

# WEAPONS & PLATFORMS

By Aaron M.U. Church

-  **BOMBER AIRCRAFT 119**
-  **FIGHTER & ATTACK AIRCRAFT 121**
-  **SPECIAL OPERATIONS AIRCRAFT 125**
-  **C3/BM/ISR 129**
-  **TANKER AIRCRAFT 135**
-  **AIRLIFT AIRCRAFT 137**
-  **HELICOPTERS 142**
-  **TRAINER AIRCRAFT 144**
-  **EXPERIMENTAL AND TEST VEHICLES 147**
-  **UNCREWED AIRCRAFT SYSTEMS 148**
-  **STRATEGIC WEAPONS 150**
-  **LONG-RANGE STANDOFF WEAPONS 153**
-  **AIR-TO-AIR MISSILES/ROCKETS 154**
-  **AIR-TO-GROUND WEAPONS 155**
-  **AREA WEAPONS 157**
-  **PRECISION GUIDED WEAPONS 158**
-  **SPACE SYSTEMS 161**
- GLOSSARY 172**

Almanac Weapons & Platforms is a researched publication derived from publicly available sources, with significant contributions from Air & Space Forces Magazine's independent reporting, as well as data and materials provided through collaboration with the Secretary of the Air Force Public Affairs.



## BOMBER AIRCRAFT

# USAF PROGRAMS

Richard Gonzales/USAF



### B-1B LANCER

Long-range conventional bomber

**Brief:** The B-1B is a conventional, long-range, supersonic, penetrating strike aircraft derived from the canceled B-1A. The B-1A first flew on Dec. 23, 1974, and four prototypes were developed and tested before program cancellation in 1977. The Reagan administration revived the program as the B-1B in 1981, adding 74,000 lb of usable payload, improved radar, and reduced radar cross section, but reducing speed to Mach 1.2. Its three internal weapons bays can carry the largest payload of guided/unguided weapons in the Air Force inventory, and its blended wing/body and variable-geometry wing permit long-range/loiter time. Offensive avionics include terrain-following SAR and a fully integrated Sniper ATP to track and target moving vehicles. B-1B made its combat debut over Iraq during Desert Fox in 1998. The B-1B is USAF's sole Long-Range Anti-Ship Missile (LRASM) carrier and its range, speed, and payload make it a key power-projection asset in USAF's Indo-Asia Pacific strategy. The fleet completed its most comprehensive upgrade in 2020 by adding an all-digital glass cockpit, Fully Integrated Data Link (FIDL) to enhance targeting/LOS/BLOS C2, and an internal test system to simplify troubleshooting. FY25 launches Load Adaptable Modular (LAM) pylon installations to enable externally mounted long-range standoff, outsized hypersonic, or 5,000 lb-class guided weapons. LAM will expand the bomber capacity to 36 JASSM, LRASM, or developmental Hypersonic Attack Cruise Missiles (HACM). Current development includes radio crypto modernization to enable transition to next-gen MUOS secure, jam-resistant BLOS SATCOM, and upgrades to replace the B-52 in the hypersonic weapons test role. AFGSC retired the 17 least serviceable airframes to boost fleet readiness but is now regenerating two of the aircraft to replace damaged airframes. A third B-1B was severely damaged in a landing accident at Ellsworth in 2023, but AFGSC does not plan to replace it. Ellsworth B-1s relocated to Grand Forks in December 2024 to allow facility construction supporting transition to the B-21. B-1Bs will continue providing bomber capacity until fully replaced by the B-21, targeted for 2032.

**Contractor:** Boeing (formerly Rockwell International).

**First Flight:** Oct. 18, 1984 (B-1B).

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

**IOC:** Oct. 1, 1986, Dyess AFB, Texas.

**Production:** 104.

**Inventory:** 46.

**Operator:** AFGSC, AFMC.

**Aircraft Location:** Dyess AFB, Texas; Edwards AFB, Calif.; Eglin AFB, Fla.; Ellsworth AFB, S.D.; Grand Forks AFB, N.D.

**Active Variant:**

•B-1B. Upgraded production version of the B-1A.

**Dimensions:** Span 137 ft (forward sweep) to 79 ft (aft sweep), length 146 ft,

height 34 ft.

**Weight:** Max T-O 477,000 lb.

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

**Performance:** Speed 900+ mph at S-L, range approx. 7,455 miles (farther with air refueling).

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

**Armament:** 84 Mk 82 (500-lb) or 24 Mk 84 (2,000-lb) general-purpose bombs; 84 Mk 62 (500-lb) or eight Mk 65 (2,000-lb) Quickstrike naval mines; 30 CBU-87/89 cluster bombs or 30 CBU-103/104/105 WCMDs; 24 GBU-31 or 15 GBU-38 JDAMs/GBU-54 JDAM; 24 AGM-158A JASSM, JASSM-ER, or LRASM.

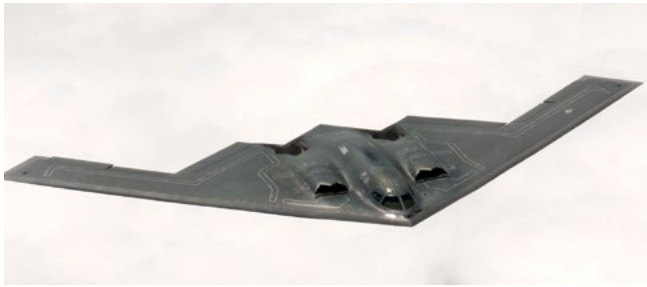
**Accommodation:** Pilot, copilot, and two WSOs (offensive/defensive) on ACES II zero/zero ejection seats.

### B-2 SPIRIT

Long-range heavy bomber

**Brief:** The B-2 is a stealthy, long-range, penetrating nuclear and conventional strike bomber. It is based on a flying wing design combining low observability (LO) with high aerodynamic efficiency. The aircraft's blended fuselage/wing holds two weapons bays capable of carrying nearly 60,000 lb in various combinations. Spirit entered combat during Allied Force on March 24, 1999, striking Serbian targets. Production was completed in three blocks, and all aircraft were upgraded to Block 30 standard with AESA radar. Construction was limited to 21 aircraft due to cost and political considerations, and a single B-2 was subsequently lost in a crash at Andersen on Feb. 23, 2008. Modernization is focused on safeguarding the B-2A's penetrating strike capability in high-end threat environments and integrating advanced weapons. Recent upgrades significantly enhance the B-2's ability to deliver precision nuclear and conventional weapons under GPS-denied or degraded conditions. The aircraft is now capable of using radar to supply targeting data or feeding coordinates to weapons pre-release to thwart jamming. A B-2A successfully employed the longer-range JASSM-ER cruise missile in a test launch last December, clearing the way for full integration. Ongoing efforts include Advanced Communications upgrades to provide Mobile User Objective System (MUOS) secure, jam-resistant SATCOM and NATO-interoperable SATURN UHF/VHF as well as Link 16-based in-flight retasking. The B-2 is also receiving new primary cockpit displays, advanced IFF, and advanced weapons integration. These upgrades collectively shift the B-2 to an easily upgradable open-system architecture to keep pace with emerging threats. USAF is also working to enhance the fleet's maintainability with LO signature improvements to coatings, materials, and radar-absorptive structures such as the radome and engine inlets/exhausts. The fleet returned to flight in 2023 following





Airman 1st Class Ivy Thomas/ANG

a six-month fleetwide stand-down after a pair of landing accidents that severely damaged two aircraft. AFGSC is retiring the aircraft damaged in the 2022 landing accident at Whiteman in FY25. The cut reduces the fleet to 19 aircraft, and USAF plans to fully retire the remainder of the fleet once the B-21 Raider enters service in sufficient numbers around 2032.

**Contractors:** Northrop Grumman; Boeing; Vought; Sierra Nevada (ACS).  
**First Flight:** July 17, 1989.  
**Delivered:** December 1993–December 1997.  
**IOC:** April 1997, Whiteman AFB, Mo.  
**Production:** 21.  
**Inventory:** 20.  
**Operator:** AFGSC, AFMC, ANG (associate).  
**Aircraft Location:** Edwards AFB, Calif.; Whiteman AFB, Mo.  
**Active Variant:**  
 •B-2A. Production aircraft upgraded to Block 30 standards.  
**Dimensions:** Span 172 ft, length 69 ft, height 17 ft.  
**Weight:** Max T-O 336,500 lb.  
**Power Plant:** Four GE Aviation F118-GE-100 turbofans, each 17,300 lb thrust.  
**Performance:** Speed high subsonic, range 6,900 miles (farther with air refueling).  
**Ceiling:** 50,000 ft.  
**Armament:** Nuclear: 16 B61-7, B61-12, B83, or eight B61-11 bombs (on rotary launchers). Conventional: 80 Mk 62 (500-lb) sea mines, 80 Mk 82 (500-lb) bombs, 80 GBU-38 JDAMs, or 34 CBU-87/89 munitions (on rack assemblies); or 16 GBU-31 JDAMs, 16 Mk 84 (2,000-lb) bombs, 16 AGM-154 JSOWs, 16 AGM-158 JASSM/JASSM-ERs, or eight GBU-28 LGBs.  
**Accommodation:** Two pilots on ACES II zero/zero ejection seats.

## B-21 RAIDER

Long-range heavy bomber

**Brief:** The B-21 Raider is a developmental, penetrating strike bomber planned to deliver both conventional and nuclear munitions. The low-observable flying-wing design was christened “Raider” in honor of the WWII Doolittle Raiders, who mounted the surprise attack on Japan in April 1942. Though similar in shape to the B-2, the B-21 features more deeply recessed engine inlets, dual-wheel main-landing gear, unique trapezoidal windscreens, and a more advanced low-observable design. The Air Force awarded Northrop Grumman the Long-Range Strike Bomber contract in 2015, aimed at developing an affordable, next-generation stealth bomber utilizing modern systems and materials. The type is the Air Force’s first new bomber since the B-2 Spirit in 1988 and is planned to become the mainstay of the strategic fleet alongside the modernized B-52J. USAF is developing the B-21 as part of a “family of systems” encompassing complementary ISR, C2, and electronic warfare platforms and capabilities designed for survivability in high-end threat environments. Northrop Grumman is using digital design techniques to quickly incorporate changes and speed fielding, as well as an open-system architecture to easily enable future upgrades and modernization. Notional nuclear armament includes the planned Long-Range Standoff (LRSO) missile and B61-12 guided free-fall weapons, as well as a range of advanced conventional weapons. AFGSC plans to acquire a fleet of at least 100 B-21s which would be delivered starting in the mid-2020s. USSTRACOM has recently advocated for up to 145 aircraft to deter simultaneous threats from China and Russia. Concurrent development and low-rate initial production (LRIP) aim to accelerate fielding, starting with the first LRIP contract awarded in 2023. USAF awarded the second of five LRIP contracts in late 2024, which collectively include 21 aircraft prior to full-rate production. At least six airframes are in production at Northrop Grumman’s Palmdale, Calif., facility where the initial bomber was unveiled in December 2022. The aircraft completed ground testing and taxi trials there prior to moving to Edwards. Aircraft T-1, dubbed “Cerberus,” launched flight-testing at Edwards on Jan. 17, 2024, and is flying approximately two developmental sorties a week with the objective of flying daily. The bomber has thus far outperformed projections and T-1 continues to expand the B-21’s

flight envelope. Two additional airframes are undergoing ground-based structural testing to assess airframe durability. Modernization includes integrating the LRSO missile and other advanced weapons, nuclear certification, and adaptation for future sensors and capabilities. Flyable test aircraft will eventually be converted to operational specification once testing is complete. The bomber program remains on time and within budget, and initial operational aircraft will be delivered to AFGSC’s formal training and operational units at Ellsworth, followed by Whiteman and Dyess.

**Contractors:** Northrop Grumman (aircraft); Pratt & Whitney (engines); Collins Aerospace; GKN Aerospace; BAE Systems; Spirit Aerosystems; Janicki Industries (advanced structures).

**First Flight:** Nov. 10, 2023.

**Delivered:** Nov. 10, 2023–present.



Giancarlo Casem/USAF

**IOC:** Unknown  
**Production:** ≥100 (projected).  
**Inventory:** One.  
**Operator:** AFMC. Planned: AFGSC.  
**Aircraft Location:** Edwards AFB, Calif. (test location); Planned: Ellsworth AFB, N.D.; Whiteman AFB, Mo.; Dyess AFB, Texas.  
**Active Variant:**  
 •B-21. Developmental Long-Range Strike Bomber.  
**Dimensions:** Span 140 ft (estimated), length 55 ft (estimated), height 18 ft (estimated).  
**Weight:** Max T-O unknown.  
**Power Plant:** Undisclosed number of Pratt & Whitney engines.  
**Performance:** Speed high-subsonic (estimated), range intercontinental.  
**Ceiling:** Unknown.  
**Armament:** Nuclear and conventional (planned).  
**Accommodation:** Two pilots; autonomous control (planned).

## B-52 STRATOFORTRESS

Long-range heavy bomber

**Brief:** The B-52H is a long-range nuclear/conventional bomber and USAF’s primary standoff cruise missile carrier. The YB-52 prototype first flew on April 15, 1952, and Strategic Air Command declared IOC with the B-52A on June 19, 1955. Boeing produced a total of 744 B-52s culminating in the current B-52H. Multimission capabilities include long-range precision strike, CAS, air interdiction, defense suppression, and maritime surveillance utilizing both Litening and Sniper targeting pods. The B-52 is undergoing major upgrades to replace key obsolescent systems including engines, radar, comms, and weapons interface to extend the fleet through the 2050s. Combat Network Communications Technology (CONNECT) recently replaced cockpit displays



Senior Airman Celeste Zuniga

and comms and added integrated mission-management, including Link 16, and machine-to-machine tasking/retargeting. It forms the digital backbone of the Internal Weapons Bay Upgrade transitioning the Conventional Rotary Launchers designed for CALCM to carry the modern AGM-158B JASSM-ER. This nearly doubles the B-52’s payload of JASSM, JDAM, and MALD, while reducing drag and increasing range. CONNECT also enables associated mods

including Tactical Data Link to add low-latency, jam-resistant C2/comms, and GPS updates. USAF is pursuing both the Radar Modernization Program to replace the B-52's AN/APQ-166 with AESA and the Commercial Engine Replacement Program (CERP) to reengine the fleet. CERP will replace the B-52's current engines with modern, efficient and reliable Rolls-Royce F130-200 turbofans in a modified pylon-mounted eight-engine arrangement. Reengined aircraft will be redesignated B-52J and fleetwide retrofits are expected to be completed by 2038. AESA radar low-rate production slipped slightly to mid-2025 or later, and future upgrades include VLF/LF receiver modernization, color targeting pod displays to enhance performance and situational awareness, AEHF SATCOM installation, and crypto modernization. Integration of the future Long-Range Standoff (LRSO) nuclear cruise missile will cement the B-52's nuclear role, complementing the B-21 Raider, potentially through the 2050s. Flight-testing of the B-52's next-generation LRSO cruise missile is on-schedule and within budget, though IOC for the upgraded B-52J has slipped three years to 2033 due to the cost and complexity of integrating new engines and radar.

**Contractors:** Boeing (airframe/CONNECT); Rolls-Royce (CERP)/Collins Aerospace (nacelles); Raytheon (RMP).

**First Flight:** July 20, 1960 (B-52H).

**Delivered:** May 9, 1961-Oct. 26, 1962 (B-52H).

**IOC:** May 1961 (B-52H).

**Production:** 102 (B-52H).

**Inventory:** 76.

**Operator:** AFGSC, AFMC, AFRC.

**Aircraft Location:** Barksdale AFB, La.; Edwards AFB, Calif.; Minot AFB, N.D.

**Active Variants:**

•B-52H. Longer-range development of the original B-52A with more efficient turbofan engines.

•B-52J. Future modernized B-52H, retrofitted with more efficient Rolls-Royce F130-200 turbofans.

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

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

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

**Performance:** Speed 650 mph, range 8,800 miles (farther with air refueling).

**Ceiling:** 50,000 ft.

**Armament:** Nuclear: 12 AGM-86B ALCMs externally, and eight ALCMs or gravity weapons internally. Conventional: 12 AGM-158 JASSM externally, and eight JASSM-ER/MALD/MALD-J internally (upgraded aircraft), as well as Mk 62 sea mines, Mk 82/84 bombs, CBU-87/89 cluster bombs, CBU-103/104/105 WCMDs, GBU-31/38 JDAMs, AGM-158A JASSMs, and GBU-10/12/28 LGBs, MALD, and MALD-J jammer variant.

**Accommodation:** Two pilots, navigator, radar navigator, and EWO on upward/downward ejection seats. (Radar navigator position will be eliminated on the B-52J).



Ralph Branson/ANG

## A-10 THUNDERBOLT II

Attack, close-air support, forward air control

**Brief:** The A-10 "Warthog" is a specialized CAS aircraft tasked with interdiction, Forward Air Controller-Airborne (FAC-A), CSAR, and Strike Control & Reconnaissance. It combines a heavy, diverse weapons load with low-level maneuverability, a large combat radius, and long loiter time. The A-10 is capable of carrying up to 16,000 lb of ordnance in addition to its 30 mm cannon which can destroy heavy armor while the pilot is protected by a titanium-armored cockpit. The prototype YA-10A first flew on May 10, 1972, winning USAF's A-X competition for a new attack aircraft. The A-10A development aircraft first flew on Feb. 15, 1975, and A-10As were delivered between October 1975 and March 1984. USAF declared A-10A IOC in October 1977. The fleet was modernized under the Precision Engagement Program, resulting in the A-10C which first flew at Eglin in 2005. The A-10C adds color cockpit MFDs, a Helmet Mounted Cueing System (HMCS), Hands-on-Throttle and Stick, digital stores man-

agement, improved fire-control, GPS-guided weapons, Litening/Sniper pods, advanced data links, and integrated sensors. The A-10C debuted in combat during Iraqi Freedom in 2007. With NVGs and targeting pods, the A-10C can operate under ceilings as low as 1,000 ft including at night. The Operational Flight Program (OFP) continuously updates the A-10's systems and software, and following current OFP Suite 11 the program will shift to more frequent rolling software upgrades. USAF has not requested modernization funding since FY23 but continues to install high-resolution



USAF

digital glass primary cockpit instruments, add directional audio threat cueing, modernize UHF/VHF comms, add Ethernet, integrate Small Diameter Bomb I, and transition to Onboard Oxygen Generation Systems (OBOGS). USAF began divesting the fleet in 2023 and plans to cut an additional 56 aircraft in FY25. A rewinging completed in 2024 extends the remaining airframes to 10,000 hours. PACAF plans to remove A-10s from Osan, ending overseas basing, while Davis-Monthan and Moody continue to retire their fleets. Both the Indiana ANG's 122nd Fighter Wing and Maryland's 175th Fighter Wing plan to end A-10 operations in FY25, changing to F-16 and cyber operations respectively. USAF plans to continue operating a dwindling fleet through 2028.

**Contractors:** Fairchild Republic (Lockheed Martin); Boeing/Korean Aerospace Industries (rewing).

**First Flight:** Jan. 20, 2005 (A-10C).

**Delivered:** 2006-2012 (A-10C).

**IOC:** September 2007 (A-10C).

**Production:** 713.

**Inventory:** 219.

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

**Aircraft Location:** Boise Air Terminal, Idaho; Davis-Monthan AFB, Ariz.; Eglin AFB, Fla.; Martin State Arpt., Md.; Moody AFB, Ga.; Nellis AFB, Nev.; Osan AB, South Korea; Selfridge ANGB, Mich.; Whiteman AFB, Mo.

**Active Variant:**

•A-10C. Upgraded version of the A-10A ground-attack aircraft.

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

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

**Power Plant:** Two GE Aviation TF34-GE-100 turbofans, each 9,065 lb thrust.

**Performance:** Speed 518 mph, range 800 miles (farther with air refueling).

**Ceiling:** 45,000 ft.

**Armament:** One internally mounted 30 mm, seven-barrel GAU-8/A cannon (1,174 rd of high-explosive incendiary (HEI) or HEI/armor-piercing incendiary); four AIM-9 Sidewinders, AGM-65 Mavericks, laser-guided rockets, most free-fall or guided air-to-surface weapons in USAF inventory, as well as ECM and advanced targeting pods.

**Accommodation:** Pilot on ACES II zero/zero ejection seat.

## F-15 EAGLE

Air superiority fighter

**Brief:** The F-15 Eagle was the world's dominant, supersonic, all-weather, day/night air-superiority fighter for more than 40 years. The F-15A first flew on July 27, 1972, and F-15A/Bs were delivered between 1974 and 1979, attaining IOC in September 1975. F-15C/Ds began replacing F-15A/Bs in 1979, offering superior maneuverability, acceleration, range, weapons, and avionics. F-15s accounted for 34 of USAF's 37 air-to-air kills during Desert Storm. The C/D added EW countermeasures and 2,000 lb of internal fuel and the final 43 production aircraft received the F-15E's APG-70 radar and Multi-Stage Improvement Program (MSIP). USAF received the first APG-63(V)3 AESA-modified F-15 in 2010, but comprehensive modernization, including the Eagle Passive/Active Warning Survivability System (EPAWSS) was canceled with the decision to replace the fleet with the new-build F-15EX. USAF also reduced the number of MIDS/JTRS secure high-capacity



Tyler Greenlees/USAF

comm and networking upgrades and limited SLEP to 63 airframes. The majority of F-15C/D's suffer performance-limiting structural issues and USAF requested to retire 65 aircraft in FY25. Congress limited reduction to 36 aircraft but added funds to accelerate replacement with F-15EX in response to ANG requests. Kadena completed its F-15C/D drawdown in December 2024, and USAF is backfilling with rotational fighters until the planned permanent basing of 36 F-15EXs as soon as 2026.

**Contractors:** Boeing (previously McDonnell Douglas).

**First Flight:** Feb. 26, 1979 (F-15C).

**Delivered:** 1979-85 (F-15C/D).

**IOC:** 1979 (F-15C/D).

**Production:** 874.

**Inventory:** 108 (F-15C); 8 (F-15D).

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

**Aircraft Location:** Barnes Arpt., Mass.; Fresno ANGB, Calif.; Jacksonville Arpt., Fla.; Kadena AB, Japan; Klamath Falls (Kingsley Field), Ore.; NAS JRB New Orleans, La.; Portland Arpt., Ore.

**Active Variants:**

•F-15C. Upgraded version of the single-seat F-15A.

•F-15D. Upgraded version of the two-seat F-15B.

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

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

**Power Plant:** Two Pratt & Whitney F100-PW-220 augmented turbofans, each 23,450 lb thrust; or two P&W F100-PW-229 augmented turbofans, each 29,000 lb thrust.

**Performance:** Speed Mach 2.5, ferry range 2,878 miles (3,450 miles with CFTs and three external tanks; farther with air refueling).

**Ceiling:** 60,000 ft.

**Armament:** One internally mounted M61A1 20 mm six-barrel cannon (940 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs, or eight AIM-120s as well as ECM pods; in a one-time test, an Eagle successfully launched an anti-satellite missile.

**Accommodation:** Pilot (C); two pilots (D), on ACESII zero/zero ejection seats.

## F-15E STRIKE EAGLE

Multirole fighter

**Brief:** F-15E is an upgraded, two-seat, all-weather F-15 capable of deep interdiction/attack, tactical nuclear delivery, and air-to-air combat. Strike Eagle is capable of sustaining 9 Gs throughout the flight envelope. It first saw combat in Desert Storm in 1991. F-15E's large, varied load of precision weapons and 20 mm cannon make it a potent ground-attack platform, and radar-guided and IR-homing missiles give it an additional air-to-air capability. Its advanced cockpit includes a wide-field-of-view HUD and helmet-mounted cockpit-cueing. The F-15E's avionics permit all-weather day/night engagement and it carries LANTIRN, Sniper, and

Litening ATPs on dedicated pylons. The "Dragon's Eye" SAR pod fielded in 2009 provides all-weather surveillance/reconnaissance capability. The Strike Eagle is undergoing major avionics modernization centered on the new APG-82(V)1 AESA radar which will increase its lethality against more capable targets fleetwide in 2025. The Eagle Passive/Active Warning Survivability System (EPAWSS) is simultaneously replacing the Strike Eagle's obsolete self-defense suite to increase survivability in future high-threat environments. Supporting upgrades include color Large Area Digital (LAD) displays and processors to fully exploit AESA and EPAWSS' targeting and situational awareness improvements, and MIDS/JTRS to enable higher-capacity, jam-resistant Link 16. F-15Es recently began transition to Mobile User Objective System (MUOS) secure, jam-resistant SATCOM and NATO-interoperable SATURN UHF. Boeing completed EPAWSS installation on the first two F-15Es in 2022 and launched operational testing in 2024 fielding the first two jets at Lakenheath in January 2025. Future enhancements include IRST to discreetly engage airborne targets, GPS hardening, and updated EW protection and warning. USAF recently announced plans to retire roughly half the F-15E fleet through 2029, retaining and upgrading only 99 late-model PW-229-engined aircraft to fund other priorities. Congress limited cuts to 68 aircraft and will likely restrict the FY25 request to cut 26 aircraft—funding additional F-15EXs to boost fighter fleets instead.

**Contractors:** Boeing (previously McDonnell Douglas); BAE Systems (EPAWSS); Raytheon (AESA).

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

**Delivered:** April 1988-2004.

**IOC:** September 1989.

**Production:** 236.

**Inventory:** 218.

**Operator:** ACC, AFMC, USAFE.

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



Senior Airman Ivy Thomas

**Active Variant:**

•F-15E. All-weather strike aircraft derived from the F-15C/D.

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

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

**Power Plant:** Two Pratt & Whitney F100-PW-220 augmented turbofans, each 23,450 lb thrust; or two F100-PW-229 augmented turbofans, each 29,000 lb thrust.

**Performance:** Speed Mach 2.5, range 2,762 miles with CFTs and three external tanks (farther with air refueling).

**Ceiling:** 50,000 ft.

**Armament:** One internally mounted M61A1 20 mm six-barrel cannon (500 rd); four AIM-9 Sidewinders and four AIM-120 AMRAAMs or eight AIM-120s; most air-to-surface weapons in USAF inventory (nuclear and conventional) including GBU-53 Stormbreaker and B61-12 nuclear free-fall weapon, as well as ECM, SAR, and advanced targeting pods.

**Accommodation:** Pilot and WSO on ACES II zero/zero ejection seats.

## F-15EX EAGLE II

Multirole fighter

**Brief:** F-15EX is the most advanced Eagle variant based on the two-seat F-15QA as a replacement for the legacy F-15C/D. The Eagle II is the first USAF F-15 to boast digital fly-by-wire flight controls, LAD glass-cockpit with touch-screen interface, and incorporate APG-82 AESA radar, Joint Helmet Mounted Cueing System (JHMCS), and EPAWSS self-defensive suite from the outset. The aircraft pioneers Open Mission System (OMS) software to enable rapid upgrades and capability enhancement, as well as the latest Suite 9.1 software



in common with upgraded legacy aircraft. F-15EX promises higher speed, longer range, increased 29,500 lb payload (including two additional weapon stations), and lower operating costs than previous variants. The type also boasts the longest stand-off air-to-air engagement range of any fighter in the USAF inventory. Due to insufficient F-22 procurement, the F-15C/D fleet has continued flying beyond its designed service life, posing a serious risk of structural failure. USAF awarded Boeing a \$1.2 billion contract for the first eight jets in July 2020 and approved the jet for full-rate production in June 2024, accelerating funds to speed phase-out of the F-15C/D. USAF requested funding for 18 aircraft in FY25 and Congress provided for an additional six requested by the ANG. The first-of-six test aircraft was delivered to Eglin on March 11, 2021,



Staff Sgt. Blake Wiles

and the F-15EX completed combined developmental and operational testing in August 2023. The aircraft proved operationally effective in all intended roles of air superiority and offensive and defensive counter-air, including against simulated fifth-generation threats. F-15EX was also deemed effective in a limited air-to-ground role, but test limitations inhibited full evaluation of EW capabilities. Development is focused on fielding full capabilities on early Lot aircraft including Mobile User Objective System (MUOS) secure, jam-resistant BLOS and NATO-interoperable LOS SATURN and GPS, as well as adding Automatic Ground Collision Avoidance System (AGCAS). The service originally planned to purchase 144 aircraft before reducing its buy to 104 and again to 98 in its FY25 request. The F-15EX achieved IOC a year later than initially planned following delivery of the second operational jet to the Oregon ANG at Portland on July 5, 2024. Similar aircraft requirements permit existing F-15 units to transition to the F-15EX in a matter of months and USAF plans to field the 44-jet fleet required for full operational capability (FOC) by 2027. Follow-On Operational Testing and Evaluation (FOT&E) will evaluate the aircraft against emerging and more capable fifth-generation threats in complex scenarios. The F-15EX will replace legacy F-15s at Fresno and New Orleans as well as backfilling Kadena. Barnes will receive either F-15EX or F-35 pending the results of an environmental review.

**Contractors:** Boeing; BAE Systems (EPAWSS); Raytheon (AESA).

**First Flight:** Feb. 2, 2021.

**Delivered:** March 11, 2021-present.

**IOC:** July 2023 (originally planned).

**Production:** 104 (planned).

**Inventory:** Eight.

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

**Aircraft Location:** Eglin AFB, Fla.; Portland Arpt., Ore. Planned: Fresno ANGB, Calif.; Kadena AB, Japan; Klamath Falls (Kingsley Field), Ore.; and NAS JRB New Orleans, La.

**Active Variant:**

•F-15EX. Future F-15C/D replacement based on the F-15QA developed for Qatar.

