B-1 Lancer

**Brief:** A long-range multimode bomber capable of flying missions over intercontinental ranges without refueling, then penetrating enemy defenses with a heavy payload of ordnance.

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

**Operator:** ACC, ANG.

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

**Delivered:** June 1985–May 1988, IOC: Oct. 1, 1986, Dyess AFB, Texas (B-1B).

**Production:** 104.

**Inventory:** 93 (B-1B).

**Unit Location:** Active: Dyess AFB, Texas, Ellsworth AFB, S.D., Mountain Home AFB, Idaho. ANG: McConnell AFB, Kan., Robins AFB, Ga.

**Contractor:** Boeing, AIL Systems; General Electric.

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

**Accommodation:** Four, pilot, copilot, and two systems officers (offensive and defensive), on zero/zero ejection seats.

**Dimensions:** Span 373 ft, swept aft 78 ft, length 174 ft, height 34 ft.

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

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

**Performance:** Max speed at low level 1,345 mph, Mach 1.2 at altitude; range intercontinental.

**Armament:** Three internal weapons bays capable of accommodating in a conventional role up to 84 Mk 82 (500-lb) bombs or Mk 62 naval mines and up to 30 CBU-87/B cluster munitions and CBU-97 Sensor Fuzed Weapons (SFWs), to be fitted with the Wind-Corrected Munitions Dispenser (WCMD) kits, and up to 24,000-lb GBU-31 Joint Direct Attack Munitions (JDAMs).

**The bomber’s offensive avionics include forward-looking radar, Moving Target Indicator (MTI), and Terrain-Following Radar (TFR), an extremely accurate Global Positioning System/Inertial Navigation System (GPS/INS), computer-driven avionics, strategic Doppler radar, and a radar altimeter, enabling aircrews to navigate, update mission profiles and target coordinates in flight, and precision bomb.**

**The current defensive avionics package, built around the ALQ-161 Electronic Countermeasures (ECM) system, is supplemented by the ALE-50 towed decoy and chaff and flares to protect against radar-homing and heat-seeking missiles. Aircraft structure and radar-absorption materials reduce the aircraft’s radar signature to approximately 1 percent that of a B-52. The ALE-50 provides greater protection against RF threats.**

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

**B-1B** is the improved variant initiated by the Reagan Administration in 1981. First production model flown October 1984 and USAF produced a total of 100. The B-1 was first used in combat in support of operations against Iraq during Desert Fox in December 1998. B-1B’s speed, superior handling qualities, and large payload make it a key element of any joint/composite strike force, with a flexibility to deliver a wide range of weapons or to carry additional fuel, as required. The JDAM GPS-guided weapon is currently being added to the B-1B’s list of weapons, with fleet completion in FY02. The B-1B’s capability is being significantly enhanced by the ongoing Conventional Mission Upgrade Program (CMUP). This gives the B-1B greater lethality and survivability through the integration of precision and standoff weapons and a robust ECM suite. CMUP includes GPS receivers, a MIL-STD-1760 weapon interface, secure radios, and improved computers to support precision weapons, initially the JDAM, followed by the Joint Standoff Weapon (JSOW) and the Joint Air-To-Surface Standoff Missile (JASSM). The Defense System Upgrade Program will improve aircrew situational awareness and jamming capability.

**B-2 Spirit**

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

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

**Operator:** ACC.

**First Flight:** July 17, 1989.

**Delivered:** Dec. 17, 1993–present.

**IOC:** April 1997, Whiteman AFB, Mo.

**Production:** 21.

**Inventory:** 21.

**Unit Location:** Whiteman AFB, Mo.

**Contractor:** Northrop Grumman, with Boeing, LTV, and General Electric as principal subcontractors.

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

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

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

**Weights:** Empty 150,000–160,000 lb, typical T-O weight 336,500 lb.

**Ceiling:** 50,000 ft.

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

**Armament:** In a nuclear role: up to 16 nuclear weapons (B61, B61 Mod II, B83). In a conventional role: up to 16 GBU-31 (2,000-lb) JDAM or a penetration version of a BLU-109, or 16 Mk 84 2,000-lb bombs; up to 16 2,000-lb GBU-36/B (GPS–Aided Munition); or up to eight 4,700-lb GBU-37 (GAM-113) near-precision guided weapons. Various other conventional weapons, incl the Mk 82 500-lb bomb, M117 750-lb bomb, Mk 62 500-lb naval mine, and up to 32 CBU-87/89/97 cluster bombs. JASSM and JSOW are presently being added to B-2 Block 30 aircraft through FY03.

**COMMENTARY**

The B-2 bomber is a unique, highly advanced system, combining sophisticated technologies, notably Low-Obbservable (LO) stealth design, with high aerodynamic efficiency, enabling it to attack heavily defended targets and neutralize enemy defenses and, thereby, making way for less stealthy systems to operate.

Based on the flying wing concept, the B-2 has no vertical tail surfaces. The smoothly blended “fuselage” section accommodates two flight crew and two large weapon bays side by side in the lower centerbody. These bays contain rotary launchers or bomb rack assemblies capable of carrying a total weapons load of 40,000 lb.

Mounted in pairs within the wing structure are four non-afterburning turbofans, with scalloped over-wing intake ducts and shielded over-wing trailing-edge nozzles. The aircraft has a quadruple-redundant fly-by-wire digital flight-control system, actuating moving surfaces at the wing trailing edges that combine aileron, elevator, and rudder functions. A landing gear track of 40 ft enables the B-2 to use any runway that can handle a Boeing 727 airliner.

**B-2A.** B-2 production represents three successive
blocks of capability. Block 10 aircraft carried B83 nuclear bombs or 16 Mk 84 2,000-lb conventional munitions. Block 20 aircraft additionally carried the B61/7 and B61/11 nuclear gravity bombs, as well as two GAMs, the GBU-37 and GBU-38B, on two rotary launcher assemblies, providing an interim, near-precision strike capability. All Block 10 and 20 aircraft have now been upgraded to Block 30.

Block 30 configuration delivers full PGM capability, including up to 16 JDAMs on the rotary launcher assemblies, and carries the Mk 82 500-lb bomb, cluster munitions, including 5FWs, JSOW, JASSM, the GAM-111 hard target munition, the M117 750-lb bomb, and the Mk 62 air-delivered sea mine on a bomb rack assembly. Other Block 30 enhancements include fully operational defensive and offensive avionics, a more sophisticated mission planning system, and additional operating modes for the Synthetic Aperture Radar (SAR).

In the mid-1980s, extensions of the B-2’s conventional capabilities beyond Block 30 configuration are under consideration. The first test B-2 is being refurbished as an operational bomber and will enter operational service in September 2002.

The first test mission took place March 24, 1999, against Serb targets in Allied Force. Two B-2s made a 30-hour plus round-trip from Whiteman AFB to attack a variety of hard and soft targets. Each aircraft dropped 16,000-lb JDAMs.

B-52 Stratofortress

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

Function: Long-range heavy bomber.

Operator: ACC, AFRC.

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


IOC: June 19, 1955.

Production: 744.

Inventory: 94.

Unit Location: Barksdale AFB, La., 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 navi- gation crew for night operations, and Electronic Warfare Officers.

Dimensions: span 185 ft, length 160 ft 11 in, height 40 ft 8 in.

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

Ceiling: 55,000 ft.

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

Armament: 12 AGM-88 ALCMs or AGM-129 ACMs externally, with provision for eight more ALCMs or gravity weapons internally. Conventional weapons incl. AGM-86C CCMs, bombs up to 2,000 lb, CBU 87/89/90 or 247/254 cluster munitions, and on some aircraft, three to four AGM-142A Have Nap missiles or eight AGM-84 Harpoons in under-wing clusters.

COMMENTARY: A key element of USAF’s manned strategic bomber force for well over 40 years, the B-52’s still-expanding weapon capability and its continuing ability to perform a wide range of missions, including show of force, maritime interdiction, precision strikes, and defense suppression. The bomber is equipped with an electro-optical viewing system that uses Forward-Looking Infrared (FLIR) and high-resolution Low-Light-Level Television (LLLTV) sensors to augment the targeting, battle assessment, flight safety, and terrain avoidance systems, thus improving combat ability and low-level flight capability. Pilots have Night Vision Goggles (NVGs) to further enhance night operation. The B-52’s ECM suite uses a combination of electronic detection, jamming, and infrared countermeasures to protect against hostile air defense systems. The aircraft can also detect and counter missile attack from the rear.

Several versions of the Stratofortress were produced, including:

B-52A: Initial production version, with J57-P-1W engines and provision for in-flight refueling. First flown Aug. 5, 1954, the three aircraft built were used by Boeing for technical development purposes. Delivered to SAC November 1957. Finally retired 1989.

B-52B: First operational version, 23 of which were built. Also, 27 RB-52B dual-role bomber/reconnaissance variants. First flown January 1955, with deliveries between June 1955–August 1956; powered by J57-P-1W, -19W, -29W or -29WA engines. Retired in the mid-1960s.

B-52C: Multimission version with increased gross weight and larger under-wing tanks. Powered by J57-P-19W or -29WA engines. First flown March 1956, 35 were delivered June–December 1956. Majority retired 1971.


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

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

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

Ongoing modernization of its conventional capabilities is extending the B-52’s service life well into this century, with the ability to provide massive firepower in low-threat environments supplemented by a standoff attack capability. Upgrades include the installation of GPS terminals, secure radios, and MIL-STD-1760 interfaces; weapons capability to include naval mines, precision guided weapons, such as Harpoon, AGM-124 Have Nap, and AGM-86 CCM (a conventional variant of the ALCM); and advanced weapons, such as JASSM, JDM, JSOW, and WCM. Installation of a heavy stores adapter beam will standardize aircraft to carry all B-52-certified munitions. Current plans encompass a force of around 76 aircraft.

B-52H Stratofortress (SrA. Greg L. Davis)
dispensers, gun pods, up to six AGM-65 Maverick missiles, up to four AIM-9 Sidewinder missiles, and jammer pods. Chaff and flares carried internally to counter radar-directed or infrared-directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

COMBAT (FAC) of fighter aircraft, combat escort, search penetration aids, self-protection systems, and AGM-65 Maverick and AIM-9 Sidewinder missiles.

65 Maverick and AIM-9 Sidewinder missiles.

penetration aids, self-protection systems, and AGM-65 Maverick and AIM-9 Sidewinder missiles.

support the demands of the Close Air Support (CAS) mission, the A-10 combines large military load, long loiter, and wide combat radius with the ability to operate under 1,000-ft ceilings, with 1.5-mile visibility, and in darkness with NVGs. In a typical anti-armor mission, the A-10, nicknamed “Warthog,” can fly 150 miles and remain on station for an hour. The 30 mm GAU-8/A gun provides a cost-effective weapon with which to defeat the whole array of ground targets, including tanks. The large bubble canopy provides all-around vision for the pilot, and the cockpit is protected with titanium armor, capable of withstanding projectiles up to 23 mm. Used extensively during the Persian Gulf War. Projected to serve well into the 2020s. An A-10 structural enhancement is in the works.

A-10A equipment includes an Inertial Navigation System (INS), Head-Up Display (HJD), NVGs, the Low-Altitude Safety and Targeting Enhancement (LASTE) system for ground collision avoidance, Pave Penny laser target identification pod, ECM, target penetration aids, self-protection systems, and AGM-65 Maverick and AIM-9 Sidewinder missiles.

OA-10A, Redesignated A-10C, was the initial version, deployed in Vietnam. Used extensively during the Persian Gulf. Projected to serve well into the 2020s. An A-10 structural enhancement is in the works.

OA-10A, Redesignated A-10C, was the initial version, deployed in Vietnam. Used extensively during the Persian Gulf. Projected to serve well into the 2020s. An A-10 structural enhancement is in the works.

The first OA-10A aircraft reached IOG in October 1987.

F-15E Strike Eagle

F-15E Strike Eagle

AC-130 Gunship

AC-130 Gunship

A 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


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

Armament:

AC-130 Gunship

AC-130 Gunship

Production: 39.

Inventory: 91.

Unit Location: Hurlburt Field, Fla.

Contractor: Lockheed Martin, Rockwell (AC-130U).


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

Weight: H model: gross 155,000 lb.

Ceiling: 25,000 ft.

Performance: H model: speed 300 mph, range 1,500 mi.

Armament: two 30 mm Vulcan cannons with 3,000 rd, one 40 mm Bofors cannon with 256 rd, and one Hiwetzer with 200 rd.

COMMENTARY

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

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

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

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

AC-130U Spookys are the most recent gunship conversions, converted by Rockwell, of which 13 were delivered to the 16th SOW’s 4th SOS in 1994–95. These aircraft have greater altitude capability and combine increased firepower, reliability, and superior accuracy with the latest methods of target location. The two 20 mm cannon of the H model are replaced with one trainable 25 mm Gatling gun. 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.

F-15 Eagle

F-15 Eagle

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

Function: Fighter.

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


Delivered: from November 1974.

IOC: September 1975.

Production: 874.

Inventory: 527.


Contractor: Boeing.

Power Plant: F-15C: two Pratt & Whitney F100-PW-220 turbosfans, each 25,000 lb thrust, with max afterburner; F-15D: two 204 turbofans, each 25,000 lb thrust with CFTs.

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

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

Weight: empty 28,600 lb, gross 68,000 lb.

Ferry range: 65,000 ft.

Performance: F-15C: max speed Mach 2.5, T/O run 900 ft, landing run without braking parachute 3,500 ft, ferry range with external fuel tanks more than 2,878 miles.

Armament: one internally mounted M61A1 20 mm six-barrel cannon; up to four AIM-9 Sidewinder air-to-air missiles, or up to eight AIM-120 AMRAAMs, carried externally.

