Ceiling:** 28,000 ft.

**Performance:** speed 335 mph cruise, range 2,645 miles.



E-8 JSTARS (Northrop Grumman photo)

#### COMMENTARY

A psychological operations aircraft employed in every US war and most other contingency operations since 1980 (EC-130E), supporting a broad spectrum of information operations and psyops missions.

#### Extant Variant(s)

■ EC-130J Commando Solo. Used by ANG's 193rd SOW as a broadcasting station for psychological warfare operations. Specialized mods include enhanced navigation systems, self-protection equipment, and worldwide color television configuration. Air refuelable. First entered service in 2004.

#### EC-130H Compass Call

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

**Function:** Electronic warfare.

**Operator:** ACC.

**First Flight:** 1981.

**Delivered:** 1982.

**IOC:** 1983; Block 30 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:** officer: two pilots, navigator, two EWOS; enlisted: flight engineer, mission crew supervisor (crypto logic experienced), four crypto logic linguists, acquisition operator, and airborne maintenance technician.

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

**Weight:** max T-O 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. Mods include electronic attack (EA) system and air refueling capability. All aircraft retrofitted to Block 35. Mission equipment baseline upgrades occur about every three years to ensure continued protection against evolving threats. Also replacing center wing box to meet wing service life expiration.

#### MC-12W Project Liberty

**Brief:** A medium- to low-altitude, twin-engine turboprop ISR version of the militarized C-12, based



MC-12W Project Liberty

on the Beechcraft Super King Air 350/350ER.

**Function:** Manned tactical ISR.

**Operator:** ACC, ANG.

**First Flight:** April 2009.

**Delivered:** April 2009.

**IOC:** May 2009.

**Production:** 42 (planned).

**Inventory:** 37.

**Aircraft Location:** Beale AFB, Calif.; Key Field, Miss. (initial weapon system training). Other TBD.

**Contractor:** Hawker Beechcraft, L3 Communications.

**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:** max T-O 15,000 lb (350) and 16,500 lb (350ER).

**Ceiling:** 35,000 ft.

**Performance:** speed 359 mph; range 1,725 miles (350) and 2,760 miles (350ER).

#### COMMENTARY

Acquired to augment RPA systems operating in Southwest Asia, this sensor-equipped C-12 is a complete collection, processing, analysis, and dissemination system. It provides ground forces with targeting data and other tactical intelligence. The MC-12W began operations in Iraq in June 2009 and in Afghanistan in December 2009.

#### Extant Variant(s)

■ MC-12W. Initial mod to first seven aircraft—used King Air 350s—included full-motion video (FMV), LOS satcom data link to ROVER system, limited Sigint, and basic BLOS connectivity. Subsequent mod to remaining 30 aircraft—based on King Air 350ER—includes enhanced FMV with laser designator, more robust Sigint, and increased bandwidth for BLOS connectivity. Before joining the fleet, an additional five aircraft are completing mod to Phase 3 configuration, including a high-definition EO/IR sensor with Hi-beam capability, enhanced communications equipment, digital intercom control system, and tactical air navigation (TACAN) system. Phase 3 mods also will be applied to 33 of the original 37 aircraft.

#### MQ-1 Predator

**Brief:** A medium-altitude, long-endurance RPA, providing joint force commanders with a multimission asset that combines imagery sensors with strike capability.

**Function:** Armed reconnaissance, airborne sur-



**MQ-9 Reaper** (SrA. Julianne Showalter)

veillance, target acquisition.  
**Operator:** ACC, AFSOC, ANG, AFRC.  
**First Flight:** July 1994.  
**Delivered:** July 1994 (USAF from 1996)-2011.  
**IOC:** 2005.  
**Production:** 268 air vehicles.  
**Inventory:** 169.  
**GCS Location:** 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.; Springfield-Beckley Arpt., Ohio.; Whiteman AFB, Mo.  
**Aircraft Location:** Cannon AFB, N.M.; Creech AFB, Nev.; Fort Polk Airfield, La.; Fort Huachuca, Ariz.; Grand Forks AFB, N.D.; Holloman AFB, N.M.; March ARB, Calif.; Whiteman AFB, Mo.  
**Contractor:** General Atomics Aeronautical Systems.  
**Power Plant:** one Rotax 914F turbo engine.  
**Accommodation:** GCS: pilot, sensor operator.  
**Dimensions:** span 55 ft, length 27 ft, height 6.9 ft.  
**Weight:** max T-O 2,250 lb.  
**Ceiling:** 25,000 ft.  
**Performance:** speed 84-135 mph, range 770 miles, max endurance 40 hr.  
**Armament:** Two AGM-114 Hellfire missiles.

**COMMENTARY**

Fullly operational system comprises four air vehicles, GCS, satellite link, and about 55 personnel for 24-hour operations. Became a fully USAF system in 1996. Systems armed with two Hellfire missiles since 2002, at which time designation changed from RQ-1 to MQ-1 to denote multi-mission capability. USAF forward deploys launch and recovery element (LRE) systems and support personnel for takeoff and landing operations, while the CONUS-based GCS conducts the mission via extended communication links.

**Extant Variant(s)**

■ MQ-1B. Multi-mission weaponized RPA. Employs near real-time FMV and MTS-A multispectral targeting system, which provides a laser designator and laser illuminator with EO/IR sensors in a single package. GCS controls the RPA via LOS data link or BLOS satcom data link. USAF received its last MQ-1B in March 2011.

**MQ-9 Reaper**

**Brief:** A medium-to-high altitude, long-endurance RPA. Operates as a persistent hunter-killer.  
**Operator:** ACC, AFSOC, ANG.  
**First Flight:** February 2001.  
**Delivered:** November 2003.  
**IOC:** October 2007.  
**Production:** 319 (planned).  
**Inventory:** 77.  
**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.; Fort Drum, N.Y.; Holloman AFB, N.M.; Nellis AFB, Nev.  
**Contractor:** General Atomics Aeronautical Systems.  
**Power Plant:** one Honeywell TPE331-10GD turboprop, max 900 shp.

**Accommodation:** GCS: pilot, sensor operator.  
**Dimensions:** span 66 ft, length 36 ft, height 12.5 ft.  
**Weight:** max T-O 10,500 lb.  
**Ceiling:** 50,000 ft.  
**Performance:** cruise speed 230 mph, range 1,150 miles, endurance 14+ hr.  
**Armament:** combination of AGM-114 Hellfires, GBU-12/49 Paveway IIs, and GBU-38 JDAMs.

**COMMENTARY**

System comprises several aircraft, GCS, a Predator Primary Satellite Link (PPSL), and spare equipment and operations and maintenance crews for deployed 24-hour operations. Delivers capabilities using mission kits with various weapons and sensors payload combinations.

**Extant Variant(s)**

■ MQ-9B Reaper. Operational in Afghanistan since 2007. The baseline aircraft has an MTS-B multispectral targeting system, integrating an EO/IR sensor, color/monochrome daylight TV camera, image-intensified TV camera, laser designator (enabling laser guided munitions), and laser illuminator in a single package. The MTS-B sensors provide FMV as separate video streams or fused together. Also employs SAR for GBU-38 JDAM targeting. Procurement of advanced Airborne Signals Intelligence Payload (ASIP-2C) has been delayed, with eight planned for FY14. Ongoing enhancements include upgrading current satcom capability to use government-owned Ka satcom networks and continuing fielding of the Gorgon Stare payload on specially modified Reapers to provide broad area sensor coverage.

**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 turbofans, each 16,050 lb thrust.  
**Accommodation:** flight crew: two pilots, two navigators, and two sensor maintenance technicians; Defense Threat Reduction Agency mission crew: mission commander, deputy, two sensor operators, and one flight follower; total seating: 35, incl space for foreign country representatives.  
**Dimensions:** span 131 ft, length 135 ft, height 42 ft.  
**Weight:** max T-O 297,000 lb.  
**Ceiling:** 50,000 ft (basic C-135).  
**Performance:** speed 500+ mph, range 3,900 miles.

**COMMENTARY**

A modified WC-135B 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 3,000 ft above the ground, and one KA-91C panoramic camera that provides a wide sweep for each picture and is used for high-altitude photography at approximately 35,000 ft. The data annotation and recording system notes position, altitude, time, roll angle, and other data for each photo.

**RC-26 Condor**

**Brief:** Specially configured variant of the Fairchild SA227-DC C-26 Metro 23 with surveillance and communications equipment for use in domestic and overseas counterdrug efforts and 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:** Ellington Field, Tex.; Fairchild AFB, Wash.; Fresno Yosemite Arpt., Calif.; Hancock Field, N.Y.; Jacksonville Arpt., Fla.; Key Field, Miss.; Kirtland AFB, N.M.; Montgomery Regional Arpt., Ala.; Truax Field, Wis.; Tucson Arpt., Ariz.; Yeager Arpt., W.Va.  
**Contractor:** Fairchild (airframe).  
**Power Plant:** two Garrett TPE331-12UAR-701 turboprops, each 1,100 shp.  
**Accommodation:** two pilots, one navigator-mission systems operator.  
**Dimensions:** span 57 ft, length 59.5 ft, height 16.6 ft.  
**Weight:** max T-O 16,500 lb.  
**Ceiling:** 25,000 ft.



**OC-135 Open Skies** (A1C Willard E. Grande II)

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

#### COMMENTARY

Militarized ISR platform used primarily in counterdrug operations and increasingly during natural disasters such as hurricanes and wildfires. Provides real-time streaming video footage to ground personnel.