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

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

**Power Plant:** Two General Electric F110-GE-129 augmented turbofans, each 29,000 lb thrust.

**Performance:** Speed Mach 2.5, range approx. 2,762 miles (air refuelable).

**Ceiling:** 60,000 ft.

**Armament:** One internally mounted M61A1 20 mm six-barrel cannon (500 rd); combination of up to 12 AIM-9 Sidewinders or AIM-120 AMRAAMs, or combination of up to 24 air-to-ground munitions including SDB I, GBU-38 JDAM, and JASSM.

**Accommodation:** Pilot and (optional) second aircrew member on ACES 5 zero/zero ejection seats.

## F-16 FIGHTING FALCON

Multirole fighter

**Brief:** The F-16 is a lightweight, multirole fighter capable of air-to-air, CAS, SEAD, interdiction, FAC-A, tactical nuclear delivery, and all-weather strike missions. The "Viper" makes up approximately 40 percent of the fighter inventory, carries the majority of PGMs in service, and is one of the most maneuverable fighters ever built. The prototype YF-16 first flew Feb. 2, 1974, competing in the USAF Lightweight Fighter competition. After selection, F-16A flew on Dec. 8, 1976, followed by the two-seat F-16B on Aug. 8, 1977. Deliveries began in Au-

gust 1978, and USAF declared F-16A IOC in October 1980. F-16C/D deliveries began at Block 25 in 1984, adding the APG-68 radar and AMRAAM missile as well as cockpit, airframe, and avionics improvements. Block 30/32 added the HARM missile and more powerful engines, and Block 40/42 introduced the terrain-following LANTIRN pod and wide-angle HUD for high-speed night/all-weather penetration. These airframes boasted higher takeoff weight and G-limits and an expanded flight envelope starting in 1988. Block 50/52 was introduced to replace the F-4G in the "Wild Weasel" SEAD-role armed with the HARM missile, longer-range radar, and even higher-performance engines. The F-16 entered combat during Desert Storm in 1991 and scored its first USAF air-to-air kill during Southern Watch on Dec. 27, 1992. The fleet is now cockpit-standardized with color MFD, modular mission computer, Helmet Mounted Integrated Targeting (HMIT), and Link 16. The Operational Flight Program (OFP) continuously updates the F-16's software, most recently adding JASSM-ER and enhanced AMRAAM. USAF is reducing the older Block 30-32 fleet to 100 aircraft through FY25 while modernizing late-block aircraft as a low-cost "capacity" fleet to augment fifth-generation fighters. Modernization centers on the new AN/APG-83 AESA radar which was initially fielded to counter cruise missile threats to the homeland. The rapidly developed Integrated Viper Electronic Warfare Suite (IVEWS) leverages AESA to give the F-16 self-defensive capabilities on par with fifth-generation aircraft and entered flight-testing in late 2024. IVEWS is designed to be rapidly upgradable against emerging threats combining EW/active jamming as well as digital RWR and self-defenses into a fully integrated internal suite. Comm upgrades will add Mobile User Objective



Nicolas Cholula/USAF

System (MUOS) secure, jam-resistant BLOS and NATO-interoperable LOS SATURN, while MIDS/JTRS will provide higher capacity, jam-resistant Link 16. Other efforts include modernizing mission computer and cockpit displays in conjunction with offensive/defensive upgrades, upgrading to Mode 5 IFF and jam-resistant GPS, and modifying early block aircraft with automatic air/ground collision avoidance. Structural life extension will extend 350 airframes beyond 8,000 hours and USAF plans to continue upgrading the F-16 to keep pace with threats through 2040 or beyond. Two aircraft were lost in accidents last year at Holloman due to undetected engine damage, and at Kunsan involving an electrical malfunction in poor weather. Luke flew its final USAF F-16 training sortie on Feb. 26, 2025, and the service plans to cut a total of 11 F-16s this year. Edwards and the ACC Viper Demonstration Team saluted the 50th anniversary of first flight with YF-16-inspired schemes for the 2024 air show season.

**Contractors:** Lockheed Martin (previously General Dynamics); Northrop Grumman (AESA/ IVEWS).

**First Flight:** June 19, 1984 (F-16C).

**Delivered:** July 13, 1984-2005 (F-16C/D).

**IOC:** 1981 (Block 25-32); 1989 (Block 40/42); 1994 (Block 50/52).

**Production:** 2,206 for USAF (nearly 5,000 for global users).

**Inventory:** 704 (F-16C); 134 (F-16D).

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

**Aircraft Location:** Aviano AB, Italy; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Holloman AFB, N.M.; Homestead ARB, Fla.; Kunsan AB, South Korea; Misawa AB, Japan; NAS JRB Fort Worth, Texas; Nellis AFB, Nev.; Osan AB, South Korea; Shaw AFB, S.C.; Spangdahlem AB, Germany; and ANG in Arizona, Colorado, District of Columbia (flying from Maryland), Indiana, Minnesota, New Jersey, Ohio, Oklahoma, South Carolina, South Dakota, and Texas. Planned: Gowen Field ANGB, Idaho.

**Active Variants:**

•F-16C/D Block 30/32. Multinational Staged Improvement Program II upgraded with new engines, flown by ANG, AFRC, and test/aggressor units.

•F-16CG Block 40/42. Optimized for night/all-weather attack.

•F-16CJ Block 50/52. Optimized for SEAD with long-range radar, engines, and weapons.

**Dimensions:** Span 32.8 ft, length 49.3 ft, height 16.7 ft.

**Weight:** Max T-O 37,500 lb (Block 30/32); 42,300 lb (Block 40/42); 48,000 lb (Block 50/52).

**Power Plant:** GE Aviation F110-GE-100 augmented turbofan, 29,000 lb thrust

(Block 30); Pratt & Whitney F100-PW-220 augmented turbofan, 24,000 lb thrust (Block 32/42); F110-GE-129 turbofan, 29,000 lb thrust (Block 50); F100-PW-229 augmented turbofan, 29,000 lb thrust (upgraded Block 42, Block 52).

**Performance:** Speed Mach 2+, ferry range 2,002+ miles.

**Ceiling:** 50,000 ft.

**Armament:** One M61A1 20 mm cannon (500 rd); up to six AIM-9 Sidewinder or AIM-120 AMRAAMs air-to-air missiles; most air-to-surface weapons in USAF inventory (nuclear and conventional) including JASSM-ER, as well as ECM and advanced targeting pods.

**Accommodation:** Pilot (C), two pilots (D), on ACESII zero/zero ejection seats.

## F-22 RAPTOR

Air superiority/multirole fighter

**Brief:** The F-22 is a stealthy, penetrating, air dominance fighter built for day, night, and adverse weather, full-spectrum operations. The prototype YF-22 first flew as part of USAF's Advanced Tactical Fighter competition on Sept. 29, 1990, followed by the flight of the first F-22 test aircraft in 1997. The Raptor debuted in combat striking Islamic State ground targets during Inherent Resolve in 2014, and achieved its first air-to-air kill downing a Chinese surveillance balloon off the coast of North Carolina on Feb. 3, 2023. It is the world's most advanced fighter and its mix of stealth, long-range supercruise, and multitarget engagement capability make it a key platform in USAF's Indo/Asia-Pacific strategy. F-22's advanced flight controls and high-performance thrust-vectoring engine enable extreme maneuverability. The Raptor features six LCD color cockpit displays, APG-77 AESA radar, EW system with RWR and missile launch detection, and advanced comm/navigation and data links. USAF is aggressively testing enhancements to ensure the F-22's "first-shot, first-kill" advantage against advanced threats until replaced or augmented by the F-47 Next-Generation Air Dominance (NGAD) fighter in the 2030s. Combat-coded aircraft recently completed Increment 3.2B software upgrades adding high-resolution ground-mapping SAR, threat geolocation, EA capability, and integrated SDB I, AIM-120D, and AIM-9X. The program employs an "agile" strategy to continuously develop, test and rapidly field improvements, including rolling NGAD technologies back into the Raptor. Ongoing efforts include a distributed IRST system to stealthily track and target airborne threats, stealthy external fuel tanks/pylons to extend unrefueled range, and AIM-260 Joint Advanced Tactical Missile testing, radar electronic hardening, and jam-resistant navigation. Other significant efforts include the Reliability, Availability, and Maintain-



Airman 1st Class Michael Sanders

ability Program (RAMP), Link 16, IFF enhancement, and engine reliability and performance improvements. RAMP improves electrical power, replaces avionic-fiber optics, adds more durable LO, and fixes structures and wiring. Link 16 will enable two-way networking with legacy aircraft via Multifunctional Information Distribution System/Joint Tactical Radio System (MIDS/JTRS). Initial installs began in FY22 and fleetwide upgrade has been extended an additional two years to FY27. The F-22 mission capable rate dropped to 40 percent in 2024 and USAF proposed retiring noncombat-coded Block 20 aircraft to fund NGAD development, retaining only modernized Block 30/35s. Congress blocked the move pending analysis of the costs to upgrade Block 20s to full combat capability through at least FY27. An F-22 was damaged in an unspecified mishap during exercise Sentry Savannah at Hilton Head International Airport, Ga., on May 6, 2024.

**Contractors:** Lockheed Martin; Boeing (production partner).

**First Flight:** Sept. 7, 1997.

**Delivered:** Oct. 23, 2002-May 2, 2012.

**IOC:** Dec. 15, 2005.

**Production:** 195.

**Inventory:** 185.

**Operator:** ACC, AFMC, AFRC (associate), PACAF, ANG.

**Aircraft Location:** Edwards AFB, Calif.; JB Elmendorf-Richardson, Alaska; JB Langley-Eustis, Va.; JB Pearl Harbor-Hickam, Hawaii; Nellis AFB, Nev.

**Active Variant:**

• F-22A. Fifth-generation air dominance fighter.

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

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

**Power Plant:** Two Pratt & Whitney F119-PW-100 augmented turbofans, each 35,000 lb thrust.

**Performance:** Speed Mach 2 with supercruise capability, ferry range 1,850+ miles with two external wing fuel tanks (farther with air refueling).

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

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

**Accommodation:** Pilot on ACES II zero/zero ejection seat.

## F-35 LIGHTNING II

Multirole fighter

**Brief:** The F-35 Lightning II is a multirole, stealthy, penetrating, all-weather fighter/attack family of tactical aircraft developed under the multinational Joint Strike Fighter program. USAF's conventional F-35A is complemented by the F-35B short takeoff and vertical landing (STOVL) version for USMC, and the carrier-capable F-35C for the Navy and USMC. The X-35 demonstrator first flew on Oct. 24, 2000, winning the go-ahead for the F-35A which first flew in developmental form in 2006. Lightning II is replacing the A-10 and some



Senior Airman Nicholas Rupiper

F-16s, offering better penetrating capability against advanced A2/AD threats to strike heavily defended targets. USAF's F-35A can carry up to 22,000 lb of weapons on 10 stations: two internal bays for stealth, and/or six wing and fuselage pylons for max loadout. Air Force F-35s first saw combat on April 30, 2019, during Inherent Resolve. The current fleet-standard Block 3F software gives the F-35A full combat capability with an array of precision guided weapons across mission sets including interdiction, basic CAS, and limited SEAD. Continuous Capability Development and Delivery (C2D2) will provide ongoing development and modernization. The next Block 4 iteration will give the F-35A a new maritime strike role and add weapons including the nuclear B61-12, developmental Stand-in Attack Weapon (SiAW), and SDB II, as well as APG-85 radar and EW improvements. Block 4 also corrects deficiencies discovered in concurrent development/testing and is scheduled to begin deliveries in mid-2025, three years behind schedule. The Lot 15 through 17 production deal reached in December 2022 will include the first Tech Refresh 3 (TR-3) aircraft specifically equipped to support Block 4 retrofit. The program office and Lockheed Martin tentatively agreed on pricing for Lot 18 production through FY27 in late 2024. The F-35A requires increased engine performance to fully exploit Block 4. Both GE and Pratt & Whitney tested prototype engines that offered as much as a 30 percent range increase, but USAF opted for an Engine Core Upgrade to the current power plant instead on cost and variant-interoperability grounds. The F-35A was approved for full rate production on March 12, 2024, following completion of initial operational and live-fire testing, unlocking future cost-saving multiyear block buys. The Joint Program Office lifted a yearlong pause accepting delivery of "truncated" TR-3 software configured jets in July 2024. The service had accumulated a backlog of more than 30 jets due to incomplete software testing. USAF additionally requested six fewer jets in FY25, opting for 42, despite Lockheed Martin projecting delivery of a record 190 F-35s this year. The fleet continues to struggle with low-availability rates due to maintenance and supply system delays, particularly with engines. Lockheed Martin delivered the 1,000th F-35 to the Wisconsin ANG's 115th FW at Truax Field in July 2024, and maintainers successfully regenerated an F-35 from two damaged aircraft in January 2025. The 301st FW at NAS JRB Fort Worth received its first F-35s on Nov. 5, 2024, becoming the first stand-alone AFRC Lightning II unit.

**Contractors:** Lockheed Martin; BAE Systems; Northrop Grumman; Pratt & Whitney (engine and Engine Core Upgrade).

**First Flight:** Dec. 15, 2006.

**Delivered:** April 2011-present.

**IOC:** Aug. 2, 2016.

**Production:** Planned: 1,763 (USAF F-35As).

**Inventory:** 443 (USAF).

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

**Aircraft Location:** Burlington ANGB, Vt.; Dannelly Field, Ala.; Edwards AFB, Calif.; Eglin AFB, Fla.; Eielson AFB, Alaska; Hill AFB, Utah; Luke AFB, Ariz.; NAS JRB Fort Worth, Texas; Nellis AFB, Nev.; RAF Lakenheath, U.K.; Truax Field, Wis.; Tyndall AFB, Fla. Planned: Barnes ANGB, Mass.; Jacksonville ANGB, Fla.; Kingsley Field, Ore.; Moody AFB, Ga.

**Active Variant:**

•F-35A. Conventional takeoff and landing (CTOL) variant for the Air Force.

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

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

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

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

**Ceiling:** 50,000 ft.

**Armament:** F-35A: one 25 mm GAU-22/A cannon; standard internal loadout: two AIM-120 AMRAAMs and two GBU-31 JDAMs.

**Accommodation:** Pilot on Martin Baker MK16 zero/zero ejection seat.

## F-117 NIGHTHAWK

### Test and training

**Brief:** The F-117 was the world's first operational stealth aircraft, designed to expand USAF's ability to strike critical, heavily defended targets. Its small radar signature, LO technologies, and advanced targeting system allowed the aircraft to penetrate dense threat environments and deliver precision weapons against heavily defended, high-value targets with pinpoint accuracy. Primary missions included precision attack, air interdiction, SEAD, and special operations. The type was first publicly acknowledged in November 1988 and conducted its first operational deployment during Just Cause over Panama in 1989. Highly classified F-117A development and manufacturing began simultaneously in November 1978, using many parts transferred or modified from existing aircraft. The F-117As were first stationed at Tonopah Test Range in Nevada to conduct test flying before transferring operationally to Holloman in 1992. A single aircraft was shot down in combat over Serbia on March 27, 1999, and the F-117 fleet was officially retired on April 22, 2008. The remaining airframes entered climate-controlled storage at Tonopah, with several being maintained in flyable condition for the Air Force Flight Test Center. F-117s have recently reemerged, notably supporting several exercises, operating more frequently and openly alongside Aggressor aircraft at Nellis and MCAS Miramar. USAF has acknowledged a need for more advanced, threat-representative training and recently reactivated



Sheila deVera/USAF

the 65th Aggressor Squadron at Nellis with early F-35As to enhance fifth-generation combat training. F-117s most recently flew dissimilar air combat training alongside ANG F-15s at Fresno in September 2021, and took part in ANG's large-force employment Exercise Sentry Savannah in May 2022. A combined 45 aircraft remain in flying (or regeneratable stored) condition with approximately three airframes undergoing demilitarization and disposal each year. USAF contracted to maintain the type for test and training support through at least 2034.

**Contractor:** Lockheed Martin.

**First Flight:** June 18, 1981.

**Delivered:** 1982-summer 1990.

**IOC:** October 1983.

**Production:** 59.

**Inventory:** 45 (Type 1000 storage).

**Operator:** AFMC.

**Aircraft Location:** Tonopah Test Range, Nev.

**Active Variants:**

•F-117A. First-generation stealth attack aircraft.

**Dimensions:** Span 43.3 ft, length 65.9 ft, height 12.4 ft.

**Weight:** Max gross 52,500 lb.

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

**Power Plant:** Two General Electric F404-GE-F1D2 non-afterburning turbojets, each 9,040 lb thrust.

**Performance:** Speed 0.9 Mach, mission radius unrefueled (5,000 lb weapons load) 656 miles.

**Ceiling:** 35,000 ft.

**Armament:** Full internal carriage of a variety of tactical weapons, including laser- and GPS-guided 2,000 lb munitions.

**Accommodation:** Pilot on ACES II zero/zero ejection seat.



Staff Sgt. Kevin Williams

## AC-130J GHOSTRIDER

### Attack

**Brief:** The AC-130J is AFSOC's primary CAS, air interdiction, and armed reconnaissance platform optimized for convoy escort, point defense, and urban combat support. The advanced gunship provides ground forces a persistent direct-fire platform and is based on a highly modified MC-130J. Airframes are retrofitted after delivery with the modular Precision Strike

Package, wing-mounted weapons, and gunship-specific systems. The initial aircraft was overstressed beyond repair when it departed controlled flight during a test sortie on April 21, 2015. Ghost rider deployed to combat for the first time in Afghanistan in June 2019. AC-130Js are upgraded and managed in common with the HC/MC-130J and are receiving Block 8.1 avionics upgrades along with the baseline C-130J. SOF-specific enhancements are rapidly developed and integrated in response to operational requirements. The aircraft's PSP weapons system includes a dual mission



management console, robust communications suite, two EO/IR sensors, advanced fire-control equipment, PGM delivery capability, and trainable cannons. Block 20 added a 105 mm gun, laser-guided SDB, side-facing pilot tactical HUD, and Large Aircraft Infrared Countermeasures (LAIRCM). Block 20+/30 improved gun accuracy, hardened GPS, and added Hellfire missile and Small Glide Munition. AFSOC is now considering removing the 105 mm gun to reduce aircrew while adding AESA radar to improve range, accuracy, and all-weather targeting as well as automating mission and comm/nav systems. Block 30 upgrades are slated for completion in mid-FY25, bringing all AC-130Js to a common configuration. Ongoing upgrades include radio frequency countermeasures (RFCM) to detect, locate, and respond to threats, LAIRCM defensive systems upgrades, and HF/VHF/UHF/SATCOM suite modernization. AC-130J formal training was moved from AFSOC at Hurlburt to AETC at Kirtland in August 2024 after a year's delay to colocate special mission C-130 training pipelines.

**Contractors:** Lockheed Martin, Sierra Nevada Corp. (RFCM).

**First Flight:** Jan. 31, 2014.

**Delivered:** July 29, 2015–Nov. 2, 2022.

**IOC:** Sept. 30, 2017.

**Production:** 31.

**Inventory:** 30.

**Operator:** AETC, AFSOC.

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

**Active Variants:**

•AC-130J Ghost Rider Block 30. Production aircraft with post-operational test upgrades.

**Dimensions:** Span 132.6 ft, length 97.7 ft, height 39.1 ft.

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

**Power Plant:** Four Rolls-Royce AE 2100D3 turboprops, each 4,700 shp.

**Performance:** Speed 416 mph, range 3,000 miles (farther with air refueling).

**Ceiling:** 28,000 ft.

**Armament:** Trainable 30 mm GAU-23/A cannon; 105 mm cannon; up to eight wing pylon-mounted GBU-39 SDB or AGM-114 Hellfire; aft-firing GBU-69B Small Glide Munition or AGM-176 Griffin (deployed from 10 Common Launch Tubes integrated into the aircraft's ramp/door).

**Accommodation:** Two pilots, CSO, WSO, sensor operator, loadmaster, and three gunners.

## C-146 WOLFHOUND

Special operations mobility

**Brief:** The C-146 provides flexible, responsive airlift for special operations teams flying from austere and semi-prepared airfields worldwide. Wolfhound is based on the German-built Dornier 328 regional airliner and was purchased by USSOCOM, modified by Sierra Nevada Corp., and designated C-146. The aircraft are operated by AFSOC as a nonstandard fleet providing direct support to SOF teams worldwide. Modifications include ARC-231, PRC-117, and Iridium communications suite, troop/



Tech. Sgt. Victor Caputo

cargo-capable cabin, casualty evacuation capability, NVG compatibility, and STOL/austere operations enhancements. The aircraft first deployed in support of USAFRICOM in 2011. Recent upgrades include navigation enhancements to permit ops in GPS-degraded environments. AFSOC recently stood up a permanent European-based C-146 contingent at Mildenhall on Dec. 4, 2024. The aircraft will provide organic intratheater airlift and quicker response to contingencies within USAF-AF-AFRICA.

**Contractors:** Fairchild-Dornier; Sierra Nevada Corp.

**First Flight:** December 1991 (Dornier 328).

**Delivered:** 2011–2017.

**IOC:** Circa 2011.

**Production:** 20 (converted).

**Inventory:** 20 (USSOCOM-owned).

**Operator:** AFSOC.

**Aircraft Location:** Cannon AFB, N.M.; Duke Field, Fla.; RAF Mildenhall, U.K.

**Active Variant:**

•C-146A. Pre-owned civil Dornier 328 modified for SOF airlift.

**Dimensions:** Span 69.6 ft, length 68.8 ft, height 23.8 ft.

**Weight:** Max T-O 30,843 lb.

**Power Plant:** Two Pratt & Whitney PW-119C turboprops, each 2,282 shp.

**Performance:** Speed 310 mph, range 1,500 miles (2,000 lb cargo).

**Ceiling:** 31,000 ft.

**Accommodation:** Two pilots, one loadmaster.

**Load:** 27 passengers; up to four litters; max cargo 6,000 lb.

## CV-22 OSPREY

Multimission lift

**Brief:** The CV-22 is a medium-lift, vertical takeoff and landing (VTOL) tilt-rotor, primarily used for clandestine long-range, all-weather penetration to insert, recover, and support SOF teams in hostile, denied, and politically sensitive areas. Derived from the V-22, which flew in prototype form on March 19, 1989, USAF CV-22Bs are equipped with a fully integrated precision TF/TA radar navigation, digital cockpit management system, FLIR, integrated NVG/HUD, digital map system, robust self-defense systems, and secure antijam comms. The CV-22 can conduct shipboard and austere forward operations and is



Senior Airman Wyatt Stabler

USAF's sole high-speed vertical lift asset. It is also fully capable of operating in nuclear, biological, and chemical (NBC) warfare conditions. CV-22s first deployed to Africa in November 2008 and debuted in combat in Iraq in 2009. The Department of the Navy leads joint-service sustainment with USAF funds, while SOCOM manages special operations specific mods. Primary efforts include upgrading the fleet to Block 20 standards, replacing the legacy TF/TA radar with the Silent Knight (in common with the MC-130J), as well as critical safety and maintainability improvements. Block 20 brings the baseline airframe in line with USMC's MV-22 configuration including new cabin lighting, Color Helmet Mounted Displays, IR searchlight, lightweight ballistic armor, EW upgrades, modernized avionics and mission computers, self-defensive improvements, weapons integration, and ISR and situational awareness enhancements. AFSOC began flight-testing the stealthier, low-altitude, night/all-weather navigation radar in 2020 and FY25 funds retrofit of 12 airframes to begin fielding. Development includes improving the Osprey's rapid, long-distance self-deployment capabilities, modifying its nacelles to improve safety and maintainability, improving engine IR suppression, and reducing dust/debris ingestion. Airborne Mission Networking (AbMN) will eventually give the aircrew a common air/ground picture and manage complex workloads (in common with the AC/MC-130 fleet), while TacNet will add lightweight Link-16. The CV-22 fleet was grounded in 2022 and again in 2023 following a fatal accident attributed to an engine-gearbox failure. The fleet commenced restricted flight operation on March 8, 2024, and approximately 60 percent of Ospreys were flying by the end of FY24. AFSOC placed 15 aircraft in flyable storage as it works to complete nacelle, gearbox, clutch, and prop-rotor safety improvements on the remaining half of the fleet. AFSOC aimed to reach full operational capability (FOC) with the CV-22 in late FY24 and anticipates returning to unrestricted flight in 2025.

**Contractors:** Boeing; Bell Helicopter Textron.

**First Flight:** February 2000 (CV-22).

**Delivered:** Sept. 19, 2005–May 22, 2021.

**IOC:** 2009.

**Production:** 56.

**Inventory:** 52.

**Operator:** AETC, AFSOC, ANG (associate).

**Aircraft Location:** Cannon AFB, N.M.; Hurlburt Field, Fla.; Kirtland AFB, N.M.; RAF Mildenhall, U.K.; Yokota AB, Japan.

#### Active Variant:

•CV-22B. Air Force special operations variant of the V-22 Osprey.

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

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

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

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

**Ceiling:** 25,000 ft.

**Armament:** One ramp-mounted .50-caliber machine gun.

**Accommodation:** Two pilots, two flight engineers.

**Load:** 24 troops seated, 32 troops on floor, or 10,000 lb cargo.

### EC-130J COMMANDO SOLO/SUPER J

Psychological warfare/special operations airlift

**Brief:** The EC-130J was the Air Force's primary psychological warfare platform, providing Military Information Support Operations (MISO) and civil affairs broadcast. Roles included offensive counterinformation radio, television, and military communications broadcast, EA, and/or SOF mobility. Aircraft are also equipped with enhanced self-protection including Large Aircraft IR Countermeasures (LAIRCM) to counter MANPAD threats. Legacy Commando Solo variants conducted psychological operations in almost every U.S. contingency since 1980 and the EC-130J debuted in combat during Enduring Freedom in 2001. With transition to the J model, USAF added a new, secondary mission resulting in the "Super J" variant. Three heavily modified EC-130J Commando Solos served as standard broadcasting stations for psychological warfare operations while the four "Super J's" performed secondary, low-cost EA in addition to special operations. USAF began modernizing the fleet with the new Multi-Mission Platform-Heavy (MMP-H) digital broadcast system in 2018. The system included a roll-on internal payload as well as the external podded Communication EA Surveillance and Reconnaissance (CEASAR) and Long-Range



Tech. Sgt. Tony Harp/ANGB

Broadcast System (LRBS), giving both variants full MISO/EA capabilities. The software-defined digital system was capable of UHF/VHF and AM/FM radio, cellular, and television broadcast as well as advanced EA at a stand-off range of up to 175 miles. Commando Solo and Super-J airframes were de-converted to quasi-standard C-130J conversion as part of AFSOC's multimission fleet consolidation. Commando Solo flew its final broadcast sortie in 2022, with two former EC-130Js transferring to Hurlburt for use as systems integration test beds and two transferring to the Arkansas ANG's 189th AW which is converting from C-130Hs to C-130Js. A converted EC-130J was transferred to Eglin on July 17, 2024, giving the C-130J program a dedicated test airframe. Deconfigured aircraft initially retained nonstandard aerial refuelling capabilities as well as AFSOC-style paint schemes, but are tentatively slated for full reconfiguration by late FY27.

**Contractors:** Lockheed Martin; Raytheon; Sierra Nevada Corp. (Link 16/AbMN).

**First Flight:** November 2003.

**Delivered:** Oct. 17, 1999-2006.

**IOC:** 2004.

**Production:** Seven.

**Inventory:** Five.

**Operator:** AFSOC, ANGB.

**Aircraft Location:** Hurlburt Field, Fla.; Little Rock AFB, Ark.

#### Active Variants:

•EC-130J Commando Solo. Modified C-130J used for broadcast and psyops.

•EC-130J Super J. Modified C-130J used for SOF mobility and psyops.

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

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

**Power Plant:** Four Rolls-Royce-Allison AE2100D3 turboprops, each 4,637 shp.

**Performance:** Speed 335 mph cruise, range 2,645 miles (air refuelable).

**Ceiling:** 28,000 ft.

**Accommodation:** Two pilots, flight systems officer, mission systems officer, two loadmasters, five electronic communications systems (CS) operators.

### MC-12W LIBERTY

Tactical ISR

**Brief:** The MC-12W is a crewed, medium/low-altitude tactical ISR, SIGINT, and targeting platform based on the Beechcraft King Air 350ER (Extended



Airman Erika Chapa/ANGB

Range). It was hastily developed under Project Liberty to meet an urgent operational need for crewed battlefield ISR and deployed to Iraq and Afghanistan in less than a year in 2009. MC-12W is capable of complete ISR collection, processing, analysis, and dissemination. The aircraft provides targeting data and tactical ISR direct to special operations ground forces. Specialized equipment includes FMV, laser designation, SIGINT, advanced BLOS connectivity, and advanced SATCOM. ACC passed 20 airframes to USSOCOM in 2015, and the Oklahoma ANG formed a dedicated SOF support mission with the remaining aircraft, deploying for the first time to Afghanistan in 2015. Pooling aircraft within SOCOM initially hampered the 137th SOW's effort to reach full capability which was eventually achieved in 2022. SOCOM is replacing both the MC-12W and U-28 with a fleet of 75 OA-1K Skyraider II light attack/armed reconnaissance aircraft. The MC-12 fleet will be reduced to seven aircraft in FY25 as the 137th SOW transitions to the OA-1K through 2027.

**Contractors:** Beechcraft; L3Harris (EO/IR sensors).

**First Flight:** April 28, 2009.

**Delivered:** April 2009-2012.

**IOC:** June 2009.

**Production:** 42.

**Inventory:** Nine.

**Operator:** ANG.

**Aircraft Location:** Will Rogers ANGB, Okla.

#### Active Variant:

•MC-12W. Modified Beechcraft King Air 350ER equipped for battlefield ISR and targeting.