COMMENTARY

The F-15’s superior maneuverability and acceleration range, weapons, and ability to penetrate hostile defenses and establish air superiority over enemy systems. F-15 fighters deployed to the Persian Gulf for Desert Storm accounted for 29 of the 37 USAF air-to-air victories.

F-15A (single-seat) and F-15B (two-seat) fighters immediately became USAF’s front-line fighter upon introduction in the mid-1970s. Basic equipment includes APG-63 pulse-Doppler radar for long-range detection and tracking of small high-speed objects down to treepoop level and effective weapons delivery, a HUD for close-in combat, Identification, Friend or Foe (IFF), and INS. A/Bs now serve with the ANG.

F-15C (single-seat) and F-15D (two-seat) models followed in June 1979. Improvements include 2,000 lb of additional internal fuel and provision for carrying Conformal Fuel Tanks (CFTs), reducing in-flight refueling requirements and increasing time in the combat zone. Tactical capabilities have been extensively enhanced since 1983 through an ongoing program of installation or modification of new or existing avionics equipment, allowing for the carriage of more advanced weapons and increased self-protection. The last 43 aircraft included improved AGP-70 radar, and more than 162 C/Ds scheduled to receive an APG-63 upgrade, with at least one squadron receiving a later version featuring an advanced active electronic scanned array.

F-15E Strike Eagle

F-15E Strike Eagle

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

Function: Dual-role fighter.

Operator: ACC, AETC, PACAF, USAFE.


Production: 226.

Inventory: 204.

Unit Location: Edwards AFB, Calif., Eglin AFB, Fla., Elmendorf AFB, Alaska, Kadena AB, Japan, Nellis AFB, Nev., RAF Lakenheath, UK, Seymour Johnson AFB, N.C.

Contractor: Boeing.

Power Plant: two Pratt & Whitney F100-PW-220, each 23,770 lb thrust; or F100-PW-229 turbosfans, each 29,000 lb thrust with max afterburner.

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

Dimensions: span 42 ft 9 in, length 63 ft 9 in, height 18 ft 5 in.

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

Ceiling: 65,000 ft.

Performance: max level speed at altitude Mach 2.5, ferry range with CFTs 3,000 miles.
F-16 Fighting Falcon

Brief: A compact, versatile, and low-cost multirole fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air and air-to-ground combat. It is designed to penetrate high-threat enemy airspace and achieve air superiority with a first-kill capability against multiple targets. It will be used to autonomously locate enemy threat radars and launch HARM missiles at them in the range known as supercruise. Its fully integrated avionics and weapons systems allow it to operate efficiently at supersonic speed without using its afterburner, making these aircraft two of the most maneuverable in the world.

Armament: one M61A1 20 mm multibarrel cannon, two AIM-9 Sidewinders stored internally in the fuselage; six AIM-120 AMRAAMs in the six-barrel cannon; and an increased-range APG-78 radar.

Dimensions: wingspan 32 ft 6 in, length overall 49 ft 5 in, height 16 ft.

Weight: empty (F-16C/D): 18,238 lb, (F-16E): 20,450 lb; gross, with external load (Block 40/42): 42,300 lb.

Performance: max speed Mach 2, radius of action: over 500 miles, ceiling: 60,000 lb.

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

COMMENTS
The F-16 is the workhorse of the USAF fighter fleet. The 200+ USAF F-16 multimission fighters deployed to the Persian Gulf Theater flew more sorties than any other type during Desert Storm, with 13,500 missions, and were again used extensively during Allied Force.

F-16s are deployed to patrol the no-fly zones in northern and southern Iraq and to Bosnia.

F-16A (single-seat) and F-16B (two-seat) versions, which entered service with the 388th TFW, Hill AFB, Utah, incorporated advanced technologies from the start, making these aircraft two of the most maneuverable fighters ever built. Equipment includes a multi-mode radar with a clutter-free look-down capability, advanced radar warning receiver, HUD, internal chaff/flare dispensers, and a 500-gd 20 mm internal gun.

Production of the F-16A and B for USAF ended in 1985. Most now belong to ANG, USAF and NATO operators who have cooperated in an operational capabilities upgrade. Under this midlife upgrade program the radar, fire-control computer, stores-management computer, and avionics software are improved, giving F-16A/B the ability to use next-generation air-to-air and air-to-surface weapons.

Reliability and maintainability improvements include a wide-angle HUD and installation of the upgraded F100-PW-220E turbofan.

This ultrasophisticated multimission air superiority fighter aircraft is designed to penetrate high-threat enemy airspace and achieve air superiority with a first-kill capability against multiple targets. It will cruise at supersonic speed without using its afterburners (supercruise). Its fully integrated avionics and weapons systems give it the ability to autonomously locate enemy threat radars and launch HARM missiles at them in the range known as supercruise. An updated version of the HTS is being worked on.

In another program, Block 40/42/50/52 USAF F-16Cs/Ds are to be retrofitted with a new modular mission computer being developed under an F-16 midlife update program. The computer will computer compatibility.

A compact, versatile, and low-cost multirole fighter aircraft that is highly maneuverable and has repeatedly proved itself in air-to-air and air-to-ground combat. It is designed to penetrate high-threat enemy airspace and achieve air superiority with a first-kill capability against multiple targets. It will be used to autonomously locate enemy threat radars and launch HARM missiles at them in the range known as supercruise.
Non-afterburning turbojets, each 10,800 lb thrust. The F-117A's much of the aircraft's external surface is made of composites and radar-absorbent materials. The F-117A's exterior surface is divided into many small, perfectly flat surfaces (facets) which deflect at a variety of angles all signals from probing hostile ground or airborne radars. In addition, the test aircraft flew Mach 0.6, and the fifth, to be equipped with the full integrated avionics suite, is expected to be flying in summer 2000. The aircraft was lost in many-publicized accidents. No aircraft were lost or damaged by hostile fire. Just Cause. During the Persian Gulf War in 1991, a first operational deployment was to Panama in 1989 for accommodations. No earliest, phase of flight, when the TBMs display bright plumes and are under tremendous dynamic stresses, making them vulnerable to laser weapons. The airborne laser can target TBMs hundreds of miles away and thus can fly over friendly territory to kill TBMs as they are launched. Function: Attack laser. Operator: ACC. IOC: FY07 (planned). Production: seven (planned). Accommodation: TBD Unit Location: TBD Contractor: Boeing (ABL platform; battle management system), TRW (COIL and subsystems), Lockheed Martin (beam control system). Power Plant: four GE CF6-80 turbofans, each 35,600 lb thrust.

**COMMENTARY**
Air Combat Command will base the Attack Laser in CONUS, but it has the ability to deploy with minimal airlift support to any region of the world. It will arrive in theater with its crew, laser fuel, and initial spares ready to fight. Typical deployment would include five aircraft to establish two, near continuous combat air patrols as directed by the joint force commander. The aircraft will fly above the clouds and typically operate at an altitude of approx 40,000 ft, initially located some 57.5 miles from the enemy but able to be moved forward as US forces gain air superiority. Information on the hostile launch location can also be determined by the ABL and passed on to attack airplanes. The attack laser’s main armament is a lightweight, megawatt-class Chemical Oxygen–Iodine Laser (COIL). The laser weapon contains 14 COIL modules and sufficient chemical fuel for 20-40 TBM kills. An optical system transports the laser beam up to the aircraft nose, where a 4.9-ft-diameter mirror in a ball turret points the beam to the target. The optical system contains low-power lasers, sensors, steering mirrors, and adaptive optics (deformable mirrors) to precisely track targets and correct atmospheric distortions, thereby increasing the high-energy laser beam’s intensity on target and the system’s lethal range.

The test aircraft will offer limited operational capability; this aircraft will eventually be converted to a fully operational model.


**COMMENTARY**
The Air Combat Command is continuing technical efforts related to development of an alternate engine source for production. Neither Lockheed Martin nor Boeing has demonstrated the need for a new engine, but the Air Combat Command has asked the defense industry to submit proposals to develop and manufacture a lightweight, low-cost, low-maintenance engine for the F-22. The next six F-22s will be production representatives. The ABL will be built for the F-22 program and will provide laser beam control, mission-planning system, high-precision weapon systems, and support for future laser weapon designs.
Earth’s surface up to the stratosphere, over land or water, at more than 200 miles.

Function: Airborne early warning, Battle Management (BM), C2.
Operator: ACC, PACAF, AFRICOM (associate).
Delivered: March 1977–84.
Production: 34.
Inventory: 32.
Unit Location: Elmendorf AFB, Alaska, Kadena AB, Japan, Tinker AFB, Okla.
Contractor: Boeing.

Power Plant: four Pratt & Whitney TF33-PW-100/10A turbfans, each 21,000 lb thrust.
Accommodation: basic operational crew of 17–23, incl 13–19 AWACS mission specialists and four flight crew members.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.
Weight: gross 335,000 lb; max T-O 347,000 lb.
Ceiling: above 38,000 ft.
Performance: optimum cruise Mach 0.78, endurance eight hr unrefueled.

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

E-3A. Of the 24 built for USAF in standard production configuration, 22 were later upgraded. An improved US/NATO Standard E-3A configuration was initiated with the 25th USAF Sentry, delivered in December 1977, with a larger memory computer and much improved detection capability. Nine were built for USAF, and one of the original E-3As was upgraded.

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

E-3C. An upgrade to the original US/NATO Standard E-3A aircraft, with additional radio, console, and radar capabilities. Redelivered 1984.

USAF E-3s are undergoing major sustainability, reliability, and availability upgrades. Mission system upgrades include new passive detection systems, known as Electronic Support Measures (ESM), that complement the active beamforming radar, enabling the aircraft to detect signals emitted by both hostile and friendly targets. Additional enhancements include upgrade of the Joint Tactical Information Distribution System (JTIDS), jam-resistant communications, increased computer capacity, and GPS capability. Radar system improvements will permit AWACS aircraft operating in the pulse–Doppler mode to detect smaller, stealthier targets. IOC for these improvements scheduled for this year.

E-8 Joint STARS
Brief: As modified Boeing 707 equipped with a large, canopied radome mounted under the forward part of the fuselage, housing long-range, air-to-ground radar, a computer, display, locating, and tracking vehicules moving on Earth’s surface out to distances in excess of 124 miles. Such data are then transmitted via vehicles moving on Earth’s surface out to distances in excess of 124 miles. Such data are then transmitted via a secure, jam-resistant digital data link to broadcast data to ground forces.

As part of their operational test and evaluation, Joint STARS aircraft flew more than 150 operational missions during Desert Storm (with two E-8A development aircraft) and Joint Endeavor (with one E-8A and one test bed E-8C). As a result of their success, the system’s original role was expanded to include battle assessment, SEAD, and the detection of mobile missile launchers and their decoys.

E-8A. Prototype version, with specialized equipment installed aboard two specially modified 707-300 airframes. Equipped with 18 operations-control consoles, which will be retrofitted on the 10 earlier aircraft.

E-8B. Specially configured variant of the Boeing 707-320B, equipped with four Pratt & Whitney TF33-P-9 turbofans, each 18,000 lb thrust. (Replaced with CFM International F108-CP-100 in W version; re-engining of further aircraft anticipated.)

Accommodation: flight crew of four; 25–35 mission crew.
Dimensions: span 145 ft 9 in, length 164 ft, height 42 ft 6 in.
Weight: gross 336,000 lb.
Ceiling: 45,000 ft.
Performance: speed 500 mph plus, range, with air refueling, unlimited.

COMMENTARY
The 55th Wing at Offutt AFB, Neb., operates a highly specialized fleet for worldwide reconnaissance missions.

RC-135W Rivet Joint (Ted Carlson)

Function: Reconnaissance aircraft.
Operator: ACC.
First Flight: June 1993.
Delivered: October 1993.
IOC: October 1993.
Production: three.
Accommodation: seating for 38.
Dimensions: span 131 ft, length 135 ft, height 42 ft.
Weight: gross 297,000 lb.
Ceiling: 50,000 ft (basic C-135).
Performance: speed: 500+ mph, unrefueled range 3,900 miles.

COMMENTARY

OC-135B modifications center around four cameras installed in the rear of the aircraft. Cameras installed include one vertical and two oblique KS-87 framing cameras, used for low-altitude photography approximating 90-Area KA-91 pan camera, which pans from side to side to provide a wide sweep for each picture, used for high-altitude photography at approximately 25,000 ft.

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

Function: Electronic reconnaissance aircraft.
Operator: ACC.
First Flight: not available.
IOC: circa 1973 (Rivet Joint).
Production: converted.
Inventory: 22.
Unit Location: Offutt AFB, Neb.
Contractor: Raytheon.

Power Plant: four Pratt & Whitney TF33-P-5/9 turbofans, each 18,000 lb thrust. (Replaced with CFM International F108-CP-100 in W version; re-engining of further aircraft anticipated.)

Accommodation: flight crew of four; 25–35 mission crew.
Dimensions: span 145 ft 9 in, length 164 ft, height 42 ft 6 in.
Weight: gross 336,000 lb.
Ceiling: 45,000 ft.
Performance: speed 500 mph plus, range, with air refueling, unlimited.

COMMENTARY
The 55th Wing at Offutt AFB, Neb., operates a highly specialized fleet for worldwide reconnaissance missions.

RC-135S Cobra Ball

Function: Used for missile tracking. Equipment includes wide-area IR sensors, long-range optical telescopes, and an advanced communications suite that can locate a missile more than 250 miles away and calculate its trajectory and impact point.

RC-135U Combat Sent. Two aircraft with larger tailcone and fin fairing, used for measuring and analyzing electronic and IR equipment.