#### 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. Six aircraft modified to Block 25, adding additional communication capabilities and self-protection, for special operations missions. National Guard is seeking, at a minimum, to upgrade Block 20 aircraft with new flight deck avionics, new onboard mission system operator station, and improved onboard communications suite.

#### RC-135S Cobra Ball

**Brief:** A Masint collector equipped with special EO instruments for observing ballistic missile flights at long range.

**Function:** Electronic reconnaissance aircraft.

**Operator:** ACC.

**First Flight:** not available.

**Delivered:** circa 1969-99.

**IOC:** circa 1972.

**Production:** converted.

**Inventory:** three RC-135S; one TC-135S.

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

**Contractor:** Boeing (original airframe), L3 Communications.

**Power Plant:** four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

**Accommodation:** flight crew: two pilots, navigator. Mission crew: officer: three EWOs; enlisted: two airborne systems engineers, two airborne mission specialists.

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

**Weight:** max T-O 297,000 lb.

**Ceiling:** 45,000 ft.

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

#### COMMENTARY

Monitors missile-associated signatures and tracks missiles during boost and re-entry phases to provide reconnaissance for treaty verification and theater ballistic missile proliferation.

#### Extant Variant(s)

■ RC-135S Cobra Ball. Provides the capability to collect optical and electronic data on ballistic 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.

■ TC-135S. Used for training purposes.

#### RC-135U Combat Sent

**Brief:** Designed to collect technical intelligence on adversary radar emitter systems.

**Function:** Electronic reconnaissance aircraft.

**Operator:** ACC.

**First Flight:** not available.

**Delivered:** circa 1970-78.

**IOC:** circa 1970s.

**Production:** converted.

**Inventory:** two.

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

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

**Power Plant:** four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

**Accommodation:** flight crew: two pilots, two navigators, two airborne systems engineers; mission crew: 10 EW officers, six or more electronic, technical, mission area specialists.

**Dimensions:** span 135 ft, length 140 ft, height 42 ft.

**Weight:** max T-O 299,000 lb.

**Ceiling:** 35,000 ft.

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

#### COMMENTARY

Collects and examines data on airborne, land,



RC-135S Cobra Ball (MSgt. Robert Wieland)

and naval radar systems, providing strategic analysis for National Command Authorities and combatant forces. Distinctive antennae arrays on the chin and wing tips, large cheek fairings, and extended tail. Each airframe has slightly unique reconnaissance equipment.

#### Extant Variant(s)

■ RC-135U Combat Sent. Uses special Sigint suite to collect scientific and technical Elint data against air-, land-, and sea-based emitter systems. Critical to effective design, programming, and reprogramming of RWRs as well as jammers, decoys, and anti-radiation missiles and to the development of effective threat simulators.

#### RC-135V/W Rivet Joint

**Brief:** Contains highly advanced electronic signal collection systems to acquire real-time Elint and Sigint data for the theater and tactical commanders.

**Function:** Electronic reconnaissance aircraft.

**Operator:** ACC.

**First Flight:** not available.

**Delivered:** circa 1973-99. Continuous equipment updates.

**IOC:** circa 1973.

**Production:** converted.

**Inventory:** eight RC-135V; nine RC-135W; two TC-135W.

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

**Contractor:** Boeing (original airframe), L3 Communications.

**Power Plant:** four CFM International F108-CF-201 turbofans, each 21,600 lb thrust.

**Accommodation:** flight crew: three pilots, two navigators; mission crew: three EW officers, 14 intelligence operators, four airborne maintenance technicians, and up to six more depending on mission.

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

**Weight:** max T-O 297,000 lb.

**Ceiling:** 50,000 ft.

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

#### COMMENTARY

Extensively modified C-135, performing worldwide reconnaissance missions to detect, identify, and geolocate signals throughout the electromagnetic spectrum.

#### Extant Variant(s)

■ 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. Planned mods include more robust communications intelligence (Comint), precision Elint upgrade, global satcom, and enhanced cockpit avionics.

■ TC-135W. Used for training purposes.

#### RQ-4 Global Hawk

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

**Function:** Unmanned surveillance and reconnaissance aircraft.

**Operator:** ACC.

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

**Delivered:** from 1995 (Advanced Concept Technology Demonstration versions).

**IOC:** Block 30 August 2011; Block 40 FY14 (planned)

**Production:** TBD.

**Inventory:** 25.

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

**Contractor:** Northrop Grumman, Raytheon, L3 Communications.

**Power Plant:** one Rolls Royce-North American F137-RR-100 turbofan, 7,600 lb thrust.

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

**Dimensions:** span 130.9 ft, length 47.6 ft, height 15.3 ft.

**Weight:** max T-O 32,500 lb.

**Ceiling:** 60,000 ft.

**Performance:** speed 356.5 mph, range 10,000 miles.

#### COMMENTARY

The system consists of an aircraft with an integrated sensor suite, LRE, MCE, and communications and mission planning equipment. November 2001 (ACTD system in Afghanistan.)

#### Extant Variant(s)

■ Block 20 (Imint). Larger than original Block 10 (version retired in FY11), adding an enhanced integrated sensor suite (EISS) in an Imint-only configuration. Four being converted to new EQ-4

communications relay configuration, employing 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 advanced Sigint program electronic signal collection sensor to provide a Multi-int capability. FY13 budget decision would terminate Block 30 variant which proved more expensive to operate than the U-2 aircraft it was intended to replace; USAF plans to place them in storage. Supported combat operations in Afghanistan, Iraq, and Libya and humanitarian relief efforts following Japan's 2011 earthquake and massive tsunami.

■ **Block 40.** A multimission platform expected to provide SAR/MTI, Imint, and BMC2 support, utilizing the multiplatform radar technology insertion program (MP-RTIP) AESA radar to simultaneously collect imagery intelligence on stationary ground targets and track ground moving targets. IOC expected in FY14.

### U-2 Dragon Lady

**Brief:** Single-seat, single-engine, high-altitude endurance reconnaissance aircraft carrying a wide variety of sensors and cameras.

**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 TU-2 trainers.

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

**Contractor:** Lockheed Martin.

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

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

**Dimensions:** span 105 ft, length 63 ft, height 16 ft.

**Weight:** max T-O 40,000 lb.

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

**Performance:** speed 410 mph, range 7,000+ miles.

### COMMENTARY

The U-2 is the Air Force's premier high-altitude reconnaissance platform, capable of carrying Multi-int sensors simultaneously. 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 of the aircraft. Conversion to S model configuration began in October 1994.

### Extant Variant(s)

■ **U-2S.** A single-seat aircraft. Each current operational 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. Additional mods planned to extend operations to 2040.

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

### WC-130 Hercules

**Brief:** A high-wing, medium-range aircraft flown into the eye of tropical cyclones or hurricanes to collect weather data from within the storm's environment.

**Function:** Weather reconnaissance aircraft.

**Operator:** AFRC.

**First Flight:** circa 1996 (production J model).

**Delivered:** September 1999-2002.

**IOC:** 2005.

**Production:** 10.

**Inventory:** 10.

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

**Contractor:** Lockheed Martin.

**Power Plant:** four Rolls Royce AE2100D3 turboprops, each 4,700 shp.

**Accommodation:** two pilots, navigator, aerial reconnaissance weather officer, weather recon loadmaster/dropsonde system operator.

**Dimensions:** span 132.5 ft, length 99.3 ft, height 38.5 ft.

**Weight:** max T-O 155,000 lb.



**U-2 Dragon Lady** (1st Lt. Victoria Porto)

**Ceiling:** 28,000 ft.

**Performance:** speed 417 mph at 22,000 ft, range 1,841 miles with payload, endurance 18 hr at 300 mph.

### COMMENTARY

Flown by AFRC's "Hurricane Hunters" to provide forecasting data for tropical disturbances and storms, hurricanes, and winter storms. An average mission lasts 11 hours and covers almost 3,500 miles. Configured with palletized weather instrumentation.

### Extant Variant(s)

■ **WC-130J.** Weather reconnaissance version of the most recent C-130 model, operated by the 53rd WRS for weather reconnaissance duties. Includes two external 1,400-gallon fuel tanks and internal 1,800-gallon tank. Features include improved radar and Dowty 391 six-bladed composite propellers. Equipment includes the GPS Dropsonde Wind-finding System, equipped with HF radio and sensing devices and released about every 400 miles over water, measuring and relaying to the aircraft a vertical atmospheric profile.

### WC-135 Constant Phoenix

**Brief:** Collects 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.

**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-5 turbofans, each 16,050 lb thrust.

**Accommodation:** seating for 33, incl cockpit crew.

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

**Weight:** max T-O 300,500 lb.

**Ceiling:** 40,000 ft,

**Performance:** speed 403 mph, range 4,600 miles.

### COMMENTARY

Program commissioned by Gen. Dwight D. Eisenhower on Sept. 16, 1947, using modified B-29 aircraft. In September 1949, a WB-29 flying between Alaska and Japan detected nuclear debris from Russia's first atomic test, much earlier than anticipated. Today, the air-sampling mission supports the Limited Nuclear Test Ban Treaty of 1963.

### Extant Variant(s)

■ **WC-135W.** Either a modified C-135B or EC-135C (former Looking Glass aircraft). Collection suite allows mission crew to detect radioactive "clouds" in real time. The aircraft has 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 from Det. 1, Air Force Technical Applications Center, at Offutt.