**Dimensions:** Span 57.9 ft, length 46.7 ft, height 14.3 ft.

**Weight:** Max T-O 16,500 lb.

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

**Performance:** Speed 359 mph, range 2,760 miles.

**Ceiling:** 35,000 ft.

**Accommodation:** Two pilots, combat systems operator, tactical systems operator.

### MC-130J COMMANDO II/ COMBAT TALON III

Special operations airlift/aerial refueling

**Brief:** The MC-130J is USAF's next-generation special operations tanker/mobility aircraft based on the C-130J. Designated Commando II (previously Combat Shadow II) in honor of the WWII C-47, the aircraft are tasked with covert day, night, and adverse weather infiltration, exfiltration, and resupply of special operations forces in hostile or denied territory. They also provide airdrop resupply, rotary wing aerial refueling, psyops, and rubber raiding craft deployment for littoral ingress/egress. Specialized mission systems include advanced, integrated defensive systems including LAIRCM, EO/IR



targeting sensor, and an added CSO flight-deck station to manage refueling, tactical navigation, and comms. MC-130Js are equipped with wing-mounted external tanks and drogue refueling pods to provision tilt-rotor and rotary-winged aircraft as well as a boom-style receptacle to receive fuel in flight. The MC-130J shares system commonality with both the HC-130J rescue and AC-130J gunship versions, sharing overlapping upgrades and modernization with both types. The MC-130J was pulled out of baseline C-130J Block 7/8.1 software upgrades, which were then merged with comm/nav modernization in 2022. "Block 8.X" now comprises critical software for HF/VHF/UHF SATCOM upgrades, including secure, jam-resistant Mobile User Objective System (MUOS) BLOS and antijam NATO-interoperable SATURN UHF. Link 16 mods were delayed for funding and a planned switch to high-capacity, jam-resistant MIDS-JTRS. AFSOC is significantly enhancing the MC-130J's ability to operate in future high-end-threat environments under Capability Release 2. This update includes Terrain-Following/Terrain Avoidance



Senior Airman Natalie Fiorilli

(TF/TA) radar, Radio Frequency Countermeasure (RFCM), and Airborne Mission Networking (AbMN). Silent Knight TF/TA is housed in a second radome below the cockpit and enables the MC-130J to conduct low-level nighttime/adverse weather penetration. RFCM modernizes EW, improves detection, location, and response to emerging threats, while AbMN gives the aircrew a common air/ground picture to manage complex workloads. Modernization also includes the radar warning receivers, chaff, and flare systems. Upgraded aircraft are redesignated Combat Talon III and will pave the way toward future open-architecture, highly integrated, and automated mission and defensive systems. AFSOC shelved plans to equip MC-130J with floats for runway independent operations in the Indo-Asia Pacific theater last year, and Lockheed Martin delivered the final production MC-130J to Kirtland Jan. 14, 2025.

**Contractors:** Lockheed Martin (airframe); Boeing; Sierra Nevada Corp. (RFCM); Raytheon (TF/TA radar).

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

**Delivered:** Sept. 29, 2011-Jan. 14, 2025.

**IOC:** Dec. 7, 2012.

**Production:** 64 (planned).

**Inventory:** 62.

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

**Aircraft Location:** Cannon AFB, N.M.; Harrisburg Arpt., Pa.; Kadena AB, Japan; Kirtland AFB, N.M.; RAF Mildenhall, U.K. Planned: Davis-Monthan AFB, Ariz.

**Active Variant:**

•MC-130J. Commando II. SOF support and aerial refueling tanker based on the C-130J.

•MC-130J. Combat Talon III. MC-130J upgraded with TF/TA radar, RFCM, and AbMN.

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

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

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

**Performance:** Speed 416 mph, range 3,000 miles (farther with air refueling).

**Fuel Capacity:** 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).

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

**Accommodation:** Two pilots, CSO, two loadmasters.

**Load:** 42,000 lb of cargo/personnel (see C-130J for configurations).

## OA-1K SKYRAIDER II

Tactical ISR/Armed Overwatch

**Brief:** The OA-1K is a tactical ISR and armed-overwatch platform based on the Air Tractor 802A agricultural aircraft with mission systems integrated by L3Harris. The short takeoff and landing (STOL) aircraft is capable of operating from unimproved airstrips less than 1,400 ft long while carrying a weapons load of up to 6,000 lb. The OA-1K's cockpit and engine compartment are



Staff Sgt. Natalie Fiorilli/USAF

fully armored and the fuel tanks are self-sealing to enhance survivability against small-arms fire. Mission equipment includes LOS/BLOS comms, LINK-16, two pylon-mounted EO-IR full-motion video ISR sensors, and air-to-ground networking that permits tablet-control of sensors by ground troops. Planned weapons include GBU-12 500 lb bombs, AGM-114 Hellfire missiles, and Advanced Precision Kill Weapons System. SOCOM picked the AT-802U as the winner of its light attack/armed reconnaissance competition to replace the U-28A as well as the MC-12W in 2022, redesignating the aircraft OA-1K. The command maintains its original requirement for a fleet of 75 AFSOC-operated aircraft but cut the purchase to 62 in FY25 due to budget constraints. Initial test pilots and instructors began training on a pair of AT-802Us at Hurlburt in July 2024, while the 137th Special Operations Wing at Will Rogers received its first aircraft on July 29, 2024. The unit is standing up formal training for the type, and AFSOC is targeting IOC for 2026, followed by FOC in 2029. Air Tractor and L3Harris are currently on contract to delivery 40 OA-1Ks through mid-2026 and FY25 requested funds for Lot 6 production of 12 aircraft. AFSOC officially named the type "Skyraider II," in a salute to the Vietnam-era Douglas A-1 Skyraider close-air support aircraft. The first operationally configured Skyraider II arrived at Hurlburt on April 3, 2025.

**Contractors:** Air Tractor Inc. (airframe); L3Harris (mission systems and conversion).

**First Flight:** Circa 2025.

**Delivered:** April 3, 2025-present.

**IOC:** 2026 (planned).

**Production:** 62 (planned).

**Inventory:** One.

**Operator:** AFSOC, AFRC.

**Aircraft Location:** Hurlburt Field, Fla.; Will Rogers ANGB, Okla.

**Active Variant:**

•OA-1K. Special operations tactical ISR aircraft based on the Air Tractor 802A.

**Dimensions:** Span 59.2 ft, length 37.5 ft, height 11.2 ft.

**Weight:** Max T-O 16,000 lb.

**Power Plant:** Single Pratt & Whitney PT6A-67F, 1,600 shp.

**Performance:** Speed 245 mph, range 1,500 miles (with auxiliary fuselage fuel).

**Ceiling:** 30,000 ft.

**Accommodation:** One pilot, one CSO; up to 6,000 lbs of weapons and/or external sensor payloads on 11 wing and fuselage-mounted hardpoints.

## U-28A DRACO

Tactical ISR

**Brief:** The U-28A is a crewed, tactical ISR and targeting platform based on the Pilatus PC-12. The USSOCOM-owned aircraft are operated by AFSOC as a nonstandard fleet. Draco is employed worldwide in support of special operations ground forces, humanitarian efforts, and search and rescue. AFSOC first employed the aircraft during Enduring Freedom in Afghanistan as well as Iraqi Freedom. Mission equipment includes advanced radio/comms suite, IR suppression, missile, hostile fire and laser warning, EO sensors, remote SIGINT, and advanced navigation systems. The primary Multispectral Targeting System includes FMV, EO-IR, IR real-time video, and coaligned laser designator. Recent upgrades include U-28 EQ+ mods that add high-definition FMV to EQ/PC-12 configured aircraft for extended standoff "find, fix, finish" capabilities in support of counter-ISIS ops. Additional improvements include Enhanced Ground Proximity Warning to prevent flight-into-terrain accidents, updated BLOS SATCOM connectivity, and navigation mods to enable ops in GPS-degraded environments. Two aircraft were lost to fatal mishaps in Djibouti in 2012 and at Cannon in 2017, and FY21 funds were allocated to replace an airframe lost in an

airfield attack at a forward location. SOCOM began procuring a truncated fleet of 62 OA-1K Skyraider II light attack/armed reconnaissance aircraft to supersede the U-28A and MC-12W fleets. AFSOC plans to complete transition from the U-28 by 2029 and FY25 funds are limited to completing low-cost upgrades. AFSOC retired the first PC-12 trainer, serial 08-0581, dedicating the airframe for display at Cannon May 16, 2024.

**Contractor:** Pilatus Aircraft Ltd.

**First Flight:** May 31, 1991 (PC-12).

**Delivered:** 2006-present.

**IOC:** June 2006.

**Production:** 36.

**Inventory:** 30 (U-28A); five (PC-12) (USSOCOM-owned).

**Operator:** AFSOC, AFRC.

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

**Active Variant:**

•U-28A. Special operations tactical ISR aircraft based on the Pilatus PC-12.

•PC-12. Converted civilian Pilatus PC-12 equipped for SOF support/training.

**Dimensions:** Span 53.3 ft, length 47.3 ft, height 14 ft.



Senior Airman Ty Pilgrim

**Weight:** Max T-O 10,935 lb.

**Power Plant:** Single Pratt & Whitney PT6A-67B, 1,200 shp.

**Performance:** Speed 253 mph, range 1,725 miles.

**Ceiling:** 30,000 ft.

**Accommodation:** Two pilots, CSO, tactical systems officer; up to nine passengers or 3,000 lb cargo (configuration dependent).

## C3/BM/ISR AIRCRAFT



William Lewis/USAF

### E-3 SENTRY

**Battle management/early warning/C2**

**Brief:** The E-3 Airborne Warning and Control System (AWACS) is a heavily modified Boeing 707-320B tasked with all-weather, air and maritime surveillance, command and control, battle management, target, threat, and emitter detection, classification, and tracking. The aircraft is capable of surveilling airspace in excess of a 250-mile radius from surface to stratosphere. AWACS coordinates theater air operations in direct subordination to joint/combined air and space operations centers. It can simultaneously conduct C2, BM, and target detection/tracking. E-3Bs were upgraded to Block 30/35 standards in 2001 and current Block 40/45 aircraft are redesignated E-3G. Block 40/45 was the most comprehensive enhancement to date and improved tracking/identification, system reliability, and life-cycle cost. Mods included open-architecture computing, operator workload reduction, new consoles, improved electronic support measures (ESM), and passive surveillance capability. DRAGON (Diminishing manufacturing sources Replacement of Avionics for Global Operations and Navigation) upgrades added a digital cockpit and next-generation CNS/GATM. The E-3 is increasingly unable to counter current and emerging threats and suffers less than a 60 percent mission capable rate due to obsolescence. USAF sharply curtailed E-3 modernization and retired roughly half the fleet, opting instead to award a \$1.2 billion contract to adapt the Boeing E-7A Wedgetail operated by several allies to meet USAF requirements. The service plans to buy 26 E-7As with two "production representative" prototypes already on order to begin testing, which has already slipped a year to 2028. Future E-3 upgrades will be limited to sensors, comms, networking, and comput-

ing improvements to maintain capability until retirement. Upgrades are focused on the AWACS Communications Integration Program (ACIP) which will include BLOS SATCOM/second-generation NATO UHF, and anti-jam GPS. USAF began retiring E-3s in FY23, reducing the fleet to 16 aircraft to improve sustainment through phaseout targeted for FY29.

**Contractors:** Boeing, Northrop Grumman (radar); Lockheed Martin (computer); Collins Aerospace (DRAGON cockpit upgrade).

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

**Delivered:** March 1977-1984.

**IOC:** 1977; July 28, 2014 (Block 40/45).

**Production:** 31.

**Inventory:** 16 (E-3G).

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

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

**Active Variants:**

•E-3B. Block 30/35 upgraded aircraft.

•E-3G. Block 40/45 upgraded aircraft.

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

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

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

**Performance:** Speed 360 mph, range 5,000+ miles (air refuelable).

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

**Accommodation:** Two pilots, navigator, flight engineer, 13 to 19 mission specialists.



## E-4 NATIONAL AIRBORNE OPERATIONS CENTER

Nuclear command and control

**Brief:** The E-4B is a highly survivable flying C3 center enabling national leaders to direct nuclear and conventional forces, execute emergency war orders, and coordinate civil response actions in support of the National Military Command System (NMCS). The early E-4A first flew on June 13, 1973, reaching IOC in December 1974. The fleet was fully upgraded to E-4B standards in 1985. It is hardened against the effects of nuclear detonations, including electromagnetic pulse (EMP). Comms and data processing capabilities include EHF Milstar SATCOM, six-channel International Maritime Satellite, and a tri-band radome that houses the SHF communications antenna. All aircraft underwent Block 1 upgrades, enhancing electronic and communications infrastructure with commercial off-the-shelf (COTS) systems. Ongoing upgrades include replacing Milstar data links with AEHF-compatible FAB-T and modernized presidential voice-conferencing, replacing the VLF/LF transmitter and legacy SHF with Survivable Super High Frequency (SSHF) for uninterrupted, jam-resistant nuclear C2 fleet-wide. FY25 launches replacement of legacy UHF comms with Mobile User Objective System (MUOS) secure, jam-resistant BLOS. E-4B airframes are viable to approximately 2033, but phaseout of commercial 747-200s hampers continued sustainment. USAF awarded Sierra Nevada Corp. the \$13 billion Survivable Airborne Operations Center (SAOC) contract to replace the fleet on April 26, 2024. The company bought five new-generation 747-8 Intercontinental airframes from Korean Airlines, the first of which arrived in Dayton, Ohio, to begin conversion in June 2024. The replacement fleet will be designated E-4C and is scheduled for delivery through 2036.



Justin Oakes/USAF

**Contractors:** Boeing; Raytheon (FAB-T); L3Harris (SSHF); Boeing/Colins Aerospace (Low-Frequency Transmit System); Sierra Nevada Corp. (E-4C SAOC).

**First Flight:** June 10, 1978 (E-4B).

**Delivered:** December 1974-1985.

**IOC:** January 1980 (E-4B).

**Production:** Four.

**Inventory:** Four.

**Operator:** AFGSC.

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

**Active Variant:**

- E-4B. Modified Boeing 747-200 equipped as a NAO.

- E-4C. Modified Boeing 747-8i SAOC, planned to replace the E-4B.

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

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

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

**Performance:** Speed 602 mph, range 7,130 miles, 12-hr normal endurance, 72-hr with air refueling.

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

**Accommodation:** Two pilots, navigator, flight engineer, up to 110 battle staff/mission crew.

## E-9A WIDGET

Range control

**Brief:** The E-9A is a modified DHC-8 commuter aircraft that provides air-to-air telemetry support for weapons testing, target drone operations, and range clearance. The aircraft supports operations at the Eglin Test and Training Range over the Gulf of Mexico and provides telemetry for weapons system evaluation at Holloman and the Utah Test and Training Range. Mission modifications include AN/APS-143(V-1) airborne sea surveillance radar, UHF telemetry, and signal relay systems. The E-9 is able to track flying and surface targets. It can detect small watercraft at ranges up to 25 miles. The fleet operates in concert with three drone recovery vessels and two patrol boats to clear waterways and airspace of civil traffic before live-fire testing or hazardous military activities commence. It also provides



Staff Sgt. Bennie Davis III

tracking and assistance with recovering targets. The aircraft can remotely initiate destruction of damaged or malfunctioning aerial target drones.

**Contractors:** Bombardier (formerly De Havilland Canada); Sierra Nevada Corp. (conversion).

**First Flight:** June 1983 (DHC-8).

**Delivered:** 1988.

**IOC:** June 1988.

**Production:** Two.

**Inventory:** Two.

**Operator:** ACC.

**Aircraft Location:** Tyndall AFB, Fla.

**Active Variant:**

- E-9A. Military surveillance version of the DHC-8 commuter airliner.

**Dimensions:** Span 85 ft, length 73 ft, height 24.5 ft.

**Weight:** Max T-O 34,500 lb.

**Power Plant:** Two Pratt & Whitney PW-120A turboprop engines, each 1,800 shp.

**Performance:** Speed 280 mph, range 1,000 miles.

**Ceiling:** 30,000 ft.

**Accommodation:** Two pilots, two mission operators.

## E-11A BATTLEFIELD AIRBORNE COMMUNICATIONS NODE

Communications relay

**Brief:** The E-11 is a modified Bombardier Global 6000/BD-700-1A10 or Global 6500 business jet equipped with specialized communications relay equipment to translate between tactical comm and data links. It provides joint range extension, BLOS C2, and internet protocol-based data transfer between dissimilar systems. E-11A was fielded to meet an urgent operational need for BLOS air-to-ground relay and enables troops to overcome comm limitations in rugged terrain. The system entered combat in Afghanistan in 2008, and an E-11 crashed near Kandahar Airfield on Jan. 27, 2020, killing the aircrew. The fleet was designated E-11A after USAF purchased the first (previously leased) aircraft in 2011. The Battlefield Airborne Communica-



Senior Airman Ashley Richards

tions Node (BACN) payload was initially integrated on a mixed fleet of manned E-11As and unmanned EQ-4B Global Hawks prior to the type's phase out in 2021 which prompted expansion of the E-11 fleet to nine aircraft. Northrop Grumman was awarded a five-year support contract in 2021, which also includes funding for research, development and testing, as well as the integration of future payloads. USAF plans to upgrade the E-11 with a High-Capacity Backbone (HCB) to support advanced battle management connectivity. Ongoing upgrades include adding military GPS to operate in high-threat environments, advanced navigation, as well as flight safety, reliability, performance, and self-defensive improvements. ACC accepted its eighth aircraft in early FY25 and plans to divest the nonstandard prototype airframe in FY25, potentially canceling delivery of the ninth aircraft later this year. ACC and the Georgia ANG plan to reach

full operational capability at Robins by 2027. The E-11A notably aided in facilitating humanitarian airdrop missions into Gaza in early 2024.

**Contractors:** Bombardier; Northrop Grumman (integration and support).  
**First Flight:** August 2007.  
**Delivered:** December 2008-present.  
**IOC:** Circa 2011.  
**Production:** Five (nine planned).  
**Inventory:** Seven.  
**Operator:** ACC, ANG (associate).  
**Aircraft Location:** Prince Sultan AB, Saudi Arabia; Robins AFB, Ga.  
**Active Variant:**  
•E-11A. Modified Bombardier Global 6000, BD-700, or Global 6500 equipped with the BACN payload.  
**Dimensions:** Span 94 ft, length 99 ft 5 in, height 25 ft 6 in.  
**Weight:** Max T-O 99,500 lb.  
**Power Plant:** Two Rolls-Royce BR710A2-20 turbofans, each 14,750 lb thrust (Global 6000/BD-700); two BR700-710D5-21 turbofans, each 15,125 lb thrust (Global 6500).  
**Performance:** Speed Mach 0.88, range 6,900 miles (Global 6000); speed Mach 0.9, range, 7,595 miles (Global 6500).  
**Ceiling:** 51,000 ft.  
**Accommodation:** Two pilots.

## EA-37B COMPASS CALL

### Electronic warfare/electronic attack

**Brief:** The EA-37B is a next-generation, tactical jamming platform tasked with disruption of enemy C3, radar, and navigation. It will also offer offensive counterinformation, EA, and SEAD support. The aircraft is based on the ultra-long-range Gulfstream G550 business aircraft and adapted from the Navy's special mission configuration. USAF awarded L3 Technologies a contract on Sept. 7, 2017, to replace the EC-130H in the tactical EA role and transport its "Compass Call" systems to a more modern aircraft. The program, originally dubbed "EC-X" is "rehosting" upgraded EC-130H mission equipment directly to the EA-37 with nearly 70 percent remaining unchanged. Redesignated from EC-37B to EA-37B in November 2023, the aircraft is faster, more economical, capable of higher altitude operations, and is more survivable than the EC-130H. Upgrades will allow it to conduct standoff jamming/EA from greater distances for attacks against A2/AD



L3Harris

targets. The first aircraft was purchased in FY17, and Congress accelerated the program in FY19, completing procurement of the 10-aircraft fleet this year. The first five aircraft are receiving the EC-130H's upgraded Baseline 3 package, including Advanced Radar Countermeasure System (ARCS) and other significant capability enhancements. The EA-37 will not receive comparable low-band capability until Baseline 4, which debuts on the sixth airframe. Baseline 4 will add System-Wide Open Reconfigurable Dynamic Architecture (SWORD-A) to enable rapid future upgrades. BAE Systems and L3 Harris delivered the first EA-37B to begin combined Baseline 3 development and operational testing Sept. 12, 2023, paving the way for initial crew training. FY25 efforts focus on completing developmental and operational testing and continued development of SWORD-A. The fleet will begin upgrade to Baseline 4 starting in 2026, coinciding with planned IOC. ACC took delivery of the first operational aircraft at Davis-Monthan on Aug. 23, 2024.

**Contractors:** Gulfstream Aerospace (airframe); BAE Systems; L3 Harris (mission equipment).  
**First Flight:** Aug. 25, 2021.  
**Delivered:** Sept. 12, 2023-present.

**IOC:** 2026 (planned).  
**Production:** 10 (planned).  
**Inventory:** One.  
**Operator:** ACC.  
**Aircraft Location:** Davis-Monthan AFB, Ariz.; Edwards AFB, Calif.  
**Active Variant:**  
•EA-37B. Military Electronic Attack special-mission variant of the Gulfstream G550.  
**Dimensions:** Span 93.5 ft, length 96.4 ft, height 25.8 ft.  
**Weight:** Max T-O 91,000 lb.  
**Power Plant:** Two BR710C4-11 turbofans, each 15,385 lb thrust.  
**Performance:** Speed 629 mph, range 4,410 miles.  
**Ceiling:** 45,000 ft.  
**Accommodation:** Two pilots; mission crew: two EWOs, mission crew supervisor (cryptologic), two cryptologic linguists, acquisition operator, and airborne maintenance technician.

## EC-130H COMPASS CALL

### Electronic warfare/electronic attack

**Brief:** The EC-130H is a modified C-130H designed to disrupt enemy C3 and limit adversary coordination and force management. Tasks include tactical jamming/disruption of communications, radar, and navigation, offensive counterinformation, EA, and SEAD support. The fleet has been



Master Sgt. Wolfram Stumpf

deployed near constantly since the beginning of combat operations in Afghanistan in 2001. The aircraft was designed to be easily updated and modified. All aircraft have been retrofitted to Block 35 standards and are air refuelable. Mission equipment upgrades occur approximately every three years to ensure continued protection and effectiveness against evolving threats. The most recent Baseline 3 configuration includes the Advanced Radar Countermeasure System (ARCS) and other significant capability enhancements, while Baseline 4 will be fielded on the next-generation EA-37B in 2026. Some 70 percent of the EC-130H's mission equipment will be directly cross-decked to the EA-37B successor platform. EC-130H airframes have reached the limit of their planned service life and the first aircraft retired to the "Boneyard" at Davis-Monthan on Aug. 31, 2021. ACC divested two airframes in FY24, reducing the fleet to four and freeing mission equipment for use on the EA-37B. The 43rd Electronic Combat Squadron at Davis-Monthan flew its final EC-130 sortie on Feb. 15, 2024, leaving its sister squadron, the 41st ECS, as the type's final operator.

**Contractors:** Lockheed Martin; BAE Systems (mission equipment); L3Harris (integration and sustainment).  
**First Flight:** 1981.  
**Delivered:** March 19, 1982-unknown.  
**IOC:** 1983; Block 35 from 2011.  
**Production:** (Converted).  
**Inventory:** Four (EC-130H).  
**Operator:** ACC.  
**Aircraft Location:** Davis-Monthan AFB, Ariz.  
**Active Variant:**  
•EC-130H. Electronic attack variant of the C-130H.  
**Dimensions:** Span 132.6 ft, length 99 ft, height 38 ft.  
**Weight:** Max T-O 155,000 lb.  
**Power Plant:** Four Allison T56-A-15 turboprops, each 4,910 shp.  
**Performance:** Speed 300 mph at 20,000 ft, unrefueled range 2,295 miles, seven-hour normal endurance (air refuelable).  
**Ceiling:** 25,000 ft.  
**Accommodation:** Two pilots, navigator, flight engineer; mission crew: two EWOs, mission crew supervisor (cryptologic), four cryptologic linguists, acquisition operator, and airborne maintenance technician.



## P-9A PALE ALE

Maritime patrol, detection, and monitoring

**Brief:** The P-9A is a heavily modified Bombardier Q202 (DHC-8) commuter aircraft equipped for maritime patrol as well as advanced detection and monitoring missions. The three-aircraft fleet is owned by ACC and primarily tasked to USSOUTHCOM to detect and monitor narcotic and illicit trafficking from South and Central America, as well as the Caribbean and Eastern Pacific. The P-9A is a government-owned, contractor-operated (GOCO) fleet and conducts more than 7,200 flying hours per year, primarily based from the Navy's counterdrug cooperative security location in Comalapa, El Salvador. Aircraft also conduct forward-deployed operations from airfields throughout the Caribbean as well as South and Central America, lasting approximately 730 days. Congress allocated additional funding in FY23 to expand the fleet by two aircraft, though FY25 requests no additional procurement.



Tomas Acevedos/Vimages

**Contractors:** Bombardier (formerly De Havilland Canada); Sierra Nevada Corp. (operator).

**First Flight:** N/A.

**Delivered:** Circa 2018-present.

**IOC:** 2013.

**Production:** Four.

**Inventory:** Four (contractor operated).

**Operator:** ACC.

**Aircraft Location:** Comalapa, El Salvador; forward operating locations across USSOUTHCOM.

**Active Variant:**

•P-9A. Maritime patrol, detection and monitoring aircraft converted from the Bombardier Q202 commuter airliner.

**Dimensions:** Span 85 ft, length 73 ft, height 24.6 ft.

**Weight:** Max T-O 37,300 lb.

**Power Plant:** Two Pratt & Whitney PW-123C/D turboprop engines, each 2,380 shp.

**Performance:** Speed 333 mph, range 2,300 miles.

**Ceiling:** 25,000 ft.

**Accommodation:** Two pilots, two sensor operators.

## RC-135S COBRA BALL

Electronic reconnaissance

**Brief:** The RC-135S gathers measurement and signature intelligence (MASINT) on missile-associated signatures and tracks during boost and reentry. Cobra Ball superseded Rivet Ball and Rivet Amber, receiving the current designation on Oct. 24, 1969, and collects both optical and electronic data on ballistic missile activity. An aircraft was lost in a crash during inclement weather at Shemya AFB, Alaska, on March 15, 1981. The variant's specialized equipment includes the long-range Medium Wave Infrared Array (MIRA) EO/IR sensor suite, all-weather tracking radar, and an advanced communications suite. Reconnaissance data is used to assess missile threats, evaluate missile performance, characterize adversary missiles, and analyze weapons testing and technology. Data also supports treaty verification and theater ballistic missile nonproliferation. It can deploy anywhere in the world in 24 hours and provide on-scene EO reconnaissance. Continuous baseline upgrades are now projected to keep the fleet viable through 2050, and flexible funding permits rapid, variant-specific mods in response to emerging/evolving threats. Aircraft were slated to complete integration of Baseline 7 mods (similar to Rivet Joint Baseline 12) in late 2024, including integrating Rivet Joint's COMINT suite, digital electromagnetic signature direction finding, digital search, and SATCOM-aided target discrimination. Baseline 14 is entering testing



Senior Airman Jacob Skovo

and will include SIGINT direction finding and steerable K-band collection antennas, digital search and recording, improved signal identification, SATCOM target identification, and Rivet Joint Baseline 14 COMINT suite integration.

**Contractors:** Boeing (airframe); L3Harris, Textron Systems (mission systems).

**First Flight:** Circa 1969.

**Delivered:** Jan. 11, 1970-November 2000 (redelivery as RC-135S).

**IOC:** March 1972 (Cobra Ball II).

**Production:** Four converted.

**Inventory:** Three.

**Operator:** ACC.

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

**Active Variant:**

•RC-135S Cobra Ball. Modified C-135 equipped for MASINT/treaty verification.

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

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

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

**Performance:** Speed 517+ mph, range 3,900 miles (farther with air refueling).

**Ceiling:** 45,000 ft.

**Accommodation:** Two pilots, navigator, three EWOs, two airborne systems engineers, two airborne mission specialists.

## RC-135U COMBAT SENT

Electronic reconnaissance

**Brief:** The RC-135U is tasked with strategic reconnaissance and technical intelligence (TECHINT) gathering on radar/emitter systems. Three Combat Sent aircraft were converted from RC-135Cs in 1970-71 to fill a critical need for data collection on adversary radar threats and defenses. Combat Sent's distinctive chin and wingtip antenna arrays, large cheek fairings, and extended tail contain specialized sensor suites to collect data and analyze airborne, land, and naval radar/emitter systems. Each airframe incorporates



SuneKuma

a different, tailored sensor suite, and the data gathered is critical to the effective design and programming of RWR (radar warning receivers), jammers, decoys, antiradiation missiles, and threat simulators. Combat Sent additionally enables strategic analysis for National Command Authorities and combatant forces. The aircraft utilizes radar/solid-state doppler, INS, celestial, and GPS for navigation, and is capable of operator, automated, and blended signal gathering and analysis. Continuous baseline upgrades are now projected to keep the fleet viable through 2050, and flexible funding permits rapid variant-specific mods in response to emerging/evolving threats. FY25 focuses on sustaining and upgrading Baseline 6 (similar to

Rivet Joint Baseline 12). Baseline 6 includes wideband SATCOM reachback, integrating Rivet Joint's Baseline 13 COMINT suite, improving operator interface, enhancing antennas and processors, and providing capability upgrades for dense signal environments. Development of the future Baseline 7 began in FY23 and continues through FY25 followed by initial integration and testing in 2026.

**Contractors:** Boeing (airframe); L3Harris, Textron (mission systems).

**First Flight:** N/A.

**Delivered:** May–December 1971 (RC-135U).

**IOC:** 1971.

**Production:** Three converted.

**Inventory:** Two.

**Operator:** ACC.

**Aircraft Location:** Offutt AFB, Neb.; forward operating locations: Al Udeid AB, Qatar; NSF Diego Garcia, U.K.; Eielson AFB, Alaska; Kadena AB, Japan; RAF Mildenhall, U.K.; NSA Souda Bay, Greece.