RC-135 V/W Rivet Joint. Used for electronic surveillance. RC-135 Rivet Joints loiter near battlefields providing near-real-time data updates via the Tactical Information Broadcast System (TIBS) and JTIDS on enemy air defense systems to crews of F-16 HTS aircraft. This aircraft’s reconnaissance systems are continuously upgraded to keep pace with new threats.

RQ-1A Predator
Brief: A medium-altitude, long-endurance Unmanned Aerial Vehicle, flown remotely by a rated

### AIR FORCE Magazine

**WC-130 Hercules**

**Operator:** ACC.
**Production:** In October 1955 (U-2); 1967 (U-2R); October 1994 (U-2S).
**Delivered:** 1955–1973 (U-2); June 10, 1978 (U-2R).
**Contractor:** Beale AFB, Calif.
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** six.
**Dimensions:** span 137 ft, length 231 ft 4 in, height 63 ft 5 in.
**Weight:** gross 800,000 lb.
**Ceiling:** above 10,000 ft, speed 374 mph at 20,000 ft, range 4,000 miles.

**COMMENTARY**

The WC-130 is flown by AFRC organizations known as the Hurricane Hunters. The WC-130's reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas. WC-130H, E, Earlier version C-130 modifications used for weather reconnaissance. Now retired.

**WC-130H**

**Operator:** ACC.
**Delivered:** June 13, 1973 (E-4A); June 10, 1978 (E-4B).
**Production:** four.
**Inventory:** four.
**Unit Location:** Offutt AFB, Neb.
**Contractor:** Boeing.
**Power Plant:** four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.
**Accommodation:** up to seven.
**Dimensions:** span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
**Weight:** gross 800,000 lb.
**Ceiling:** above 30,000 ft.
**Performance:** unrefueled endurance in excess of 12 hours with refueling up to 72 hours.

**COMMENTARY**

E-4 aircraft were developed as the National Emergency Operation Command Post (NEACP), now the National Airborne Operations Center (NAOC). The E-4B fleet provides a survivable C3I platform capable of supporting the National Command Authority through-out the full threat spectrum, including sustained operations in a nuclear environment.

The first B model was delivered to the Air Force in January 1980. Four were produced, of which three were converted E-4A. The first operational mission was flown in March 1980. The E-4B is hardened against the effects of nuclear explosions, including electromagnetic pulse. A 1,200-kW tactical system supports advanced system electronics as well as state-of-the-art communications and data processing equipment such as an extremely high frequency (EHF) Millstar satellite terminals and six-channel International Maritime Satellite (INMARSAT). Tornado radomes also house the E-4B’s Super High Frequency (SHF) Frequency Demand Multiple Access (FDMA) communications antenna, the only such system on an airborne platform.

The E-4B system is capable of tying into commercial telephone and radio networks and could be used for radio broadcasts to the general population. E-4Bs also support the Federal Emergency Management Agency.

**E-9**

**Operator:** ACC.
**Delivered:** circa 1959.
**Production:** (no new-build WC-130H).
**Inventory:** 10 (WC-130H).
**Unit Location:** Keessy AFB, Miss.
**Function:** Weather reconnaissance aircraft.
**Operator:** AFRC.
**First Flight:** circa 1959.
**Delivered:** C-130J; October 1999–present.
**IOC:** 1959 (B model), 1962 (E), 1964 (H).

**WC-130 Hercules**

**Operator:** ACC.
**Production:** In October 1955 (U-2); 1967 (U-2R); October 1994 (U-2S).
**Delivered:** 1955–1973 (U-2); June 10, 1978 (U-2R).
**Contractor:** Beale AFB, Calif.
**Power Plant:** four Allison T56-A-15 turboprops, each 4,910 shp.
**Accommodation:** six.
**Dimensions:** span 137 ft, length 231 ft 4 in, height 63 ft 5 in.
**Weight:** gross 800,000 lb.
**Ceiling:** above 10,000 ft, speed 374 mph at 20,000 ft, range 4,000 miles.

**COMMENTARY**

The WC-130 is flown by AFRC organizations known as the Hurricane Hunters. The WC-130’s reconnaissance area includes the Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and central Pacific Ocean areas. WC-130H, E, Earlier version C-130 modifications used for weather reconnaissance. Now retired.

**WC-130H**

**Operator:** ACC.
**Delivered:** June 13, 1973 (E-4A); June 10, 1978 (E-4B).
**Production:** four.
**Inventory:** four.
**Unit Location:** Offutt AFB, Neb.
**Contractor:** Boeing.
**Power Plant:** four General Electric CF6-50E2 turbofans, each 52,500 lb thrust.
**Accommodation:** up to seven.
**Dimensions:** span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
**Weight:** gross 800,000 lb.
**Ceiling:** above 30,000 ft.
**Performance:** unrefueled endurance in excess of 12 hours with refueling up to 72 hours.

**COMMENTARY**

E-4 aircraft were developed as the National Emergency Operation Command Post (NEACP), now the National Airborne Operations Center (NAOC). The E-4B fleet provides a survivable C3I platform capable of supporting the National Command Authority through-out the full threat spectrum, including sustained operations in a nuclear environment.

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The E-4B system is capable of tying into commercial telephone and radio networks and could be used for radio broadcasts to the general population. E-4Bs also support the Federal Emergency Management Agency.

**E-9**

**Operator:** ACC.
**Delivered:** circa 1959.
**Production:** (no new-build WC-130H).
**Inventory:** 10 (WC-130H).
**Unit Location:** Keessy AFB, Miss.
**Function:** Weather reconnaissance aircraft.
**Operator:** AFRC.
**First Flight:** circa 1959.
**Delivered:** C-130J; October 1999–present.
**IOC:** 1959 (B model), 1962 (E), 1964 (H).
surveillance in order to keep boats out of the Gulf Test Range during tests.

**Function:** Electronic surveillance.

**Comments:**
- The latest C-130.
- First Flight: (Prototype Dash 8) June 20, 1983.
- Production: two.
- Inventory: zero (two, Primary Aircraft Inventory).
- Unit Location: Tyndall AFB, Fla.
- Contractor: de Havilland of Canada.
- Power Plant: two Pratt & Whitney Canada PW120A turboprops, each 2,000 shp. (No military designation on these engines).
- Accommodation: three: pilot, copilot, and systems operator.
- Dimensions: span 85 ft, length 73 ft, height 24 ft 7 in.
- Weight: gross 34,500 lb fully fueled.
- Ceiling: 25,000 ft.
- Performance: max speed at 25,000 ft 245 mph, loiter time 5 h.

### E-9 (Ted Carlson)

**DIMENSIONS:**
- Span: 130 ft 10 in, length 136 ft 3 in, height 38 ft 3 in.
- Weight: (ARIA) gross 300,500 lb.
- Ceiling: (ARIA) 33,000 ft.
- Performance: max cruise speed 470 mph, range 7,610 miles.

**SUMMARY**

EC-18

**Brief:** A heavily modified Boeing 707 used to gather telemetry and other data in tests of aircraft, spacecraft, and missiles.

**Function:** Electronic surveillance.

**Operator:** AFMC.

**First Flight:** February 1985.

**Delivered:** January 1986.

**IOC:** January 1986.

**Production:** six.

**Inventory:** three.

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

**Contractor:** Boeing.

**Power Plant:** four Pratt & Whitney TF33 turbofans, each 18,000 lb thrust.

**Accommodation:** 16–24 in EC-18B.

**Dimensions:** span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.

**Weight:** gross 326,000 lb.

**Ceiling:** 4,910 shp.

**Performance:** max cruise speed 470 mph, range 7,610 miles.

**COMMENTS**

**EC-130E Commando Solo**

**Function:** Electronic surveillance.

**Operator:** ACC.

**First Flight:** April 1980.

**Delivered:** March 1980.

**IOC:** December 1990.

**Production:** (no USAF new-build EC-130Es).

**Inventory:** 15.

**Power Plant:** Active: Davis–Monthan AFB, Ariz. ANG; Davis–Monthan AFB, Ariz. ANG; Harrisburg IAP, Pa.

**Contractor:** Lockheed Martin.

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

**Accommodation:** four flight crew, 15 mission personnel.

**Dimensions:** span 132 ft 7 in, length 100 ft 6 in, height 38 ft 3 in.

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

**Ceiling:** 20,000 ft.

**Performance:** speed 299 mph, range in excess of 2,100 miles.

**COMMENTS**

**EC-130H Compass Call**

**Function:** Electronic warfare.

**Operator:** ACC.

**First Flight:** April 1980.

**Delivered:** March 1981–April 1990.

**IOC:** 1983.

**Production:** (converted).

**Inventory:** 15.

**Unit Location:** Davis–Monthan AFB, Ariz.

**Contractor:** Lockheed Martin.

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

**Accommodation:** standard crew 13.

**Dimensions:** span 132 ft 7 in, length 100 ft 6 in, height 38 ft 3 in.

**Weight:** 155,000 lb.

**Ceiling:** 20,000 ft.

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

**COMMENTS**

A variant used as an airborne communications jamming platform. It played a vital role in disrupting Iraqi military communications at strategic and tactical levels during the Persian Gulf War and has since been deployed to the Balkans.

**EC-135**

**Brief:** Modified KC-135 tanker aircraft extensively equipped with sophisticated communications equipment was used to provide continuous airborne alert in support of national command and control; other aircraft used for telemetry and voice relay.

**Function:** ARIA aircraft.

**Operator:** AFMC.

**First Flight:** not available

**Delivered:** not available

**IOC:** Feb. 3, 1961.

**Production:** (converted).

**Inventory:** three.

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

**Contractor:** Boeing.

**Power Plant:** (EC-135C) four Pratt & Whitney TF33-9-P turbofans, each 18,000 lb thrust.

**Accommodation:** flight crew of four, plus various specialists.

**Dimensions:** span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

**Weight:** (ARIA) gross 300,500 lb.

**Ceiling:** (ARIA) 33,000 ft.

**Performance:** (ARIA) max cruise speed 490 mph, operational radius 2,675 miles.

**COMMENTS**

Several KC-135A tankers were modified for use as airborne command posts during the 1960s.

EC-135A/G/L were operated by SAC; EC-135H by USAF; EC-135JP by PACAF; and EC-135K by TAC.

EC-135Ns had specialized nose radar and tracking equipment to support the Apollo program. Other EC-135 aircraft included J and Y versions. Virtually all retired.

EC-135C aircraft, known as Looking Glass, supported USSTRATCOM’s Airborne National Command Post mission, as well as other command-and-control missions. Delivered as KC-135Bs, they were redesignated in 1964 to reflect their role. Continuous airborne alert status ended July 24, 1990, and all retired by September 1998 as the USAF’s E-8B aircraft took over the NCP mission.

EC-135E ARIA. Only one E-model now functions as telemetry data recording and relay station to supplement land and marine telemetry stations that support DoD and NASA space and missile programs. Specialist equipment includes an airborne steerable antenna housed in a bulbous nose, a probe antenna on each wingtip, and a trailing wire antenna on the bottom of the fuselage. The cargo compartment is modified to include all of the instrumentation subsystems installed as a 30,000-lb modular package.

### Tanker Aircraft

**EC-10 Extender**

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

**Function:** Aerial refueling/transport.

**Operator:** AMC, AFRC (associate).

**First Flight:** April 1980.

**Delivered:** March 1981–April 1990.
KC-10A Extender (Ted Carlson)

KC-135 Stratotanker (Ted Carlson)

KC-135R Stratotanker (SSgt. Randy Mallard)

KC-135E

50,000 lb.
 Ceiling: 42,000 ft.

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

The KC-10 combines the tasks of tanker and cargo aircraft in a single unit, enabling it to support worldwide fighter deployment, strategic airlift, strategic reconnaissance, and conventional operations.

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

The KC-10 is a DC-10 Series 30CF, modified to include fuselage fuel cells, an air refueling operator’s station, aerial refueling boom and integral hose reel/drogue unit, a receiver refueling receptacle, and military avionics. Later modification included wing-mounted air refueling pods to increase capability.

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

KC-135 Stratotanker

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

Function: Aerial refueling/airlift.

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

First Flight: August 1956.
Delivered: January 1957–66.
IOC: June 1957.
Production: 732.

Inventory: 547.


Contractor: Boeing.


Accommodation: crew of four; up to 57 passengers.

Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.

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

Ceiling: 42,000 ft.

Performance: maximum speed at 30,000 ft 610 mph, range with max fuel 11,015 miles.

COMMENTARY

Backbone of the USAF tanker fleet, the long-servicing KC-135 is similar in size and appearance to commercial 707 aircraft but was designed to military specifications, incorporating different structural details and materials. The KC-135 fuel tankage is located in the "wet wings" and in fuel tanks below the floor in the fuselage.

KC-135A Original version with J57 turbojets. USAF built 732, since modified to other standards.

KC-135E The JT3D re-engining program upgraded 163 AFRC and ANG KC-135As to KC-135E standard with JT3D turbfans removed from surplus commercial 707s; fuel carrying capacity is increased by 20 percent.

KC-135R/T Designation of re-engined KC-135As with CFM56 turbfans. They embody modifications to major systems and subsystems and not only carry more fuel farther but have reduced maintenance costs, are able to use shorter runways, and meet Stage III requirements. The first KC-135R flight was in October 1982, and redeliveries began in July 1984. KC-135T aircraft are capable of refueling SR-71s. The program continues. Ongoing modernization programs are extending KC-135 capability and operational utility well into this century. The lower wing skin was renewed, adding 27,000 flying hours to the aircraft. The Pacer CRAG avionics modernization program permits operation by a three-person flight crew. Several avionics upgrades are under way that will significantly improve systems reliability and maintainability. Under the Pacer CRAG program, the entire fleet will be fitted with improved cockpit and navigation suites, including color weather radar, reduced vertical separation minimums equipment, and integrated INS/GPS. Some KC-135Rs have been fitted with wing-mounted hose and drogue refueling pods to enhance interoperability and support to the US Navy, US Marines, NATO, and other allied receiver aircraft.