## Tanker Aircraft

### HC-130N/P King

**Brief:** An extended-range, CSAR-configured C-130



**WC-135W Constant Phoenix** (Josh Plueger)



**HC-130 King (l) and an HH-60 Pave Hawk (r) (USAF)**

that extends the range of rescue helicopters through in-flight refueling and performs tactical delivery of pararescue 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 converted N/P models.

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

**Accommodation:** officer: two pilots, navigator; enlisted: flight engineer, airborne comm specialist, two loadmasters, three PJs.

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

**Weight:** max T-O 155,000 lb.

**Ceiling:** 33,000 ft.

**Performance:** speed 289 mph at S-L, range 4,000+ miles.

**COMMENTARY**

Conducts operations to austere airfields and denied territory for expeditionary, all-weather personnel recovery operations, including airdrop, air-land, helicopter air-to-air refueling and forward areas refueling point missions. Secondary roles include humanitarian assistance, disaster response, security cooperation/aviation advisory, emergency medical evacuation, noncombatant evacuation, and spaceflight support for NASA. Features include integrated GPS/INS navigation package, NVG lighting, FLIR, radar/missile warning receivers, chaff/flare countermeasures dispensers, and data-burst communications. FY13 funding would upgrade the Personnel Locator Systems of the 14 so-equipped N/P models.

**Extant Variant(s)**

■ HC-130N. C-130H model modified with C-130E model radome, new center wing section, and the capability to refuel helicopters aurally.

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

**HC-130J Combat King II**

**Brief:** An extended range version of the C-130J dedicated as a personnel recovery platform, designed to operate in hostile environments and provide C2 and helicopter in-flight refueling.

**Function:** Aerial refueling/transport.

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

**First Flight:** July 29, 2010.

**Delivered:** from 2010.

**IOC:** 2013 planned.

**Production:** 37 planned.

**Inventory:** two.

**Aircraft Location:** Davis-Monthan AFB, Ariz.;

Kirtland AFB, N.M. Planned: Francis S. Gabreski Arpt., N.Y.; JB Elmendorf-Richardson, Alaska; Moody AFB, Ga.; Patrick AFB, Fla.

**Contractor:** Lockheed Martin.

**Power Plant:** four Rolls Royce AE2100D3 turboprops, each 4,591 shp.

**Accommodation:** flight crew: two pilots, CSO, two loadmasters.

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

**Weight:** max T-O 164,000 lb.

**Ceiling:** 33,000 ft.

**Performance:** speed 363.4 mph at S-L, range 4,000+ miles.

**COMMENTARY**

Replacing HC-130N/Ps. Based on KC-130J tanker baseline with enhanced service life wing, enhanced cargo handling system, boom refueling receptacle, EO/IR sensor, CSO console on flight deck, and dual satcom. Features also include INS/GPS, NVG-compatible lighting, FLIR, radar/missile warning receivers, chaff and flare dispensers.

**Extant Variant(s)**

■ HC-130J. Modified version of USMC KC-130J. First ACC aircraft delivered to 79th RQS at Davis-Monthan Sept. 24, 2011; first training aircraft delivered to 58th SOW at Kirtland Sept. 29, 2011. Plans also would add the Lightweight Airborne Radio System V12 to speed locating personnel and add the ALQ 213 EW management system to automate/integrate defensive systems.

**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 AE 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: two pilots, flight engineer, boom operator; AE crew: two flight nurses, three medical technicians; other crew depending on mission. Load: up to 75 people and 17 pallets or 27 pallets—a total of nearly 170,000 lb.

**Dimensions:** span 165.4 ft, length 181.6 ft, height 58 ft.

**Weight:** max T-O 590,000 lb.

**Ceiling:** 42,000 ft.

**Performance:** speed 619 mph, range 11,500 miles, or 4,400 miles with max cargo.

**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 within the same mission. Can be air refueled by a KC-135 or another KC-10.

**Extant Variant(s)**

■ KC-10A. DC-10 Series 30CF, modified to include three large fuel tanks under the cargo floor, an air refueling operator's station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. FY13 budget includes upgrades to communications, navigation, and surveillance equipment to meet civil air traffic requirements. Service life expected through 2045.

**KC-46**

**Brief:** A modified Boeing 767-200R that will provide air refueling capability for any military fixed-wing aircraft and carry simultaneously a mixed load of passengers, patients, and palletized cargo.

**Function:** Aerial refueling/transport.

**Operator:** AMC.

**First Flight:** early 2015 (planned).

**Delivered:** from 2017 (planned).

**IOC:** TBD.

**Production:** 179.

**Inventory:** zero.

**Aircraft Location:** TBD.

**Contractor:** Boeing.

**Power Plant:** two Pratt & Whitney 4062, each 62,000 lb thrust.

**Accommodation:** 15 crew seats, incl aeromedical evacuation crew. Passenger load: 58 or up to 114 for contingency operations. AE load: 58 patients (24 litters and 34 ambulatory). Cargo load: 18 pallet positions, max 65,000 lb.

**Dimensions:** span 157.7 ft, length 165.5 ft, height 52.8 ft.

**Weight:** max T-O 415,000 lb.

**Ceiling:** 43,000 ft (767).

**Performance:** (767) cruise speed 530 mph, range 6,500 miles.

**COMMENTARY**

Boeing awarded contract for 179 KC-46A tankers, the first increment toward replacing USAF's KC-135R fleet, on Feb. 24, 2011. Compared to



**KC-10 Extender (TSgt. Charles Larkin Sr.)**

the 50-year-old KC-135, the KC-46A will have enhanced refueling capabilities, including more fuel capacity, improved efficiency, and enhanced cargo and AE capability. Like the KC-10, it will employ both an advanced refueling boom and independently operating hose and drogue system.

#### Extant Variant(s)

■ **KC-46A.** By early 2012, Boeing completed several major milestones in the design and development phase, leading USAF to expect on-time delivery of the first 18 combat-ready KC-46As by 2017.

#### 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 AE 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:** 360 KC-135R; 54 KC-135T.

**Aircraft Location:** Altus AFB, Okla.; Fairchild AFB, Wash.; Grissom ARB, Ind.; JB Andrews, 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:** four CFM International CFM56-2 (USAF designation F108) turbofans, each 21,634 lb thrust.

**Accommodation:** flight crew: two pilots, boom operator, plus navigator depending on mission; AE crew: two flight nurses, three medical technicians (adjusted for patient needs). Load: 37 passengers, six cargo pallets, max 83,000 lb.

**Dimensions:** span 130.8 ft, length 136.3 ft, height 41.7 ft.

**Weight:** max T-O 322,500 lb.

**Ceiling:** 50,000 ft.

**Performance:** speed 530 mph; range 1,500 miles with 150,000 lb transfer fuel, up to 11,015 miles for ferry mission.

#### COMMENTARY

Mainstay of the USAF tanker fleet for some 50 years, similar in size and appearance to commercial 707 aircraft but designed to military specifications.

#### Extant Variant(s)

■ **KC-135R.** Re-engined KC-135As with CFM turbofan engines. Can operate from relatively short runways. First flight October 1982; deliveries started July 1984. Twenty were modified with the Multipoint Refueling System (MPRS), allowing the use of hose-and-drogue systems either on wing pods or attached to the end of the boom that enable them to refuel US Navy and NATO aircraft. The MPRS also allow them to refuel two aircraft at once, one on each wing pod. Other KC-135s may use the shuttlecock-shaped drogue attached to the boom. Upgrades include Pacer CRAG avionics and Block 30 safety mods (completed 2002) and GATM mod (completed 2011). Link 16 capability also added to a limited number. Plans call for Block 45 flight deck mods, including a new digital flight director, digital radar altimeter, and electronic engine instrument displays. Fleet service life projected to 2045.

■ **KC-135T** aircraft (formerly KC-135Q) can carry different fuels in the wing and body tanks. Under same upgrade programs as R models.

## Transports

#### C-5 Galaxy

**Brief:** A heavy-lift, air refuelable cargo transport for massive strategic airlift over long ranges, including oversize cargo.

**Function:** Cargo and troop transport.

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

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



**KC-135 Stratotanker (l) and an F-15 Eagle (r)** (MSgt. Scott Reed)

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

**IOC:** September 1970.

**Production:** 131.

**Inventory:** 42 C-5A; 43 C-5B; two C-5C; seven C-5M.

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

**Contractor:** Lockheed Martin.

**Power Plant:** four General Electric TF39-GE-1C turbofans, each 43,000 lb thrust; (C-5M) four General Electric F138-GE-100 turbofans.

**Accommodation:** crew: two pilots, two flight engineers, three loadmasters. Load: 81 troops and 36 standard pallets, max 270,000 lb. There is no piece of Army combat equipment the C-5 can't carry.

**Dimensions:** span 222.9 ft, length 247.1 ft, height 65.1 ft.

**Weight:** max T-O 840,000 lb.

**Ceiling:** 45,000 ft.

**Performance:** speed 518 mph, range 2,473 miles with max payload (plus additional 575 miles after offload).

#### 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 mod, extending service life by 30,000 flight hours. Incorporates avionic subsystems developed for C-5B. USAF plans to retire remaining A models.

■ **C-5B.** Embodies all improvements since completion of C-5A production, including strengthened wings, improved turbofans, and improved avionics, with color weather radar and triple INS. First flight September 1985. First delivery 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 (under Avionics Modernization Program) and new GE CF6-80C2 (F138) turbofans, with 200 percent increase in thrust. Equipped with other components installed under the Reliability Enhancement and Re-engining Program (RERP). First flight June 6, 2006. Developmental testing completed August 2008. Operational testing and evaluation concluded in 2010. First flight of production C-5M September 2010. Program completion is scheduled for 2017. Service life expected to at least 2040 for RERP aircraft.