**Active Variant:**

•RC-135U Combat Sent. Modified C-135 equipped for radar/emitter analysis.

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

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

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

**Performance:** Cruise speed 517 mph, range 4,140 miles, 8-hr normal endurance, 24-hr crew endurance (farther with air refueling).

**Ceiling:** 42,000 ft.

**Accommodation:** Two pilots, one navigator, two airborne systems engineers; mission crew: 10 EW officers, six or more electronic, technical, mission-area specialists.

## RC-135V/W RIVET JOINT

Electronic reconnaissance

**Brief:** The RC-135V/W is tasked with real-time electronic and signals intelligence gathering, analysis, and dissemination in support of theater and strategic-level commanders. The extensively modified C-135s detect, identify, and geolocate signals throughout the electromagnetic spectrum. Rivet Joint is mostly used to exploit electronic battlefield intelligence and deliver near-real-time ISR information to tactical forces, combatant commanders, and



Josh Plueger/USAF

National Command Authorities. The British Royal Air Force also operates three RC-135W Airseeker aircraft, which are co-crewed by USAF/RAF personnel under an agreement through at least 2035. Onboard capabilities encompass rapid search, detection, measurement, identification, demodulation, geolocation, and fusion of data from potentially thousands of electronic emitters. Continuous baseline upgrades keep the fleet viable and drive standards for Combat Sent/Cobra Ball. Flexible funds permit rapid, variant-specific mods in response to emerging/evolving threats. The current Baseline 11/12 modernized cockpit and operator interface, added new direction finding COMINT, precision ELINT/SIGINT, improved collection in dense-signal environments, enhanced near-real-time data dissemination, and integrated RC-135 with the Distributed Common Ground Station (DCGS). USAF is currently upgrading the recently fielded Baseline 13 aircraft and beginning Baseline 14 integration. Baseline 13 included signal search and geolocation improvements, wideband signal recording, jam-resistant search, moving emitter target location and tracking, and wideband data link improvement. Baseline 14 will incorporate signal recording and spectral receiver enhancements, modernized navigation, surveillance, and air traffic management (CNS/ATM), advanced Mode 5 IFF, and upgraded autopilot. Development includes Baseline 15, automated search and detection, employment of artificial intelligence, and collaboration to speed collection, analysis, and distribution. USAF recently tested an Elec-

tromagnetic Warfare Integrated Reprogramming (EWIR) concept to enable the RC-135 to quickly respond to evolving adversary tactics in a high-threat environment. Rivet Joints notably supported border surveillance efforts along the U.S.–Mexico border in early 2025 operating in conjunction with a Navy P-8 Poseidon conducting maritime surveillance of the Gulf of Mexico.

**Contractors:** Boeing (airframe); L3Harris (mission systems).

**First Flight:** N/A.

**Delivered:** Circa 1973–99 (continuous equipment updates).

**IOC:** Circa 1973.

**Production:** Converted.

**Inventory:** Eight (RC-135V); 12 (RC-135W); three (TC-135W).

**Operator:** ACC, AFMC.

**Aircraft Location:** Offutt AFB, Neb.; forward operating locations: Elmendorf AFB, Alaska; Kadena AB, Japan; RAF Mildenhall, U.K.; RAF Waddington, U.K. (USAF co-manned).

**Active Variants:**

•RC-135V/W Rivet Joint. Standoff airborne SIGINT variant of the C-135.

•TC-135W. Training version of the operational aircraft.

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

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

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

**Performance:** Speed 500+ mph, range 3,900 miles (farther with air refueling).

**Ceiling:** 50,000 ft.

**Accommodation:** Three pilots, two navigators, three EWO, 14 intelligence operators, four airborne maintenance technicians (six additional, if required).

## U-2S DRAGON LADY

High-altitude reconnaissance

**Brief:** U-2S is the Air Force's only manned, strategic, high-altitude, long-endurance ISR platform and is capable of SIGINT, IMINT, and MASINT collection. The aircraft's modular payload systems allow it to carry a wide variety of advanced optical, multispectral, EO/IR, SAR, SIGINT, and other payloads simultaneously. Its open system architecture also permits rapid fielding of new sensors to counter emerging threats and requirements. The original U-2A first flew on Aug. 4, 1955. The type was further developed into the larger, more capable U-2R, which first took flight on Aug. 28, 1967, and was delivered between 1967 and 1968. Current U-2s date to the 1980s when U-2R production was reopened under the designation TR-1 (later returned to U-2R designation in 1992). The TR-1A first flew on Aug. 1, 1981, and was reengineered and modernized starting in 1994, emerging as the U-2S. Current Block 20 U-2S feature glass cockpits, digital autopilot, modernized EW systems, and updated data links. Its major sensors are the ASARS-2A SAR, modernized SYERS-2C multispectral EO/IR imagery system, and enhanced Airborne Signals Intelligence Payload (ASIP). The aircraft is also capable of mounting the legacy optical bar camera for broad-area synoptic imagery, though operations from Beale concluded in 2022. Modification and upgrades are focused on sustaining U-2 capability through its currently planned retirement, while meeting current and emerging requirements. Current development and mods support Block 20.1 upgrades. Major efforts include ASARS-2B/C integration, avionics and



Nicholas Hamack/USAF

navigation refresh, (Link-16/IFDL, MADL) modernization, next-generation SIGINT, and quick-response capabilities to meet emergent ISR requirements. ASARS-2B/C significantly improves the U-2's high-altitude, deep-look radar ground mapping, moving target, and maritime capabilities and moves to an open, easily upgradable architecture. ASARS-2B/C continued flight-testing through expected IOC in 2024. The 2B/C will replace the current 2A and its open architecture makes it transferable to future platforms. A U-2 upgraded to Avionics Technical Refresh (ATR) standards flew for the first



time in September 2023, adding open-architecture systems, enhanced C2 networking, and pilot workload management features. Development and modification efforts include ATR Phase 2, SIGINT and IR sensor technical refresh, stellar navigation for GPS-denied operations, SIGINT modernization, quick-change modular mission systems, unmanned-system interoperability, and a helmet and pressure suit refresh. The program continues to prioritize experimental sensors, systems, and software to meet emerging threats, and development of networked, next-generation BM/C2. Two U-2s notably intercepted and photographed a Chinese ISR balloon over the central U.S. on Feb. 3, 2023, marking the two-seat TU-2S's first operational use. ACC retired the first TU-2S and three U-2S aircraft in early 2024 with plans to retire the entire fleet by 2026.

**Contractors:** Lockheed Martin, Northrop Grumman (ASIP); Raytheon (ASARS); UTC Aerospace (SYERS/Optical Bar Camera).

**First Flight:** October 1994 (U-2S).

**Delivered:** September 1981–October 1989 (TR-1/U-2R).

**IOC:** Circa 1981 (U-2R).

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

**Inventory:** 27 (U-2); four (TU-2).

**Operator:** ACC.

**Aircraft Location:** Beale AFB, Calif.; forward operating locations: Osan AB, South Korea; RAF Akrotiri, Cyprus; RAF Fairford, U.K.

**Active Variants:**

•U-2S. Current variant of the U-2/TR-1.

•TU-2S. A two-seat trainer aircraft originally designated U-2ST.

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

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

**Power Plant:** GE Aviation F118-GE-101A turbofan, 17,000 lb thrust.

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

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

**Accommodation:** Pilot (U-2S); two pilots (TU-2S) on RQ201 zero/zero ejection seats.

## WC-130J HERCULES

Weather reconnaissance

**Brief:** The WC-130J “Weatherbird” is a modularly configurable C-130J equipped with specialized systems to penetrate tropical and winter storms, capture meteorological data, and aid severe weather forecasting. Early WC-130Bs entered service in 1959, followed by the WC-130E in 1962, and WC-130H in 1964. The WC-130J began replacing legacy variants in 1999, though several H models remained in service with the Puerto Rico ANG until a fatal crash resulted in the fleet's retirement in 2019. All WC-130Js are



USAF

operated by AFRC's 53rd Weather Reconnaissance Squadron “Hurricane Hunters” at Keesler. Mission equipment includes a pod-mounted Stepped-Frequency Microwave Radiometer (SFMR) for monitoring surface winds and precipitation rates, parachute-deployed GPS dropsondes to gather vertical atmospheric profiles, and palletized operator stations/equipment running specialized software. WC-130Js are optionally equipped with two external wing tanks, as well as an internal auxiliary fuel tank to increase range and endurance. Crews include an added aerial weather reconnaissance officer/flight director and weather system specialist/loadmaster. Aircraft are capable of penetrating tropical cyclones from up to 10,000 ft to as low as 500 ft. The fleet primarily monitors oceanic weather over the Atlantic, Central Pacific, Caribbean, and Gulf of Mexico. Airframes are modernized alongside the baseline C-130J fleet, including Block 8.1 upgrades, and enhanced service-life center wing sections, MUOS jam-resistant BLOS and wide-band SATCOMS. AFRC is returning the fleet to the more weather-resistant gloss-gray paint scheme worn by WC-130s prior to 2007 and aims to add a dedicated weather radar as well as modular sensor pods for

specific missions. The small, hard-used WC-130J fleet suffers a 65 percent mission capable rate and has struggled to meet the demands of a longer and busier storm season. WC-130Js flew 1,130.6 hours over 107 missions, collecting data on 12 of the 18 named storms in the Atlantic and two of the 13 in the Pacific during the 2024 storm season. Hurricane Hunters then shifted to collecting data on Pacific atmospheric rivers that bring heavy localized precipitation to the West Coast, flying missions from Mather Airfield, Calif., and Yokota AB, Japan, in early 2025.

**Contractor:** Lockheed Martin.

**First Flight:** April 5, 1996 (C-130J).

**Delivered:** Sept. 30, 1999–September 2005.

**IOC:** October 2006.

**Production:** 10.

**Inventory:** 10.

**Operator:** AFRC.

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

**Active Variant:**

•WC-130J. Weather reconnaissance version of the C-130J.

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

**Weight:** Max T-O 155,000 lb; max payload 42,000 lb.

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

**Performance:** Speed 417 mph; range with 35,000 lb payload 1,841 miles (3,000+ miles with external/auxiliary tanks).

**Ceiling:** With max payload, 26,000 ft.

**Accommodation:** Two pilots, aerial reconnaissance weather officer, loadmaster/dropsonde operator.

**Load:** Palletized weather systems.

## WC-135 CONSTANT PHOENIX

Air sampling and collection

**Brief:** WC-135's mission is nuclear test monitoring, airborne radiological sampling, and arms control treaty verification. The KC-135R-based aircraft is equipped with air sampling and collection equipment and primarily supports monitoring under the 1963 Limited Nuclear Test Ban Treaty. Air sampling WB-29s detected debris from the Soviet Union's first atomic test in 1949, and subsequent aircraft have monitored weapons tests in North Korea, as



Tech. Sgt. Anthony Hetlage

well as the Chernobyl and Fukushima nuclear disasters. The original fleet of modified C-135Bs was delivered between 1965 and 1996 and was fully retired in 2022 with delivery of the first modernized WC-135R. The WC-135R features modernized glass cockpits and uprated CFM-56 turbofans (common with the KC-135 fleet) which significantly improve the aircraft's range, service ceiling, performance, and maintainability. Constant Phoenix' sampling and collection suite allows mission crew to detect radioactive “clouds” in real time. The collection system uses external flow-through devices to collect particles on filter paper for later analysis. The podded particulate sampler/Radiation Monitoring and Analysis System (RMAS) detects radiation contact, and the Directional Gamma Sensor System (DGSS) guides the crew toward the plume for collection. The Whole Air Collection System (WACS) captures and stores radioactive samples from the aircraft's bleed-air system. An integrated control system permits real-time mission system interface and monitors internal and external radiation levels for safety and analysis. L3 Technologies completed retrofit and redelivery of the first modernized WC-135R Constant Phoenix on July 11, 2022, followed by a second aircraft on May 11, 2023. The third and final aircraft was delivered to Offutt on Dec. 4, 2023. WC-135Rs conducted rare air sampling missions over the CENTCOM area of operations in late 2024 in addition to more routine operations worldwide.

**Contractors:** Boeing; L3 Technologies (WC-135R conversion).

**First Flight:** June 2022 (WC-135R).

**Delivered:** July 11, 2022–Dec. 4, 2023 (WC-135R).

**IOC:** 2022 (WC-135R).



**Production:** Two (WC-135C/W); three (WC-135R).

**Inventory:** Three (WC-135R).

**Operator:** ACC.

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

**Active Variants:**

•WC-135R. Modified KC-135R tankers succeeding the WC-135C/W fleet.

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

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

**Power Plant:** Four CFM International CFM56-2 turbofans, each 21,634 lb thrust.

**Performance:** Speed 530 mph, range approx. 3,900 miles (farther with air refueling).

**Ceiling:** 50,000 ft.

**Accommodation:** Two pilots, navigator, up to 31 special equipment operators/observers as required.

# TANKER AIRCRAFT



Airman 1st Class Jonah Bliss

A KC-46 Pegasus aircraft from Altus Air Force Base, Okla., executes a fly-over at The Wings and Warriors Fly-In at San Marcos, Texas, in 2024.

## HC-130J COMBAT KING II

Aerial refueling/airlift

**Brief:** The HC-130J is tasked with helicopter in-flight refueling support for CSAR/personnel recovery, tactical C2, and pararescue (PJ) deployment. It replaced the HC-130N/P and is based on the USMC's KC-130J tanker. It adds an enhanced service-life wing, improved cargo handling system, refueling receptacle, EO/IR sensor, flight deck CSO console, and dual SATCOM. It is also equipped with INS/GPS, NVG-compatible lighting, FLIR, and integrated situational awareness. Recently added Advanced Threat Warning and RF countermeasures, as well as chaff/flares give the HC-130 the latest self-defensive capability for recovery



Tech. Sgt. Dhruv Gopinath

operations in contested environments. USAF plans to standardize HC/AC/MC-130J block upgrades, and past efforts aimed to bring all HC-130Js to a more common configuration. Avionics Block 8.1 development (in common with the C-130J fleet) was completed in FY23 and large-scale retrofits are planned starting in FY26. The fleet is receiving the Airborne Mission Networking (AbMN) battlefield situational awareness system as well as aft paratrooper door search window, ballistic armor, and safety improvements in FY25. Comm Modernization Phase I including Mobile User Objective System (MUOS) and crypto updates were pushed to FY27 to FY-28, and future Comm Modernization Phase II will add NATO-interoperable LOS SATURN and updated UHF/VHF radios. Required upgrades include a Star mission computer refresh as well as an EO/IR sensor life extension. USAF conducted a series of tests and exercises utilizing the HC-130J as an airborne command post to control Pacific theater air operations in 2024.

**Contractor:** Lockheed Martin; Sierra Nevada (AbMN).

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

**Delivered:** Sept. 24, 2010-2022.

**IOC:** April 25, 2013.

**Production:** 39.

**Inventory:** 39.

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

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

**Active Variants:**

•HC-130J. KC-130J modified for CSAR and aerial refueling.

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

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

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

**Performance:** Speed 363.4 mph at S-L, range 4,000+ miles (farther with air refueling).

**Ceiling:** 33,000 ft.

**Fuel Capacity:** 61,360 lb at 150-300 gpm (100 gpm dual, simultaneous refueling).

**Accommodation:** Two pilots, CSO, two loadmasters, three PJs.

## KC-10 EXTENDER

Aerial refueling/airlift

**Brief:** The KC-10 was a multirole tanker/transport capable of aeromedical evacuation, based on the McDonnell Douglas DC-10-30CF, making it USAF's largest air-refueling aircraft. It could simultaneously operate as a tanker and airlifter, optimizing it to support worldwide fighter deployments. The KC-10 employed an advanced aerial refueling boom and hose/drogue system allowing it to refuel a wide variety of U.S. and allied aircraft, including the CV-22 tilt-rotor, within the same mission. The aircraft had three large fuel tanks under the cargo floor and an air-refueling operator's station recessed into the aft fuselage. It was also refuelable by boom-equipped tankers. The fleet amassed more than 2.3 million flying hours before the first airframes retired in 2020. Congress prevented USAF from making drastic KC-10 cuts in 2021 citing capacity concerns with delays to the KC-46 program but removed limitations starting in FY22. AMC steadily retired KC-10s as KC-46s were delivered, maintaining a minimum of 446 overall tankers. McGuire ended KC-10 operations on June 22, 2023, leaving Travis as the type's final main operating base. USAF cut 15 aircraft in FY23 and retired the final aircraft, serial number 79-1948, at Travis on Sept. 26, 2024. Three KC-10s retired on display at the Air Mobility Command Museum at Dover, the National Museum of the U.S. Air Force at Wright-Patterson, and March Field Air Museum.

**Contractors:** McDonnell Douglas (now Boeing); Collins Aerospace (CNS/ATM).

**First Flight:** April 1980.



Senior Airman Sergio Avalos

**Delivered:** March 1981-April 1990.

**IOC:** August 1982.

**Production:** 60.

**Inventory:** Zero.

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

**Variant:**

•KC-10A. Modified McDonnell Douglas DC-10 designed as a multirole cargo-tanker.

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

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

**Power Plant:** Three GE Aviation CF6-50C2 turbofans, each 52,500 lb thrust.

**Performance:** Speed 619 mph, range 11,500 miles, or 4,400 miles with max cargo (air refuelable).

**Ceiling:** 42,000 ft.

**Fuel Capacity:** 356,000+ lb. at 1,100 gpm (boom), 470 gpm (drogue).

**Accommodation:** Two pilots, flight engineer, boom operator; Aeromedical Evacuation (AE) crew: two flight nurses, three medical technicians; other crew depending on mission.

**Load:** Up to 75 people and 17 pallets or 27 pallets up to approx. 170,000 lb.

## KC-46 PEGASUS

Aerial refueling/airlift

**Brief:** The KC-46A is a heavily modified Boeing 767-200ER multirole passenger/cargo-tanker equipped with flying boom and probe/drogue refueling capability using the Wing Air Refueling Pod (WARP) system. It is also equipped for aeromedical evacuation. KC-46 incorporates the 787's state-of-the-art cockpit, a fly-by-wire boom, remote boom-operator's station, advanced self-defensive suite including Large Aircraft IR Countermeasures (LAIRCM), RWR,



Bryce Bennett/USAF

tactical situational awareness, comms relay hosting, and nuclear/chem/bio hardening. In 2011 Boeing was contracted for 179 KC-46A tankers, the first increment (KC-X), was to replace approximately half of USAF's KC-135R fleet. Compared to the 50-year-old KC-135, the KC-46A has more fuel capacity, improved efficiency, and enhanced cargo and AE capability. Like the KC-10, it employs an advanced refueling boom and independently operating hose/drogue system. The program's provisioned 767-2C prototype (minus refueling boom) flew on Dec. 28, 2014, and received FAA type certification in 2017 prior to the first production aircraft's delivery in 2019. USAF awarded the first LRIP contract for 19 aircraft in 2016, and most recently awarded Lot 11 in November 2024, raising the quantity on contract to 158 airframes. Full-rate production was initially planned for Lot 3 but IOC and full-rate production slipped due to remaining deficiencies with the boom, remote vision system (RVS), and fuel drain lines. USAF accepted Boeing's revised 3D-RVS design for six color/IR cameras and boom modifications and plans to begin retrofits and initial flight testing in 2026. KC-46s suffered two refueling-boom related mishaps refueling an F-16 and F-15E in 2024, and the fleet continues to fall significantly short of

its target 90 percent mission capable rate. The Wing Aerial Refueling Pods (WARPs) have also faced certification delays due to icing and weight and balance issues. The KC-46 is cleared to refuel receivers in combat (except for the A-10) while awaiting resolution of the final three critical deficiencies. The KC-46 completed developmental testing and entered operational testing in 2019, which USAF now plans to complete in FY26. The KC-46 is testing a C2 pod which is the first element of the Advanced Battle Management System (ABMS) to network fifth-generation aircraft in high-threat environments and FY25 aims to launch LOS/BLOS secure C2 and situational awareness. The service is considering an upgraded KC-46 as one option for a 75-aircraft "bridge" fleet to a next-generation, possibly stealthy, tanker and announced it will increase the planned fleet from 179 aircraft to 183. A KC-46 completed a 45-hour maximum endurance mission circumnavigating the Earth from McConnell, as well as its first operational deployment to USCENTCOM in 2024.

**Contractor:** Boeing.

**First Flight:** Sept. 25, 2015 (KC-46A).

**Delivered:** Jan. 10, 2019-present.

**IOC:** FY24 (planned).

**Production:** 183 (planned).

**Inventory:** 89 (KC-46A).

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

**Aircraft Location:** Altus AFB, Okla.; Edwards AFB, Calif.; JB McGuire-Dix-Lakehurst, N.J.; McConnell AFB, Kan.; Pease ANGB, N.H.; Seymour-Johnson AFB, N.C.; Travis AFB, Calif. Planned: MacDill AFB, Fla.; March ARB, Calif.; Selfridge ANGB, Mich.; others TBD.

**Active Variant:**

•KC-46A. Modified Boeing 767 designed as a multirole cargo tanker.

**Dimensions:** Span 156 ft, length 165.5 ft, height 52.8 ft.

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

**Power Plant:** Two Pratt & Whitney PW4062, each 62,000 lb thrust.

**Performance:** Speed 650 mph, range 7,350 miles (farther with air refueling).

**Ceiling:** 43,000 ft.

**Fuel Capacity:** 212,299 lb, max transfer load 207,672 lb at 1,200 gpm (boom), 400 gpm (drogue).

**Accommodation:** Two pilots, boom operator, and up to 12 additional crew; 15 crew seats, incl AE crew.

**Passenger Load:** 58 or up to 114 for contingency operations. AE load: 58 patients (24 litters and 34 ambulatory).

**Cargo Load:** 18 pallet positions, max 65,000 lb.

## KC-135 STRATOTANKER

Aerial refueling/airlift

**Brief:** The KC-135 is an aerial tanker capable of simultaneous cargo and AE missions and has been the mainstay of the USAF tanker fleet for more than 60 years. The C-135 family is similar in appearance to the commercial 707 but designed to unique military specifications. It first flew on Aug. 31, 1956, and the KC-135A fleet was delivered between June 1957 and January 1965, reaching IOC at Castle AFB, Calif., in 1957. KC-135s were reengined under two separate but concurrent programs and redelivered as the KC-135E and the current KC-135R beginning in July 1984. Twenty KC-135Rs received Multipoint Refueling System (MPRS) hose/drogue pods on each wing to simultaneously refuel two NATO or Navy aircraft. (Standard KC-135s can use a single drogue adapter attached to the boom). A small number of McConnell-based aircraft are also receiver-capable, incorporating a forward-fuselage receptacle. KC-135s can be equipped with a podded Large-Aircraft IR Countermeasures (LAIRCM) system to track/jam IR missiles for high-threat missions. The fleet completed Block 45 cockpit upgrades that updated its glass flight deck with additional digital engine displays, a radar altimeter, advanced autopilot, and modern flight director in FY24. Ongoing upgrades include replacing Aero-I long-distance oceanic satellite tracking/C2 with the Iridium system, Real Time in the Cockpit (RTIC) to network active-duty aircraft with Link-16/SADL, and a rudder position indicator to increase crew safety awareness. USAF plans to begin Mobile User Objective System (MUOS) secure, jam-resistant BLOS, NATO-interoperable LOS SATURN mods and crypto modernization in FY25, as well as launch HF radio replacement. Air Force Research Laboratory recently tested prototype winglets to potentially increase the KC-135's fuel efficiency. USAF plans to keep the KC-135 in service until at least 2050 but is considering replacing some KC-135s with an interim aircraft until arrival of the notional Next-Generation Air-refueling System (NGAS). USAF aims to retire 15 KC-135s per year through the late 2030s, maintaining a minimum force of 466 tankers.

**Contractors:** Boeing; Collins Aerospace (Block 45/Iridium SATCOM).

**First Flight:** Aug. 4, 1982 (KC-135R).

**Delivered:** July 1984-June 9, 2005 (KC-135R).



Staff Sgt. Ryan Gomez

**IOC:** June 1957.

**Production:** 732 (420 converted to KC-135R).

**Inventory:** 325 (KC-135R); 51 (KC-135T).

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

**Aircraft Location:** Altus AFB, Okla.; Beale AFB, Calif.; Fairchild AFB, Wash.; Grissom ARB, Ind.; JB Andrews, Md.; Kadena AB, Japan; MacDill

AFB, Fla.; March ARB, Calif.; McConnell AFB, Kan.; RAF Mildenhall, U.K.; Seymour-Johnson AFB, N.C.; Tinker AFB, Okla.; and ANG in Alabama, Alaska (active associate), Arizona, Hawaii, Illinois, Iowa, Kansas, Maine, Michigan, Mississippi, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Utah, Washington, and Wisconsin.

**Active Variants:**

•KC-135R. Reengined KC-135A fitted with CFM turbofan engines.

•KC-135T. Reengined former KC-135Qs, able to carry different fuels in wing and fuselage tanks.

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

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

**Power Plant:** Four CFM International CFM56-2 (USAF designation F108) turbofans, each 21,634 lb thrust.

**Performance:** Speed 530 mph at 30,000 ft, range 1,500 miles with 150,000 lb transfer fuel, up to 11,015 miles for ferry missions.

**Ceiling:** 50,000 ft.

**Fuel Capacity:** Max transfer load 200,000 lb at 1,100 gpm (boom), 450 gpm (MPRS pods).

**Accommodation:** Two pilots, navigator, boom operator; **AE crew:** two flight nurses, three medical technicians (adjusted as needed).

**Load:** 37 passengers, six cargo pallets, max 83,000 lb.

# AIRLIFT AIRCRAFT



Roland Balik/USAF

## C-5 GALAXY

Strategic airlift

**Brief:** The C-5 is USAF's largest airlifter and one of the world's largest aircraft, capable of carrying unusually large/heavy cargo over intercontinental ranges. It can also take off and land in relatively short distances and taxi on substandard surfaces if required. The Galaxy's front and rear cargo doors permit simultaneous drive-through loading/unloading. The aircraft's unique upper deck is split between the flight deck—with galley and crew rest area forward of the wing—and a troop compartment seating 75 passengers and a second galley/lavatory aft of the wing. The C-5A first flew on June 30, 1968, and a total of 81 were delivered between 1969 and 1973, reaching IOC in September 1970. C-5As underwent major wing modifications to extend their service lives and all but one (converted to C-5M) were retired. The C-5B first flew in 1985 and was delivered between 1986 and 1989. C-5Bs incorporated all C-5A improvements including strengthened wings, uprated turbofans, color weather radar, triple INS, and defensive systems (on some aircraft). Two C-5As were modified for outsize space cargo and redelivered as C-5Cs in 1989 and 1990. The combined Avionics Modernization Program (AMP) and Reliability Enhancement and Re-engining Program (RERP) resulted in the C-5M Super Galaxy. Upgraded aircraft incorporate new engines with a 20 percent increase in thrust, as well as avionics, structural, and reliability fixes. A total of 49 B models, two C models, and the single C-5A were converted. Major modifications include CNS/ATM upgrades, new mission computers and off-the-shelf color weather radar which are planned for fleetwide completion in FY25. Additional ongoing efforts include a lavatory redesign to address corrosion slated for completion in FY27 and select external skin replacements to increase structural life launching in FY25. Development includes flight

deck display replacement as well as studies to replace legacy SATCOMS with modern Mobile User Objective System (MUOS). AFMC is working to improve the C-5 fleet's mission capable rate, which dipped below 46 percent, by reengaging with industry suppliers.

**Contractors:** Lockheed Martin; Collins Aerospace and Honeywell (CNS/ATM, weather radar/mission computer).

**First Flight:** June 6, 2006 (C-5M).

**Delivered:** Feb. 9, 2009-Aug. 2, 2018 (C-5M).

**IOC:** Feb. 21, 2014 (C-5M).

**Production:** 131 (52 converted to C-5M).

**Inventory:** 50 (C-5M); two (C-5M-SCM).

**Operator:** AMC, AFRC.

**Aircraft Location:** Dover AFB, Del.; JBSA-Lackland, Texas; Travis AFB, Calif.; Westover ARB, Mass.

**Active Variants:**

•C-5M. Super Galaxy converted from C-5A/B, incorporating AMP and RERP.

•C-5M-SCM. Super Galaxy converted from C-5C to carry large NASA/space cargo.

**Dimensions:** Span 222.8 ft, length 247.8 ft, height 65.1 ft.

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

**Power Plant:** Four GE Aviation F138-GE-100 (CF6-80C2) turbofans, each 50,580 lb thrust.

**Performance:** Speed 518 mph, range 5,524 miles with 120,000 lb of cargo.

**Ceiling:** 45,000 ft.

**Accommodation:** Two pilots, two flight engineers, three loadmasters.

**Cargo Load:** 81 troops and 36 standard pallets, max 285,000 lb; incl seven MRAP vehicles, six AH-64 Apache helicopters, four M2 Bradley fighting vehicles, or two M1 Abrams main battle tanks.



## C-12 HURON

Light airlift

**Brief:** C-12 is tasked with multimission passenger and priority light-cargo airlift, medevac, as well as diplomatic and flight-test support. The family of aircraft includes military versions of the Beechcraft King Air and 1900C (C-12J). Flight decks and cabins are pressurized for high-altitude flight. The C-12D incorporates a cargo door with an integral airstair, high-flotation landing gear, structural improvements, and optional external wingtip tanks. Both C-12C and C-12D are deployed to U.S. embassies worldwide and incorporate earlier three-bladed propellers. The C-12F incorporated uprated engines, four-bladed propellers, and an increased service ceiling. The C-12J is based on the elongated Beechcraft 1900C commuter airliner with a large, aft cargo door. C-12Js are operated by AFMC for testing and PACAF in support of U.S. Forces Japan with provision for two litters or 10 ambulatory patients in the AE role. C-12Js incorporate extensive avionics upgrades, including three MFDs, integrated GPS, flight management systems, autopilot, VHF/UHF radios, and weather radar.