MC-130P Combat Shadow/HC-130

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

Function: Air refueling for SOF helicopters/airdrop.

Operator: AETC, AFSOC, ANG, AFRC.

First Flight: Dec. 8, 1964 (as HC-130H).
Delivered: from 1965.

Production: (converted).

Inventory: MC-130P: 28; HC-130/P/N: 29.


Contractor: Lockheed.


Accommodation: four flight crew, plus four mission crew.

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

Weight: gross 155,000 lb.

Ceiling: 33,000 ft.

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

COMMENTARY

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

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

HC-130. Tankers serving with active, ANG, and AFRC search-and-rescue units retain the HC-130 designation.

Strategic Transports

C-5 Galaxy

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

Function: Cargo and troop transport.

Operator: AETC, AMC, ANG, AFRC.

First Flight: June 30, 1966.
IOC: September 1970.

Production: 131.

Inventory: 126.

Unit Location: Active: Altus AFB, Okla., Dover AFB, Del., Kelly AFB, Texas, Travis AFB, Calif. ANG: Stewart IAP, N.Y., AFRIC: Dover AFB, Del., Kelly AFB, Texas, Travis AFB, Calif., Westover AB, Mass.

Contractor: Lockheed.

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

Accommodation: normal crew of six (two pilots, two
Engineers, and two loadmasters), plus rest area for 15 (relief crew, etc.) and seating for 75. There is no piece of Army combat equipment the C-5 can’t carry. Possible loads: six Apache helicopters, two M1 main battle tanks (each weighing 135,400 lb), six Bradley vehicles, three CH-47 helicopters, the 74-ton mobile bridge, a quick-deployment capability for up to 340 passengers in an airbus configuration. Airdrop capability for single platforms weighing up to 42,000 lb. Dimensions: span 222 ft 9 in, length 247 ft 10 in, height 65 ft 1 in. Weight: empty 374,000 lb, gross 769,000 lb (wartime 840,000 lb). Ceiling: 34,000 ft with a 605,000-lb load. Performance: max speed at 25,000 ft 571 mph, 35,750 ft T-O run at S/L; 6,300 ft landing run, max landing weight at S/L 2,380 lb, range with max payload 3,434 miles, range with max fuel 6,469 miles. Normal cruising speed at altitude 518 mph (Mach 0.77). unlimited range with in-flight air refueling. COMMENTARY One of the world's biggest aircraft, the C-5 is able to carry unusually large and heavy cargo for intercontinental ranges at jet speeds. It can take off and land in relatively short distances and taxi on standard airfields (3,000 ft x 90 ft) previously restricted to C-130s. The C-5 is able to operate routinely into small, austere airfields without the need for special runways (50 ft 3 in to realize the aircraft's full payload potential. Power Plant: four Pratt & Whitney F117-PW-100 turbofans, each 40,400 lb thrust. Accommodation: normal flight crew of three (two pilots plus loadmaster). Provisions for full range of military air freight missions, incl capacity for up to 102 passengers/paratroops or 36 litters; range of military cargo incl tanks, jeeps, and up to 100 AH-64A helicopters; three Bradley vehicles; one M1 main battle tank with other equipment; airdrop capability for single platforms weighing up to 60,000 lb. Dimensions: span over winglet tips 169 ft 8 in, length 173 ft 11 in, height 55 ft 1 in. Weight: empty 277,000 lb, max payload 170,900 lb, gross 585,000 lb. Ceiling: 45,000 ft. Performance: normal cruising speed 484 mph at 35,000 ft or 518 mph (Mach 74) at 28,000 ft, unrefueled range with 160,000-lb payload 2,760 miles, unlimited with refueling. COMMENTARY Developed to meet US force projection requirements, the C-17 is able to operate routinely into small, austere airfields (3,000 ft x 90 ft) previously restricted to C-130s and provides the first capability to air-lift or air-drop outsize cargo in the tactical environment. C-17A completed its full flight test program in June 1995. It is the first military transport to feature a full digital fly-by-wire control system and two-person cockpit, with two full-time, all-function HUDs and four multifunction electronic displays. For operations to Bosnia, the C-17 was the only aircraft capable of carrying outsize cargo into Tuzla AB.

C-135 Stratolifter Brief: A version of the KC-135 tanker, without refueling equipment, produced for non-tanker duties. Function: Passenger and cargo airlifter. Operator: ACC, AFMC, AMC, PACAF, ANG. First Flight: May 1961. Delivered: 1961–62. IOC: circa 1961. Production: 48, plus five WC-TC-135s. Inventory: five. Unit Location: Andrews AFB, Md., Edwards AFB, Calif., Hickam AFB, Hawaii, Offutt AFB, Neb., Dover AFB, Del. Contractor: Boeing. Power Plant: (C-135B) four Pratt & Whitney TF33-P-5 turbofans, each 18,000 lb thrust. Accommodation: (C-135B): 60 passengers. Dimensions: span 130 ft 10 in, length 134 ft 6 in, height 38 ft 4 in. Weight: (C-135B): operating weight empty 102,300 lb, gross 275,500 lb. Ceiling: 50,000 ft. Performance: (C-135B): max speed 600 mph, range with 54,000 lb payload 4,625 miles. COMMENTS: Several C-135 transports and variants, without the KC-135's refueling equipment, remain operational within USAF. They were ordered originally to serve as interim jet passenger or cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratolifters in two versions. C-135A. The first 15 aircraft were equipped with JS7-P-7 turbojets. C-135B. The next version included upgraded Pratt & Whitney turbofans. USAF retired 11 Bs with revised interior for VIP transportation. C-141 Starlifter Brief: The workhorse of US airlift force, the Starlifter can project combat forces over long distances, inject those forces and their equipment either by air-lift or air-land, resupply those employed forces, and extract the sick and wounded from the hostile area to advanced medical facilities. Primary strategic special operations and airdrop platform. Function: Long-range, air refuelable troop and cargo airlift. Operator: AETC, AMC, ANG, AFRC. First Flight: Dec. 17, 1963. Delivered: October 1964–June 1982. IOC: May 1965. Production: 285. Inventory: 155. Unit Location: Active: Altus AFB, Okla., Charleston AFB, S.C., Edwards AFB, Calif., McChord AFB, Wash., McGuire AFB, N.J., ANG: Jackson IAP, Miss., Memphis IAP, Tenn., AFRC: Andrews AFB, Md., Charleston AFB, S.C. (associate), March ARB, Calif., McChord AFB, Wash., McGuire AFB, N.J., Wright-Patterson AFB, Ohio. Contractor: Lockheed. Power Plant: four Pratt & Whitney TF33-P-7 turbofans, each 21,000 lb thrust. Accommodation: crew of five; cargo on 13 standard 463L pallets. Alternative freight or vehicle payloads, 200 fully equipped troops, 155 paratroopers, or 103 litter patients plus attendants. Dimensions: span 159 ft 11 in, length 166 ft 4 in, height 39 ft 3 in. Weight: operating 150,000 lb; max payload 68,725 lb normal, 89,000 lb emergency war planning; gross 325,000 lb normal, 344,900 lb emergency war planning. Ceiling: 41,600 ft. Performance: max cruising speed 566 mph, range with max payload 2,170 miles without air refueling. COMMENTARY Longtime mainstay of USAF’s airlift fleet, the C-141 was the first jet aircraft designed to meet military standards as a troop and cargo airlifter. C-141A entered service with MAC in April 1965, and 285 were built, some of which were structurally modified to accommodate the Minuteman ICBM. C-141B is a stretched C-141A with in-flight refueling capability. All C-141As (except four AFMC aircraft used for test purposes) were lengthened by 23 ft 4 in to realize the aircraft’s full payload potential. First C-141B flew March 1977 and redeliveries took place between December 1979 and June 1982. The modification gave USAF the equivalent of 90 additional C-141A aircraft. Subsequent improvements include structural upgrades of the airframe, avionics, and all-weather landing system, and improved airdrop systems. Modification of 13 C-141Bs is aimed at...
at increasing their SOLL (Special Operations Low Level) capability and survivability. C-141C is a C-141B modified with computerized glass-cockpit instrumentation and digital flight-management system, with integrated GPS data for navigation and modern navigation safety equipment. The first version, which rolled out at Warner Robins ALC, Ga., Oct. 1, 1997, is assigned to AFRIC’s 452nd Air Mobility Wing, March ARB, Calif. ANG and AFRIC are slated to get 63 of these glass-cockpit transports.

**C-9 Nightingale**

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

Function: Aeromedical evacuation.

Operator: AMC, PACAF, USAFE, AFRIC.

First Flight: August 1968.


IOC: circa 1968.

Production: 24.

Inventory: 23.

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

Contractor: McDonnell Douglas (now Boeing).

Power Plant: two Pratt & Whitney JT9D-9A turbofans, each 14,500 lb thrust.

Cabin: One.except: 40 litter patients or 40 ambulatory patients, or a combination of both, plus five medical staff.

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

Weight: gross 121,000 lb.

Ceiling: 35,000 ft.

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

**C-141 Starlifter**

First Flight: November 1962.

IOC: October 1965.

Production: 117.

Inventory: 88.

Unit Location: Andrews AFB, Md., Ramstein AB, Germany, Ramstein AB, Germany, Wright-Patterson AFB, Ohio, Yokota AB, Japan.

Operator: AMC, PACAF, USAFE, AFRIC.

Function: Special airlift.

Aircraft to provide airlift support for attaché personnel.

**C-12 Huron**

Brief: A modified commuter transport aircraft.

Function: Passenger transportation.

Operator: ANG.

First Flight: February 1963 (commercial).


Production: four.

Inventory: three.

Unit Location: Andrews AFB, Md.

Contractor: Beech.

Power Plant: two AlliedSignal TFE731-2 turbofans, each 11,400 lb thrust.

Accommodation: crew of two and up to eight passengers.

Dimensions: span 97 ft 7 in, length 119 ft 3 in, height 27 ft 5 in.

Weight: gross 120,000 lb.

Ceiling: 35,000 ft.

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

**C-20 Gulfstream III**

Brief: A military version of the larger Gulfstream.

Function: Operational support airlift; special air missions.

Operator: AMC, USAFE.

First Flight: December 1979.

Delivered: from September 1983.

IOC: circa 1983.

Production: not available.

Inventory: 13.

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

Contractor: Gulfstream.

Power Plant: two Allison T56-A-15A turboprops, each 1,100 shp.

Accommodation: crew of five; 12 passengers.

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

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

Ceiling: 45,000 ft.

Performance: max cruising speed 651 mph, range 4,050 miles.

**C-22B**

Brief: A modified commuter transport aircraft.

Function: Transport, medevac, and counterdrug.

Operator: ANG.

First Flight: not available.

Delivered: March 1989–present.


Production: not available.

Inventory: 12 (C-26B, UC-26C).

**C-23**


Production: 22.

Inventory: 19.

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

Operator: AMC, USAFE, AFRIC.

Function: Special airlift.

A military version of the larger Beechcraft Model 1900, operated by PACAF.

C-25:

First Flight: December 1979.

IOC: circa 1983.

Production: not available.

Inventory: 13.

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

Contractor: Gulfstream.

Power Plant: two Rolls Royce–Spey MK611-8 turbofans, each 13,850 lb thrust.

**C-26**

First Flight: April 1957.

IOC: October 1959.

Production: 162.

Inventory: 87.

Unit Location: Andrews AFB, Md., Ramstein AB, Germany, Wright-Patterson AFB, Ohio, Yokota AB, Japan.

Operator: AMC, USAFE, AFRIC.

Function: Operational support airlift; special air missions.

Aircraft to provide airlift support for attaché personnel.

**C-27**

First Flight: December 1978.


Production: eight.

Inventory: seven.

Unit Location: Andrews AFB, Md., Yellowstone AB, Wyo.

Operator: AMC, USAFE, AFRIC.

Function: Special airlift.

A modified commuter transport aircraft.

**C-29**

First Flight: December 1978.


Production: three.

Inventory: two.

Unit Location: Andrews AFB, Md.

Operator:三农.

Function: Special airlift.

A modified commuter transport aircraft.

**C-32**

First Flight: December 1978.


Production: three.

Inventory: two.

Unit Location: Andrews AFB, Md.

Operator: AMC, USAFE, AFRIC.

Function: Special airlift.

A modified commuter transport aircraft.

**C-36**

First Flight: December 1978.


Production: three.

Inventory: two.

Unit Location: Andrews AFB, Md.

Operator: AMC, USAFE, AFRIC.

Function: Special airlift.

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

 IOC: 1999.
 Production: four.
 Inventory: four.
 Unit Location: Andrews AFB, Md.
 Contractor: Gulfstream.
 Power Plant: two BMW–Rolls Royce BR710A-10 turbofans, each 14,900 lb thrust.
 Accommodation: five crew and 12 passengers.
 Dimensions: span 93 ft 6 in, length 96 ft 5 in, height 25 ft 10 in.
 Weight: empty 47,601 lb, gross 90,500 lb.
 Performance: cruise speed Mach 0.8, cruise altitude up to 51,000 ft.

COMMENTARY
The C-37A, along with the C-32, is a replacement for the VC-137B/C aircraft. It can conduct simultaneous diplomatic missions with secure secure communications. Capable of operations at any suitable civil or military airfield in the world.

C-38A
 Brief: A twin-engine transcontinental aircraft used to provide transportation for the vice president, cabinet, Congressional members, and other high-ranking US and foreign officials.
 Operator: USAF.
 Production: two.
 Inventory: two.
 Unit Location: Andrews AFB, Md.
 Contractor: Lockheed-Martin.
 Power Plant: two AlliedSignal TFE731-40R-200G, each 4,250 lb thrust.
 Accommodation: three crew and eight passengers.
 Dimensions: span 54 ft 7 in, length 55 ft 7 in, height 18 ft 2 in.
 Weight: gross 24,800 lb.
 Performance: cruise speed Mach 0.87, cruise altitude 33,000 ft.