#### C-9 Nightingale

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

**Function:** VIP 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 turbofans, each 14,500 lb thrust.

**Accommodation:** crew of three.

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

**Weight:** max T-O 108,000 lb.

**Ceiling:** 35,000 ft.

**Performance:** cruise speed 565 mph at 25,000 ft, range 2,500 miles.

#### COMMENTARY

A specially configured derivative of the DC-9 Series 30 commercial airliner. Only USAF aircraft modified specifically for the AE role.

#### Extant Variant(s)

■ **C-9C.** Three specially configured C-9s, delivered to Andrews in 1975 for the special air mission supporting the President and other US government officials. Flown by AFRC's 932nd AW since 2005. Last aircraft retired in fall 2011.

#### C-12 Huron

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



**C-5 Galaxy** (SrA. Kelly Galloway)



**C-17 Globemaster III** (SSgt. Taylor Worley)

**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 US embassies.  
**Contractor:** Beech.  
**Power Plant:** (C-12J) two Pratt & Whitney Canada PT6A-65B turboprops, each 1,173 shp.  
**Accommodation:** crew: two pilots; load: (C-12J) up to 19 passengers or 3,500 lb cargo.  
**Dimensions:** (C-12J) span 54.5 ft, length 57 ft, height 15 ft.  
**Weight:** (C-12J) max T-O 16,710 lb.  
**Ceiling:** (C-12J) 25,000 ft.  
**Performance:** (C-12J) speed 284 mph, range 1,669 miles.

**COMMENTARY**

Military version of the Beechcraft King Air A200 series. Flight deck and cabin are pressurized for high-altitude flight. Incorporates a cargo door with an integral air-stair door.

**Extant Variant(s)**

- C-12C. Re-engined C-12As, with PT6A-41 turboprops, deployed to US embassies.
- C-12D. Similar to C model, with larger cargo doors and stronger wing. Also deployed to US embassies.
- C-12F. With uprated PT6A-42 engines, up to eight passengers, accommodates AE litters.
- C-12J. A military version of the larger Beechcraft Model 1900C, operated by PACAF. Can also transport two litters or 10 ambulatory patients for AE. Extensive avionics upgrade, including three MFDs, three integrated GPS, two flight management systems, new autopilot, VHF/UHF radios, and weather radar.

**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:** 212.  
**Aircraft Location:** Allen C. Thompson Field, Miss.; Altus AFB, Okla.; Dover AFB, Del.; Edwards 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 ARB, Calif.; Travis AFB, Calif. Planned: Wright-Patterson AFB, Ohio.  
**Contractor:** Boeing.  
**Power Plant:** four Pratt & Whitney F117-PW-100 turboprops, each 40,440 lb thrust.  
**Accommodation:** flight crew: two pilots, loadmaster; AE crew: two flight nurses, three medical technicians (altered as required). Load: 102 troops/

paratroops; 36 litter and 54 ambulatory patients; 18 pallet positions; max payload 170,900 lb.  
**Dimensions:** span 169.8 ft, length 174 ft, height 55.1 ft.

**Weight:** max T-O 585,000 lb.  
**Ceiling:** 45,000 ft.  
**Performance:** speed 518 mph at 25,000 ft, range 2,760 miles with 169,000 lb payload.

**COMMENTARY**

Core airlifter of US military. Able to operate on small, austere airfields (3,500 ft by 90 ft) previously limited to C-130. Only aircraft able to directly air-land or air-drop outside cargo into a tactical environment. First military transport to feature a full digital fly-by-wire control system.

**Extant Variant(s)**

- C-17A. Ongoing modernization of original aircraft through Block 17. Improvements include open-system communications architecture, new weather radar, all-weather formation flying system, NVG lighting, HF data link. Full retrofit to Block 17 to be completed by FY15. Additional planned mods through FY20 include an advanced IFF system and other software upgrades to meet new operational requirements.

**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, USAFE.  
**First Flight:** December 1979.  
**Delivered:** September 1983-89.  
**IOC:** circa 1983.  
**Production:** not available.  
**Inventory:** 11.  
**Aircraft Location:** JB Andrews, Md.; Ramstein AB, Germany.

**Contractor:** Gulfstream.

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

**Accommodation:** crew: two pilots, flight engineer, communication system operator, flight attendant. Load: 12 passengers.

**Dimensions:** span 77.8 ft, length 83.1 ft (B), 88.3 ft (H), height 24.5 ft.

**Weight:** max T-O 69,700 lb (B), 74,600 lb (H).

**Ceiling:** 45,000 ft.

**Performance:** speed 576 mph; range 4,250 miles (B), 4,850 miles (H).

**COMMENTARY**

C-20A/B models initially acquired to replace C-140B Jetstar aircraft.

**Extant Variant(s)**

- C-20B. With advanced mission communications equipment and revised interior, delivered in 1988.
- C-20H. Gulfstream IV SP aircraft, with advanced technology flight management systems and upgraded Rolls Royce engines acquired 1992. Equipped with GPS, vertical separation equipment, GATM, and traffic alert and collision avoidance system (TCAS).

**C-21 Learjet**

**Brief:** Aircraft designed to provide cargo and passenger airlift and transport litters during AE.  
**Function:** Pilot seasoning, passenger and cargo airlift.

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

**First Flight:** January 1973.

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

**IOC:** April 1984.

**Production:** 84.

**Inventory:** 54.

**Aircraft Location:** Bradley Arpt., Conn.; Buckley AFB, Colo.; Hector Arpt., N.D.; JB Andrews, Md.; Peterson AFB, Colo.; Ramstein AB, Germany; Scott AFB, Ill.; W. K. Kellogg Arpt., Mich.

**Contractor:** Gates Learjet.

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

**Accommodation:** crew: two pilots; AE crew: flight nurse, two medical technicians (adjusted as required). Load: eight passengers and 3,153 lb cargo; one litter or five ambulatory patients.

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

**Weight:** max T-O 18,300 lb.

**Ceiling:** 45,000 ft.

**Performance:** speed 530 mph at 41,000 ft, range 2,306 miles.

**COMMENTARY**

Provides operational support for time-sensitive movement of people and cargo throughout the US and European Theaters, including AE missions if required.

**Extant Variant(s)**

- C-21A. Military version of the Learjet 35A. Upgrades included color weather radar, TACAN, and



**C-21 Learjet** (MSgt. David Lipp)

HF/VHF/UHF radios. Budget/resource decisions cutting fleet in half, including plans to retire ANG aircraft in FY13.

### 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:** 11.

**Aircraft Location:** 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:** crew: two pilots, two loadmasters. Load: up to 68 troops or 24 paratroops; 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:** max T-O 70,000 lb.

**Ceiling:** 30,000 ft.

**Performance:** speed 374 mph, range 1,150 miles with 22,046 lb payload.

#### 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 or for missions where the C-130 would operate at half-load capacity. FY13 budget decision would terminate the program, with USAF likely storing already delivered aircraft. Army would like to retain/use current aircraft.

#### 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, 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, Md.; JB McGuire-Dix-Lakehurst, N.J.

**Contractor:** Boeing.

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

**Accommodation:** crew: 16 (varies with mission). Load: up to 45 passengers.

**Dimensions:** span 124.6 ft, length 155.2 ft, height 44.5 ft.

**Weight:** max T-O 255,000 lb.

**Ceiling:** 42,000 ft.

**Performance:** speed 530 mph, range 6,325 miles.

#### COMMENTARY

Using COTS acquisition practices, contract award to first delivery in less than two years.

#### Extant Variant(s)

■ C-32A. Specially configured Boeing 757-200 airliner. Cabin divided into four sections: forward, communications center, galley, lavatory, 10 business-class seats; second, full-enclosed stateroom with private lavatory, two first-class swivel seats, convertible divan; third, conference and staff area with eight business-class seats; rear, 32 business-class seats, galley, two lavatories. Communications system provides worldwide clear and secure voice and data communications. Modern flight deck avionics are upgradeable.



C-32A Air Force Two (Sam Meyer)

### C-37 Gulfstream V

**Brief:** Modified Gulfstream aircraft used for worldwide special air missions for high-ranking government and DOD officials.

**Function:** VIP air transport.

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

**First Flight:** USAF October 1998.

**Delivered:** from October 1998.

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

**Production:** 10 C-37A; two C-37B.

**Inventory:** 10 C-37A; two C-37B.

**Aircraft Location:** Chievres, Belgium; JB Andrews, 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:** crew: five. Load: up to 12 passengers.

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

**Weight:** max T-O 90,500 lb.

**Ceiling:** 51,000 ft.

**Performance:** speed 600 mph, range 6,300 miles.

#### COMMENTARY

Military versions of "ultralong range" Gulfstream business aircraft.

#### Extant Variant(s)

■ C-37A. Military version of the Gulfstream V. Includes separate VIP and passenger areas and a communications system capable of worldwide clear and secure voice and data. Features include enhanced weather radar, autopilot, and advanced HUD.

■ 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 VIP transportation for congressional or high-ranking military members.

**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, Md.

**Contractor:** Tracor (Israel Aircraft Industries Ltd).

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

**Accommodation:** crew: two pilots. Load: up to eight passengers or, for AE 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:** max T-O 24,800 lb.