Adam Bowles/USAF

**Contractor:** Beechcraft.

**First Flight:** Oct. 27, 1972 (Super King Air 200); March 1, 1990 (1900C).

**Delivered:** 1974-mid 1990s.

**IOC:** Circa 1974.

**Production:** 30 (C-12A/C); six (C-12D); 46 (C-12F); five (C-12J).

**Inventory:** 16 (C-12C); six (C-12D); three (C-12F); five (C-12J).

**Operator:** AFMC, PACAF.

**Aircraft Location:** Edwards AFB, Calif.; Holloman AFB, N.M. (J); JB Elmendorf-Richardson, Alaska; Yokota AB, Japan (J); various U.S. embassies.

### Active Variants:

- C-12C. C-12As retrofitted with PT6A-41 engines.
- C-12D. C-12 with an enlarged cargo door and strengthened wings.
- C-12F. C-12 with uprated PT6A-42 engines, eight-passenger seating, and AE capability.
- C-12J. Military version of the Beechcraft Model 1900C commuter airliner.

**Dimensions:** Span 54.5 ft, length 43.8 ft, height 15 ft (C/D/F); span 54.5 ft, length 57 ft, height 15 ft (J).

**Weight:** Max T-O 15,000 lb (F); 16,710 lb (J).

**Power Plant:** Pratt & Whitney Canada PT6A-41 (C/D) or PT6A-42 (F) turbo-props, each 850 shp; PT6A-65B turboprops, each 1,173 shp (J).

**Performance:** Speed 300 mph (C/D), 336 mph (F), range 2,271 miles; 284 mph, range 1,669 miles (J).

**Ceiling:** 31,000 ft (C/D); 35,000 ft (F); 25,000 ft (J).

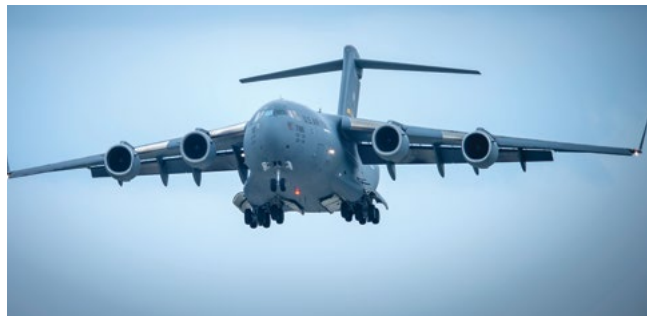
**Accommodation:** Two pilots.

**Load:** Eight passengers (C/D/F), 19 passengers or 3,500 lb cargo (C-12J).

## C-17 GLOBEMASTER III

Tactical/strategic airlift

**Brief:** C-17 is a heavy-lift, strategic transport capable of direct tactical delivery of all classes of military cargo. It is the U.S. military's core airlift asset, capable of operating on small, austere airfields (3,500 ft by 90 ft) previously limited to C-130s. It is the only aircraft able to directly deliver or airdrop outsize cargo into a tactical environment, and it is the first military transport to feature fully digital, fly-by-wire control. The C-17 fleet was heavily tasked evacuating U.S. and allied personnel from Afghanistan during Operation Allies Refuge, including carrying a record-breaking 823 passengers on a single flight on Aug. 15, 2021. Early production aircraft have been upgraded to a common fleetwide configuration, and the most recent Block 21 including Mode 5 IFF and airspace compliance were completed in 2020. FY25 continues HUD replacement through FY28, ramps-up install of enhanced high-bandwidth BLOS voice/data SATCOMS as well as fire-protection, safety and sustainment mods. The fleet completed Large Aircraft Infrared Counter-measures (LAIRCM) upgrades to combat man-portable air defenses last year. Current development focuses on Flight Deck Replacement with an easily upgradable modular infrastructure, and enhancing LOS/BLOS C2 capabilities. The C-17



USAF

is USAF's largest consumer of jet fuel and Pratt & Whitney is under contract to improve the F117 engine's efficiency and increase maintenance intervals by 2027. C-17s notably airdropped humanitarian supplies to civilians in Gaza and evacuated personnel from U.S. bases in Niger following a coup and the breakdown of security cooperation in 2024.

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

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

**Delivered:** June 1993-Sept. 12, 2013.

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

**Production:** 257.

**Inventory:** 222.

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

**Aircraft Location:** Altus AFB, Okla.; Dover AFB, Del.; JB Charleston, S.C.; JB Elmendorf-Richardson, Alaska; JB Lewis-McChord, Wash.; JB McGuire-Dix-Lakehurst, N.J.; JB Pearl Harbor-Hickam, Hawaii; March ARB, Calif.; Pittsburgh Arpt., Pa.; Travis AFB, Calif.; Wright-Patterson AFB, Ohio; and ANG in Hawaii (associate), Mississippi, North Carolina, West Virginia, and New York.

### Active Variant:

• C-17A. Long-range tactical/strategic airlifter.

**Dimensions:** Span 169.8 ft, length 174 ft, height 55.1 ft.

**Weight:** Max T-O 585,000 lb.

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

**Performance:** Speed 518 mph at 25,000 ft, range 2,760 miles with 169,000 lb payload (farther with air refueling).

**Ceiling:** 45,000 ft.

**Accommodation:** Two pilots, loadmaster; **AE crew:** Two flight nurses, three medical technicians (mission dependent).

**Load:** 102 troops/paratroopers; 36 litter and 54 ambulatory patients; 18 pallets up to max payload 170,900 lb.

## C-21

Light airlift

**Brief:** The C-21 "Cougar" is a militarized Learjet 35 used for passenger and priority light-cargo airlift and aeromedical transport. It is equipped with color weather radar, TACAN, and HF/VHF/UHF radios. It provides medium-range operational support for time-sensitive movement of people and cargo throughout the U.S. and the European theater, including AE



Airman 1st Class DeQuan Simmons

missions if required. Recent upgrades include the C-21 Avionics Upgrade Program (AUP), which added a modern glass cockpit, digital weather radar, GPS, flight management system, satellite-updating real-time flight information, digital black boxes, and ADS-B/Mode 5 transponder. USAF added BLOS comms concurrently with AUP to save costs. The fleet was also retrofitted with enlarged aft-fuselage "delta fins" to improve low-speed stability and control, eliminating previous approach/landing flight

restrictions. USAF plans to sustain the fleet through the 2030s.

**Contractor:** Bombardier (previously Gates Learjet).

**First Flight:** January 1973.

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

**IOC:** April 1984.

**Production:** 84.

**Inventory:** 19.

**Operator:** AMC, USAFE.

**Aircraft Location:** Ramstein AB, Germany; Scott AFB, Ill.

**Active Variant:**

•C-21A. Military version of the Learjet 35A.

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

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

**Power Plant:** Two AlliedSignal TFE731-2-B2 turbofans, each 3,500 lb thrust.

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

**Ceiling:** 45,000 ft.

**Accommodation:** Two pilots; **AE crew:** Flight nurse, two medical technicians (mission dependent).

**Load:** Eight passengers, 3,153 lb cargo; one litter or five ambulatory patients (AE role).

## C-32

### VIP transport

**Brief:** The C-32A provides dedicated vice presidential and DV airlift while the C-32B is tasked with politically sensitive crisis-mobility. Both types were acquired as commercial Boeing 757s. Aircraft assigned to the 89th Airlift Wing at JB Andrews fly under the call sign "Air Force Two" during vice presidential missions but additionally serve the First Lady, Congress, and Cabinet officials. The cabin is divided into sections, including a worldwide



Tech. Sgt. Benjamin Mota

clear and secure voice and data communications suite, first-class cabin, two business-class cabins, center galley, lavatories, fully enclosed state-room, and a conference and staff area. The C-32B provides DOD discreet, rapid, global airlift in support of government crisis response efforts and is equipped to receive in-flight refueling. The C-32's modern flight deck is designed to be easily upgraded. The C-32A fleet recently underwent a full cabin refurbishment to match the VC-25, as well as installation of fully reclining crew rest seats to enable long-endurance missions without pre-positioned relief crews. The C-32A fleet is undergoing significant comm-suite modernization including a Senior Leader Communication System (SLC C3), next-generation Presidential and National Voice Conferencing (PNVC), and replacement of obsolescent UHF SATCOM with Mobile User Objective System (MUOS) compatible BLOS. SLC is installing Wideband SATCOM, secure air-to-air/ground comms, commercial WiFi, in-flight information, and enhanced airborne executive phones across USAF's executive fleets. Two C-32A will undergo installation in FY25 with modification fleetwide planned by 2027. Two aircraft received PNVC and the FY25 request included funds for a third install as well as launching MUOS-compatible crypto modernization through FY26. DOD scrapped plans to replace the C-32A, opting to retain the fleet through 2038 or beyond. USAF requested to expand the C-40 fleet by two aircraft and has been assessing options to augment its C-32s with up to 10 modified commercial aircraft.

**Contractors:** Boeing; L3 Harris (Senior Leader Communications Modernization).

**First Flight:** Feb. 11, 1998 (C-32A).

**Delivered:** June–December 1998.

**IOC:** 1998.

**Production:** Six.

**Inventory:** Four (C-32A); two (C-32B).

**Operator:** AMC, ANG.

**Aircraft Location:** JB Andrews, Md. (A); JB McGuire–Dix–Lakehurst, N.J. (B).

**Active Variants:**

•C-32A. Presidential support-configured commercial Boeing 757-200 airliner.

•C-32B. Commercial Boeing 757-200 tasked with global crisis response airlift.

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

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

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

**Performance:** Speed 530 mph, range 6,325 miles (C-32B is capable of farther with aerial refueling).

**Ceiling:** 42,000 ft.

**Accommodation:** Two pilots, up to 14 cabin and maintenance crew (varies with mission).

**Load:** Up to 45 passengers.

## C-37

### VIP transport

**Brief:** The C-37 family provides worldwide special air mission and DV support, consisting of military versions of the ultra-long-range Gulfstream business aircraft. The C-37A is based on the Gulfstream V and is equipped with separate VIP and passenger areas, secure global voice and data communications suites, enhanced weather radar, autopilot, and advanced HUD. The C-37B, first delivered in 2004, is based on the G550 and adds directional IR countermeasures for self-defense and the advanced Honeywell Plane-View flight deck. Ongoing mods include commercial wideband SATCOM, to ensure leaders access to secure data and voice networks, and FAA-required CNS/ATM updates. FY25 continues comm suite upgrades as part of the Senior Leader Communication Modernization effort across USAF's executive fleets. A total of 16 aircraft will be modified, including two in FY25, to ensure redundant, survivable and secure/top-secret voice, data, and videoconferencing for uninterrupted worldwide C2. Existing aircraft will receive modernized en route air traffic SATCOMS, which will be standard on future airframes. USAF aims to acquire as many as 40 aircraft to backfill the retired C-20. Four aircraft were delivered between 2019 and 2022. FY25 funds MUOS-compatible crypto to support secure, jam-resistant BLOS UHF SATCOM upgrades by FY26.

**Contractors:** Gulfstream Aerospace; Honeywell (commercial SATCOM replacement); L3 Harris (Senior Leader Communications Modernization).

**First Flight:** October 1998 (C-37A).

**Delivered:** Oct. 14, 1998–February 2022.

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

**Production:** 16.

**Inventory:** Nine (C-37A); seven (C-37B).



Senior Airman Shellmar Rivera-Rosado

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

**Aircraft Location:** JB Andrews, Md.; JB Pearl Harbor–Hickam, Hawaii; Ramstein AB, Germany.

**Active Variants:**

•C-37A. Military version of the Gulfstream V.

•C-37B. Military version of the Gulfstream G550.

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

**Weight:** Max T-O 90,500 lb. (A); 91,000 lb. (B).

**Power Plant:** Two BMW/Rolls-Royce BR710A14-10 turbofans, each 14,750 lb thrust (A); two BMW/Rolls-Royce BR710C4-11 turbofans, each 15,385 lb thrust (B).

**Performance:** Speed 600 mph (cruise 345 mph); range 6,300 miles (A), 6,700 miles (B).

**Ceiling:** 51,000 ft.

**Accommodation:** Two pilots, flight attendant, crew chief.

**Load:** Up to 12 passengers (A); 14 passengers (B).



## C-40 CLIPPER

VIP transport

**Brief:** The C-40 is a medium-range DV airlift aircraft based on the commercial Boeing 737-700. It is used to transport senior military commanders, Cabinet officials, and members of Congress, as well as performing other support missions. C-40Bs are equipped with an office-in-the-sky arrangement, including clear and secure voice/data communication and broadband data/video. C-40Cs lack the advanced communications suite, are VIP configured with sleep accommodations, and are reconfigurable to carry 42 to 111 passengers. Both versions have modern avionics, integrated GPS and flight-management system/electronic



Airman 1st Class Luis Rios Calderon

flight instrument system, and HUD. Each aircraft has auxiliary fuel tanks and managed passenger communications. Recent mods add fully reclining crew rest seats to enable long-endurance missions without pre-positioned relief crews. Both variants are receiving updated Large Aircraft Infrared Countermeasures (LAIRCM) through FY27. Senior Leader Communication Modernization across the executive fleets includes Wideband SATCOM, secure air-to-air/ground comms, commercial WiFi, in-flight information, and enhanced airborne executive phones. Two C-40Bs will be upgraded in FY25 to ensure redundant, survivable and secure/top-secret voice, data, and video conferencing for uninterrupted worldwide C2. C-40Bs are also receiving MUOS-compatible crypto to support upgraded secure, jam-resistant BLOS UHF SATCOM. Congress trimmed USAF's request for two additional aircraft to augment the heavily tasked C-32 and C-40 fleets. FY25 instead funds a single C-40D that will be similarly configured to the C-40B but with increased passenger capacity.

**Contractors:** Boeing; L3Harris (Wideband SATCOM/Senior Leader Communication Modernization).

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

**Delivered:** 2002-2007.

**IOC:** Feb. 28, 2003.

**Production:** 11.

**Inventory:** Four (C-40B); seven (C-40C).

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

**Aircraft Location:** JB Andrews, Md.; Scott AFB, Ill.

### Active Variants:

- C-40B. VIP military-configured Boeing 737-700 with advanced comms.
- C-40C. Passenger-configured Boeing 737-700, lacking advanced comms.
- C-40D. Future VIP military-configured Boeing 737 with advanced comms and increased passenger capacity.

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

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

**Power Plant:** Two GE Aviation CFM56-7 turbofans, each 27,000 lb thrust.

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

**Ceiling:** 41,000 ft.

**Accommodation:** Two pilots, up to eight cabin and maintenance crew (varies by model/mission).

**Load:** Up to 89 passengers (B); up to 111 passengers (C).

## C-130H HERCULES

Tactical airlift

**Brief:** The C-130H is an all-purpose theater transport that performs diverse roles, including tactical and intertheater airlift and airdrop, AE, aerial spraying, aerial firefighting, and humanitarian support. The developmental YC-130A first flew in August 1954 with the C-130A entering USAF service in 1956. The H model improved on the later C-130E and was delivered starting in 1965, with delivery of the current, more advanced models starting in 1974. Improvements included uprated engines, redesigned outer wing, improved pneumatic systems, new avionics, improved radar, and NVG lighting. USAF is replacing the fleet with the C-130J while modernizing the remaining C-130Hs. Primary upgrades consist of the Avionics Modernization Program and NP2000 propeller retrofits, center wing box replacement, and low-cost mods. AMP Increment 1 added new CNS/ATM and brought legacy C-130s

into compliance with international airspace rules. The first Increment 2 upgrade was completed in 2022, adding terrain awareness and warning, new flight management, and modern glass cockpit displays. UHF SATCOM modernization was added in FY23, rolling in Mobile User Objective System (MUOS) secure, jam-resistant BLOS, and NATO-interoperable LOSSATURN. A total of 77 aircraft are planned for upgrade through 2029. Legacy four-bladed propellers will be replaced fleetwide by the eight-bladed NP2000 propellers in 2025, enhancing performance up to 20 percent and eliminating cracking problems. AFRC's 910th AW at Youngstown began transitioning to the C-130J in 2024, and ANG units in Connecticut, Illinois, Minnesota, and Montana will also upgrade to the C-130J in the coming years. USAF plans to cut six C-130Hs this year, replacing them with C-130Js on a one-for-one basis to maintain the congressionally mandated 271-airframe tactical fleet.

**Contractors:** Lockheed Martin (airframe); L3Harris (AMP Increment 2); Collins Aerospace (NP2000).

**First Flight:** 1965 (C-130H).

**Delivered:** April 1975-96 (current C-130H2/H3).

**IOC:** Circa 1974.

**Production:** 1,202 (C-130H).

**Inventory:** 122.

**Operator:** ANG, AFRC.

**Aircraft Location:** Dobbins ARB, Ga.; Little Rock AFB, Ark.; Minneapolis-St. Paul Arpt./ARS, Minn.; Peterson SFB, Colo. (MAFFS); Youngstown ARS, Ohio (Electronic Modular Aerial Spray System (EMASS)), and ANG in Arkansas, Connecticut, Delaware, Illinois, Minnesota, Missouri, Montana, Nevada (MAFFS), Texas, and Wyoming (MAFFS).



Staff Sgt. Janae Masoner

### Active Variant:

• C-130H Hercules. Updated late-production version of the legacy C-130.

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

**Weight:** Max T-O 155,000 lb; max payload 42,000 lb.

**Power Plant:** Four Allison T56-A-15, or Rolls-Royce T56 3.5 turboprops, each 4,591 shp (approx. 20 percent increased thrust with NP2000 propellers).

**Performance:** Speed 366 mph; range with 35,000 lb payload 1,496 miles.

**Ceiling:** With max payload, 23,000 ft.

**Accommodation:** Two pilots, navigator, flight engineer, loadmaster.

**Load:** Up to 92 combat troops or 64 paratroopers or 74 litters or six cargo pallets or 16 Container Delivery System (CDS) bundles or any combination of these up to max weight.

## C-130J/C-130J-30 SUPER HERCULES

Tactical airlift

**Brief:** The C-130J is the redesigned, current production version of the C-130 all-purpose theater transport. Missions include tactical and intertheater airlift, airdrop, AE, and wildfire suppression using the Modular Airborne Fire Fighting System (MAFFS), and humanitarian relief. The aircraft first deployed to combat in Southwest Asia in 2004. The Super Hercules features three-crew flight operations, more powerful engines, composite six-blade propellers, and digital avionics and mission computers. The C-130J can fly faster, higher, and farther than the C-130H. The C-130J-30 variant features a 15-foot-longer "stretched" fuselage. The combined fleet is sustained via block upgrades. USAF combined Block 7/8.1 upgrades to reduce modification downtime. Block 7 includes Link 16, new flight management systems, civil GPS, and a special mission processor. Ongoing Block 8.1 upgrades add improved LOS data link and BLOS comms, improved precision navigational aids, enhanced covert lighting, replace UHF comms with SATCOMS, and update mission planning systems. Block





Yasuo Osakabe/USAF

8.1's Mode 5 IFF and air traffic management upgrades were fielded ahead of cycle to meet airspace requirements and the first full 7/8.1 aircraft was redelivered in late 2020 with 12 slated for upgrade in FY25. C-130Js continue to receive Large Aircraft IR Countermeasures (LAIRCM) upgrades and enhanced service-life center wings to bring pre-2009 aircraft in line with current standards. Major development is focused on Comm Modernization to provide jam-resistant HF/UHF/SATCOM voice and data (MUOS and NATO Saturn) as well as crypto and data links to keep pace with newer satellites and networking starting in FY27. Two former EC-130J Super-Js are undergoing deconversion to standard C-130Js and will be redelivered to Little Rock by late 2027. AFRC successfully tested the Electronic Modular Aerial Spray System (EMASS) on a C-130J in March 2024, paving the way for the J-model to take over the aerial spray mission from the C-130H. The Georgia ANG took delivery of its first C-130J on Jan. 22, 2024, which was the first production aircraft delivered with Block 8.1 software. Eglin's 96th Test Wing received a single deconverted EC-130J July 17, 2024, now giving the C-130J program a dedicated test airframe. ANG units in Connecticut, Montana, Minnesota, and Illinois also plan to upgrade to the Super Hercules.

**Contractor:** Lockheed Martin.

**First Flight:** April 5, 1996.

**Delivered:** February 1999-present.

**IOC:** October 2006.

**Production:** 545 + worldwide (J), 202 (USAF).

**Inventory:** 154.

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

**Aircraft Location:** Dyess AFB, Texas; Keesler AFB, Miss.; Little Rock AFB, Ark.; Ramstein AB, Germany; Yokota AB, Japan; and ANG in California (EMASS), Georgia, Kentucky, Rhode Island, Texas, and West Virginia. Planned: Youngstown ARS, Ohio; ANG in Arkansas, Connecticut, Montana, Minnesota, and Illinois.

**Active Variants:**

- C-130J Super Hercules. Short-fuselage current production version.
- C-130J-30 Super Hercules. Stretched version capable of accommodating larger loads.

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

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

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

**Performance:** Speed 417 mph (J), 410 mph (J-30); range with 35,000 lb payload 1,841 miles (J), 2,417 miles (J-30).

**Ceiling:** With max payload, 26,000 ft (J), 28,000 ft (J-30).

**Accommodation:** Two pilots, loadmaster.

**Load:** Up to 92 combat troops or 64 paratroopers or 74 litters or six cargo pallets or 16 Container Delivery System (CDS) bundles or any combination of these up to max weight (J); 128 combat troops or 92 paratroopers or 97 litters or eight pallets or 24 CDS bundles or any combination of these up to max weight (J-30).

## LC-130H SKIBIRD

Arctic support/tactical airlift

**Brief:** The LC-130H is a ski-equipped, Arctic-support derivative of the C-130H. It is capable of direct resupply of Antarctic research stations and high-Arctic radar sites using ice and snowpack runways. The LC-130H fleet supports the National Science Foundation's (NSF) Antarctic research, ferrying much of the material, provisions, and personnel between Christchurch, New Zealand, and McMurdo Station, Antarctica. The aircraft also provide onward support to the remote Amundsen-Scott South Pole Station. USAF began augmenting the Navy's "Operation Deep Freeze" with the C-124 in 1956. C-130s began Antarctic support in 1959, operating without skis until the initial ski-borne deployment of the C-130D in January 1960.

By 1975, the New York ANG's 109th AW operated USAF's only ski-equipped LC-130 supporting Distant Early Warning sites in the high Arctic. The unit began augmenting Navy LC-130s during Deep Freeze in 1988, before taking over primary responsibility in 1999. Three aircraft were converted from ex-Navy LC-130Rs, and the NSF funded an additional three new-build aircraft in 1995-96. LC-130s have been upgraded with eight-bladed NP-2000 propellers to increase takeoff performance, digital cockpit displays and flight management systems, multifunction radar, modernized comms, and a single air data computer. LC-130s are upgraded along with the baseline C-130H fleet, including Avionics Modernization Program Increment 2 launched in 2022 and center wing box replacement. Required upgrades include NVG-compatible flight deck, secure BLOS data link, increased reliability commercial SATCOM, and self-defensive/missile warning capability. The ANG test-flew an LC-130 with upgraded T56 3.5



Jaclyn Lyons/USAF

engine enhancements for the first time in October 2022. Paired with the NP2000 propellers, the upgrade improves payload, range, high-altitude performance, and reliability. The ANG planned to retrofit all 10 aircraft by early 2024. A total of five LC-130s flew 79 Operation Deep Freeze missions supporting NSF research during the 2024-2025 season. Aircraft carried a total of 1,076 passengers, 900 tons of cargo, and 120,000 gallons of fuel. LC-130s also completed nine medical evacuations from Antarctica and cooperated with Canadian Forces landing on an ice runway during Operation Nanook-Nunavut. Congress is continuing to push USAF to recapitalize the LC-130 with C-130Js, citing increased Russian and Chinese activity in the Arctic and a current mission capable rate below 50 percent.

**Contractor:** Lockheed Martin.

**First Flight:** 1957 (ski-equipped C-130D).

**Delivered:** 1974-96.

**IOC:** Circa October 1984.

**Production:** 10.

**Inventory:** 10.

**Operator:** ANG.

**Aircraft Location:** Stratton ANGB, N.Y.

**Active Variants:**

- LC-130H Skibird. Arctic support variant with wheel-ski gear and eight-bladed propellers.

**Dimensions:** Span 132.6 ft, length 97.8 ft, height 38.8 ft; nose ski 10 ft by 6 ft wide, main gear skis 12 ft by 6 ft wide.

**Weight:** Max T-O 155,000 lb; max payload 45,000 lb.

**Power Plant:** Four Rolls-Royce T56 3.5 turboprops, each 4,591 shp.

**Performance:** Speed 366 mph; range with 35,000 lb payload 1,636 miles (with engine upgrades).

**Ceiling:** With max payload, 23,000 ft.

**Accommodation:** Two pilots, navigator, flight engineer, loadmaster.

**Load:** Up to 92 passengers or 74 litters; six cargo pallets, 16 Container Delivery System (CDS) bundles, or any combination up to max weight.

## VC-25 AIR FORCE ONE

Presidential airlift

**Brief:** The VC-25 is a specially configured Boeing 747-200B equipped for airlifting the President and his entourage. VC-25s operate under the call sign "Air Force One" when the President is aboard, and SAM (Special Air Mission) during nonpresidential flights. Aircraft are equipped with staff work areas, a conference room, a general seating area, and an executive office. Communications capability includes worldwide secure and clear communications and a full suite of strategic C2 comm/data links. The aircraft also have a full self-defensive suite. The fleet is operated by the Presidential Airlift Group of the 89th Airlift Wing at JB Andrews. FY20



Adam Schultz/White House

funded the fleet's final block upgrade, which included MUOS and protected SATCOM, weather radar, digital voice/data comms, and networking. FY25 funds integration of the Multi-Role Tactical Common Data Link to add low-latency satellite teleconferencing and higher-capacity tactical data links on a second aircraft. USAF also plans to upgrade the fleet with the Senior Leader Communication Modernization effort in common with its executive fleets. These aim to keep the VC-25A fleet viable until the next generation VC-25B enters service. Boeing began converting two undelivered commercial 747-8 Intercontinental airframes to VC-25B standards under a \$3.9 billion contract in 2020. VC-25B modification includes adding mission comms, DV interior, self-defensive systems, integral airstairs/ground-level boarding, as well as autonomous baggage handling, a

second auxiliary power unit, and uprated electrical systems. Unlike the current fleet, the VC-25B will not be capable of refueling in-flight as a cost saving measure. Production challenges have delayed the aircraft by three years jeopardizing the VC-25A's congressionally mandated 2025 out-of-service date. Boeing now plans to deliver the first aircraft in 2027, and the second in 2028.

**Contractor:** Boeing.

**First Flight:** Sept. 6, 1990 (VC-25A).

**Delivered:** August-December 1990.

**IOC:** Dec. 8, 1990; planned 2027 (VC-25B).

**Production:** Two VC-25A; two VC-25B (undergoing modification).

**Inventory:** Two (VC-25A).

**Operator:** AMC.

**Aircraft Location:** JB Andrews, Md.

**Active Variants:**

- VC-25A. Specially configured presidential support version of the Boeing 747-200B.

- VC-25B. Next-generation presidential aircraft based on the Boeing 747-8 Intercontinental.

**Dimensions:** Span 195.8 ft, length 231.8 ft, height 63.4 ft (A); span 224.5 ft, length 250.2 ft, height 63.4 ft (B).

**Weight:** Max T-O 833,000 lb (A); max T-O 987,000 lb (B).

**Power Plant:** Four GE Aviation CF6-80C2B1 turbofans, each 56,700 lb thrust (A); four GE Aviation GENx-2B turbofans, each 66,500 lb thrust (B).

**Performance:** Speed 630 mph, range 7,800 miles (farther with air refueling) (A); speed 660 mph, range 8,900 miles (B).

**Ceiling:** 45,100 ft.

**Accommodation:** Two pilots, navigator, flight engineer, up to 22 cabin and maintenance crew; **Load:** Up to 102 passengers (A); TBD (B).



Senior Airman Zachary Rufus

## HH-60 Jolly Green

### HH-60 PAVE HAWK

Personnel recovery/medium lift

**Brief:** The HH-60G Pave Hawk is an armed, all-weather day/night CSAR helicopter derived from the UH-60 Black Hawk. Additional missions include casualty/medical evacuation, disaster and humanitarian response, firefighting, and combat/utility support. The HH-60G is equipped with advanced INS/GPS/Doppler navigation systems, SATCOM, and secure/antijam communications, and personnel locating system (PLS) that aids location of a survivor's radio. It includes automatic flight control, NVG lighting, FLIR, an engine/rotor blade anti-ice system, in-flight refueling probe, additional fuel tanks, and an integral rescue hoist. Combat enhancements include a full self-defensive suite and two miniguns (or .50-caliber guns). Major upgrades include Block 162, which encompasses Avionics Communications Suite Upgrade and replaced obsolete systems with color weather radar, improved TACAN, new RWR, auto direction finding, and digital intercoms. HH-60U are modified UH-60Ms operated by AFMC for testing and support. USAF initially pursued new-build UH-60Ms as loss replacements for the HH-60G, ultimately modifying Army surplus UH-60Ls instead. The first of 21 UH-60L combat loss replacements was delivered in 2016 with the final aircraft entering service in 2022. FY25 launches Degraded Visual Environment (DVE) mods to prevent accidents due to pilot disorientation on landing. USAF plans to fully replace the Pave Hawk fleet with new-build HH-60W by 2026 and began retirements in 2022 cutting 37 airframes in FY24 with plans for 12 more in FY25. Aviano, Kadena, and Kirtland transitioned to the HH-60W ending Active-duty operations. The New York ANG's 106th Rescue Wing likewise converted to the new platform in 2024.