COMMENTARY
The C-38A is a military version of the Astra SPX produced by IAI and supported worldwide by Galaxy Aerospace. The first two aircraft were delivered to the 201st AS. It replaced existing Learjet C-21As. The contract includes an option for two additional aircraft.

C-130 Hercules
 Brief: A rugged aircraft capable of operating from rough dirt strips to provide theater airlift and para-dropping of troops and equipment into hostile areas.
 Operator: AAC, AETC, AFSOC, AMC, PACAF, USAFE, ANG, AFRC.
 IOC: August 1954 (C-130A).
 Production: more than 2,200.
 Inventory: 530.
 Unit Location: Active: Dyess AFB, Texas, Eglinton RAF, Scotland, Fairford, N. M., Little Rock AFB, Ark., Moody AFB, Ga., Pope AFB, N.C., Ramstein AB, Germany, Yokota AB, Japan; ANG: 25 units. AFRC: 10 units.
 Contractor: Lockheed-Martin.
 Power Plant: (C-130H) four Rolls Royce–Allison T36-A-15 turboprops, each 4,500 shp.
 Accommodation: (C-130H) crew of five; up to 92 troops, 64 pararescue, 74 litter patients plus attendants, 54 passengers on palletized seating, or up to five 463L standard freight pallets, etc.
 Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 1 in.
 Weight: (C-130H) empty 81,000 lb, fuel/cargo max gross 155,000 lb.
 Ceiling: 33,000 ft at 100,000 lb T-O weight.
 Performance: (C-130H) max cruising speed 385 mph, T-O run 3,585 ft, landing run (at 130,000 lb) 1,700 ft, range with 40,000-lb payload 2,240 miles.

COMMENTARY
Continuing in production, the C-130 Hercules transport aircraft first flew 45 years ago and has been delivered to more than 60 countries. Basic and specialized versions operate throughout USAF, performing diverse roles in both peace and war situations, including airlift support, Arctic ice cap resupply, aeromedical missions, aerial spray missions, fire-fighting duties for the US Forest Service, and natural disaster and humanitarian relief missions.

C-130A, B, and D
 Early versions, now retired. The initial production C-130A had four Allison T56-A-11 or -9 turboprop engines. USAF ordered a total of 219. The C-130B had improved range and higher weights and introduced Allison T56-A-7 turboprops; 134 were produced, with delivery from April 1959. Six were modified in 1961 as JC-130Bs for air-snatch satellite recovery. Twelve C-130Ds were modified as AC-124 utility aircraft.

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

C-130H is generally similar to the E model but has updated turboprops, a redesigned outer wing, updated avionics, and other minor improvements; delivery began in July 1974. More than 350 C-130Hs and derivatives were ordered for active and reserve units of the US services. Night Vision Instrumentation System was introduced from 1993, TCAS II in new aircraft from 1994. ANG and AFRC C-130Hs are used in fire-fighting missions. Specifically modified aircraft are used by AFRC’s 757th AS for aerial spraying, typically to suppress mosquito-spread epidemics. Seven LC-130Hs, modified with wheel-ski gear, are operated by ANG’s 109th AW, Schenectady County Airport, N.Y., in support of Arctic and Antarctic operations. Two former USN LC-130Rs are being modified to LC-130H standard for delivery to the 190th AW later this year. Two DC-130Hs were modified for UV control duties.

C-130J. This newest model features a three-crew flight operation system, 6,000 shp Rolls Royce-Allison AE 2100 engines, digital avionics and mission computers, enhanced performance, and improved reliability and maintainability.

C-137 Stratoliner
Brief: A modified Boeing 707 providing transportation for the vice president, cabinet and Congressional members, and other high-ranking US and foreign officials. It also serves as a backup for Air Force One, the presidential aircraft.
Function: VIP air transport.
Operator: AMC.
First Flight: April 1959.
Delivered: from 1959.
IOC: 1962.
Production: seven.
Inventory: two.
Unit Location: Andrews AFB, Md.
Contractor: Boeing.
Power Plant: four Pratt & Whitney JT3D-3B turbofans, each 18,000 lb thrust.
Accommodation: varies with mission.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in (VC-137C).
Weight: gross 322,000 lb (VC-137C).
Ceiling: 42,000 ft.
Performance: max speed 627 mph, range 6,000 miles (VC-137C).

C-137C Stratoliner (Ted Carlson)
Development of this variant of the Marine Corps MV-22 is continuing, it is expected to fulfill the Air Force special operations requirements for high-speed, long-range Vertical/Short Takeoff and Landing (V/STOL) aircraft capable of performing penetration/extraction of denied areas in adverse weather.
C-137C is based on Bell’s XV-15. It is designed typically to carry troopers or cargo over a 575-mile combat radius at 265 mph. Self-deployment range will be 2,860 miles with one air refueling.
The C-137C will be shipboard compatible and air-refueling capable. Equipment will include a fully integrated precision navigation suite, with GPS and INS; FLIR; terrain-following/terrain-avoidance radar; digital map display; and NVG-compatible cockpit displays. The electronic warfare suite will include radar and missile warning receivers, radar and infrared missile jammers, and flare/chaff dispensers.
COMMENTARY
One specially modified Boeing 707 transport is operated by AMC’s 89th Airlift Wing for VIP duties. Other aircraft have been replaced by new Boeing 757-200s, designated C-32A, and two Gulfstream-5s, designated C-37A.
VC-137A. Three specially configured 707-120 aircraft were acquired by USAF for VIP duties. All modified to C-37B standard.
VC-137B. VC-137A aircraft modified with turbofan engines. All retired.
C-137C. Four VIP-configured 707-320Bs, two of which have been Air Force One aircraft. Aircraft tail #26000, the first VC-137C in service (Oct. 12, 1962) and the first specifically purchased for use as Air Force One, retired in May 1998. It is perhaps most well-known as the aircraft that was used to return President John F. Kennedy’s body to Washington and to host the swearing in of President Lyndon B. Johnson in 1963.
The remaining Air Force One, tail #27000, entered service Aug. 4, 1972.

CV-22 Osprey
Brief: A tiltrotor, multi-mission transport aircraft designed to have the maneuverability and lift capability of a helicopter and the speed of a fixed-wing aircraft.
Function: Multi-mission airlift.
Operator: AFSOC.
First Flight: March 19, 1989 (V-22).
Delivery: 2003 (planned).
IOC: 2004 (planned).
Production: 50 (planned).
Inventory: 50 (planned).
Unit Location: TBD.
Contractor: Bell/Boeing.
Power Plant: two Allison T406-AD-400 turboshfts, each 5,150 shp.
Accommodation: four flight crew, 18 troops or 8,000 lb internal cargo.
Dimensions: proprotor diameter 38 ft, width, rotors turning 84 ft 7 in, fuselage length 57 ft 4 in, height over tail fins 17 ft 8 in.
Weight: normal weight, VTO 47,500 lb; gross, STO 65,500 lb.
Ceiling: 28,000 ft.
Performance: max cruising speed in helicopter mode 115 mph, in airplane mode 316 mph.

MC-130H Combat Talon II (MSgt. Val Gempis)
Brief: A modified C-130 able to provide global, day, night, and adverse weather capability to air-drop personnel, to deliver personnel and equipment in support of SOF, and to refuel helicopters.
Function: SOF infiltration, exfiltration, and resupply.
Operator: AETC, AFCSOC, AFRC.
First Flight: circa 1965 (E); January 1990 (H).
Delivered: initially 1966.
IOC: 1966 (E); June 1991 (H).
Production: 24 (new build Hs).
Inventory: 14 (E); 24 (H).
Unit Location: Active (associate) and AFRC MC-130Es at Duke Field, Fla. Active MC-130H at Hurlburt Field, Fla.; Kadena AB, Japan, Kirkland AFB, N.M., RAF Mildenhall, UK.
Contractor: Lockheed Martin.
Accommodation: E: crew of nine; 53 troops or 26 paratroops; H: crew of seven; 75 troops or 52 paratroops.
Dimensions: span 132 ft 7 in, height 38 ft 6 in, length 150 ft 10 in (E); 99 ft 9 in (H).
Weight: empty 72,892 lb, gross 155,000 lb.
Ceiling: 33,000 ft.
Performance: max speed 366 mph, range 3,110 miles, unlimited with refueling.
COMMENTARY
Specially modified C-130 transports, these aircraft have in-flight refueling equipment, terrain following/terrain avoidance radar, INS/GPS, and a high-speed aerial delivery system. These systems are used to locate small drop zones and deliver people or equipment with greater accuracy and at higher speeds than is possible with a standard C-130. The aircraft can penetrate hostile airspace at low altitudes, at night, and in adverse weather.
MC-130E (Combat Talon I). Fourteen modified C-130E aircraft, nine of which are equipped with a surface-to-air Fulton air recovery system. During Operation Desert Storm, MC-130Es played a vital role performing psychological operations, with a secondary mission in combat search and rescue.
MC-130H (Combat Talon II). Twenty-four new-build MC-130Hs were acquired to supplement the Talon I. They include an integrated glass cockpit compatible with NVGs and improved infrared and electronic defensive countermeasures. The 1st, 7th, and 15th SOSs employ the Combat Talon II, supporting unconventional warfare units from their bases in Japan, Europe, and CONUS, respectively. The 58th SOW at Kirkland AFB, N.M., is responsible for MC-130H mission qualification training.
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.
Trainer Aircraft

T-1 Jayhawk

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

Function: Advanced pilot training.

Operator: AETC, AFRC (associate).

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


Production: 180.

Inventory: 180.

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

Contractor: Raytheon.

Power Plant: two Pratt & Whitney Canada JT15D-5B turboprops, 1,100 shp.

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

Dimensions: span 33 ft 6 in, length 48 ft 5 in, height 13 ft 11 in.

Weight: empty 5,200 lb, gross 16,300 lb.

Ceiling: 31,000 ft.

Performance: max speed 368 mph.

T-6A Texan II

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

Function: Primary trainer.

Operator: AETC (USAF), USN.


Delivery: from FY00 (planned).

IOC: FY01 (planned).

Production: USAF 372, USN 339 (planned).

Inventory: one.

Unit Location: USAF: Columbus AFB, Miss., Laughlin, Randolph, and Sheppard AFBs, Texas, Moody AFB, Okla., Vance AFB, Okla. Navy: NAS Corpus Christi, Texas, NAS Whiting and Pensacola, Fla.

Contractor: Raytheon.

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

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

Dimensions: span 33 ft 6 in, length 33 ft 3 in, height 10 ft 6 in.

Weight: empty (approx) 4,900 lb; gross 6,500 lb.

Ceiling: 31,000 ft.

Performance: max speed 368 mph.

T-37 Tweet

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

Function: Primary trainer.

Operator: AETC, AFRC.

First Flight: September 1955.

Delivered: from December 1956.

IOC: 1957.

Production: 985.

Inventory: 417.

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

Contractor: Cessna.

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

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

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

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

Ceiling: 35,000 ft.

Performance: max speed at 25,000 ft 426 mph, range at 360 mph with standard tankage 870 miles.

T-38 Talon

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

Function: Trainer.

Operator: ACC, AETC, AFMC, AFRC.

First Flight: April 1959.


IOC: March 1961.
T-43 (Guy Aceto)

HH-60G Pave Hawk (Ted Carlson)


HH-60G. Until recently operated by AFSOC’s 16th SOW, these aircraft were transferred to ACC units.

HH-53 Pave Low


HH-53M. Older version of the helicopter, all of which, together with all HH-CH-53B/Cs, were upgraded to HH-53J Pave Low III “Enhanced” standard from 1986. HH-53J. Enhanced version equipped with a nose-mounted FLIR, an integrated digital avionics suite that includes terrain-following and terrain-avoidance radar, GPS, INS, Doppler, secure communications.
armor plating, and an ECM suite with radar and IR missile jammers, flare/chaff dispensers, radar warning receivers, and missile launch detectors.

**UH-1N Iroquois**

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

**Function:** Utility helicopter.

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

**First Flight:** circa 1956.

**Delivered:** from September 1970.

**IOC:** circa 1970.

**Production:** 79.

**Inventory:** 63.

**Unit Location:**

**Contractor:** Bell.

**Power Plant:** Pratt & Whitney Canada T400-CP-400 Turbo “Twin-Pac,” 1,290 shp.

**Accommodation:** two pilots and 14 passengers or cargo, or external load of 4,000 lb.

**Dimensions:** rotor diameter (with tracking tips) 48 ft 2 in, fuselage length 42 ft 4 in, height 14 ft 4 in.

**Weight:** gross and mission weight 11,200 lb.

**Ceiling:** 13,000 ft.

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

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

**Strategic Missiles**

**AGM-86 Air Launched Cruise Missile**

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

**Function:** Strategic air-to-surface cruise missile.

**Operator:** ACC.

**First Flight:** June 1979 (FSD).

**Delivered:** from 1981.

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

**Production:** 1,715.

**Inventory:** 1,600.

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

**Contractor:** Boeing.

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

**Guidance:** AGM-86B: inertial plus TERCOM; AGM-86C: inertial plus GPS.

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

**Dimensions:** length 20 ft 9 in, body diameter 2 ft, wingspan 12 ft.

**Weight:** 3,200 lb.

**Performance (approx):** speed Mach 0.6, range 1,555 miles.

**COMMENTARY**

**AGM-86A.** A prototype cruise missile, developed in the mid-1970s. Slightly smaller than the later versions, it never entered production.