**Ceiling:** 33,000 ft.

**Performance:** speed 662 mph, range 3,000 miles.

#### 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 modern avionics, navigation, communication, vertical separation, and safety equipment. Facing diminished manufacturing sources, ANG seeking replacement.

### C-40 Clipper

**Brief:** A Boeing 737-700 used primarily for medium-range airlift of senior military commanders, Cabinet officials, and members of Congress.

**Function:** Passenger transportation.

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

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

**Delivered:** 2002.

**IOC:** not available.

**Production:** 11.

**Inventory:** four C-40B; seven C-40C.

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

**Contractor:** Boeing.

**Power Plant:** two General Electric CFM56-7



C-37A Gulfstream V (A1C Brea Miller)

turbopfans, each 27,000 lb thrust.

**Accommodation:** crew: 10 (varies with model and mission). Load: up to 89 passengers (C-40B); up to 111 (C-40C).

**Dimensions:** span 117.4 ft, length 110.3 ft, height 41.2 ft.

**Weight:** max T-O 171,000 lb.

**Ceiling:** 41,000 ft.

**Performance:** speed 530 mph, range 5,750 miles.

**COMMENTARY**

The C-40, which added winglets to Boeing 737-700, transports VIPs and performs other operational support missions. Both versions have modern avionics, integrated GPS and flight management system/electronic flight instrument system, and HUD. Each also has auxiliary fuel tanks and managed passenger communications.

**Extant Variant(s)**

■ C-40B. Equipped with an office-in-the-sky arrangement, including clear and secure voice/data communication and broadband data/video.

■ C-40C. Does not have the advanced communications of the B model. It does have a VIP area, including sleep accommodations, and can be configured to carry from 42 to 111 passengers.

**C-130 Hercules**

**Brief:** A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and parachuting 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.

**Production:** more than 2,200.

**Inventory:** 17 C-130E; 279 C-130H; 82 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; Youngstown ARS, Ohio; and ANG in Alaska, Arkansas, California, Delaware, Georgia, Hawaii, Illinois, Kentucky, Minnesota, Missouri, Nevada, New York, North Carolina, Ohio, Puerto Rico, Rhode Island, Tennessee, Texas, West Virginia, Wyoming.

**Contractor:** Lockheed Martin.

**Power Plant:** four Allison T56-A-7 turboprops (C-130E), 4,200 shp; four Allison T56-A-15 turboprops (C-130H), each 4,591 shp; four Rolls Royce AE2100D3 turboprops (C-130J), each 4,700 shp.

**Accommodation:** E/H crew: two pilots, navigator, flight engineer, loadmaster. J/J30 crew: two pilots, loadmaster. E/H/J load: up to 92 combat troops or 64 paratroopers or 74 litters or six cargo pallets or 16 Container Delivery System (CDS) bundles or any combination of these up to max weight for each version. J-30 load: 128 combat troops or 92 paratroopers or 97 litters or eight pallets or 24 CDS bundles or any combination of these up to max weight.

**Dimensions:** span 132.6 ft, length 97.8 ft, height 38.8 ft.; J-30 length 112.8 ft.

**Weight:** max T-O 155,000 lb (E/H/J), 164,000 lb (J-30); max payload 42,000 lb (E/H/J), 44,000 lb (J-30).

**Ceiling:** with max payload, 19,000 ft (E), 23,000 ft (H), 26,000 ft (J), 28,000 (J-30).

**Performance:** speed 345 mph (E), 366 mph (H), 417 mph (J), 410 mph (J-30); range with 35,000 lb payload 1,438 miles (E), 1,496 miles (H), 1,841 miles (J), 2,417 miles (J-30).

**COMMENTARY**

All-purpose theater transport that operates throughout USAF, performing diverse roles. Missions include tactical and intertheater airlift and airdrop support, Arctic resupply, AE flights, aerial spraying, firefighting duties for the US Forest Service, and natural disaster and humanitarian relief missions. FY13 budget decision would terminate the C-130H Avionics Modernization Program (AMP), which would have enabled the model to fly without a navigator, and instead pursue



**C-130 Hercules** (TSgt. Jeromy K. Cross)

a less ambitious safety of navigation upgrade only.

**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, NVG lighting. ANG LC-130Hs modified with wheel-ski gear and eight-bladed props 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 operations system, more powerful 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

capable of larger payload. 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, Md.

**Contractor:** Boeing.

**Power Plant:** four General Electric CF6-80C2B1 turbopfans, each 56,700 lb thrust.

**Accommodation:** crew: 26; load: up to 76 passengers.

**Dimensions:** span 195.7 ft, length 231.8 ft, height 63.4 ft.

**Weight:** max T-O 833,000 lb.

**Ceiling:** 45,100 ft.

**Performance:** speed 630 mph, range 7,800 miles.



**VC-25 Air Force One** (Jeremy Mashek)

## COMMENTARY

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.

### Extant Variant(s)

■ VC-25A. Flown by the Presidential Airlift Group at the 89th AW. Service life remaining five years. FY13 budget proposes avionics upgrade to sustain safety and reliability and unrestricted worldwide access.

## Helicopters

### HH-60 Pave Hawk

**Brief:** Specially modified helicopters used primarily for personnel recovery in hostile environments. Also conduct AE, civil SAR, disaster and humanitarian response, and other support missions.

**Function:** Personnel recovery medium-lift helicopter.

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

**First Flight:** October 1974 (HH-60G).

**Delivered:** from 1982 (HH-60G).

**IOC:** circa 1982 (HH-60G).

**Production:** 105 (HH-60G).

**Inventory:** 99 HH-60G; two HH-60M.

**Aircraft Location:** Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; 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:** HH-60G: two General Electric T700-GE-700/701C turboshafts, each 1,560-1,940 shp; HH-60M: two GE T700-GE-701D turboshafts, 1,940-3,988 shp.

**Accommodation:** crew: two pilots, flight engineer, gunner. Load: mission dependent.

**Dimensions:** HH-60G: rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft. HH-60M: rotor diameter 53.7 ft., overall length 64.8 ft (fuselage 49.8 ft), height 16.9 ft.

**Weight:** max T-O 22,000 lb.

**Ceiling:** 14,000 ft (G).

**Performance:** speed 184 mph; range 580 miles (G).

**Armament:** two 7.62 mm miniguns or two .50-caliber machine guns.

### COMMENTARY

Both versions are highly modified Black Hawk helicopters. The HH-60G was acquired by USAF in the early 1980s and has been in continuous use by Active Duty, ANG, and AFRC air rescue units. Under a short-term-fix operational loss replacement (OLR) program, USAF is procuring 24 UH-60Ms through the Army contract. Future plans call for a new Combat Rescue Helicopter competition to replace the entire Pave Hawk fleet, with contract award in 2013.

### Extant Variant(s)

■ HH-60G. Equipped with advanced communications/navigation suite that includes INS/GPS/Doppler navigation systems, satcom, 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 machine guns. FY13 funding would update the IFF system and make mission-critical avionics and safety of flight mods.

■ HH-60M. Initial three aircraft purchased under OLR program are receiving minimal mods to be used by a noncombat-coded unit, freeing up three combat-coded Pave Hawks for deployed units. Subsequent OLR-purchased helicopters will be modified to the current HH-60G configuration.

### 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.

**Delivered:** from September 1970 (UH-1N).

**IOC:** circa 1970.

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

**Inventory:** 20 TH-1H; two UH-1H; 60 UH-1N.

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

**Contractor:** Bell, Lockheed Martin (TH-1H prime).

**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: two Pratt & Whitney Canada T400-CP-400 turboshafts, 1,290 shp.

**Accommodation:** UH-1N crew: two pilots, flight engineer; load: up to 13 passengers (depending on fuel and atmospheric conditions) or up to six litters or, without seats, bulky, oversize cargo.

**Dimensions:** TH-1H: rotor diameter 48.0 ft, length 57 ft, height 13 ft. UH-1H: rotor diameter 48.3 ft, length 57.1 ft, height 13.6 ft. UH-1N: rotor diameter 48 ft, length 57.1 ft, height 12.8 ft.

**Weight:** max gross 10,500 lb (TH-1H), 9,500 lb (UH-1H), 10,500 (UH-1N).

**Ceiling:** 15,000 ft (10,000 ft with 10,000+ lb).

**Performance:** (UH-1N) speed 149 mph, range 300+ miles.

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

### COMMENTARY

UH-1N aircraft initially provided SAR capabilities, and then began replacing the UH-1Hs at missile wings and taking on other missions. With termination of the Common Vertical Lift Support Program (CVLSP) (also called the Common Support Helicopter), USAF may fly the 40-year-old UH-1N for at least another 10 years.

### Extant Variant(s)

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

■ UH-1H. Single-engine version of UH-1 utility helicopter, based on Bell 205. AFSOC maintains two for combat aviation advisor training.

■ UH-1N. Military version of the Bell 212. Most used for ICBM security and administrative/VIP airlift. Also used by AETC's 58th SOW at Kirtland for training purposes and by the 336th TRG at Fairchild for aircrew survival training. AFSOC maintains two for combat aviation advisor training. With CVLSP termination, AFGSC plans to provide selective mods, including an NVG-capable cockpit, upgraded sensors, and safety and sustainment improvements to extend fleet life and usefulness. USAF plans to purchase three or more USMC UH-1Ns to offset operational losses.

## Trainers

### T-1 Jayhawk

**Brief:** A medium-range, twin-engine jet trainer version of the Beechcraft 400A. Used by USAF 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:** 178.