**Contractor:** Lockheed Martin Sikorsky.

**First Flight:** October 1974.

**Delivered:** 1982-1998 (HH-60G).

**IOC:** 1982.

**Production:** 112 (HH-60G); three (HH-60U).

**Inventory:** 27 (HH-60G); three (HH-60U).



Airman 1st Class Catherine Daniel

**Operator:** AFMC (HH-60U), ANG, AFRC.

**Aircraft Location:** Eglin AFB, Fla.; JB Elmendorf-Richardson, Alaska; Moffett Field, Calif.; Patrick SFB, Fla.



#### Active Variants:

- HH-60G. Modified UH-60 helicopter equipped for CSAR.
- HH-60U. Modified UH-60M helicopters utilized by AFMC for utility and test support.

**Dimensions:** Rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft.

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

**Power Plant:** Two GE Aviation T700-GE-700/701C turboshafts, each 1,560-1,940 shp.

**Performance:** Speed 184 mph; range 580 miles (farther with air refueling).

**Ceiling:** 14,000 ft.

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

**Accommodation:** Two pilots, flight engineer, gunner.

**Load:** Up to three PJs and four nonambulatory patients.

### HH-60 JOLLY GREEN II

Personnel recovery/medium lift

**Brief:** The HH-60W is an armed, all-weather day/night CSAR helicopter meant to replace the HH-60G. The type is derived from the UH-60M Black Hawk and dubbed "Jolly Green II" in honor of the Vietnam-era HH-3 and HH-53. Additional missions include casualty/medical evacuation, disaster and humanitarian response, firefighting, and combat/utility support. The HH-60W features a fully digital glass cockpit, improved hot weather/high-altitude performance, onboard self-defenses capable of defeating higher-end threats, increased usable cabin space, and double the internal fuel capacity of the HH-60G. Features include digital RWR, laser/missile/ hostile fire warning, integrated chaff/flares, cabin and cockpit armor, mounted 7.62 mm and .50-cal weapons, LINK 16, SADL, integrated cockpit/cabin displays, advanced comms, ADSB, tactical moving map displays, upturned IR-masking exhausts, and efficient wide-chord rotor blades. USAF awarded Sikorsky Aircraft the \$1.28 billion Combat Rescue Helicopter contract to replace the HH-60G on June 26, 2014. USAF revised its accelerated procurement plan to buy a total of 75 HH-60Ws over five lots (decreased from a planned 113 aircraft) which Congress amended to a total of 85 airframes in FY24, adding a possible two aircraft in FY25. USAF accepted the first production aircraft from Sikorsky on May 18, 2021, FY25 launches the Degraded Visual Environment (DVE) system to prevent disorientation during takeoff and landing as part of the HH-60W's first major capability upgrades. Development includes jam-resistant GPS, MUOS next-generation SATCOMS integration, and software and airspace compliance updates. Distributed Aperture IR Countermeasures (DAIRCM) to counter modern missile threats has suffered delays and is now projected for FY29 or beyond. Future capability enhancements include Video Data Link (VDL), improved Blue Force Tracker, and integrated system diagnostics. The service is also exploring options to merge the platform's various sensor-



Senior Airman Sarah McKernan

related interface to save airframe weight. USAF approved full-rate production and shifted to full operational testing at Nellis. Current tests are validating corrections to identified deficiencies, integrating the .50-cal weapon, and verifying low-visibility hover instrumentation. Aviano, Davis-Monthan, Francis S. Gabreski Arpt., Moffett, and Kadena received their first HH-60Ws in the last year, continuing the phase out of the HH-60G.

**Contractor:** Lockheed Martin Sikorsky.

**First Flight:** May 17, 2019.

**Delivered:** 2019-present.

**IOC:** Sept. 7, 2022.

**Production:** 85 (planned).

**Inventory:** 54 (HH-60W).

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

**Planned:** USAF, ANG, AFRC.

**Aircraft Location:** Aviano AB, Italy; Davis-Monthan AFB, Ariz.; Duke Field, Fla.; Francis S. Gabreski Arpt., N.Y.; Kadena AB, Japan; Kirtland AFB, N.M.;

Moody AFB, Ga. Planned: JB Elmendorf-Richardson, Alaska; Moffett Field, Calif.; Nellis AFB, Nev.; Patrick SFB, Fla.

#### Active Variants:

- HH-60W. Developmental next-generation Combat Rescue Helicopter based on the UH-60M.

**Dimensions:** Rotor diameter 53.6 ft, overall length 64.7 ft, height 16.7 ft.

**Weight:** Max T-O 22,500 lb.

**Power Plant:** Two GE Aviation T700-GE-701D turboshafts, each 1,857 shp.

**Performance:** Speed 176 mph; range 690 miles (air refuelable).

**Ceiling:** 20,000 ft.

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

**Accommodation:** two pilots, flight engineer, gunner, two PJs.

**Load:** TBD.

### MH-139 GREY WOLF

Missile field security/light lift

**Brief:** The MH-139 is based on the Leonardo AW139 and is modified with mission-specific equipment, systems, and armament by prime contractor Boeing. Features include an open-architecture glass cockpit, weather radar, enhanced ground proximity warning, radar altimeter, engine IR signature reduction, and military UHF/SATCOMS. The helicopter also features defensive systems such as chaff/flares and missile warning, cockpit and cabin ballistic protection, and crashworthy, self-sealing fuel tanks. AFGSC aircraft will be optionally armed with cabin-mounted 7.62 mm M240 machine guns. USAF awarded Boeing the \$2.4 billion UH-1N replacement contract on Sept. 24, 2018, following cancellation



Senior Airman Breanna Christopher Volkmar

of the earlier Common Vertical Lift Support Program (CVLSP). Requirements were driven by the MH-139's primary ICBM-field security and support role, but targeted to eventually replace UH-1Ns in the DV lift and aircrew survival training roles as well. Since the commercial AW139 is a mature system, USAF streamlined developmental testing to focus on mission requirements. IOC was initially pegged for 2021 but developmental flight-testing uncovered performance-limiting deficiencies in crosswinds, degraded visual conditions, and austere operating conditions that delayed FAA and subsequent military certification to August 2022. Six helicopters conducted USAF-led developmental testing expanding the flight envelope, validating mission suitability, and developing tactics prior to starting operational testing on Jan. 28, 2025. Development is focused on fixing intercom, machine-gun ammunition feed system, mission-planning, and cabin layout problems. USAF is also working to solve engine debris ingestion issues that have restricted operations from unimproved surfaces, evaluate heavyweight, hot/high-density altitude performance, and validate the effectiveness of the IR self-defense systems. USAF approved low-rate initial production in March 2023, and FY25 request included funds for eight aircraft with a total of 13 slated for delivery this FY. The first production aircraft was delivered to Malmstrom on Aug. 5, 2024, and a decision to ramp up to full-rate production of 15 helicopters annually is expected this year. The service reduced its 84-helicopter buy to 42 due to budget constraints in FY24 before raising the number to 56 to avoid triggering a Pentagon program review. AFGSC's three missile bases and the schoolhouse at Maxwell are unaffected by the change, though Andrews, Fairchild, Kirtland, Duke Field, and Yokota will continue to operate the UH-1N. Malmstrom took delivery of the first operational MH-139 on March 9, 2024, while Maxwell received its first MH-139 on April 3, 2024.

**Contractors:** Boeing (prime contractor); Leonardo (formerly Agusta-Westland) (airframe); Honeywell (avionics).

**First Flight:** 2019.

**Delivered:** August 2022-present; (USAF/contractor-operated test aircraft delivered Dec. 19, 2019).

**IOC:** 2023 (planned).

**Production:** 56 (planned).

**Inventory:** Eight.

**Operator:** AFGSC, AFRC, AETC.

**Aircraft Location:** Duke Field, Fla.; Malmstrom AFB, Mont.; Maxwell AFB,



Ala. Planned: F.E. Warren AFB, Wyo.; Minot AFB, N.D.

**Active Variants:**

•MH-139A. Military version of the Agusta Westland AW139 for utility support and light lift.

**Dimensions:** Rotor diameter 45.2 ft, length 54.7 ft, height 16.3 ft.

**Weight:** Max gross 14,110 lb.

**Power Plant:** Two Pratt & Whitney PT6C-67C turboshaft, each 1,100 shp.

**Performance:** Speed 167 mph, range 890 miles.

**Ceiling:** 20,000 ft.

**Armament:** Two M240 7.62 mm machine guns (mission dependent).

**Accommodation:** Two pilots, flight engineer.

**Load:** 15 passengers (depending on fuel, equipment, and atmospheric conditions) or up to four litters and five medical personnel.

## UH-1 HUEY/IROQUOIS

### Light lift/training

**Brief:** The UH-1N aircraft initially provided search and rescue capabilities before replacing earlier Huey variants in the ICBM field security and support role. UH-1Ns also provide administrative/DV lift to U.S. National Capital Region at JB Andrews and U.S. Forces-Japan at Yokota, as well as supporting aircrew survival training at Fairchild. The TH-1H fleet provides Air Force helicopter pilot training at Fort Novosel (formerly Fort Rucker). USAF converted all single-engine UH-1H models to TH-1H variants, extending their service lives by at least 20 years. USAF awarded Boeing the \$2.4 billion UH-1N replacement contract for up to 84 MH-139s in 2018, but contract delays pushed initial fielding to 2023 or beyond. The fleet is fully upgraded with NVG-compatible cockpits, sensors, and safety and sustainment improvements. The UH-1N is the only DOD aircraft fleet to consistently achieve its target mission capable rate over the past decade. USAF planned to begin retiring the fleet in 2022 with full retirement by 2032, though no airframes have yet been divested. Budget cuts to the MH-139 as well as the UH-1 fleet's significant remaining service life reversed plans to replace Hueys at Andrews, Fairchild, and Yokota, which will continue flying the UH-1N for the foreseeable future. A single UH-1N was lost in a crash during a training sortie at Cheyenne Regional Airport on Aug. 30, 2023.

**Contractors:** Bell Helicopter; Lockheed Martin (TH-1H prime).



2nd Lt. Rebecca Abordo

**First Flight:** April 1969 (UH-1N).

**Delivered:** September 1970-1974; November 2005-2013 (TH-1H).

**IOC:** October 1970 (UH-1N); circa 2009 (TH-1H).

**Production:** 28 (TH-1H); 79 (USAF UH-1Ns).

**Inventory:** 28 (TH-1H); 63 (UH-1N).

**Operator:** AETC, Air Force District of Washington, AFGSC, AFMC, PACAF.  
**Aircraft Location:** Eglin AFB, Fla.; Fairchild AFB, Wash.; F. E. Warren AFB, Wyo.; Fort Novosel, Ala.; JB Andrews, Md.; Kirtland AFB, N.M.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Yokota AB, Japan.

**Active Variants:**

•TH-1H. Modified single-engine version of UH-1H used for flight training.

•UH-1N. Military version of the Bell 212 used for utility support and light lift.

**Dimensions:** Rotor diameter 48 ft, length 57 ft, height 13 ft (TH-1H); rotor diameter 48 ft, length 57.1 ft, height 12.8 ft. (UH-1N).

**Weight:** Max gross 10,500 lb.

**Power Plant:** One Honeywell T53-L-703 turboshaft, 1,800 shp (TH-1H); two Pratt & Whitney Canada T400-CP-400 turboshafts, 1,290 shp (UH-1N).

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

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

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

**Accommodation:** Two pilots, flight engineer.

**Load:** Six to 13 passengers (depending on fuel, equipment, and atmospheric conditions) or up to six litters or, without seats, bulky, oversize cargo (UH-1N).

## TRAINER AIRCRAFT



Richard Gonzales/USAF

## A-29 SUPER TUCANO

### Light attack

**Brief:** The A-29 Super Tucano is a turboprop light attack/armed reconnaissance aircraft designed by Embraer in Brazil and built under license by Sierra Nevada Corp. The A-29 was a contender for the Air Force's Light Attack/Armed Reconnaissance (LAAR) as well as the 2017 Light Attack

Experiment (OA-X) that evaluated off-the-shelf CAS/ISR platforms for low-cost counterinsurgency operations. The A-29 ultimately lost out to the OA-1K Skyraider II, which will replace the AFSOC-operated U-28A fleet. AETC also operated the A-29 to train Afghan and Nigerian Air Force pilots through 2021. Three aircraft were delivered to AFSOC at Hurlburt in early 2021. The aircraft were then transferred to the Air Force Test Pilot School (AFTPS) at Edwards on Aug. 18, 2024, due to changing mission

requirements. The Super Tucanos will provide avionics, weapons, sensors, and external stores capability to the AFTPS curriculum and also provide students with a novel, modern airframe for evaluation training.

**Contractor:** Sierra Nevada Corp.

**First Flight:** June 2, 1999.

**Delivered:** Feb. 23, 2021-March 31, 2021.

**IOC:** N/A.

**Production:** Three.

**Inventory:** Three.

**Operator:** AFMC.

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

**Active Variants:**

•A-29 Super Tucano. License-built version of the Embraer EMB-314 light attack aircraft.

**Dimensions:** Span 36.5 ft, length 37.3 ft, height 13 ft.

**Weight:** Max T-O 11,905 lb.

**Power Plant:** One Pratt & Whitney Canada PT6A-68C turboprop, 1,604 shp.

**Performance:** Speed 368 mph, range 1,900 miles (with wing-mounted external tanks).

**Ceiling:** 35,000 ft.

**Armament:** Two internal wing-mounted .50-caliber machine guns (200 rd each), up to 3,714 lb of external weapons on four wing and one centerline station.

**Accommodation:** Two aircrew on Martin Baker MK10 zero/zero ejection seats.

## T-1 JAYHAWK

Advanced trainer

**Brief:** The T-1A is a military version of the Beechcraft 400A business jet used in the advanced phase of JSUPT for tanker/transport pilot and CSO training pipelines. The cockpit seats an instructor and two students. Militarization includes UHF/VHF radios, INS, TACAN, airborne direction finder, increased bird-strike resistance, and an additional fuselage fuel tank. CSO training aircraft also incorporate GPS-driven synthetic aperture radar (SAR) and simulated RWR, as well as a second student and instructor station. Upgrade efforts are focused on avionics modernization and include new MFD and terrain collision avoidance systems. The Avionics Modernization Program (AMP), completed in 2023, replaced the flight deck with a commercial glass cockpit.



Sean Worrell/USAF

A total of 73 aircraft, including all CSO-training airframes, were completed prior to USAF beginning fleet drawdown in FY23. Congress barred AETC from retiring an additional 52 aircraft in FY24 until it fully implemented a revamped Undergraduate Pilot Training road map completed in April 2024. AETC reversed plans to retain the 22 CSO-configured trainers at Pensacola and will instead rely on simulators to conduct future CSO and mobility pilot qualifications. The final T-1A departed JBSA Randolph on July 15, 2024, followed by Laughlin on Dec. 17. Pensacola began shedding aircraft in February 2025. AETC plans to divest 22 airframes this year prior to completing retirement in FY26.

**Contractors:** Beechcraft (airframe); Field Aerospace/Collins Aerospace (AMP).

**Operator:** AETC.

**First Flight:** July 5, 1991.

**Delivered:** Jan. 17, 1992-July 1997.

**IOC:** January 1993.

**Production:** 180.

**Inventory:** 86.

**Aircraft Location:** Columbus AFB, Miss.; Vance AFB, Okla.; NAS Pensacola, Fla.

**Active Variant:**

•T-1A. Military trainer version of Beechcraft 400A.

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

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

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

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

**Ceiling:** 41,000 ft.

**Accommodation:** Three pilots (two students side-by-side, instructor in jump-seat); one pilot, one CSO trainee side-by-side, instructor in jump-seat, one radar/system student and one instructor at aft-consoles (CSO-training configured aircraft).

## T-6 TEXAN II

Primary trainer

**Brief:** The T-6 is a joint Air Force/Navy undergraduate pilot trainer developed under the Joint Primary Aircraft Training System program. The aircraft is based on the Swiss-designed Pilatus PC-9, and the Navy version is designated T-6B. Mods include a strengthened fuselage, zero/zero ejection seats, upgraded engine, increased fuel capacity, pressurized cockpit, bird-resistant canopy, and digital avionics with sunlight-readable LCDs. The tandem student and instructor positions are interchangeable,



USAF

including single-pilot operation from either seat. The T-6 is fully aerobatic and features an anti-G system. Ongoing mods include a crash-survivable flight data recorder, and updated training aids. The fleet completed Next-Generation Onboard Oxygen Generation System (OBOGS) upgrades in 2024. Improved maintenance and inspections resulted in an 82 percent reduction in hypoxia-type incidents in the interim and upgrades aim to eliminate aircrew oxygen problems from the fleet. FY25 will launch the delayed Avionics Replacement Program (ARP) to replace the T-6A's aging HUD cockpit displays and interface, integrate simulated air-to-air/air-to-ground weapons and EW, and modernize debriefing aids. Future development includes controlled flight-into-terrain-avoidance systems. A single T-6A made a gear-up landing at JBSA Randolph on April 3, 2024, following an inflight emergency. The Vietnam Air Defense Air Force received its first three T-6Cs on Nov. 20, 2024, as part of a landmark Foreign Military Sale of 12 aircraft. The delivery marked the first U.S. aircraft delivery since the end of the Vietnam conflict, buttressing regional partnership capacity to confront growing regional threats.

**Contractor:** Beechcraft/Textron Aviation Defense (formerly Raytheon).

**First Flight:** July 15, 1998.

**Delivered:** May 2000-May 2010.

**IOC:** May 2000.

**Production:** 452 (USAF); 328 (USN).

**Inventory:** 442 (USAF).

**Operator:** AETC, USN.

**Aircraft Location:** USAF: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, and Sheppard AFB, Texas; Vance AFB, Okla.; NAS Pensacola, Fla.

**Active Variants:**

•T-6A. Joint service primary training aircraft, based on the Pilatus PC-9.

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

**Weight:** Max T-O 8,300 lb (T-6).

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

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

**Ceiling:** 31,000 ft.

**Accommodation:** Two pilots on Martin Baker MK16LA zero/zero ejection seats.



## T-7A RED HAWK

Advanced trainer

**Brief:** The T-7A Red Hawk is the Air Force's developmental next-generation, supersonic advanced jet trainer. The service selected the joint-venture Boeing-SAAB aircraft as the winner of its \$9.2 billion "T-X" competition to replace the T-38 on Sept. 20, 2018. The Air Force dubbed the type "Red Hawk" in honor of the WWII Tuskegee Airmen. The T-7A was developed in fewer than three years using digital design techniques to quickly field new, low-cost designs. The aircraft was designed from the outset to replicate the systems and performance of advanced fourth- and fifth-generation aircraft including high-G/high angle of attack performance and a blend of synthetic and onboard systems, including simulated radar, defensive systems, data links, and smart weapons. It incorporates fly-by-wire controls, a fully digital glass cockpit, "stadium seating" to improve backseat visibility, next-gen ACES 5 ejection seats, modular systems architecture, and maintainer-friendly design to cut downtime and life-cycle cost. T-7A is being developed in tandem with the Ground-Based Training System simulator and courseware to provide AETC with a seamless, comprehensive flight training program. The first of two "production ready" airframes flew from Boeing's facility at St. Louis on Dec. 21, 2016, launching initial flight-testing with the manufacturer. Boeing delivered the first of five production-representative aircraft to Edwards on Nov. 9, 2023, launching USAF and Boeing developmental flight-testing. Two aircraft are conducting flight-envelope expansion at Edwards and a third completed extreme weather-testing at Eglin in 2024 prior to supporting systems testing. Instability at high angles of attack discovered in early trials as well as concerns with ejection seat performance and supply chain issues have delayed testing. A decision to begin low-rate production was likewise delayed a year to 2025 and



Joshua McClanahan/USAF

initial operational capability was postponed from 2024 to 2028 or later. USAF recently reduced its planned procurement from 351 aircraft to an initial 346 with the first production T-7A and simulators slated for delivery to Randolph in 2025.

**Contractors:** Boeing-SAAB; General Electric (engine); Collins Aerospace (cockpit/ejection seats).

**First Flight:** Dec. 20, 2016 (T-X).

**Delivered:** 2023 onward (planned).

**IOC:** 2028 (planned).

**Production:** 351 (planned).

**Inventory:** Six (contractor-owned test airframes).

**Operator:** AETC; Planned: AFMC.

**Aircraft Location:** Edwards AFB, Calif.; Eglin AFB, Fla. Planned: Columbus AFB, Miss.; Laughlin AFB, JBSA-Randolph, and Sheppard AFB, Texas; Vance AFB, Okla.

**Active Variants:**

•T-7A. Developmental next-generation advanced trainer.

**Dimensions:** Span 30.6 ft, length 46.9 ft, height 13.5 ft.

**Weight:** Max T-O 12,125 lb.

**Power Plant:** General Electric F404-GE-103 augmented turbofan, 17,200 lb thrust.

**Performance:** Speed Mach 1+, range approx. 1,140 miles.

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

**Accommodation:** Two pilots on ACES 5 zero/zero ejection seats.

## T-38 TALON

Advanced trainer

**Brief:** The T-38 was the first supersonic trainer aircraft and primarily serves AETC's advanced JSUPT fighter/bomber tracks and Introduction to Fighter Fundamentals. The aircraft is used to teach supersonic techniques, aerobatics, formation, night and instrument flying, and cross-country/low-level navigation. The T-38 is also used by the USAF Test Pilot School to train test pilots and flight-test engineers and by ACC and AFGSC as a



Jet Fabara/USAF

companion trainer to maintain pilot proficiency. ACC uses regenerated T-38s as dedicated Aggressor aircraft for F-22 training and companion trainers for the B-2 and U-2 programs. T-38Bs are equipped with a gunsight and centerline station for mounting external stores including ECM pod/practice bomb dispensers. Aircraft were redesignated T-38Cs after avionics modernization that added a glass cockpit and HUD, color MFDs, mission computer, integrated INS/GPS, and reshaped engine inlets. T-38s were designed for 7,000 flying hours but many have surpassed 20,000 hours, requiring life-extension to bridge the gap to replacement by the T-7A. Pacer Classic III is the type's third structural renewal effort and the most intensive in its history, replacing major longerons, bulkheads/formers, intakes, internal skins, and structural floors on 180 high-risk T-38Cs. The concurrent Talon Repair Inspection and Maintenance (TRIM) program addresses similar issues across the T-38A and T-38B fleets as well as T-38Cs lacking Pacer Classic III mods through 2029. The first Pacer Classic III airframe was redelivered in 2015 and a total of 18 aircraft will undergo rework in FY25, while TRIM (Talon repair, inspection, and maintenance), launched in 2023 will redeliver 19 aircraft this year. Future upgrades focus on cockpit modernization, including the Terminal Avionics Replacement Program (TARP) and Low-cost Avionics Modification Program (LAMP). TARP replaces obsolete HUD components and cockpit displays, while LAMP modernizes inertial navigation and instrument landing systems to prevent spatial disorientation. Delays to the T-7A program have strained the fleet which suffers a shortage of overhauled engines due to parts obsolescence, dragging mission capable rates as low as 58 percent and continuing to delay pilot training.

**Contractors:** Northrop Grumman; Boeing (sustainment); CPI Aerostructures (Pacer Classic III kits).

**First Flight:** April 1959 (T-38A); July 8, 1998 (T-38C).

**Delivered:** 1961-72 (T-38A); 2002-07 (T-38C).

**IOC:** March 1961.

**Production:** 1,187.

**Inventory:** 52 (T-38A); six (AT-38B); 437 (T-38C).

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

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

**Active Variants:**

•T-38A. Upgraded version with Pacer Classic I and II mods.

•AT-38B. Armed weapons training version.

•T-38C. Modernized airframes incorporating glass cockpits and upgraded engines.

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

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

**Power Plant:** Two General Electric J85-GE-5 augmented turbojets, each 2,900 lb thrust.

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

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

**Accommodation:** Two pilots on Martin Baker US16T zero/zero ejection seats.



# EXPERIMENTAL AND TEST VEHICLES



USAF

## X-37B ORBITAL TEST VEHICLE

Orbital test

**Brief:** X-37B is an unmanned experimental Orbital Test Vehicle (OTV) aimed at developing and maturing a reusable space-launch capability and conducting classified, extended, on-orbit missions/experiments and/or launching small satellites. NASA began the X-37 program in 1999, with the intention of building two demonstrators to validate technologies for both launch/on-orbit flight, and reentry/landing. Only the Approach and Landing Test Vehicle (ALTV) was built before NASA handed over the program to DARPA, which completed ALTV captive-carry/drop testing with the subscale X-40A in 2006. The X-37B is based on NASA's notional OTV and is boosted into low-Earth orbit atop a standard Atlas V or SpaceX Falcon 9 launch vehicle for long-endurance space missions. The craft has an internal payload bay similar to the space shuttle orbiter's and can deploy satellites or conduct on-orbit experimentation. The vehicle autonomously reenters the atmosphere upon command from a ground control station (GCS), and it lands conventionally on the runway. Development includes advanced guidance, navigation and controls, avionics, thermal-resistant materials, propulsion, and autonomous control systems. The program's two test vehicles have successfully completed six orbital missions. The first mission (OTV-1) launched in 2010 and remained on orbit 224 days. The OTV-2 and OTV-3 missions launched in 2011 and 2012, and remained on orbit 468 days and 674 days, respectively. The OTV-4 mission remained aloft for 718 days and landed at Cape Canaveral for the first time on March 25, 2017. The OTV-5 mission marked the type's first launch atop a SpaceX Falcon 9 on Sept. 7, 2017, setting a record of 780 days on orbit, returning to Earth on Oct. 27, 2019. USSF launched its inaugural X-37B mission, OTV-6 (USSF-7), on May 17, 2020, which surpassed all previous flights, logging 908 days on orbit before landing at Kennedy Space Center on Nov. 12, 2022. OTV-6 was equipped with an aft-mounted service module enabling it to carry a larger research payload. The craft successfully deployed the U.S. Air Force Academy's experimental Falcon SAT-8 as well as conducted a demonstration converting solar to RF microwave energy and transmitting it back to Earth. OTV-7 was carried aloft by a Falcon Heavy rocket for the first time Dec. 28, 2023, from Cape Canaveral, potentially targeting higher geosynchronous orbit. The launch closely followed deployment of a Chinese space plane dubbed "Shenlong." OTV-7 demonstrated a fuel-efficient "aerobraking" maneuver to change orbits prior to landing at Vandenberg on March 7, 2025.

**Contractor:** Boeing.

**Operator:** USSF SPoC, Space Delta 9 Detachment 1, (DEL 9 Det. 1).

**First Launch:** April 22, 2010.

**IOC:** N/A.

**Launch Vehicle:** Atlas V, Falcon 9, Falcon Heavy.

**Production:** Two.

**Inventory:** Two.

**Operational Location:** Cape Canaveral SFS, Fla. (launch/landing); Vandenberg SFB, Calif., Kennedy Space Center, Fla. (landing).

**Active Variant:**

•X-37B. DARPA/USAF-developed Orbital Test Vehicles.

**Dimensions:** Span 14ft, length 29.25 ft (without service module), height 9.5 ft.

**Weight:** 11,000 lb at launch.

**Propulsion:** Single liquid-propellant rocket motor.

**Endurance:** 908+ days on orbit.

**Orbit Altitude:** Low-Earth orbit (LEO) at 110-500 miles.

**Power:** Gallium arsenide solar cells with lithium-ion batteries.

## X-62 VARIABLE-STABILITY IN-FLIGHT TEST AIRCRAFT

In-flight simulator

**Brief:** The X-62 Variable-stability In-flight Simulator Test Aircraft (VISTA) is a highly modified F-16D Block 30 capable of replicating the flight characteristics of a wide array of aircraft. VISTA was initially modified to support the Multi-Axis Thrust-Vectoring (MATV) program that tested the combat potential of high-angle-of-attack maneuvers starting in July 1993. VISTA completed 95 test flights with the Axisymmetric Vectoring Exhaust Nozzle (AVEN) and



Kyle Brasier/USAF

General Electric F110-GE-100 engine before the program terminated in 1994. The aircraft subsequently became a mainstay of the USAF Test Pilot School, training test pilots and flight-test engineers to evaluate unstable or unpredictable aircraft with relative safety. The VISTA aircraft more recently aided in the development and testing of Automatic Integrated Collision Avoidance Systems (ICAS), enhancing the safety of the F-16 and other fighter fleets. Originally designated NF-16D, the aircraft was equipped with the VISTA Simulation System (VSS) which could generate differing flight dynamics for the pilot linked to a second control stick in the cockpit. VISTA incorporates an enlarged dorsal spine for additional equipment as well as a drag chute in common with some export variants of the F-16. It was redesignated X-62 in 2021 as part of a radical modernization that included upgrading VSS and integrating the new System for Autonomous Control of Simulation (SACS) and Model Following Algorithm (MFA). SACS permits the aircraft to be remotely controlled from the ground or operated via reprogrammable synthetic artificial intelligence (AI), though with a safety pilot onboard. Open-architecture upgrades permit rapid reprogramming of various AI or control dynamics to replicate a

broader variety of aircraft including uncrewed platforms. X-62 became the first supersonic aircraft to fly under AI control in December 2022 completing a series of 21 flights before advancing to dogfight scenarios that built from defensive to offensive, eventually countering conventional, manned fighters. The Air Force Research Laboratory is employing X-62 as a surrogate to test software for the Skyborg paired, autonomous aircraft program. Algorithms flown on the X-62 enabled an unmanned XQ-58A Valkyrie to successfully fly via synthetic AI control. USAF is also modifying six F-16s with autonomous flight controls under the separate Viper Experimentation and Next-gen Operations Model-Autonomy Flying Testbed program (VENOM-AFT), which is likewise developing Collaborative Combat Aircraft (CCA) concepts. The X-62 is operated in partnership with Calspan Aviation and continues to support the Air Force Test Pilot School syllabus in addition to test work.