**AGM-8.** First production version, the B is programmed for precision attack on surface targets. When launched in large numbers, its ability to dilute enemy defenses improves the capability of manned aircraft to penetrate to major targets. Small radar signature and low-level flight capability enhance the missile’s effectiveness. The last of 1,715 production models was delivered in October 1986.

**AGM-86C.** A non-nuclear version, developed from 1986, the Conventional Air Launched Cruise Missile (CALCM) was first used operationally during the Persian Gulf War and has since been widely used in combat. Boeing is currently under contract to convert 322 B-52s to conventional configuration, the first of which was delivered November 1999.

**AGM-86D.** The last 50 of the 322 CALCm conversions will be to AGM-86D standard, with a Lockheed Martin AUP-3(M) hard target penetrating warhead. Final delivery expected mid-2001.

**AGM-129 Advanced Cruise Missile**

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

**Function:** Strategic air-to-surface cruise missile.

**Operator:** ACC.

**First Flight:** July 1985.

**Delivered:** June 1990—August 1993.

**IOC:** circa 1991.

**Production:** 461.

**Inventory:** not available

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

**Contractor:** General Dynamics/McDonnell Douglas (now Boeing).

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

**Guidance:** inertial, with TERCOM update.

**Warhead:** W80-1 nuclear.

**Dimensions:** length 20 ft 10 in, body width 2 ft 3 in, wingspan 10 ft 2 in.

**Weight:** 3,705 lb.

**Performance (approx):** range 1,865 miles.

**COMMENTARY**

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

**LGM-30 Minuteman**

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

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

**Operator:** AFSPC.

**First Flight:** February 1961.

**Delivered:** 1962—December 1978.

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

**Production:** 1,800.

**Inventory:** 500.

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

**Contractor:** Boeing.

**Power Plant:** stage 1: Thiokol M-55 solid-propellant motor, 210,000 lb thrust; stage 2: Aerojet—General SR19-AJ-1 solid-propellant motor, 60,300 lb thrust; stage 3: Thiokol SR73-AJ-1 solid-propellant motor, 34,400 lb thrust.

**Guidance:** Inertial guidance system.

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

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

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

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

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

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

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

LGM-30G. The current version, Minuteman III, became operational in July 1970, providing improved range, rapid targeting, and the capability to place three Multiple Independently Targetable Re-entry Vehicles (MIRVs) on three targets with a high degree of accuracy. USAF deployed 550 in 10 squadrons.

A single re-entry vehicle configuration has been demonstrated and planned for, in accordance with strategic arms control negotiations. A total of 500 Minuteman IIIs will be based at Minot AFB, N.D.; F.E. Warren AFB, Wyo.; and Malmstrom AFB, when START II is ratified.

All 150 missiles that were at Grand Forks AFB have been transferred to Malmstrom AFB and emplaced in converted MM II silos.

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

LGM-118 Peacekeeper

Brief: A solid-fuel intercontinental-range ballistic missile capable of delivering a thermonuclear payload of 10 warheads with high accuracy over great distances.

Function: Strategic surface-to-surface ballistic missile.

Operator: AFSPC.

First Flight: June 17, 1983.


IOC: December 1986, F.E. Warren AFB, Wyo.

Production: 50.

Inventory: 50.

Unit Location: F.E. Warren AFB, Wyo.

Contractor: Martin Marietta.

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

Guidance and control system.

Warheads: 10 Avco Mk 21 MIRVs.

Dimensions: length 71 ft, diameter 7 ft 8 in.

Weight: approx 195,000 lb.

COMMENTS

LGM-118A. Developed initially in response to an increased Soviet strategic threat, the ending of the Cold War caused the US to cap deployment at only 50 Peacekeeper missiles in the FY90 budget and to cease development of a gallium-nitride mode of deployment. Housed in former Minuteman III silos, Peacekeeper is a four-stage ICBM that carries up to 10 independently targetable re-entry vehicles. It is more accurate, carries more warheads, and has greater range than the Minuteman III. Its greater resistance to nuclear effects and its more capable guidance system provide a greatly improved ability to destroy very hard targets. These attributes, combined with its prompt response, provide a decisive deterrent. Peacekeeper will be scheduled for retirement under the provisions of the START II treaty; however, no retirement action will occur until its terms come into force.

LGM-30G

Delivered: from 1956.

IOC: April 1976 (AIM-7F).

Production: not available.

Inventory: classified.

Contractor: Raytheon/Hughes; General Dynamics.

Power Plant: Hercules Mk 58 Mod 0 boost–sustain rocket motor.


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

Dimensions: length 12 ft, body diameter 8 in, wing span 3 ft 4 in.

Weight: launch weight 504 lb.

Performance: (estimated): max speed more than Mach 3.5, range more than 30 miles.

AIM-7 Sparrow

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

Function: Air-to-air guided missile.

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

AIM-7 Sparrow (Guy Aceto)
AIM-9 Sidewinder (top), AIM-120 AMRAAM (bottom) (Guy Aceto)

AIM-54A Phoenix

AIM-9 Sidewinder (top), AIM-120 AMRAAM (bottom) (Guy Aceto)

AIM-88 HARM (Guy Aceto)

AIM-54 A Maverick (Guy Aceto)

AGM-84 Harpoon

Beyond-visual-range air-to-air missile carried by fighters, with high capability to attack low-altitude targets. Pilot may aim and fire several Advanced Medium-Range Air-to-Air Missiles simultaneously at multiple targets and perform evasive maneuvers.

Function: Air-to-air guided missile.
Delivered: 1988-present.
Production: more than 12,000 planned for USAF/USN.

Contractor: classified.
Raytheon.

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

Guidance: inertial and command inertial with active radar terminal homing.
Warhead: high-explosive directed fragmentation weighing 48 lb.

Dimensions: (A/B models) length 12 ft, body diameter 2 ft 1 in.
Weight: 335 lb.
Performance: cruising speed approx Mach 4, range more than 20 miles.

Commentary
A replacement for the AIM-7 Sparrow, the AIM-120 AMRAAM equips USAF’s F-15, F-16, and F-22 fighters. (The F-22 will only carry the C model.) Inertial and command inertial guidance and active radar terminal homing provide launch-and-engage capability. Significant improvements in operational effectiveness over the AIM-7 include increased average velocity, reduced miss distance, improved fuzing, increased warhead lethality, multiple target engagement capability, improved clutter rejection in low-altitude environments, and improved reliability. The AIM-120C currently in production has smaller, clipped control surfaces to provide for internal carriage capability in the F-22.

AIM-54A Maverick

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

Function: Air-to-surface guided missile.
First Flight: August 1969.
Delivered: From August 1972.

Inventory: not available.
Contractor: Raytheon.

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

Guidance: self-homing, EO guidance system (IIR on D and G models).
Warhead: AGM-54B/D/H/I 125-lb high-explosive, charged shape; AGM-65G/K 298-lb blast fragmentation.

Dimensions: length 8 ft 2 in., body diameter 1 ft, wingspan 2 ft 4 in.
Weight: launch weight (AGM-65A) 462 lb, (AGM-65G) 677 lb.
Performance: range 0.6 to 14 miles.

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

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

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

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

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

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

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

AGM-84 Harpoon

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

Function: Air-to-surface anti-ship missile.
First Flight: March 1974 (for USN).
Delivered: from 1977 (for USAF).
IOC: circa 1985 (USAF).
Production: USAF none.

Inventory: classified.
Contractor: McDonnell Douglas (now Boeing).

Power Plant: Teledyne CAE J402-CA-400 turbojet, 660 lb thrust.

Guidance: sea-skimming cruise monitored by radar altimeter, active radar terminal homing.
Warhead: penetration-high-explosive blast type, weighing 488 lb.

Dimensions: length 12 ft 7 in, body diameter 1 ft 1 in, wingspan 3 ft.
Weight: 1,145 lb.
Performance: speed high subsonic, range more than 57 miles.

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

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

AGM-88 HARM

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

Production: not available.

Inventory: classified.
Contractor: Raytheon.

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

Guidance: passive homing guidance system, using seeker head that homes on enemy radar emissions.
Warhead: high-explosive fragmentation, weighing 145 lb.

Dimensions: length 13 ft 8.5 in., body diameter 1 in., wingspan 3 ft 8.5 in.
Weight: 807 lb.
Performance: cruising speed supersonic, altitude limit 30,000 ft to 40,000 ft, range more than 10 miles.

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

AGM-88A. A factory-programmed version used to equip the now-retired F-4S Wild Weasel to increase its lethality in electronic combat.

AGM-88B. USAF is updating older AGM-88BWs with the new, enhanced capability guidance seeker currently equipping the C version.

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

Erastable Electronically Programmable Read-Only Memory has been retrofitted on USAFE, PACAF, and ACC HARMs, permitting changes to missile memory in the field. Current upgrade initiatives are aimed at increasing capability of both B and C versions against target shutdown, blanking, and blinking and at reducing potential damage to friendly radars in the target area; home-on-jamming capability will be added to the C. Further upgrades under development will introduce GPS precision navigation capability.

AGM-130

Brief: A powered TV– or IIR-guided air-to-surface missile, carried by the F-15E and designed for high-subsonic flight and low-altitude strikes at standoff ranges against heavily defended targets.

Function: Air-to-surface guided and powered bomb.
AGM-130

**Brief:** A medium-range stand-off attack missile that is carried by USAF B-52Hs to provide this long-range aircraft a conventional precision strike capability.

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

**First Flight:** 1990.

**Delivered:** 1992.

**IOC:** June 1992.

**Production:** approx. 250.

**Contractor:** Raytheon.

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

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

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

**Weight:** 2,998 lb.

**Performance:** Range approx. 50 miles.

**AIM-142C Have Nap

**Brief:** A medium-range stand-off attack missile that is carried by USAF F-15Es and F-16s to provide this long-range aircraft a conventional precision strike capability.

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

**First Flight:** 1990.

**Delivered:** 1992.

**IOC:** June 1992.

**Production:** approx. 250.

**Contractor:** Raytheon.

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

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

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

**Weight:** 2,998 lb.

**Performance:** Range approx. 50 miles.

**AIM-142D Have Nap (TSgt. Mike Ammons)

**GBU-15

**Brief:** A precise air-to-ground penetrating glide bomb.

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

**First Flight:** GBU-15 in service May 1985; GBU-15(V)1/B in service 1983.

**IOC:** 1983.

**Production:** 6,000.

**Inventory:** USAF 14,000; Navy 12,000.

**Contractor:** Raytheon.

**Guidance:** TV or IIR seeker.

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

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

**Weight:** 2,450 lb.

**Performance:** Cruising speed subsonic.

**AIM-154 JSOW (Guy Aceto)

**Brief:** A glide bomb with a guidance system designed to give pinpoint accuracy from short standoff distances.

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

**First Flight:** 1997.

**Delivered:** from 1994.

**IOC:** 1997.

**Production:** 5,000.

**Contractor:** Textron Systems.

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

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

**Weight:** 927 lb.

**Performance:** Delivers 40 lethal projectiles.

**COMMENTARY**

The GBU-15 Sensor Fuzed Weapon comprises an 800-lb tactical munitions dispenser with an FZU-39 fuze. Each tactical munitions dispenser contains 10 BLU-109/B submunitions, and each submunition contains four projectiles that are being thrown out, seek out their target and deliver a warhead. Each SFW can deliver a total of 40 lethal projectiles. The projectiles’ IR sensors can detect a vehicle’s infrared signature; if no target is detected, the warhead detonates after a preset time.

The SFW is currently delivered as an unguided gravity weapon from the B-1, B-2, B-52H, F-15E, and F-16. The Air Force is completing development of an IIR version, leading to a new STK-20 IIR tail kit. The STK will improve the munitions delivery accuracy when released from medium to high altitude.
with a third-generation Laser-Guided Bomb guidance kit, called Paveway III, integrated with a BLU-109 penetrating warhead.

The kit consists of an advanced guidance section and high-lift airframe. It is extremely precise and highly effective against a broad range of high-value hard targets. The system can be employed from low, medium, and high altitudes, providing operational flexibility through the use of an adaptive digital autopilot and large field-of-regard, highly sensitive scanning seeker.

The GBU-24A/B adapts to conditions of release, flies an appropriate midcourse, and provides trajectory shaping for enhanced warhead effectiveness. The weapon is deployed on the F-15E and F-16. The GBU-24A/B was highly successful in the Persian Gulf War and is in production for foreign military sales.

**GBU-27**

Brief: A precise air-to-ground penetrating glide bomb equipped with an advanced guidance kit.

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

**First Flight:** not available

**Delivered:** from 1988.

**IOC:** 1988 (unconfirmed).

**Production:** not available

**Inventory:** classified.

**Contractor:** Lockheed Martin.

**Guidance:** semi-active laser.

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

**Weight:** 2,170 lb.

**EGBU-28.** Integrates GPS/INS guidance into the existing GBU-28 laser seeker to provide adverse weather capability and improved target location. Entered production in FY98.

**GBU-31 Joint Direct Attack Munition**

**Brief:** A joint USAF/Navy weapon. GBU-31 JDAM-guided 1,000- or 2,000-lb 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:** 1997–present.