**Aircraft Location:** Columbus AFB, Miss.; Laughlin AFB and JBSA-Randolph, 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:** three pilots, two side by side, one to the rear.

**Dimensions:** span 43.5 ft, length 48.4 ft, height 13.9 ft.

**Weight:** max T-O 16,100 lb.

**Ceiling:** 41,000 ft.

**Performance:** speed 538 mph, range 2,555 miles.



HH-60 Pave Hawk (MSgt. Sean Mitchell)

## COMMENTARY

Military version of Beech 400A used in the advanced phase of JSUPT for students selected to fly tanker or transport aircraft. Also used to train student CSOs.

### Extant Variant(s)

■ T-1A. Cockpit seating for instructor and two students. Mods include UHF/VHF radios, INS, TACAN, airborne detection finder, increased bird-strike resistance, and an additional fuselage fuel tank. CSO training aircraft also have GPS-driven SAR and simulated RWR and have a second student and second instructor station.

## T-6 Texan II

**Brief:** A single-engine turboprop aircraft used for primary pilot training for Air Force and Navy pilots.

**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:** 450 (USAF).

**Aircraft Location:** USAF: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, 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 pilots, in tandem, on zero/zero ejection seats.

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

**Weight:** basic 6,500 lb.

**Ceiling:** 31,000 ft.

**Performance:** speed 320 mph, range 1,035 miles.

### COMMENTARY

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

### Extant Variant(s)

■ T-6A. Purchased by USAF to replace T-37 and Navy to replace T-34 as primary pilot trainer. (Navy also acquiring B model.) Student and instructor positions—one in front of the other—are interchangeable. May be flown by one pilot in front seat. Full aerobatic and features an anti-G system, ejection seat, and advanced avionics package with sunlight readable LCDs.

■ T-6B. Navy is also purchasing this variant with upgraded glass cockpit avionics suite, including six MFDs, backup flight instrument, HUD, hands-on-throttle-and-stick functionality, and integrated computers.

## 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).

**Function:** Trainer.

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

**First Flight:** April 1959.

**Delivered:** 1961-72.

**IOC:** March 1961.

**Production:** more than 1,100.

**Inventory:** 50 T-38A; 471 T-38C.

**Aircraft Location:** Beale AFB and Edwards AFB, Calif.; Columbus AFB, Miss.; Holloman AFB, N.M.; JB Langley-Eustis, Va.; JBSA-Randolph and Sheppard AFB, Tex.; Tyndall AFB, Fla.; Vance AFB, Okla.

**Contractor:** Northrop Grumman.

**Power Plant:** two General Electric J85-GE-5 turbojets, each 2,900 lb thrust with afterburning.

**Accommodation:** two pilots in tandem ejection seats.

**Dimensions:** span 25.3 ft, length 46.3 ft, height 12.8 ft.

**Weight:** max T-O 12,093 lb.

**Ceiling:** above 55,000 ft.

**Performance:** speed 812 mph, range 1,093 miles.

### COMMENTARY

Most now used by AETC for advanced bomber-fighter training track in JSUPT and IFFT. Used to



T-38 Talon (SrA. Brian Ybarbo)

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 in experimental techniques, and by ACC as a companion trainer to maintain pilot proficiency. ACC also uses 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. Underwent structural renewal in successive Pacer Classic I and II mods, first begun in 1984, to extend service life.

■ T-38C. Redesignated after Avionics Upgrade Program, which added glass cockpit avionics, including HUD, color MFDs, mission computer, and INS/GPS. First model delivered 2002; last delivery 2007. Life sustaining measures include propulsion mods to replace major engine components to improve reliability and maintainability. FY13 funding includes Pacer Classic III, the latest structural renewal effort, which will replace major longerons, bulkheads/formers, internal skins, and structural floors, and an escape system upgrade. Service life expected to 2020.

## T-41 Mescalero

**Brief:** Short-range, high-wing trainer used primarily for aerodynamic and navigation courses.

**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:** max T-O 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) max T-O 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 aerobatic glider for competitions and demonstrations.

**Function:** Trainer.

**Operator:** AETC.

**Delivered:** May 2002.

**IOC:** December 2002.

**Inventory:** 12 (B); five (C).

**Aircraft Location:** USAFA, Colo.

**Contractor:** Blanik.

**Accommodation:** two.

**Dimensions:** span 55.4 ft (B), 46.6 ft (C); length 27.9 ft (B), 27.6 ft (C); height 6.2 ft (B), 6.9 ft (C).



TG-10C Kestrel (Mike Kaplan)

**Weight:** 1,168 lb (B), 1,100 lb (C).  
**Performance:** speed 142.6 mph (B), 146.1 mph (C); glide ratio 28:1 (B), 26:1 (C).

#### 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.

#### 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 (A); three (B).

**Aircraft Location:** USAFA, Colo.

**Contractor:** Schempp-Hirth, Germany.

**Accommodation:** two-seat (A), single-seat (B).

**Dimensions:** span 65.6 ft (A), 49.2 ft (B); length 28.3 ft (A), 22.3 ft (B).

**Weight:** 1,543 lb (A), 1,157 lb (B).

**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: two pilots; load: up to 20 passengers.

**Dimensions:** span 65 ft, length 51.9 ft, height 18.7 ft.

**Weight:** max T-O 12,500 lb.

**Ceiling:** 25,000 ft.

**Performance:** speed 210 mph, range 806 miles.

#### COMMENTARY

Used at US Air Force Academy to support various parachuting activities and perform general utility 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.

**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 (conventional only); Barksdale AFB, La.; Minot AFB, N.D.

**Contractor:** Boeing.

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

**Guidance:** inertial plus Terrain Contour Matching (B); inertial plus GPS (C/D).

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

**Dimensions:** span 12 ft, length 20.8 ft, body diameter 2 ft.



LGM-30G Minuteman III (USAF)

**Weight:** 3,150 lb.

**Performance:** speed 550 mph (B), high subsonic (C/D); range 1,500+ miles (B), 690 miles (C/D).

#### 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 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, standoff 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.

#### 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 5.5 ft.

**Weight:** weight 79,432 lb.

**Performance:** speed at burnout approx 15,000 mph, range 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. FY13 budget mods would extend that to 2030.

#### Extant Variant(s)

■ LGM-30G. 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 completed in July 2008.

## Tactical Missiles and Weapons

#### AGM-65 Maverick

**Brief:** A tactical, TV or IIR guided 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.

**Contractor:** Raytheon.

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

**Guidance:** EO TV guidance system (B/H/K); IIR seeker (D/G); laser seeker (E).

**Warhead:** 125-lb cone-shaped (B/D/H); 300-lb delayed-fuse penetrator (E/G/K).

**Dimensions:** span 2.3 ft, length 8.2 ft, diameter 12 in.

**Performance:** classified.

#### COMMENTARY

First employed during Vietnam War; used extensively in Desert Storm and Iraqi Freedom. Integrated with 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, EO TV guided



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

missile. Equipped with "scene magnification" TV seeker allowing pilot to identify and lock on to smaller or distant targets.

■ AGM-65D. Employs an IIR seeker to overcome daylight-only, adverse weather of B variant. Became operational in 1986 on A-10 aircraft.

■ AGM-65E. Laser guided version used by USAF and USMC. Employs heavyweight penetrator warhead.

■ AGM-65G. Uses IIR seeker with software mods to track larger targets. Employs heavyweight penetrator warhead. Has digital autopilot and a pneumatic actuation system. First delivered in 1989.

■ AGM-65H. Upgraded B variant to increase capability. Undergoing tracker upgrade.

■ AGM-65K. Modified G variant, replacing IR guidance system with EO TV guided seeker. Undergoing tracker upgrade.

■ AGM-65L. New laser Maverick to strike moving targets traveling at high speed. Will use EO TV seeker components with new semi-active laser (SAL) components.

#### **AGM-88 HARM**

**Brief:** A tactical air-to-surface 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.

**Contractor:** Raytheon.

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

**Guidance:** proportional with fixed antenna and seeker head in missile nose.

**Warhead:** high-explosive fragmentation.

**Dimensions:** span 3.7 ft, length 13.7 ft, diameter 10 in.

**Performance:** speed supersonic, range 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. Highly effective against enemy ground radar. Carried by USAF F-16CJ Block 50/52s dedicated to SEAD mission.

#### **Extant Variant(s)**

■ AGM-88B. Equipped with erasable and electronically programmable read-only memory, permitting in-field changes to missile memory.

■ AGM-88C. Current production model. Has warhead more lethal than earlier variants. Control section mod replacing current navigation system with GPS and inertial measurement unit; upgraded missiles to be redesignated AGM-88F.

#### **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).

**Contractor:** Raytheon.

**Guidance:** GPS/INS.

**Warhead:** (see variants below).

**Dimensions:** length 13.3 ft, diameter 13 in.

**Performance:** range 13.8 miles low altitude, 73 miles high altitude.

#### **COMMENTARY**

Medium-range, GPS/INS guided, standoff air-to-ground weapon. Used to attack a variety of soft and armored area targets during day and night, and adverse weather conditions. USAF stopped its production in FY05.

#### **Extant Variant(s)**

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

■ AGM-154B. The BLU-108 variant provides anti-armor capability.

#### **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. Joint USAF-Navy program.

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

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

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

**IOC:** September 2003.

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

**Power Plant:** Teledyne Continental Motors turbojet (baseline); Williams Intl. turbofan (ER).

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

**Warhead:** 1,000-lb class penetrator.

**Dimensions:** length 14 ft.

**Performance:** 1,000-lb dual mode penetrator/blast-fragmentation warheads; range 200+ miles (baseline), 500+ miles (ER).