**Contractors:** Lockheed Martin; Calspan Aviation (VISTA VSS).

**First Flight:** April 1992 (NF-16D VISTA).

**Delivered:** January 1995.

**IOC:** 1992.

**Production:** One.

**Inventory:** One.

**Operator:** AFMC (AFRL, AFTPS).

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

**Active Variants:**

•X-62A. Highly modified F-16D Variable stability In-Flight Simulator Aircraft (VISTA).

**Dimensions:** Span 32.8 ft, length 49.3 ft, height 16.7 ft.

**Weight:** Max T-O 42,300 lb.

**Power Plant:** F100-PW-229 augmented turbofan, 29,000 lb thrust.

**Performance:** Speed Mach 2+, range 3,200 miles.

**Ceiling:** 50,000 ft.

**Accommodation:** Two pilots on ACES II zero/zero ejection seats; remote or AI algorithm control (with safety pilot).

## UNCREWED AIRCRAFT SYSTEMS



Senior Airman Dylan McCrink/ANG

An MQ-9 Reaper assigned to the 174th Attack Wing flies over Syracuse, N.Y., during a routine training flight in 2024. The 108th Field Training Unit conducts these flights to instruct pilots and sensor operators on proper flight operations of the aircraft.

### BQMS-167 SUBSCALE AERIAL TARGET

Full-scale aerial target

**Brief:** BQM-167A is a subscale, unmanned aerial target and threat simulator serving missile/weapons development, testing, validation, and training over the Eglin Test and Training Range. The 82nd Aerial Targets Squadron employs the cheaper subscale targets to complement its QF-16 full scale aerial target fleet operating from Tyndall. The BQM-167 is boosted to flying speed from a launch rail via a solid-fuel Rocket-Assisted Take



Sara Vidoni/USAF

Off (RATO) motor that is then jettisoned. BQM-167 is capable of representing air targets maneuvering at up to 9 Gs at speeds up to Mach 0.91 and altitudes between 50 and 50,000 feet. The drone is constructed of durable, lightweight composites, equipped with a recovery parachute, and depending on its condition capable of being refurbished and reused. BQM-167s incorporate a scoring system and a range of threat-simulating

systems/stores, including IFF, EA pods, IR/radar countermeasures as well as IR/radar signature augmentation to simulate a variety of threats. The Air Force competitively awarded the first BQM-167 production contract in 2002 and most recently awarded a \$338 million contract for Lot 17 through 21 covering 79 targets in September 2021. FY25 funds support production of 20 subscale targets.

**Contractor:** Kratos Unmanned Aerial Systems.

**First Flight:** Dec. 8, 2004.

**Delivered:** 2004-present.

**IOC:** 2008.

**Production:** 800+ (planned).

**Inventory:** Approx. 37.

**Operator:** ACC.

**Aircraft Location:** Tyndall AFB, Fla.

**Active Variants:**

•BQM-167A. Subscale aerial target.

**Dimensions:** Span 10.5 ft, length 20 ft, height 4 ft.

**Weight:** Max T-O 2,050 lb.

**Power Plant:** MicroTurbo (Safran) Tri 60-5 turbofan, 1,000 lb thrust.

**Performance:** Speed Mach 0.91, range unknown.

**Ceiling:** 50,000 ft.

**Defensive Systems:** Chaff/flares, EA pods, IR/RF wing pods (augmentation).

**Accommodation:** Preprogrammed, unmanned.

### MQ-9 REAPER

Attack/armed reconnaissance

**Brief:** The MQ-9B is a medium-to high-altitude, long-endurance hunter-killer RPA, primarily tasked with eliminating time-critical and high-value targets in permissive environments. Additional roles include CAS, CSAR, precision strike, armed overwatch, target development/designation, and terminal weapon guidance. The MQ-9 fulfills a secondary tactical ISR role utilizing its Multispectral Targeting System-B (MTS-B), upgraded Lynx





Airman 1st Class Victoria Nuzzi

## QF-16 FULL-SCALE AERIAL TARGET

Full-scale aerial target

**Brief:** QF-16 is a manned/unmanned aerial target and threat simulator serving missile/weapons development, testing, validation, and training. QF-16s replaced the QF-4 Full-Scale Aerial Target (FSAT) from 2015 through the type's final retirement in 2017. QF-16s are capable of manned or "not under live local operator" (NULLO) control operations. The first of 13 LRIP QF-16s was delivered to Tyndall in early 2015, and Boeing is under contract to deliver converted airframes in six production lots through April 2025. Recent upgrades include EA pod and software modernization to more accurately replicate adversary capabilities and tactics, ground-control modernization, and threat realism/countermeasure improvements. USAF is seeking a follow-on supersonic Next Generation Aerial Target (NGAT) to better replicate advanced adversary platforms' performance, radar, IR, and system signatures. The service transitioned the QF-16 program from procurement to fleet sustainment this year and is soliciting industry to extend operations for up to 90 QF-16s through at least 2035 due to the lack of a suitable replacement.



Airman 1st Class Emily Kenney

SAR, and/or Gorgon Stare wide-area surveillance. MTS-B integrates EO/IR, color/monochrome daylight TV, image-intensified TV, and a laser designator/illuminator. MTS-B provides FMV as separate video streams or fused together. The MQ-9 employs SAR for JDAM targeting and dismounted target tracking. A Reaper system comprises three aircraft, upgraded Block 30 GCS, LOS/BLOS satellite and terrestrial data links, support equipment/personnel, and crews for deployed 24-hour operations. MQ-9B debuted in combat in Afghanistan in 2007. Extended Range (ER) mods added external fuel tanks, a four-bladed propeller, engine alcohol/water injection, heavyweight landing gear, longer wings and tail surfaces, and other enhancements in 2023. The latest Multi-Domain Operations (M2DO) configuration transitions the MQ-9 from counterinsurgency to future roles in or near contested airspace. The M2DO flew for the first time in 2022, and retrofits are slated for fleetwide completion by FY26. M2DO adds enhanced data link and control robustness, plug-and-play system integration, and double the power to integrate future advanced sensors, systems, and algorithms. Other enhancements include antijam GPS, Link 16, internet-protocol and modular mission system architecture, enhanced C2 resiliency, and greater flight autonomy/automation. The System Lifecycle Agile Modernization (SLAM) program will continuously upgrade the MQ-9 for emerging threats. Reapers have recently demonstrated maritime support, C2, and ISR roles flying from forward operating locations in the Pacific. Efforts including the Automatic Takeoff and Land Capability (ATLC) and single operator control of up to three MQ-9s now allow it to operate from airfields worldwide without a line-of-sight ground station, vastly increasing its utility for Agile Combat Employment. USAF retired all Block 1s and is divesting the highest-time Block 5 airframes through 2027, including six passed to the USMC. Plans call for retaining 140 Reapers through 2035, and USAF expects delivery of its final MQ-9 in 2025. At least three MQ-9s were lost in combat against Houthi rebels attacking shipping in the Red Sea in 2024, and a fourth was mistakenly shot down by U.S.-backed Kurdish fighters in Syria.

**Contractors:** General Atomics Aeronautical Systems; L3Harris; Raytheon (sensors).

**First Flight:** February 2001.

**Delivered:** November 2003-present.

**IOC:** October 2007; 2015 (ER).

**Production:** 338.

**Inventory:** 230.

**Operator:** ACC, AFMC, AFRC (associate), AFSOC, ANG.

**Aircraft Location:** Cannon AFB, N.M.; Creech AFB, Nev.; Eglin AFB, Fla.; Ellington Field, Texas; Fort Drum, N.Y.; Fort Huachuca, Ariz.; Hancock Field, N.Y.; Hector Arpt., N.D.; Holloman AFB, N.M.; March ARB, Calif.; Nellis AFB, Nev.; Whiteman AFB, Mo., and deployed locations worldwide.

GCS Location: Cannon AFB, N.M.; Creech AFB, Nev.; Battle Creek ANGB, Mich.; Davis-Monthan AFB, Ariz.; Des Moines Arpt., Iowa; Ellington Field, Texas; Ellsworth AFB, S.D.; Fort Smith Arpt., Ark.; Hancock Field, N.Y.; Hector Arpt., N.D.; Holloman AFB, N.M.; Horsham AGS, Pa.; Hurlburt Field, Fla.; March ARB, Calif.; Niagara Falls Arpt., N.Y.; Shaw AFB, S.C.; Springfield-Beckley Arpt., Ohio.; Whiteman AFB, Mo.

**Active Variants:**

•MQ-9B Reaper Block 5. Improved, current production Reaper, incorporating extended-range fuel tanks, longer wings, and other enhancements.

**Dimensions:** Span 79 ft, length 36 ft, height 12.5 ft.

**Weight:** Max T-O 10,500 lb.

**Power Plant:** One Honeywell TPE331-10GD turboprop, max 900 shp.

**Performance:** Cruise speed 230 mph, range 1,150+ miles, endurance 34 hr.

**Ceiling:** 50,000 ft.

**Armament:** Combination of AGM-114 Hellfire (up to eight), GBU-12/49 Paveway II, and GBU-38 JDAMs.

**Accommodation:** Pilot, sensor operator (operating from GCS).

**Contractors:** Lockheed Martin; Boeing (drone conversion).

**First Flight:** May 4, 2012.

**Delivered:** February 2015-present.

**IOC:** Sept. 23, 2016.

**Production:** 134 (planned).

**Inventory:** 11 (QF-16A); 62 (QF-16C).

**Operator:** ACC.

**Aircraft Location:** Holloman AFB, N.M.; Tyndall AFB, Fla.

**Active Variants:**

•QF-16A. Converted from retired F-16A Block 15.

•QF-16C. Converted from retired F-16C Block 25 and Block 30.

**Dimensions:** Span 32.8 ft, length 49.3 ft, height 16.7 ft.

**Weight:** Max T-O 37,500 lb.

**Power Plant:** Pratt & Whitney F100-PW-200 augmented turbofan, 23,830 lb thrust (Block 15); Pratt & Whitney F100-PW-220 augmented turbofan, 23,830 lb thrust (Block 25); GE Aviation F110-GE-100 augmented turbofan, 29,000 lb thrust (Block 30).

**Performance:** Speed Mach 2, ferry range 2,000+ miles.

**Ceiling:** 50,000 ft.

**Defensive systems/stores:** Chaff/flares; EA pods: ALQ-188, ALQ-167; Towed Aerial Target Gunnery System.

**Accommodation:** Safety pilot (optional) on ACES II zero/zero ejection seat.

## RQ-4 GLOBAL HAWK

High-altitude reconnaissance

**Brief:** The Global Hawk is a strategic, long-endurance, high-altitude "deep look" ISR platform complementing satellite and manned ISR. The system consists of the aircraft and sensors, launch and recovery element (LRE), mission control element (MCE), and comms/mission planning cell. The preproduction Block 10 debuted in combat in 2001 and retired in 2011. The follow-on Block 20 was initially equipped with the Enhanced Integrated Sensor Suite (EISS) for imagery intelligence (IMINT) and five were eventually converted as EQ-4B Battlefield Airborne Communications Node (BACN) relays, retired in 2021. The most numerous Block 30 was a multi-intelligence fleet equipped with EO/IR, SAR, and SIGINT sensors retired in 2022 and subsequently converted to telemetry platforms to support hypersonic weapons testing. Block 40 is the sole remaining variant and is equipped with the Multiplatform Radar Technology Insertion Program





Bryce Bennett/USAF

(MP-RTIP) sensor for ground-moving target surveillance. Its AESA and SAR simultaneously conduct moving target and cruise missile tracking, as well as stationary imagery collection. NATO also operates a pooled fleet of RQ-4Ds based on the Block 40, which declared initial operating capability with the Allied Ground Surveillance fleet in 2021. FY25 funds support Block 40 and Ground Station sustainment through planned retirement in 2027. RQ-4s deployed to Fairford for the first time on Aug. 22, 2024, operating alongside U-2s supporting operations in the EUCOM area of operations, in addition to testing concepts for Arctic surveillance.

**Contractors:** Northrop Grumman; Raytheon; L3Harris.

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

**Delivered:** August 2003-circa April 2017.

**IOC:** August 2011 (Block 30); August 2016 (Block 40).

**Production:** 45 (USAF).

**Inventory:** Nine (Block 40).

**Operator:** ACC.

**Aircraft Location:** Grand Forks AFB, N.D. (Block 40); forward operating locations: Andersen AFB, Guam; NAS Sigonella, Italy; RAF Fairford, U.K.; Yokota AB, Japan.

**Active Variants:**

•RQ-4B Block 40. AESA and SAR equipped ground-moving target indication (GMTI) and battlefield ISR platform.

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

**Weight:** Max T-O 32,250 lb; max payload 3,000 lb.

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

**Performance:** Speed 356.5 mph, range 14,150 miles, endurance 32+ hrs

(24 hrs on-station loiter at 1,200 miles).

**Ceiling:** 60,000 ft.

**Accommodation:** LRE Pilot, MCE pilot, MCE sensor operator (operating from LRE/MCE) and/or maintainer at four workstations (in GSMP-upgraded ground segments).

## RQ-170 SENTINEL

Unmanned surveillance and reconnaissance

**Brief:** RQ-170 is an unmanned, stealthy, penetrating, day/night tactical ISR platform. Although the RQ-170 was still under development and testing, USAF employed it in Southwest Asia during Enduring Freedom. The RPA was developed in response to DOD's call for additional RPA support for combatant commanders. USAF publicly acknowledged the aircraft after photos appeared in foreign news media of operations over Afghanistan in 2009. The type is operated by the 432nd Wing at Creech and the 30th Reconnaissance Squadron at Tonopah Test Range. In 2011, an RQ-170 was captured almost intact by Iranian forces. Iran allegedly reverse-engineered a copy of the aircraft, which the Israeli Air Force reported shooting down during an engagement inside Israeli territory on Feb. 10, 2018. The RQ-170 took part in a joint exercise at Nellis in August 2020, testing its ability to accompany a B-2 on penetrating operations aided by SEAD F-35s.



USAF

**Contractor:** Lockheed Martin.

**Operator:** ACC.

**GCS Location:** Creech AFB, Nev.; Tonopah Test Range, Nev.

**Aircraft Location:** Tonopah Test Range, Nev.; deployed worldwide.

**Known Active Variant:**

•RQ-170. No data available.

**Dimensions:** Span 65.6 ft, length 14.75 ft.



Airman 1st Class Kyle Wilson

## AGM-86 AIR-LAUNCHED CRUISE MISSILE (ALCM)

Strategic air-to-surface cruise missile

**Brief:** The AGM-86 is a low-level, penetrating nuclear strike weapon for use against strategic surface targets. ALCM's small radar signature and low-level flight capability enhance the missile's effectiveness. The nuclear AGM-86B was the first production version with a total of 1,715 delivered through 1986. USAF plans to cut the inventory to an eventual 528 ALCM. Some ALCMs were modified for conventional use with INS/GPS guidance

and a blast fragmentation warhead and redelivered in 1987 as the AGM-86C CALCM and were operationally employed for the first time in Desert Storm and widely used in subsequent operations. CALCM was capable of adverse weather, day/night, air-to-surface, accurate, standoff strike at ranges greater than 500 miles. The AGM-86D was CALCM's Block II penetrator version with AUP-3(M) warhead used for standoff strikes on hardened, deeply buried targets in Afghanistan. CALCM was retired in early 2019 and the remaining AGM-186C/D were sent to Barksdale for storage awaiting disposal. ALCM is undergoing SLEP/component remanufacture to stretch its service life to 2030, pending replacement by the Long-Range

Standoff (LRSO) missile. USAF awarded technology-maturation and risk-reduction contracts for the LRSO in 2017, resulting in the selection and continued development of Raytheon's AGM-181 Long-Range Standoff Weapon in April 2020. Plans call for fielding the nuclear AGM-181 by the late 2020s, possibly followed by a conventional derivative thereafter.

**Contractor:** Boeing.  
**First Flight:** June 1979 (full-scale development).  
**Delivered:** 1981-1986.  
**IOC:** December 1982 (B); January 1991 (C); November 2001 (D).  
**Production:** 1,715.  
**Inventory:** Approx. 536 (B).  
**Operator:** AFGSC.  
**Unit Location:** Barksdale AFB, La.; Minot AFB, N.D.  
**Active Variants:**  
•AGM-86B. Nuclear ALCM variant.  
**Dimensions:** Span 12 ft, length 20.8 ft, body diameter 2 ft.  
**Weight:** 3,150 lb.  
**Power Plant:** Williams/Teledyne CAE F107-WR-10 turbofan, 600 lb thrust.  
**Performance:** Speed 550 mph, range 1,500+ miles (B).  
**Guidance:** Inertial plus Terrain Contour Matching (B).  
**Warhead:** W80-1 nuclear warhead (B).  
**Estimated Yield:** W80-1 warhead: 5-150 kilotons (preselectable).  
**Integration:** B-52H.

### **AGM-183 AIR-LAUNCHED RAPID RESPONSE WEAPON (ARRW)**

**Hypersonic air-to-surface weapon**

**Brief:** The AGM-183A is a developmental boost-glide hypersonic missile to provide future, nonnuclear strike against time-sensitive, heavily defended, high-value targets from standoff range. The missile is designed to accelerate to speeds well in excess of Mach 5 before releasing a nonpowered glide vehicle that maneuvers a warhead to the intended target. USAF completed a series of seven captive flight tests utilizing an instrumented test article on a B-52H at Edwards, culminating in an aborted boost test in December



Giuseppe Casem/USAF

2020. An attempted boost test over the Point Mugu Sea test range on April 5, 2021, failed to leave the aircraft. A third attempt on July 28, 2021, proved safe separation and targeting acquisition but the booster failed to ignite. USAF conducted a series of six ground detonations quantifying the characteristics of the weapon's warhead in early FY22. ARRW achieved safe separation and booster ignition for the first time on May 14, 2022, attaining Mach 5 after release from a B-52. A second successful launch on July 12 concluded booster testing, paving the way for operational testing. An AGM-183 completed the first live-fire test of a full-up weapon on Dec. 9, 2022, successfully flying its planned route before impacting the predetermined target. USAF conducted three all-up round tests in 2023 including a test in which the shroud failed to separate from the glide vehicle, invalidating terminal performance data. An additional shot achieved proper release, boost, and ascent as well as "nominal" glide vehicle and warhead detonation, followed by a similarly successful over-water shot. Assessments indicate ARRW is survivable against advanced defenses, though early failures may limit the program's ability to fully prove its lethality against intended targets. No additional tests are planned after the March 17, 2024, all-up round launch proving the weapon's land-target engagement capability at Kwajalein Atoll. USAF is transitioning hypersonic test funding to the Hypersonic Attack Cruise Missile (HACM) planned for flight-testing this year as well as future reusable hypersonic technology. Integration was originally planned for the B-1, B-52, and possibly F-15E/EX pending test results.

**Contractor:** Lockheed Martin.  
**First Flight:** May 14, 2022.  
**Delivered:** TBD.  
**IOC:** 2022 (planned).  
**Production:** TBD.  
**Inventory:** N/A.  
**Operator:** AFMC, Planned: AFGSC.  
**Unit Location:** Edwards AFB, Calif.  
**Active Variants:**  
•AGM-183A. Developmental prototype hypersonic boost-glide weapon.  
**Dimensions:** Unknown.  
**Weight:** Unknown.  
**Propulsion:** Solid fuel rocket.  
**Performance:** Mach 5+, range approx. 1,000 miles.  
**Guidance:** Unk.  
**Warhead:** Boost-glide vehicle with explosive warhead.

### **B61 THERMONUCLEAR BOMB**

**Air-to-surface thermonuclear bomb**

**Brief:** B61 is an air-dropped battlefield/tactical nuclear weapon equipping the F-16 and F-15E in the forward-deployed, allied extended deterrent role. It is also the B-2's primary strategic weapon. B61 was first delivered in 1966, and the B61 Mod 11 introduced in 1997 adds a ground-penetrating capability, enhancing its effect against buried and hardened targets. The weapon incorporates several preselectable yield options tailored to mission requirements. The B61 Mod 12 Life Extension Program (LEP) begun in 2016 is consolidating the B61-3, -4, -7, and -10 into a single, standardized configuration. The LEP refurbishes the warhead to improve the safety, security, and reliability through 2040. B61-12 also adds a guided tail kit, making it the first precision guided weapon of its type, thus permitting higher effectiveness at lower yields. USAF and the National Nuclear Security Administration finished B61-12 qualification flight-testing on June 9, 2018. The 31 inert test drops greatly exceeded performance requirements, validating nonnuclear components such as arming/fire control, guidance, spin-rocket motors, and software. B61-12 was approved for production and completed operational flight-testing on the F-15E and B-2A in 2019. Operational testing included 15 drops, certifying the F-15E in 2020, as the first aircraft capable of delivering the B61-12. The Department of Energy conducted nine additional drops, culminating in a full weapon system demo on the B-2A. The F-35A dropped an inert B61-12 for the first time in 2020 and full integration is planned as part of ongoing Block 4 development. The first production B61-12 was produced in 2021 prior to full-rate production ramp-up the following year. The entire inventory is slated for upgrade through FY26. Congress additionally approved DOD plans to develop a B61-13 variant using -12 enhancement to modernize the higher yield -7 in August 2024. B61-13 will modernize the existing weapons for use against "harder and large area military targets," replacing the 1.2 megaton B83-1 and the approximately 360 kiloton-yield B61-7 without increasing the existing stockpile.



Airman 1st Class Devan Halstead

**Contractors:** Los Alamos National Laboratory, Sandia National Laboratory (weapon); Boeing (B61-12 tail kit).  
**Delivered:** 1979-1998 (legacy stockpile); 2022-present (B61-12 mod).  
**IOC:** 1968.  
**Production:** Approx. 1,840 (current active variants).  
**Inventory:** Approx. 725 (including stockpiled and deployed).



**Operator:** AFMC, USAFE.

**Deployed locations:** Aviano AB, Italy; Büchel AB, Germany; Ghedi AB, Italy; Incirlik AB, Turkey; Kleine Brogel AB, Belgium; Volkel AB, Netherlands.

**Active Variant:**

- B61-3. Free-fall thermonuclear weapon with 0.3-170kt selectable yield.
- B61-4. Free-fall thermonuclear weapon with 0.3-50kt selectable yield.
- B61-7. Free-fall thermonuclear weapon with 10-360kt selectable yield.
- B61-11. Ground-penetrating free-fall thermonuclear weapon with 400kt fixed yield.
- B61-12. Modernized free-fall thermonuclear weapon with 0.3-50kt selectable yield and precision-guidance tail kit.

**Dimensions:** Length 11 ft 8 in., diameter 1 ft 1 in.  
**Weight:** 700 lb; 825 lb (B61-12).

**Performance:** 0.3-400 kiloton thermonuclear yield air-droppable at speeds in excess of Mach 1.

**Guidance:** None (B61 Mod 1 to 11); unknown, likely INS (B61 Mod 12).

**Warhead:** One B61 -3, -4, -7, or -11.

**Estimated Yield:** 0.3 kilotons, 1.5 kilotons, 10 kilotons, 50 kilotons, (pre-selectable); 360 kilotons (B61-7), 400 kilotons (B61-11) (fixed yield).

**Integration:** B-2A, F-15E, and F-16C/D; NATO: F-16A/B Mid-Life Upgrade (MLU), and Panavia Tornado IDS.

## LGM-30 MINUTEMAN III

Strategic surface-to-surface ballistic missile

**Brief:** Minuteman is a three-stage, solid-propellant nuclear deterrent ICBM housed in a survivable underground silo. Minuteman III became operational in 1970, providing improved range, rapid retargeting, and the capability to place up to three reentry vehicles on three targets with high accuracy. It is the sole operational U.S. land-based ICBM. AFGSC initially deployed 550 missiles, later reducing that number to 400 based at Malmstrom, Minot, and F.E. Warren. Deployed ICBMs were also reduced to a single-warhead configuration in 2014 under limits imposed by the New START agreement. Minuteman III is already more than 40 years beyond its initially planned service life, and USAF expects the system will fall below readiness standards as early as 2026. USAF awarded Northrop Grumman the Ground Based Strategic Deterrent (GBSD) development contract in 2019, resulting in the future LGM-35A Sentinel. AFGSC planned to begin replacing Minuteman III in 2027, with Sentinel fully replacing legacy ICBMs by 2036 but announced program delays of three or more years in 2024. Current efforts are focused on sustaining Minuteman III's critical deterrent capability through the full fielding of Sentinel. Guidance and propulsion upgrades must now extend systems through the late 2030s, while modernized reentry vehicles and fuzes will serve both Minuteman and Sentinel. USAF and Lockheed Martin completed the fourth and final test of the replacement fuse clearing the way for production, as well as a successful test of the future Mk 21A reentry vehicle in 2024. FY25 additionally requested funds for Minuteman Essential Emergency Communication Network (MEECN) mods, generator reliability improvement, and access denial system life extension. USAF is assessing sustainment requirements to keep Minuteman in service longer than expected due to delays fielding Sentinel but has ruled out another full Service Life Extension Program.



Senior Airman Abbigayle Williams

**Contractors:** Boeing; General Electric; Lockheed Martin; Northrop Grumman (formerly Orbital ATK).

**First Flight:** February 1961.

**Delivered:** 1962-1978.

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

**Production:** 1,800.

**Inventory:** Approx. 400 deployed.

**Operator:** AFGSC.

**Unit Location:** F.E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Vandenberg SFB, Calif. (test location).

**Active Variant:**

•LGM-30G. Current Minuteman III variant.

**Dimensions:** Length 59.9 ft, diameter 5.5 ft.

**Weight:** 79,432 lb.

**Propulsion:** Stage 1: Orbital ATK refurbished M55 solid-propellant motor, 202,600 lb thrust; Stage 2: Orbital ATK refurbished SR19 solid-propellant motor, 60,721 lb thrust; Stage 3: Orbital ATK refurbished SR73 solid-propellant motor, 34,400 lb thrust.

**Performance:** Speed at burnout approx. 15,000 mph, range 6,000+ miles.

**Guidance:** Inertial guidance system.

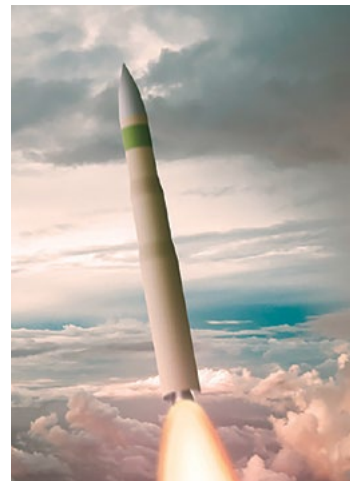
**Reentry Vehicle:** One Mk 21 RV; one to three Mk 12/12A MIRVs.

**Warhead:** One W87 or up to three W78 enriched uranium thermonuclear weapons.

## LGM-35 SENTINEL

Strategic surface-to-surface ballistic missile

**Brief:** The LGM-35A Sentinel is a developmental three-stage, solid-propellant, silo-based ICBM designed to replace the Minuteman III land-based element of the nuclear deterrent "triad." Nuclear modernization is the Defense Department's top priority and USAF exhaustively studied further extending the 50-year-old Minuteman III before determining full replacement would be the most cost-effective investment. USAF awarded Boeing and Northrop Grumman technology maturation and risk-reduction contracts for a future Ground-Based Strategic Deterrent (GBSD) in 2017. Boeing declined to bid on full development in 2019, leaving Northrop Grumman to develop GBSD, officially designated LGM-35A Sentinel in 2022. AFGSC plans to modernize and/or replace existing Minuteman III launch control, alert, and C2 facilities at Malmstrom, Minot, and F.E. Warren to accommodate Sentinel, targeted for IOC with nine alert missiles by 2029. Sentinel will replace 400 deployed Minuteman IIIs and 450 silos on a one-for-one basis, with the addition of 242 missiles to support developmental testing as well as reliability validation over the life of the program. The ICBM will incorporate modular design and open system architecture to ease both maintenance and future modernization. The service plans to initially deploy it with a single thermonuclear warhead aligning it



USAF illustration

to New START limits, though the ICBM's increased performance could permit a multiple-warhead configuration. Sentinel will utilize both the Mk21 reentry vehicle and ICBM fuse already undergoing modernization for Minuteman III. AFGSC projects the LGM-35A will reach full operational capability by 2036, providing land-based strategic deterrence capability through at least 2075. Northrop Grumman completed a full-scale qualification static fire test of the LGM-35A's first stage solid rocket motor at its static-test facility at Promontory, Utah, on March 6, 2025, following a test of the second stage in a vacuum chamber at Arnold Engineering Development Complex, Tenn., in 2024. Required design changes to the command and launch infrastructure drove an 81 percent cost increase, triggering a DOD program review in early 2024. USAF rescinded its approval of the preliminary design and is undertaking an approximately two-year restructuring of the program. The service also paused work on ground infrastructure and is reviewing revised options, including mobile or hybrid fixed-mobile facilities. Planned IOC will be delayed by at least two years to 2031 or beyond, though development of the LGM-35A itself is continuing. The first test launch was likewise postponed at least two years due to delays sourcing guidance components and is now targeted for 2026.

**Contractors:** Northrop Grumman (prime contractor); Aerojet Rocketdyne (third-stage solid fuel rocket); Bechtel, Clark Construction (launch infrastructure); CAE (training system); Collins Aerospace (training system/C2); General Dynamics (C2, digital engineering, aerospace equipment); Honeywell (guidance and control); Textron (reentry system); Lockheed Martin (payload support); Kratos, HDT Global (transport systems).