**IOC:** 1998.

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

**Inventory:** not available

**Contractor:** Boeing.

**Dimensions:** Mk 84 with JDAM 152.7 in; BLU-109 with JDAM 148.6 in; Mk 83 with JDAM 119.5 in.

**Weight:** Mk 84 2,036/2,056 (USAF/USN); BLU-109 2,115/2,135; Mk 83 631/631.

**Performance:** 42.9 ft CEP with GPS; 99 ft CEP with INS only.

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

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

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

**Joint Air-to-Surface Standoff Missile**

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

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

**First Flight:** April 8, 1999

**Delivered:** TBD

**IOC:** FY03 (planned).

**Production:** 2,400 (USAF planned); TBD (Navy).

**Inventory:** TBD

**Contractor:** Lockheed Martin.

**Power Plant:** Teledyne Continental Motors.

**Dimensions:** 14 ft.

**Weight:** 2,250 lb.

**Performance:** 1,000-lb class warhead (both versions).

**COMMENTARY** JASSM is intended to be a precision, long-range weapon to hold high-value targets at risk. The missile will use an IR seeker for terminal guidance, with GPS/INS for midcourse and back-up terminal guidance. Engineering and Manufacturing Development program commenced November 1998. DoD plans to use JASSM on threshold aircraft B-52H and F-16. Objective aircraft include B-1B, B-2, F/A-18E/F, F-15E, F-117, and P-3C.

**Wind-Corrected Munitions Dispenser**

**Brief:** A tail kit to be fitted to CBU 87/89/97 dispenser weapons. When dropped from high altitude its inertial guidance system corrects for launch transients and wind effects to enhance accuracy.

**Function:** Guidance tail kit.

**First Flight:** February 1996.

**Delivered:** FY00 (planned).

**IOC:** FY00 (planned).

**Production:** 40,000 (planned).

**Inventory:** TBD

**Contractor:** Lockheed Martin.

**Dimensions:** length 17 in, diameter 15 in.

**Weight:** 100 lb.

**Performance:** range, about eight miles.

**COMMENTARY** USAF plans to modify 40,000 standard tactical munition dispensers with guidance kits to compensate for wind drift on downward flight from high altitudes. WCDM kits will each have an INS guidance unit, movable tail fins that pop out in flight, and a signal processor. A WCDM tail kit will be fitted on dispensers that will carry mine, cluster bomblets, or anti-armour submunitions. Successful flight testing began in February 1996. DoD plans to integrate WCDM on threshold aircraft B-52 and F-16. Objective aircraft: B-1, F-15E, F-22, and F-117.

**FIM-92 Stinger**

**Brief:** A man-portable Surface-to-Air Missile designed to defend airfields against low-flying attacking aircraft.

**Function:** Surface-to-air missile.
Delivered: from 1980.
IOC: 1984 (USAF).
Production: not available.
Inventory: not available.
Contractor: Raytheon (Hughes).
Power Plant: solid-propellant rocket motor.
Guidance: IR homing guidance.
Warhead: high-explosive blast fragmentation, weighing 6.6 lb.
Dimensions: length 5 ft, body diameter 2.7 in., wingspan 5.5 in.
Weight: launch weight 35.2 lb.
Performance: range 1.86 miles.

**COMMENTARY**

Rapier is a man-portable, tube-launched SAM for the US Army, Stinger has been employed since 1984 by air personnel in South Korea to provide base defense against high-speed, low-level ground-attack aircraft.

Production: 32.
Inventory: 32.
Contractor: British Aerospace (now Mahr BAe Dynamics).

### Power Plant

IMI two-stage solid-propellant rocket motor.

Guidance: surveillance radar and command to line-of-sight guidance. Optional Blindfire radar or optical target tracking, depending on conditions.

Warhead: semi-armor-piercing, with impact fuze.

Dimensions: length 7 ft 4 in., body diameter 5 in., wingspan 1 ft 3 in.

Weight: approx 94 lb.

Performance: max speed more than Mach 2, range 4 miles.

**COMMENTARY**

Atlas body diameter 10 ft. Atlas II and IIIA, one RL10A-4-1 engine; for Atlas IIIB, one or two RL10A-4-2 engines. A 10-ft-diameter fairing protects payloads for Atlas D-1A/3A.

Delta Brief: An expendable, medium-lift launch vehicle now used to launch Navstar Global Positioning System satellites into orbit, providing navigational data to military and civilian users, and to launch civil and commercial payloads into low Earth, polar, geo transfer, and geosynchronous orbits.

Function: Medium expendable spaceflight vehicle.

**COMMENTARY**

Delta II: length 130 ft, diameter 8 ft; bulbous payload fairing, max diameter 10 ft. Delta III: length 130 ft, diameter 10 ft; payload fairing, diameter 13 ft.

Launch Weight: 511,190 lb.

Performance: Delta II: up to 11,100 lb to near Earth orbit, up to 4,010 lb to Geosynchronous Transfer Orbit (GTO); Delta III: up to 2,000 lb to GTO, up to 660 lb to GEO. Delta III: up to 8,930 lb to GTO; up to 18,280 lb to Low Earth Orbit (LEO).

**COMMENTARY**

Delta I. Delta launch vehicle family began in 1959 with a contract to Douglas Aircraft Co. (now Boeing) for the production and integration of 12 space launch vehicles.

The D-2A, used with the current Atlas II, has been stretched 3 ft to include more propellant and thus has increased thrust. Payload fairings of either 11- or 14-ft diameter can be used. D-1A upper stage powered in the Atlas IIIA will have a single RL-10-4-1 engine; a dual engine, stretched version is applicable to the Atlas IV. The Centaur D-2A/3A is virtually identical to that used on Atlas IIIB.

Centaur G-prime modified upper stage, with high-energy cryogenic propulsion system. Propellant capacity is enhanced by the Titan IVB, creating the great-weight-to-altitude capability of any US launch vehicle by placing a 10,200-lb payload into Geosynchronous Earth Orbit.

### Delta

**Brief:** An expendable, medium-lift launch vehicle now used to launch Navstar Global Positioning System satellites into orbit, providing navigational data to military and civilian users, and to launch civil and commercial payloads into low Earth, polar, geo transfer, and geosynchronous orbits.

**Function:** Medium expendable spaceflight vehicle.

**COMMENTARY**

### Atlas IIA

**Dimensions:**
- Length: 51 ft 6 in.
- Diameter: 14 ft 2 in.
- Weight: 301,300 lb.
- Thrust: 1,850,000 lb.

**Performance:** Max speed more than Mach 2.

**Warhead:** Semi-armor-piercing, with impact fuze.

**Guidance:** High-energy upper stage with multiburn and extended coast capability.

**Function:** High-energy upper stage.

**Contractor:** Boeing.

**Power Plant:**
- Atlas IIA: one RL10A-4-1 engine; for Atlas II, one or two RL10A-4-2 engines.
- Atlas III: two-chamber RD-180 built by NPO Energomash of Russia. The RD-180 is a throttleable engine fed by liquid oxygen/liquid hydrogen rocket engines, each 22,300 lb thrust; for Atlas II, one RL10A-4-1 engine; for Atlas III, two (FY00); three (FY01).

**Dimensions:**
- Length: 33 ft 7 in.
- Diameter: 14 ft 2 in.
- Thrust: 1,850,000 lb.
- Weight: 301,300 lb.

**Launch Weight:**
- Atlas II: 511,190 lb.
- Atlas III: 1,175,000 lb.

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

**Contractor:** Boeing.

**Power Plant:**
- Atlas IIA: one RL10A-4-1 engine; for Atlas II, one or two RL10A-4-2 engines.
- Atlas III: two-chamber RD-180 built by NPO Energomash of Russia. The RD-180 is a throttleable engine fed by liquid oxygen/liquid hydrogen rocket engines, each 22,300 lb thrust; for Atlas II, one RL10A-4-1 engine; for Atlas III, one or two RL10A-4-2 engines, each 22,300 lb thrust; G-prime version.

**Dimensions:**
- Length: 33 ft 7 in.
- Diameter: 14 ft 2 in.
- Thrust: 1,850,000 lb.
- Weight: 301,300 lb.

**Performance:**
- Max speed more than Mach 2.
- Range: 400 miles.

**Warhead:** Semi-armor-piercing, with impact fuze.

**Guidance:** High-energy upper stage with multiburn and extended coast capability.

**Function:** High-energy upper stage.

**Contractor:** Boeing.

**Power Plant:**
- Atlas IIA: one RL10A-4-1 engine; for Atlas II, one or two RL10A-4-2 engines.
- Atlas III: two-chamber RD-180 built by NPO Energomash of Russia. The RD-180 is a throttleable engine fed by liquid oxygen/liquid hydrogen rocket engines, each 22,300 lb thrust; for Atlas II, one RL10A-4-1 engine; for Atlas III, one or two RL10A-4-2 engines, each 22,300 lb thrust; G-prime version.

**Dimensions:**
- Length: 33 ft 7 in.
- Diameter: 14 ft 2 in.
- Thrust: 1,850,000 lb.
- Weight: 301,300 lb.

**Launch Weight:**
- Atlas II: 511,190 lb.
- Atlas III: 1,175,000 lb.

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

**Contractor:** Boeing.

**Power Plant:**
- Atlas IIA: one RL10A-4-1 engine; for Atlas II, one or two RL10A-4-2 engines.
- Atlas III: two-chamber RD-180 built by NPO Energomash of Russia. The RD-180 is a throttleable engine fed by liquid oxygen/liquid hydrogen rocket engines, each 22,300 lb thrust; for Atlas II, one RL10A-4-1 engine; for Atlas III, one or two RL10A-4-2 engines, each 22,300 lb thrust; G-prime version.

**Dimensions:**
- Length: 33 ft 7 in.
- Diameter: 14 ft 2 in.
- Thrust: 1,850,000 lb.
- Weight: 301,300 lb.

**Performance:**
- Max speed more than Mach 2.
- Range: 400 miles.
Inertial Upper Stage

Titan IV

Brief: A heavy-lift space launch vehicle used to carry DoD payloads such as Defense Support Program (DSP) and ICBM satellites into space. It is the largest unmanned space booster used by the Air Force.

Function: Heavy expendable spacecraft.

Operator: Commercial (AFSPC oversight).

First Launch: June 14, 1989 (Titan IVA); Feb. 23, 1997 (Titan IVB).

Launches Scheduled: Three (FY00); three (FY01).

Operator: Lockheed Martin.

Function: Inertial guidance system.

Power Plant: Aerojet liquid hypergolic propellant rocket engines; stage 1: 45,100 lb thrust each; stage 2: 106,150 lb thrust; two Alliant Tecumseh solid rocket motors each 1.8 million lb peak thrust.

Guidance: Digital avionics system on Titan IVB.

Dimensions: Stage 1 and 2: height 119 ft 2 in, diameter 10 ft.

Launch Weight: 1.9 million lb.

Performance: 12,700 lb to GEO; 47,800 lb to LEO.

COMMENTARY

USAF’s primary heavy-lift launcher, Titan IV was selected in 1985 to augment the space shuttle and is used to launch critical military payloads, including DSP and ICBM satellites. It is a growth version of the earlier Titan 34D, with stretched first and second stages, three-segment solid boosters, and a 16- by 8.5-ft-diameter payload fairing, with various heights of payload fairings available.

Titan IVA. The last Titan IVA was launched Aug. 12, 1998. This version was capable of placing 32,000-lb payload into polar LEO and 39,000 lb into LEO. With a modified Centaur G-prime upper stage, it could place 10,200 lb into GEO, or with an alternative IUS, 5,200 lb into GEO.

Titan IVB. The latest Titan IVB version has mission-unique kits, providing a standard interface for payloads to permit launch-site processing, a new electrical system on the bus core, a new ground system, and upgraded solid rocket motors with 25 percent improved performance. First Titan IVB launch from Cape Canaveral was made successfully Feb. 23, 1997.

Inertial Upper Stage

Titan II

Brief: A more powerful version of the Pegasus space launch vehicle, using an LGM-118 Peacekeeper missile first-stage addition and with the Pegasus wings removed. Taurus is ground-launched from regular launch complexes. The first launch, March 13, 1994, put two USAF and DARPA satellites into a 340-mile polar orbit.

Function: Expendable launch vehicle.

Operator: Commercial (AFSPC oversight).

First Launch: April 1964 (NASA’s Titan II–Gemini).

Unit Location: Vandenberg AFB, Calif.

Contractor: Lockheed Martin.

Power Plant: Stage 1 and 2: Aerojet liquid hypergolic propellant rocket engines; stage 1: 430,000 lb thrust; stage 2: 100,000 lb thrust.

Guidance: Inertial guidance system.

Dimensions: Stage 1 and 2: height 110 ft, diameter 10 ft; payload fairing heights 20, 25, and 30 ft, diameter 10 ft.

Launch Weight: 408,000 lb.

Performance: More than 4,200 lb to polar LEO.

COMMENTARY

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

Titan II. Titan I provided many structural and propulsion techniques that were later incorporated into the Titan II. The launchers were used in the 1960s for the manned Gemini flights.

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

Titan IV

Brief: A small winged launcher tasked to carry small payloads to LEO.

Function: Expendable launch vehicle.

Operator: Orbital Sciences/Alliant.

First Launch: March 8, 1996, following two earlier, unsuccessful attempts.

Launches Scheduled: One (FY00); one (FY01).

Operator: Cape Canaveral AFS, Fla., Vandenberg AFB, Calif.

Function: Serves as an upper stage for the Titan IV for DoD, as well as with the shuttle for NASA, the highly reliable IUS consists of an all-steel, an all-stage solid rocket motor, an interstage, a forward-stage solid rocket motor, and an equipment support structure.

Pegasus

Brief: A small winged launcher tasked to carry small payloads to LEO.

Function: Expendable launch vehicle.

Operator: Commercial (AFSPC oversight for DoD payloads).

First Launch: April 5, 1990.

Launches Scheduled: None for DoD.

Contractor: Orbital Sciences/Alliant.

Power Plant: Three solid-propellant motors developing 109,400 lb, 27,600 lb, and 7,800 lb thrust, respectively.

Guidance: Inertial guidance.

Dimensions: Length 17 ft, diameter 9 ft 6 in.

Launch Weight: 32,600 lb.

Performance: 5,350 lb into GEO when used on Titan IVB.

Titan IV

Brief: A small winged launcher tasked to carry small payloads to LEO.