#### **COMMENTARY**

Autonomous precision strike weapon. Can attack both fixed and relocatable targets, from nonhardened above ground to moderately hardened buried targets.

#### **Extant Variant(s)**

■ AGM-158 JASSM. Stealthy LO airframe equipped with GPS/INS guidance, IIR terminal seeker. Low operational support costs.

■ AGM-158 JASSM-ER. Extended-range version. Utilizes same baseline body, but new engine and fuel system increase range to more than 500 miles.

#### **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. AIM-9M deliveries began 1983; AIM-9X May 2002.

**IOC:** circa 1983 (9M); 2003 (9X).

**Contractor:** Raytheon, Loral.

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

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

**Warhead:** annular blast fragmentation.

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

**Performance:** 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. Improved defense against IR countermeasures, background discrimination, and reduced-smoke rocket motor. First flight in 1978.

■ AIM-9M-9. Expanded IR countermeasures detection capability.

■ AIM-9X. A jointly funded Navy-USAF project. Employs same rocket motor and warhead as AIM-9M. Has fixed forward canards and smaller fins to increase flight performance. Employs IIR seeker.

#### **AIM-120 AMRAAM**

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

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

**First Flight:** December 1984.

**Delivered:** 1988.

**IOC:** September 1991.

**Contractor:** Raytheon.

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

**Guidance:** active radar terminal/inertial midcourse.

**Warhead:** blast fragmentation.

**Dimensions:** span 1.7 ft, length 12 ft, diameter 7 in.

**Performance:** speed supersonic, range 20+ miles.

#### **COMMENTARY**

Joint USAF-Navy project, follow-on to AIM-7 Sparrow. Launch-and-maneuver capability.

#### **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. Adds an enhanced electronic protection suite, two-way data link, improved HOBS, GPS-aided navigation, and increased range. Limited production began in 2006 for operational test and IOC requirements; completed engineering and manufacturing development (EMD) in 2009.

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

**Brief:** An area munition effective against light armor, materiel, and personnel and used by USAF and Navy fighters and bombers for interdiction.

**Function:** Area munition.

**Contractor:** Aerojet General, Honeywell, Alliant Tech.

**Guidance:** none (CBU-87).

**Dimensions:** length 7.7 ft, diameter 15 in.

**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. CEM type. Dispenses BLU-97 shaped-charge anti-personnel/anti-materiel fragmentary/incendiary bomblets over the target in rectangular pattern.

■ CBU-103. Basic CBU-87 CEM with WCMD tail kit to increase accuracy when released from medium to high altitude.

#### **CBU-89/104 Gator**

**Brief:** An anti-armor/anti-personnel mine dispenser used by USAF and Navy fighters and bombers for interdiction.

**Function:** Scatterable mines.

**Contractor:** Honeywell, Aerojet General, Olan, Alliant Tech.

**Guidance:** none (CBU-89).

**Dimensions:** length 7.7 ft, diameter 15 in.  
**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. Dispenses 72 anti-tank and 22 anti-personnel 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 CBU-89 with WCMD tail kit to increase accuracy when released from medium to high altitude.

**CBU-105 Sensor Fuzed Weapon**

**Brief:** 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.

**Contractor:** Textron Systems.

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

**Dimensions:** length 7.7 ft, diameter 15 in.

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

**COMMENTARY**

Tactical munitions dispenser with a payload of 10 BLU-108 submunitions, each containing four skeet projectiles, for a total of 40 lethal projectiles that seek out their target. 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. Primary targets are massed tanks, armored personnel carriers, and self-propelled targets.

**Extant Variant(s)**

■ CBU-105. Basic gravity-type CBU-97 with a WCMD tail kit for greater accuracy. Can be delivered from high altitude and in adverse weather. Combat debut came in April 2003 in Iraq.

**CBU-107 Passive Attack Weapon**

**Brief:** 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.

**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 15 in.

**Performance:** delivers a high-speed volley of nearly 4,000 metal projectiles in three sizes from a single canister; projectiles: 15 in rods (350), 7 in rods (1,000), and small-nail size (2,400).

**COMMENTARY**

After release, weapon glides toward its target. Before impact, inner chamber begins to rotate and the projectiles are ejected in rapid succession by centrifugal force, penetrating a target within a 200-ft radius.

**Extant Variant(s)**

■ CBU-107A. Weapon has no explosive. Ejects various-size, penetrating projectiles. WCMD guided for greater accuracy. Full production completed in six months. Used during Iraqi Freedom.

**GBU-10 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.

**Delivered:** from 1976.

**IOC:** 1976.

**Contractor:** Lockheed Martin, Raytheon.

**Guidance:** semiactive laser.

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

**Dimensions:** span 5.5 ft, length approx 14.8 ft, diameter 18 in.



**GBU-12 Paveway II (USAF)**

**Performance:** 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.

**Extant Variant(s)**

■ GBU-10. Laser guidance provides high accuracy over distances up to 40,000 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.

**Delivered:** from mid-1970s.

**IOC:** 1976.

**Contractor:** Lockheed Martin, Raytheon.

**Guidance:** semiactive laser.

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

**Dimensions:** span 4.4 ft, length 10.8 ft, diameter 11-18 in.

**Performance:** CEP 29.7 ft, range about six miles.

**COMMENTARY**

Improved versions of the earlier fixed wing Paveway I.

**Extant Variant(s)**

■ GBU-12. Used primarily to strike fixed armor. Can operate in cloud ceilings down to 2,500 ft.

■ GBU-49. Features both laser guidance and onboard GPS for all-weather, precision delivery capability.

**GBU-24 Paveway III**

**Brief:** An unpowered low-level LGB equipped with an advanced guidance kit.

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

**First Flight:** GBU-24 in service May 1985.

**Delivered:** from 1986.

**IOC:** 1986.

**Contractor:** Raytheon.

**Guidance:** semiactive laser.

**Warhead:** BLU-109 2,000-lb bomb.

**Dimensions:** span 6.7 ft, length 14.4 ft, diameter 18 in.

**Performance:** range more than 11 miles.

**COMMENTARY**

Precision weapon that is effective against a broad range of high-value targets. Can be dropped from low, medium, or high altitude.

**Extant Variant(s)**

■ GBU-24. 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 Paveway III**

**Brief:** A large 5,000 lb class air-to-ground penetrating warhead, known as the "Bunker Buster," 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.

**Contractor:** Raytheon.

**Guidance:** laser.

**Warhead:** BLU-113 or BLU-122 5,000-lb bombs.

**Dimensions:** length approx 20 ft, diameter 15 in.

**Performance:** range more than 5.75 miles.

**COMMENTARY**

Developed during Desert Storm for use against Iraq's deeply buried, hardened C2 facilities. Two used by F-111Fs against a bunker complex Feb. 27, 1991.

**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 more powerful BLU-122 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 GPS/INS 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:** from 1998.

**IOC:** 1998.

**Contractor:** Boeing, Textron, Honeywell.

**Guidance:** GPS/INS.

**Warhead:** 2,000-lb Mk 84/BLU-109 (31), 1,000-lb Mk 83/BLU-110 (32), 500-lb Mk 82/BLU-111 (38).

**Dimensions:** span 25 in (31), 19.6 in (32), 14 in (38); length (with JDAM and warhead) approx 12 ft (31), 10 ft (32), 7.8 ft (38).

**Performance:** range up to 15 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. FY13 budget continues production.

**Extant Variant(s)**

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

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

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

**GBU-39 Small Diameter Bomb I**

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

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



**GBU-39 Small Diameter Bomb (USAF)**

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

**Delivered:** from 2006.

**IOC:** Oct. 2, 2006.

**Contractor:** Boeing.

**Guidance:** GPS/INS.

**Warhead:** 250-lb class penetrating blast fragmentation munition.

**Dimensions:** bomb: length 6 ft, width 7.5 in; BRU-61/A carriage (four bombs) length 12 ft, width 16 in, height 16 in.

**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.

**Extant Variant(s)**

■ GBU-39B SDB I. First combat use Oct. 5, 2006, by F-15E operating over Iraq. Employs advanced anti-jam GPS/INS. Contract to develop/build SDB issued in 2003. As of January 2012, 10,000 delivered.

**GBU-43 MOAB Bomb**

**Brief:** A massive weapon designed for use against large area or buried targets.

**Function:** Massive guided bomb.

**Delivered:** 2003.

**Guidance:** GPS/INS.

**Warhead:** BLU-120/B 18,000-lb high explosive.

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

**COMMENTARY**

Large, powerful, and accurately delivered conventional high-explosive bomb. Developed in only nine weeks to be available for the 2003 Iraq campaign. Given name Massive Ordnance Air Blast (MOAB), but known unofficially as "Mother of All Bombs." Designed to be 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-43/B. 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-53 Small Diameter Bomb II**

**Brief:** Air-launched, precision strike standoff weapon for use against both fixed and moving targets in adverse weather conditions. Features higher loadout and less collateral damage similar to the SDB I.

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

**First Flight:** 2012 (planned).

**Delivered:** from 2013 (planned).

**IOC:** TBD.

**Contractor:** Raytheon.

**Guidance:** Tri-mode seeker, fusing millimeter-wave radar, uncooled IIR, and digital semiactive laser sensors on a single gimbal.