Function: Expendable launch vehicle.

Operator: Commercial (AFSPC oversight for DoD payloads).


**Constellation:** classified.
**Design Life:** three yr.
**Launch Vehicle:** Titan IV IUS.
**Unit Location:** Peterson AFB, Colo.
**Orbit Altitude:** 22,000+ miles in geosynchronous orbit.

**Contractor:** TRW, Aerojet.
**Power Plant:** solar arrays generating 1,485 watts.
**Dimensions:** diameter 22 ft, height 32 ft 8 in, with solar paddles deployed.
**Weight:** 5,000 lb (approx).
**Performance:** orbits at approx 22,000 miles altitude in geosynchronous orbit; uses IR sensors to sense heat from missile and booster plumes against Earth's background.

**COMMENTARY**

Defense Support Program (DSP) satellites are a key part of North America's early warning system, capable of detecting missile launches, space launches, and nuclear detonations. Warning data is fed to NORAD and US Space Command early warning centers at Cheyenne Mountain AFS, Colo.

Since their first launch DSP satellites have provided an uninterrupted early warning capability to the US. Though not designed to spot and track smaller missiles, the system's capability was demonstrated during the Persian Gulf War, when the satellites provided warnings of Iraqi Scud attacks. A total of 19 DSP satellites have been launched by USAF. Procurement will end with No. 23, and the last DSP satellite will be launched in FY02.

**Space Based Infrared System**

The follow-on to the DSP is the Space Based Infra-Red System (SBIRS), an advanced program with four primary missions: missile warning, missile defense, technical intelligence, and battle space characterization. SBIRS is an integrated "system of systems" including a High Component (satellites in GEO and sensors hosted on satellites in Highly Elliptical Orbit) and a Low Component (satellites in LEO), as well as ground assets. It is being fielded in three increments. Increment 1 was expected to consolidate all DSP ground processing in one CONUS Mission Processing Station at Buckley ANGB, Colo., by the end of FY00. Increment 2 fields the High Component starting in FY04, and Increment 3 fields the Low Component starting in FY06. The High Component is in the EMD phase of development, through a Lockheed Martin team, including Aerojet, Honeywell, and Northrop Grumman. The Low Component should complete the program definition phase in early FY02. Two SBIRS Low program definition and risk reduction contracts were awarded to TRW and Spectrum Astro in August 1999.

**Defense Meteorological Satellite Program**

Four satellites that collect air, land, sea, and space environmental data to support worldwide strategic and tactical military operations.

**Function:** Environmental monitoring satellite.
**Operator:** National Polar Orbiting Environmental Satellite System (NPOESS) program office.
**First Launch:** circa 1960s (classified until 1973).
**IOC:** classified but in use during Vietnam War.
**Constellation:** Two.
**Unit Location:** Suitland, Md.
**Orbit Altitude:** approx 500 miles.
**Contractor:** Lockheed Martin.
**Power Plant:** solar arrays generating 500–600 watts.
**Dimensions:** height 12 ft, width 4 ft.
**Weight:** 1,750 lb.
**Performance:** DSP satellites orbit Earth at about 500 miles altitude and scan an area 1,800 miles wide. Each system covers the Earth in about 12 hr.

**COMMENTARY**

Defense Meteorological Satellite Program (DMSP) space vehicles have been collecting weather data for US military operations for more than 30 years. In addition to atmospheric data, DMSP satellites provide critical land, sea, and space environmental data for the military.

Circa 2008–09, DMSP will be replaced by the follow-on NPOESS. NPOESS will consolidate today's separate civil and military polar orbiting meteorological satellite systems into a single national program.

**Global Positioning System**

A constellation of orbiting space vehicles that provides highly precise and reliable navigation data, 24 hours a day, to military and civilian users around the world. Signals permit calculation of location within 300 feet.

**Function:** Worldwide navigation satellite.
**Operator:** AFSPC.
**First Launch:** Feb. 22, 1978.
**IOC:** Dec. 9, 1993.
**Constellation:** 24.
**Design Life:** six yr (IIIA); 7.5 yr (IIR).
**Launch Vehicle:** Delta II.
**Unit Location:** Schriever AFB, Colo.
**Orbit Altitude:** 12,636 miles (IIA); 12,532 miles (IIR).
**Contractor:** Boeing and Lockheed Martin.
**Power Plant:** solar arrays generating 700 watts (II/IIA); 1,136 watts (IIR).
**Dimensions:** body 8 ft x 8 ft x 12 ft, incl solar arrays 11 ft x 19 ft (IIIA); body 8 ft x 6 ft x 10 ft, span incl solar arrays 37 ft (IIR).
**Weight:** 2,174 lb (IIA); 2,370 lb (IIR) on orbit.
**Performance:** GPS satellites orbit the Earth every 12 hr, emitting continuous navigation signals. The signals are so accurate that time can be figured to within one-millilongitude of a second, velocity within a fraction of a mile per hour, and location to within a few feet. Receivers are used in aircraft, ships, and land vehicles and can also be handheld.

**COMMENTARY**

The 24 satellites of the Navstar Global Positioning System (GPS) provide 24-hour navigation services, including accurate, three-dimensional (latitude, longitude, and altitude) velocity and precise time; passive, all-weather operation; continuous real-time information; support to an unlimited number of users and areas; and support to civilian users currently at a slightly less accurate level. Concern over potential enemy use of GPS is being addressed under the Navwar and GPS modernization efforts; new GPS satellites will have two jam-resistant channels for military-only use, as well as two new civilian-only channels. There are currently 28 satellites on orbit: nine Block II, 17 IIA, and two IIR.

MAPPING, aerial refueling and rendezvous, geodetic surveys, and search-and-rescue operations are examples of the many GPS applications.

**Milstar Satellite Communications System**

A satellite communications system that provides secure, jam-resistant worldwide C-band communications for tactical and strategic forces in all levels of conflict, linking command authorities to ground forces, ships, submarines, and aircraft.
Function: Communications satellite.  
Operator: AFSPC.  
IOC: July 1997 (Militar I).  
Constellation: three (three spares).  
Design Life: 10 yr.  
Launch Vehicle: Titan IV/Centaur.  
Unit Location: Schriever AFB, Colo.  
Orbit Altitude: 22,300 miles.  
Contractor: Lockheed Martin.  
Power Plant: solar arrays generating 5,000 watts.  
Dimensions: 51 ft x 116 ft (with full solar array extension).  
Weight: 10,000 lb.  
Performance: The constellation will consist of three satellites in low-inclined geosynchronous orbit, providing worldwide coverage between 65° north and 65° south latitude.  

**COMMENTARY**  
Militar is a joint-service communications system that provides secure, jam-resistant EHF communications. Operated by the 50th Space Wing, the constellation will link command authorities with a wide variety of resources, including ships, submarines, aircraft, and ground stations.  

Currently serving tactical as well as strategic forces, the last three Militars (to be launched between 2000 and 2002) will include low-data-rate and medium-data-rate payloads able to transmit higher data rates to highly mobile forces.

**MILSATCOM Polar System**  
**Brief:** Satellite that provides secure, survivable communications, supporting peacekeeping, contingency, and wartime operations in the North Pole region.  
**Function:** Communications satellite.  
**Operator:** AFSPC.  
**First Launch:** late 1997.  
**IOC:** 1997.  
**Constellation:** three.  
**Design Life:** host satellite dependent.  
**Launch Vehicle:** not available.  
**Unit Location:** Schriever AFB, Colo.  
**Orbit Altitude:** 25,300 miles.  
**Contractor:** classified.  
**Power Plant:** 410 watts consumed by payload (power from host solar array).  
**Dimensions:** numerous items integrated throughout host.  
**Weight:** 470 lb (payload).  

**COMMENTARY**  
USAF deployed a modified EHF payload on a host polar-orbiting satellite, providing an interim cheaper alternative to Militar to ensure protected polar communications capability. Two further satellites are under development, with launches scheduled for 2003 and 2004.

**UHF Follow-On Satellite Systems**  
**Brief:** New-generation communications satellites replaced Fleet Satellite Communications System (FLTSATCOM).  
**Function:** Communications satellite.  
**Operator:** US Navy, AFSPC.  
**First Launch:** March 25, 1993.  
**IOC:** Sept. 3, 1993.  
**Constellation:** four primary, four redundant.  
**Design Life:** 14 yr.  
**Launch Vehicle:** Atlas II.  
**Unit Location:** Schriever AFB, Colo., worldwide Navy locations.  
**Orbit Altitude:** 22,300 miles.  
**Contractor:** Hughes.  
**Power Plant:** two deployed three-panel solar arrays generating 2,500–3,800 watts.  
**Dimensions:** deployed length 60 ft 6 in (F-2–F-7); 86 ft (F-8–F-10); diameter 9 ft 6 in.  
**Weight:** 2,600–3,400 lb.  

**COMMENTARY**  
New generation of satellites with 39 channels, providing UHF communications. Compatible with the terminals used by the earlier systems. UFO-4 was the first in the series to include an EHF communications package, constituting 20 channels of Militar-compatible protected connectivity. UFO-8, -9, and -10 will host GE-17 turbojets, providing direct broadcast of digital multimedia information to small tactical terminals. A Gapfiller UFO II is planned.

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**AERIAL TARGETS**

**MQM-107 Streaker (Guy Aceto)**  
**Brief:** A jet-powered, variable speed, recoverable target drone.  
**Function:** Aerial target.  
**Operator:** ACC.  
**First Flight:** not available  
**Delivered:** from 1984 (B).  
**IOC:** 1987.  
**Production:** 70 (B); 221 (D); 78 (E).  
**Inventory:** not available  
**Unit Location:** Tyndall AFB, Fla.  
**Contractor:** Raytheon (D model); Marconi (formerly Tracor) (E model).  
**Power Plant:** initially on D model, one Teledyne CAE 373-8 engine, 950 lb thrust; MQM-107Ds delivered since 1989 have 950 lb thrust TR-305 turbojets. Microrotra TR-60-5 engine, 1,061 lb thrust or TCAE 373-8B (E model).  
**Guidance and Control:** analog or digital, for both ground control and preprogrammed flight (D model); high-g autopilot provisions; digital autopilot and remote control by the Gulf Range Drone Control Upgrade System (GRDCUS), a multifunction command-and-control multitelerationation system (E model).  
**Dimensions:** length 18 ft 1 in, body diameter 1 ft 3 in, span 9 ft 10 in.  
**Weight:** max launch weight (excl booster) 1,460 lb.  
**Performance:** operating speed 207–630 mph, operating height 50–40,000 ft, endurance 2 hr 15 min.  

**MOM-107D.** A third-generation version of the MQM-107 Streaker. It is a recoverable, variable-speed target drone used for Research, Development, Test, and Evaluation (RDT&E) and the Weapon System Evaluation Program.  

**MOM-107E.** Improved performance follow-on to the MOM-107D. In operational service.  

**BQM-34 Firebee**  
**Brief:** A jet-powered, variable speed, recoverable target drone.  
**Function:** Aerial target.  
**Operator:** ACC.  
**First Flight:** 1951; 1958 (BQM-34A).  
**Delivered:** from 1951.  
**IOC:** circa 1951.  
**Production:** 1,800+.  
**Inventory:** not available  
**Unit Location:** Tyndall AFB, Fla.  
**Contractor:** Teledyne Ryan.  
**Power Plant:** two General Electric J85-GE-100 turbojets, 2,850 lb thrust.  
**Guidance and Control:** remote-control methods incl choice of radar, radio, active seeker, and automatic navigator developed by Teledyne Ryan; the current model of the BQM-34A is configured to accommodate the GRDCUS, which allows multiple targets to be flown simultaneously.  
**Dimensions:** length 22 ft 11 in, body diameter 3 ft 1 in, span 12 ft 11 in.  
**Weight:** launch weight 2,500 lb.  
**Performance:** max level speed at 6,500 ft 690 mph, operating height range 10 ft to more than 60,000 ft, max range 796 miles, endurance (typical configuration) 30 min.  

**COMMENTARY**  
More than 1,800 of these jet target vehicles have been delivered to USAF since initial development of the BQM-34A in the 1950s.  
Current BQM-34As with upgraded General Electric J85-100 engine provide a thrust-to-weight ratio of 1-to-1, enabling this version to offer higher climb rates and 6g maneuvering capability. A new microprocessor flight-control system provides a prelaunch and in-flight self-test capability. Used for weapon system evaluation.

**QF-4**  
**Brief:** A converted, remotely piloted F-4 Phantom fighter used for full-scale training or testing.  
**Function:** Aerial target.  
**Operator:** ACC.  
**First Flight:** August 1993.  
**IOC:** not available  
**Inventory:** not available  
**Unit Location:** Tyndall AFB, Fla. (detachment at Holloman AFB, N.M.)  
**Contractor:** Marconi (formerly Tracor).  
**Power Plant:** two General Electric J79-GE-17 turbojets, each with approx 17,000 lb thrust with afterburning.  
**Guidance and Control:** remote-control methods incl the GRDCUS (Tyndall) and the Drone and Control System (Holloman) and will also accommodate the triservice Target Control System currently under development.  
**Dimensions:** length 63 ft, height 16 ft 5.5 in, wing span 38 ft 5 in.  
**Weight:** mission operational weight 49,500 lb.  
**Performance:** max speed Mach 2+, ceiling 55,000 ft, range (approx) 500 miles.  

**COMMENTARY**  
The F-4 was selected as the source aircraft for the replacement of the QF-106 Full-Scale Aerial Target (FSAT) when the F-106 inventory was depleted. The QF-4 provides for a larger operational performance envelope (maneuvering) and greater payload capability compared with its predecessors. A complement of 331 F-4E, F-4G, and RF-4G aircraft have been allotted for the FSAT conversion program.