**Warhead:** 250-lb class munition.

**Dimensions:** not available (compatible with SDB I BRU-61/A carriage).

**Performance:** precision strike at standoff range up to 46 miles.

**COMMENTARY**

A joint USAF-Navy program designed to provide the capability to attack both mobile and stationary targets from standoff range and through adverse weather. Will provide multiple kills per pass, multiple ordnance carriage, precision strike, reduced munitions footprint, minimized collateral damage, reduced susceptibility to countermeasures, and network-enabled capability through Link 16 and UHF data links.

**Extant Variant(s)**

■ GBU-53 SDB II. Under development. Raytheon won competition; contract issued August 2010, with delivery to begin in 2013.

**GBU-54 Laser JDAM**

**Brief:** 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:** from 2008.

**IOC:** 2008.

**Contractor:** Boeing.

**Guidance:** GPS/INS with laser.

**Warhead:** Mk 82 500-lb munition.

**Dimensions:** length (with JDAM and warhead) approx 8 ft.

**Performance:** range up to 15 miles.

**COMMENTARY**

Combines a laser guidance kit with the GPS/INS-based navigation of existing GBU-38 JDAM. Boeing also developing GBU-31 and GBU-32 variants.

**Extant Variant(s)**

■ GBU-54 Laser JDAM. Dual mode 500-lb guided weapon. Adds laser seeker to the JDAM's existing GPS/INS guidance to provide capability to attack moving targets with precision. Identified as an urgent operational need, development and testing completed in less than 17 months. First delivered in May 2008. First combat use in August 2008 in Iraq.

**GBU-57 Massive Ordnance Penetrator**

**Brief:** A massive earth-penetrating weapon for use against hard and deeply buried targets.

**Function:** Massive precision guided bomb.

**Guidance:** GPS.

**Warhead:** 5,300-lb high explosive.

**Dimensions:** length 20.5 ft, diameter 31.5 in.

**COMMENTARY**

USAF partnered with the Defense Threat Reduction Agency in 2004 on early development and test. Flight tests conducted from 2008 to 2010. In February 2010, program transitioned to USAF. Boeing received contract in 2009 for aircraft integration.

**Extant Variant(s)**

■ GBU-57B. Integration testing for B-2A bomber completed June 2011.

**Satellite Systems**

**Advanced EHF Satellite System**

**Brief:** Satellite communications system that provides global, secure, protected, and jam-resistant strategic and tactical communications.

**Function:** Communications.

**Operator:** AFSPC.

**First Launch:** August 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:** 24-hr low, medium, and extended data rate connectivity from 65 north to 65 south latitude worldwide.

**COMMENTARY**

Replenishing existing Milstar satellites, operating at much higher capacity and data rate capability. Offers secure, anti-jam communications around the world. Uses cross-linked satellites, eliminating the need for ground relay stations. Collaborative program with Canada, Netherlands, and United Kingdom.

**Extant Variant(s)**

■ AEHF SV-1. Launched in August 2010. An anomaly with its propulsion system delayed its arrival in operational orbit until October 2011. Completed on-orbit testing February 2012.

**Defense Meteorological Satellite Program**

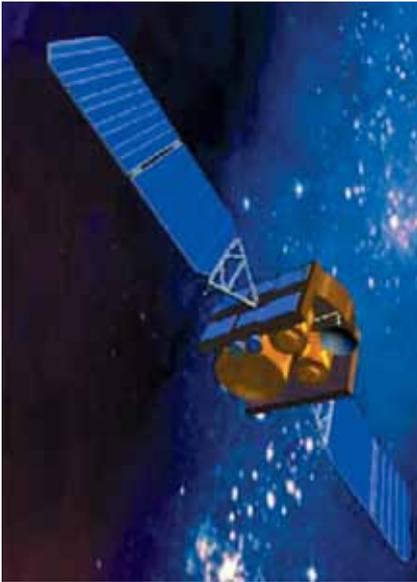
**Brief:** Satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations.

**Function:** Space and Earth environmental data collection.

**Operator:** National Oceanic and Atmospheric Administration (NOAA).



**AEHF (Lockheed Martin)**



**DSCS** (USAF illustration)

**First Launch:** May 23, 1962.  
**IOC:** 1965.  
**Constellation:** two low Earth orbit (LEO).  
**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, incl 772-lb sensor; 2,270 lb with 592-lb sensor payload.

**Performance:** polar orbits, cover Earth in about 6 hr, primary sensor scans 1,800-mile wide area.

**COMMENTARY**

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.

**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. Two spacecraft (DMSP-19 and DMSP-20) awaiting launch on need. Expected to remain viable into the mid-2020s.

**Defense Satellite Communications System**

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

**Function:** Communications.

**Operator:** AFSPC.

**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:** employ six independent 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.

**Extant Variant(s)**

■ DSCS III. Most recent configuration. Final (of 14) DSCS IIIs launched in 2003. Final four satellites received SLEP, providing higher power amplifiers, more sensitive receivers, and increased antenna connection options. Also carries a single channel transponder to disseminate emergency action and force direction messages to nuclear-capable forces.

**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.

**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:** approx 5,200 lb.

**Performance:** 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 1991 Gulf War to detect theater missile launches against coalition forces. The 23rd and final DSP satellite launched in December 2007.

**Extant Variant(s)**

■ Block 5. Nine satellites in period 1989-present. This latest variant is more survivable than predecessors, includes a medium wavelength IR sensor for more mission utility, and accommodates 6,000 detectors.

**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 data.

**Operator:** AFSPC.

**First Launch:** Feb. 22, 1978.

**IOC:** Dec. 9, 1993.

**Constellation:** at least 24 spacecraft.

**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



**GPS IIF** (USAF illustration)

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:** orbit the Earth every 12 hr, emitting continuous signals, providing time to within one-millionth of a second, velocity within a fraction of a mile per hr, and location to within a few ft.

**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 includes 11 IIAs launched to replace original GPS Block I series.

■ GPS Block IIF. Upgrades include extended design life, faster processors, and improved anti-jam and accuracy, with multiple civil/military signals and two dedicated civil signals. Follow-on to IIR-M. First launched in 2010, second in 2011, another two are in storage, with eight more in production.

■ GPS Block IIR-M. First launched in 2005 and last in 2009. Upgrades included two new signals, enhanced encryption and anti-jamming capabilities, and second civil signal.

■ GPS Block IIIA. Future generation expected to provide improved accuracy, availability, integrity, and resistance to jamming. First launch 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.

**Function:** Communications.

**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:** Milstar I sats have low data rate (LDR) payload, transmitting 75 to 2,500 bps of data over 192 channels in EHF range; Milstar II sats have both LDR and medium data rate (MDR) payloads, transmitting 4,800 bps to 1.5 Mbps over 32 channels.

**COMMENTARY**

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. Two Milstar I satellites launched in the period 1994-95. Both still active.

■ Block II. Four Milstar II satellites launched in period 1999-2003. First one was placed in nonuseable orbit. Other three are still active.

**Space Based Infrared System**

**Brief:** Advanced surveillance system for missile warning, missile defense, battlespace characterization, and technical intelligence. System includes IR sensor payloads on host satellites in highly elliptical orbit (HEO) and two IR sensors each on dedicated satellites in geosynchronous Earth orbit (GEO).

**Function:** space surveillance.

**Operator:** AFSPC.

**First Launch:** GEO 1, May 2011.

**IOC:** HEO 1, Dec. 5, 2008. (Increment 1, Dec. 8, 2001)

**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:** 5,603 lb (GEO on orbit).

**COMMENTARY**

Follow-on to the Defense Support Program satellite. System includes GEO satellites, HEO payloads, and ground assets. HEO sensor detects launch of SLBMs from the North Polar region and can be tasked for other IR detection missions. GEO scanning IR sensor performs strategic missile warning mission, global technical intelligence, and initial phase for the strategic missile defense mission, providing two times the revisit rate and three times the sensitivity of DSP.

**Space Based Surveillance System**

**Brief:** Space-based capability to provide metric and characterization data on objects in space.

**Function:** Space surveillance and object identification.

**Operator:** AFSPC.

**First Launch:** Sept. 25, 2010.

**IOC:** 2012 (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:** height approx 10 ft; 10 ft x 3.2 ft, plus solar panels.

**Weight:** approx 2,273 lb.

**COMMENTARY**

Designed to track and collect optical signatures of Earth-orbiting objects, including space debris, from a space-based platform. First operational satellite (SSBS Block 10) launched in September 2010. Announcement of IOC anticipated in spring 2012.

**Wideband Global SATCOM**

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

**Function:** Communications.

**Operator:** AFSPC.

**First Launch:** October 2007.

**IOC:** April 16, 2008.

**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 provide worldwide communications coverage for tactical and fixed users, augmenting and then replacing DSCS X-band frequency service and augments the one-way Global Broadcast Service Joint Program Ka-band frequency capabilities. WGS satellites also provide a new high-capacity two-way Ka-band frequency service.

**Extant Variant(s)**

■ Block I. Three satellites (SV-1 thru SV-3) launched in October 2007, April 2009, and December 2009.

■ Block II. Comprises satellites modified to better support the airborne ISR mission. SV-4 satellite launched Jan. 20, 2012, with SV-5 and SV-6 slated for 2013. In a US-Australia partnership, codified in 2007, Australia provides funds to purchase SV-6. The US entered a multilateral partnership with Canada, Denmark, Luxembourg, Netherlands, and New Zealand, in which the new partners will fund acquisition and support for SV-9. ■



**Milstar** (Lockheed Martin illustration)