**First Flight:** 2024 (planned).

**Delivered:** N/A.

**IOC:** 2029 (planned).



**Production:** 642 (planned).  
**Inventory:** Zero.  
**Operator:** AFGSC (planned).  
**Unit Location:** Planned: F. E. Warren AFB, Wyo.; Malmstrom AFB, Mont.; Minot AFB, N.D.; Vandenberg SFB, Calif. (test location).  
**Variant:**  
 •LGM-35A. Developmental Minuteman III replacement.  
**Dimensions:** Unknown.

**Weight:** Unknown.  
**Propulsion:** Stage 1: Northrop Grumman solid-propellant motor, thrust TBD; Stage 2: Northrop Grumman solid-propellant motor, thrust TBD; Stage 3: Aerojet Rocketdyne solid-propellant motor, thrust TBD.  
**Performance:** Speed hypersonic, range 6,000+ miles.  
**Guidance:** Unknown.  
**Reentry Vehicle:** Mk 21 or Mk 21A RV.  
**Warhead:** W87-0 or W87-1 enriched uranium thermonuclear weapons.

# LONG-RANGE STANDOFF WEAPONS



Senior Airman Jonathan Ramos

## AGM-158 Joint Air-To-Air Surface Missile

### ADM-160 MINIATURE AIR LAUNCHED DECOY (MALD)

Aircraft decoy; close-in radar jammer

**Brief:** MALD is a programmable, low-cost, modular, autonomous flight vehicle that mimics U.S. or allied aircraft to confuse enemy Integrated Air Defense Systems (IADS). MALD-J adds radar jamming capability to the basic decoy platform and can operate alone or in concert with other EW platforms. The jammer version is designed as an expendable, close-in jammer to degrade and deny an early warning or acquisition radar's ability to establish a track on strike aircraft. It also maintains the ability to fulfill the basic decoy mission. The F-16 or B-52 are lead employment

aircraft for MALD. Lot 11 contract for 250 weapons in 2018. A-10s demonstrated a MALD standoff support capability, escorting B-1s during Exercise Iron Thunder near the Philippines in 2022. The systems have also been noted equipping Ukrainian aircraft in combat since 2023.

**Contractor:** Raytheon.

**First Flight:** 1999 (MALD); 2009 (MALD-J).

**Delivered:** Sept. 6, 2012 (MALD-J).

**IOC:** 2015 (MALD-J).

**Active Variants:**

•ADM-160B. MALD base decoy variant.

•ADM-160C. MALD-J jammer/decoy variant.

**Dimensions:** Span 5.6 ft (extended), length 9.3 ft.

**Weight:** Less than 300 lb.

**Power Plant:** Hamilton Sundstrand TJ-150 turbojet, 337 lb thrust.

**Performance:** Range up to 575 miles, endurance 90 minutes (50 minutes on-station loiter).

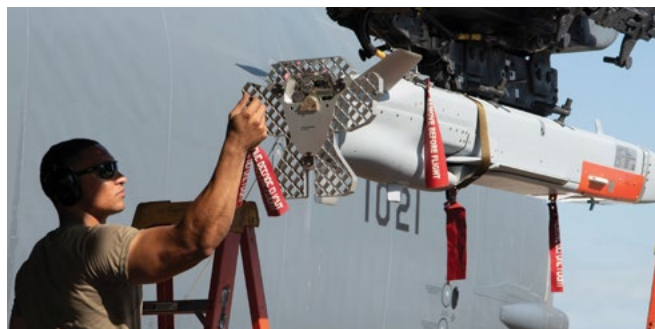
**Guidance:** GPS/INS.

**Integration:** A-10, B-52H, F-16C. Planned: B-1B.

### AGM-158 JOINT AIR-TO-SURFACE STANDOFF MISSILE (JASSM)

Air-to-surface cruise missile

**Brief:** JASSM is a joint USAF-Navy autonomous, precision cruise missile for use against heavily defended or high-value targets at standoff range. It can attack fixed, relocatable, and moderately hardened/buried targets. The base variant is a stealthy, low-cost airframe equipped with GPS/INS guidance and imaging IR terminal seeker. The JASSM-Extended Range (JASSM-ER) version uses the same baseline body but a new engine and fuel system that increase range to more than 500 miles. The ER was cleared for combat on the B-1B in 2015, reached full operational capability on the F-15E in 2018, and is planned for use on all fighter/bomber platforms. Full-rate production began in 2018, and production shifted to ER-only in 2016. Further development has resulted in the extended range AGM-158B and "extreme range" AGM-158D, which is retargetable via data link after launch. JASSM-ER production is shifting to AGM-158B-2 and production of the jam-resistant B-3 is projected for 2026. Prior production JASSM will not be upgraded though USAF aims to modify



Airman 1st Class Celeste Zuniga

aircraft for MALD. USAF capped procurement in FY12, converting Lot 4 to the MALD-J variant. Plans call for 3,000, of which 2,400 are the jammer version. USAF demonstrated in-flight retargeting capabilities and is integrating GPS-Aided Inertial Navigation System (GAINS II) to improve navigational accuracy in GPS-denied environments. An upgraded Jammer variant dubbed "MALD-X" successfully demonstrated future, low-level flight capabilities, improved EW payloads, and enhanced data links in 2018. MALD-X aims to establish USAF's future baseline and serves as the basis of the Navy's developmental MALD-N variant. USAF awarded a MALD-J contract option for Lot 10 production in 2016 and a follow-on

existing contract lots to procure B-2/B-3 instead. The AGM-158D is also currently in development and planned for delivery starting in 2027. Lockheed Martin is further developing the Long-Range Anti-Ship Missile (LRASM), which reached early operational capability on the B-1B in December 2018 and is planned for fielding on the B-52. USAF conducted a proof-of-concept employing palletized JASSM from mobility aircraft in 2020 in a massed stand-off attack. JASSM and LRASM are USAF's premiere weapons for use in a high-end threat scenario. Notable efforts include Weapon Data Link (WDL) development to enable post-launch retargeting and precision guidance for GPS-denied environments. The service increased its JASSM stockpile objective by 47 percent, and FY25 funds continue maximum-rate procurement of 550 JASSM-ER as well as continuing LRASM purchases of 115 weapons. The manufacturer is opening a second production facility to double JASSM/LRASM production, and USAF plans to increase purchases to 810 missiles a year due to threats in Europe and the Pacific. A B-2A successfully launched JASSM-ER for the first time during an integration test flight in 2022, and an F-15EX conducted its first shot as part of integrated testing in August 2023. Both the F-35B and C variants began flight testing this past year to carry JASSM/LRASM externally as part of Block 4 upgrades.

**Contractors:** Lockheed Martin; Raytheon; Honeywell.

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

**Delivered:** 2001-present.

**IOC:** September 2003; December 2014 (ER variant); 2018 (LRASM).

**Production:** 10,000 JASSM (planned); 400 LRASM (planned).

**Active Variants:**

- AGM-158A JASSM. Base variant.
- AGM-158B JASSM-ER. Extended-Range variant (including B-2 and B-3).
- AGM-158C LRASM. Long-Range Anti-Ship Missile, based on JASSM.
- AGM-158D JASSM-ER. Developmental extreme-range variant of JASSM-ER (previously XR).



Airman 1st Class Joel Pfeister/Released

**Dimensions:** Length 14 ft, diameter approx. 2 ft, wingspan 7.8 ft.

**Power Plant:** Teledyne Technologies J402 turbojet (JASSM); Williams Intl. F107-WR-105 turbofan (JASSM-ER).

**Performance:** Speed subsonic, range 200+ miles (baseline), 500+ miles (ER), approx. 1000 miles (XR).

**Guidance:** GPS/INS and imaging IR terminal seeker.

**Warhead:** 1,000-lb class penetrator (JASSM); 1,000-lb blast fragmentation (LRASM).

**Integration:** B-1B, B-2, B-52H, F-15E, and F-16 Block 40-52; planned: F-35A (JASSM). B-1B, B-2A, B-52H, F-15E, F-16 Block 40-52; planned: F-15EX, F-35A, (JASSM-ER); planned: B-52 (LRASM).

## AIR-TO-AIR MISSILES



Tom Demerly/ANG

### AIM-9 SIDEWINDER

Air-to-air missile

**Brief:** Sidewinder is an IR-guided short-range, supersonic air-to-air missile. It was developed by the Navy for fleet air defense and adapted for USAF fighters. Early versions were used extensively in the Vietnam War. The AIM-9M is a joint Navy-USAF, all-altitude, all-aspect intercept missile. It has improved defense against IR countermeasures, background discrimination, and a reduced-smoke rocket motor. AIM-9X is the newest joint-funded variant. It employs passive IR tracking, jet-vane steering for increased maneuverability and Joint Helmet-Mounted Cueing System (JHMCS) compatibility for high-angle, off-boresight targeting. The enhanced AIM-9X Block II was cleared for full-rate production in September 2015 and adds improved lock-after-launch and maneuverability, a new data link for beyond-visual range engagement, enhanced anti-countermeasures, a new fuse, and safer ground-handling characteristics. AIM-9X production includes 67 converted AIM-9Ms, 1,289 Block I, and planned joint-service procurement of 11,635 Block II/II-plus (nearly double the number originally planned) through 2035. FY25 funds decreased from FY24, procuring a combined 147 AIM-9X Block II/II+ missiles. An F-22 scored its first kill on

Feb. 4, 2023, using an AIM-9X to down a Chinese ISR balloon flying at 60,000 feet off the South Carolina coast. Block II+ will begin operational testing of software and hardware upgrades to enhance performance and add two new, classified capabilities in early FY25, though live testing is hampered by a lack of advanced threat-representative targets.

**Contractors:** Raytheon; Northrop Grumman (propulsion).

**First Flight:** September 1953; July 1999 (AIM-9X); 2016 (AIM-9X Block II).

**Delivered:** AIM-9M 1983; AIM-9X from 2002-2011 (Block I); 2011-present (Block II); 2017-present (Block II+).

**IOC:** Circa 1983 (9M); November 2003 (9X); September 2016 (9X Block II).

**Production:** 1,289 (Block I); 11,635 (Block II/Block II+) (planned).

**Active Variants:**

- AIM-9M. Early variant.
- AIM-9M-9. Expanded anti-countermeasure capability variant.
- AIM-9X. Newest, highly maneuverable, JHMCS compatible variant.

**Dimensions:** Span 2.1 ft (M), 1.4 ft (X); length 9.4 ft (M), 9.9 ft (X); diameter 5 in.

**Propulsion:** Mk 36 Mod 11 (9M); Orbital ATK Mk 139 solid-propellant rocket motor (9X).



**Performance:** Speed Mach 2+, range 10+ miles.  
**Guidance:** Passive IR homing guidance.  
**Warhead:** HE annular blast fragmentation.  
**Integration:** F-15C/D/E, F-16C/D, F-22A (AIM-9X). Planned: F-15EX, F-35A.

## AIM-120 ADVANCED MEDIUM-RANGE AIR-TO-AIR MISSILE (AMRAAM)

Air-to-air guided missile

**Brief:** AMRAAM is an active, radar-guided, medium-range, supersonic air-to-air missile. It is a joint USAF-Navy follow-on to the AIM-7 Sparrow with launch-and-leave capability. The AIM-120B is an upgraded, reprogrammable variant of the original missile. The AIM-120C incorporates smaller control surfaces for internal carriage on F-22 and F-35 and a high-angle off-boresight (HOBS) launch capability. AIM-120D offers improved range, GPS-assisted guidance, updated data links, and jam resistance in addition to greater lethality. System Improvement Program (SIP II) upgrades debuted in 2020, and the latest AIM-120D3 with SIP IIIF software was fielded in March 2024. The new configuration incorporates Form, Fit, and Function (F3R) upgrades and nearly doubles the missile's range while increasing its kinetic energy against advanced long-distance threats. The next SIP-4 software upgrade will maximize the F3R hardware's nearly four-times-faster computing power to maximize weapon performance, while SIP-5 will expand its engagement envelope. USAF plans to potentially utilize AIM-120D3 as an affordable "capacity" weapon in tandem with the next-generation AIM-260 Joint Air Tactical Missile (JATM) which is currently in testing. FY25 continues a multi-year/large lot procurement started last year that boosts USAF production from a previous base of 320 to 462 AIM-120Ds.



USAF

**Contractors:** Raytheon; Northrop Grumman; Nammo Group (propulsion).

**First Flight:** December 1984; Jan. 25, 2022 (AIM-120D F3R).

**Delivered:** 1988-present.

**IOC:** September 1991; July 2015 (120D).

**Active Variants:**

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

- AIM-120C. Production variant optimized for the F-22/F-35.

- AIM-120D. Latest variant with GPS guidance, improved range, lethality, and jam-resistance.

**Dimensions:** Span 1.7 ft (A/B), 1.5 ft (C/D); length 12 ft; diameter 7 in.

**Propulsion:** Boost-sustain solid-propellant rocket motor.

**Performance:** Supersonic, range 20+ miles (AIM-120C).

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

**Warhead:** HE blast-fragmentation.

**Integration:** F-15C/D/E/, F-16C/D, F-22A, F-35A. Planned: F-15EX.



Staff Sgt. Laura Weaver

## AGM-65 Maverick

## WGU-59 ADVANCED PRECISION KILL WEAPON SYSTEM (APKWS) II

Air-to-surface guided rocket

**Brief:** APKWS II is a low-cost, semi-active laser-guidance system sized to fit the 2.75-in aerial rocket. It is optimized for precision, low-collateral-damage strikes against moving or stationary light vehicle and personnel targets. APKWS can be fitted with HE or penetrating warheads as well as visual and IR illuminating, or white phosphorous rounds for target marking by forward air control aircraft. USAF acquired the system as an urgent operational requirement, and an F-16 employed it in combat for the first time in June 2016. The weapon employs a midbody guidance package to convert the standard rocket into a guided weapon. APKWS was already being used by the three other services and initial weapons were procured from Navy stocks. The rockets are launched from multiround reusable pods. BAE introduced a block upgrade capable of increasing APKWS' range by as much as 30 percent in 2021. The weapons have proved adaptable to new missions and an A-10 tested it against advanced reactive armor in 2022. An F-16 successfully destroyed an airborne target using APKWS during an anti-cruise missile demo and further counter-UAS development led to the

AGR-20 FALCO (Fixed Wing, Air-Launched, Counter-Unmanned Aircraft Systems Ordnance). Addition of an IR seeker permits fire-and-forget capability against airborne targets, easing pilot workload in the anti-missile/counter-UAS role. The enhanced weapons have been extensively used downing Houthi missiles and drones targeting shipping in the Red Sea and Iranian weapons fired against Israel in October 2023. USAF fulfilled its inventory requirement last year and requested no FY25 funds.

**Contractor:** BAE Systems.

**First Flight:** May 2013 (USAF).

**Delivered:** October 2012-present.

**IOC:** Circa 2016.

**Active Variant:**

- WGU-59B. Semi-active, laser-guided 2.75-in rocket, adapted for fixed-wing use.

- AGM -20. Fixed Wing, Air Launched, Counter-Unmanned Aircraft Systems Ordnance (FALCO) adapted for use against small airborne targets.

**Dimensions:** Span 9.5 in, length 6.25 ft, diameter 2.75 in.

**Propulsion:** Solid-propellant rocket motor.

**Performance:** Subsonic, range 1.2 to 6.8 miles.



Courtesy illustration

**Guidance:** Semi-active laser.

**Warhead:** HE, armor-penetrating, white phosphorous, or illuminating round.

**Integration:** A-10, A-29, F-16. Planned: OA-1K.

## AGM-65 MAVERICK

Air-to-surface guided missile

**Brief:** Maverick is a TV, imaging IR, or laser-guided standoff air-to-surface missile employed by fighter/attack aircraft against tanks, vehicles, and air defenses. It was first employed during the Vietnam War and was used extensively in Desert Storm and Iraqi Freedom. AGM-65B is a launch-and-leave, EO/TV guided missile, equipped with "scene magnification" allowing acquisition of small/distant targets. Fielded in 1986, AGM-65D employs an imaging IR seeker for all-weather day/night use. The AGM-65E is laser guided with a heavyweight penetrator warhead. The AGM-65G fielded in 1989 combines an imaging IR seeker, software to track larger targets, with a heavyweight penetrator warhead, digital autopilot, and pneumatic actuation system. The AGM-65H is an upgraded B variant that recently completed tracker upgrades. The AGM-65K is a modified G variant that replaces IR guidance with EO TV and is also undergoing a tracker upgrade. The AGM-65L is the most recent EO TV/semiactive-laser seeker equipped "Laser Maverick" designed to strike high-speed moving targets. USAF is gradually modifying legacy missiles to Laser Maverick standards but is not currently procuring additional weapons.



Tom Demerly/ANG

**Contractors:** Raytheon (missile body); Northrop Grumman (propulsion).

**First Flight:** August 1969.

**Delivered:** August 1972.

**IOC:** February 1973.

**Active Variants:**

- AGM-65B. A launch-and-leave EO TV seeker variant.
- AGM-65D. Adverse weather B variant.
- AGM-65E. Laser-guided version heavyweight penetrator variant.
- AGM-65G. Imaging IR seeker heavyweight penetrator variant.
- AGM-65H. Upgraded B variant.
- AGM-65K. Modified EO TV seeker G variant.
- AGM-65L. Laser-guided EO TV seeker variant for fast-moving targets.

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

**Propulsion:** Two-stage, solid-propellant rocket motor.

**Performance:** Supersonic, approx. 714 mph, range 20 miles.

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

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

## AGM-88 HIGH-SPEED ANTI-RADIATION MISSILE (HARM)

Air-to-surface anti-radiation missile

**Brief:** HARM is an anti-radiation, air-to-surface missile highly effective against enemy ground radar. AGM-88 is a joint USAF-Navy weapon carried by SEAD-dedicated F-16CJs. AGM-88B is equipped with erasable and electronically programmable read-only memory, permitting in-field changes to missile memory. The AGM-88C is the current production model with a more lethal warhead. Raytheon began a HARM Control Section Mod (HCSM) in 2013 to convert current models to more precise AGM-88Fs with improved GPS/INS guidance, anti-countermeasure performance, and reduced risk of collateral damage. The Navy is further retrofitting its missiles with advanced networking, digital homing, and terminal millimeter-wave radar seeker resulting in the AGM-88E Advanced Anti-Radiation Guided Missile (AARGM). USAF dropped sole-source plans to pursue the extended-range AGM-88G AARGM-ER as the basis for its next-generation Stand-in Attack Weapon (SiAW), issuing a request to industry in March 2021 for proposals instead. SiAW will give the F-35 the ability to strike advanced threats including theater ballistic missile and land attack/anti-ship missile sites, GPS jammers, and anti-satellite systems. USAF is pursuing Navy-led field-



Jim Haseltine/courtesy photo via PACAF

ing of AARGM-ER as an interim SEAD capability for the F-35A, procuring 184 missiles from FY23 to FY25 as a bridge to SiAW. AARGM-ER differs significantly from the legacy AGM-88, incorporating a new motor, larger diameter, and blended conformal strakes in place of forward stabilizing fins. A Navy F-18F successfully test-fired the first AARGM-ER in 2021, but the sea service's plan to reach IOC in 2023 slipped due to testing and certification delays to late FY25.

**Contractors:** Raytheon (HARM); Northrop Grumman (AARGM).

**First Flight:** April 1979 (HARM); July 19, 2021 (AARGM-ER).

**Delivered:** 1982-98.

**IOC:** Circa 1984.

**Active Variants:**

- AGM-88B. Early production variant.
- AGM-88C. Current production variant.
- AGM-88E. Next-generation Advanced Anti-Radiation Guided Missile.
- AGM-88F. Upgraded variant with greater accuracy and precision.
- AGM-88G. Next-generation Advanced Anti-Radiation Guided Missile Extended-Range variant.

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

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

**Performance:** Mach 2+, range 30+ miles.

**Guidance:** Proportional passive RF broadband via fixed antenna and seeker head in missile nose.

**Warhead:** HE fragmentation.

**Integration:** F-16CJ (Block 50); planned: B-21, F-35A (AARGM-ER).

## AGM-114 HELLFIRE

Air-to-surface guided missile

**Brief:** Hellfire is a low-collateral-damage, precision air-to-ground missile with semi-active laser guidance for use against light armor and personnel. Missiles are employed on the MQ-9 Reaper and the AC-130J gunship. Hellfire is procured through the Army and numerous variants are utilized based on overseas contingency demands. An MQ-1 Predator employed Hellfire in combat for the first time in Afghanistan on Oct. 7, 2001. The latest AGM-114R replaces several types with a single, multitarget weapon and USAF is also buying variable height-of-burst (HOB) kits to enhance lethality. The next-generation Joint Air-to-Ground Missile (JAGM) is also procured via the Army and adds a new multimode guidance section to the AGM-114R. JAGM is used against high-value moving or stationary targets in any weather. The AC-130J demonstrated new wing-pylon-mounted Hellfires in a live-fire exercise with South Korea in June 2024.





Staff Sgt. Brian Ferguson

## AGM-176 GRIFFIN

Air-to-surface guided missile

**Brief:** Griffin is a light, low-cost, multiservice air-launched weapon with GPS-aided inertial guidance and semi-active laser seeker. The weapon is used for high-precision, low-collateral damage attacks against light surface targets. The AGM-176A forms part of the PSP employed on AFSOC's AC-130J Ghost Rider gunship, which employs the aft-firing weapon from ramp-mounted common-launch tubes. The forward-firing AGB-176B is employable on RPAs. FY22 ended additional procurement as USSOCOM shifts funds to confront future threats by developing small, Standoff Precision Guided Munitions (SOPGM) for use in contested environments. SOCOM plans to include AGM-176 in the future OA-1K armed over-watch platform's arsenal.

**Contractor:** Raytheon.

**First Flight:** Feb. 16, 2000 (USAF).

**Delivered:** September 2001.

**IOC:** N/A.

**Active Variants:**

•AGM-176A. Aft-ejecting missile employed as part of the PSP.

•AGM-176B. Forward-firing variant optimized for light aircraft/RPAs.

**Dimensions:** Length 43 in, diameter 5.5 in.

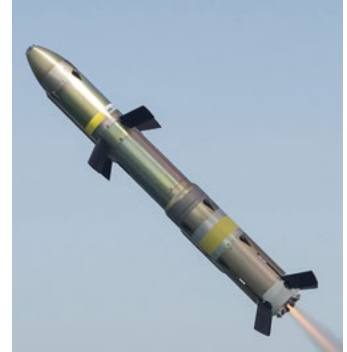
**Propulsion:** Solid-propellant rocket motor.

**Performance:** Subsonic, range 12+ miles.

**Guidance:** GPS/INS/semi-active laser.

**Warhead:** Blast fragmentation.

**Integration:** AC-130J (A), MQ-9 (B). Planned: OA-1K.



Raytheon

**Contractors:** Lockheed Martin (missile body); Northrop Grumman (propulsion).

**First Flight:** Feb. 16, 2000 (USAF).

**Delivered:** March 2016-present.

**IOC:** N/A.

**Active Variants:**

•AGM-114. Numerous subvariants, depending on target and mission requirements.

•AGM-169. JAGM, incorporating a multimode seeker on the advanced AGM-114R.

**Dimensions:** Span 28 in, length 5.33 ft, diameter 17 in.

**Propulsion:** Solid-propellant rocket motor.

**Performance:** Subsonic, range 5+ miles.

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

**Warhead:** Shaped charge and blast fragmentation.

**Integration:** AC-130J, MQ-9.

## AREA WEAPONS



Senior Airman Jonathan Ramos

## CBU-105 SENSOR FUZED WEAPON (SFW)

Wide-area munition

**Brief:** SFW is a tactical area weapon for use against massed stationary or moving armor and ground vehicles. The munitions dispenser contains a payload of 10 BLU-108 submunitions each containing four skeet-shaped copper disks totaling 40 lethal, target-seeking projectiles. The skeet's active laser and passive IR sensors can detect a vehicle's shape and IR signature. If no target is detected, the warhead instead detonates at a preset time. Primary targets are massed tanks, armored personnel carriers, and other self-propelled targets. SFWs can be delivered from high altitude and in adverse weather. It debuted in combat in Iraq in 2003. DOD ceased cluster munition procurement in 2007 and has only

employed the weapons in combat once since 2003. CBU-105 was the standard USAF cluster munition that met the less-than-one-percent failure rate previously mandated by DOD for use beyond 2018. DOD has since reversed course, retaining existing weapons for deterrence on the Korean Peninsula. USAF is gradually replacing its legacy area weapons with the 500-lb class and 2,000-lb class Next-Generation Area Attack Weapon (NGAAW), which replaces explosive submunitions with a high-fragmentation warhead, reducing the risk of unexploded munitions injuring noncombatants.

**Contractor:** Textron Systems.

**First Flight:** Circa 1990.

**IOC:** 1997.

#### Active Variants:

• CBU-105. CBU-97 casing with Wind-Corrected Munitions Dispenser (WCMD) tail kit.

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

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

**Guidance:** IR targeting in each warhead; INS (via WCMD tail kit predispersal) and GPS-data (via aircraft, prerelease).

**Warhead:** Shaped charge and blast fragmentation.

**Integration:** A-10C, B-1B, B-52H, F-15E; F-16C/D, (tested on MQ-9).

### CBU-107 PASSIVE ATTACK WEAPON

#### Wide-area munition

**Brief:** Passive Attack Weapon is a nonexplosive, kinetic penetrating area weapon for use against sensitive targets. The CBU-107's penetrator rods limit collateral damage and do not scatter potentially contaminating debris when used against enemy WMD stockpiles. The weapon glides toward its target after release. Before impact, its inner chamber begins to rotate and projectiles are ejected in rapid succession by centrifugal force, penetrating targets within a 200-ft radius. The weapon contains various-sized penetrating projectiles, but no explosive. Full production was completed in six months. The weapon was used during Iraqi Freedom.

**Contractors:** General Dynamics (kinetic energy penetrator payload and canister); Lockheed Martin (WCMD); Textron (tactical munition dispenser kit).

**First Flight:** 2002.

**IOC:** December 2002.

#### Active Variant:

• CBU-107A. Centrifugally dispersed, armor-penetrating weapon with Wind-Corrected Munitions Dispenser (WCMD) tail kit.

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

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

**Guidance:** INS (via WCMD tail kit) and GPS-data (via aircraft) pre-release.

**Warhead:** Nonexplosive projectiles.

**Integration:** B-52, F-15E, F-16C/D.

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



Tech. Sgt. Marvin Lynchard

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

**Guidance:** INS (via WCMD tail kit) and GPS-data (via aircraft) pre-release.

**Warhead:** Nonexplosive projectiles.

**Integration:** B-52, F-15E, F-16C/D.

### NEXT-GENERATION AREA ATTACK WEAPON (NGAAW)

#### Wide-area munition

**Brief:** Next-Generation Area Attack Weapon (NGAAW) is a blast-fragmentation area weapon designed as an alternative to cluster bomb munitions banned by DOD mandate beyond 2018. DOD ceased cluster munition procurement in 2007 and implemented a less-than-one-percent failure rate mandate on area weapons to prevent civilian casualties from unexploded ordnance. USAF awarded the \$60 million NGAAW procurement contract for a compliant family of weapons in 2019. NGAAW is being developed in two increments, the 500-lb Improved Lethality Warhead (ILW) anti-personnel/materiel weapon based on the BLU-134B, followed by the more potent 2,000-lb high-fragmentation warhead. An F-16 conducted initial live-developmental test drops of the 2,000-lb-class BLU-136 at the Nellis Range in July 2020. The 10-weapon series proved the effectiveness of the weapon against light vehicles, structures, and personnel in excess of a 225-ft radius. The 2,000-lb weapon is externally similar to the standard JDAM when fitted with the precision-guided tail kit, requiring little adaptation to existing platforms for operational use. The NGAAW family of weapons is primarily aimed at replacing the remaining CBU-105/107 stockpile, with potential to replace additional area weapons.

**Contractors:** Major Tool & Machine; Faxon Machining.

**First Flight:** 2020.

**IOC:** N/A.

#### Active Variant:

• NGAAW Increment I. Optionally GPS/INS-guided Improved Lethality Warhead area weapon based on the 500-lb-class BLU-134/B.

• NGAAW Increment II. Optionally GPS/INS-guided 2,000-lb area weapon, based on the BLU-136/B.

**Dimensions:** Length approx. 12 ft (2,000-lb class with tail kit), diameter approx. 14.5 in; length approx. 7.8 ft, diameter approx. 10.7 in. (500-lb class with tail kit).

**Performance:** Range up to 15 miles (based on JDAM guidance/BLU-136 mass and form factor), 225+ ft effective radius (based on initial testing). Guidance: GPS/INS.

**Warhead:** 2,000-lb high-fragmentation area-attack warhead with height-of-burst sensor (BLU-136/B); 500-lb fragmentation area-attack warhead (BLU-134/B).

**Integration:** N/A.

### GBU-10/12/49 PAVEWAY II

#### Air-to-surface guided munition

**Brief:** Paveway II is a laser-guided, free-fall bomb for use against surface targets at short to standoff range. The kit is a folding-wing version of the earlier fixed-wing Paveway I with seeker and reliability improvements. The recent Paveway II Plus adds a modernized, more precise guidance package. GBU-10 is the Paveway II seeker and tail kit mounted on a 2,000-lb general-purpose bomb and primarily used against nonhardened targets. It is, however, capable of penetration. The GBU-12 has a 500-lb bomb body and is primarily used against stationary armored targets. GBU-49 also has a 500-lb body but adds GPS guidance for all-weather precision delivery from 2,500 ft up to 40,000 ft. GBU-49 currently provides the F-35A an interim moving target capability until its Block 3F software is fully fielded. An F-35 dropped the weapon for the first time in a test at Eglin on Nov. 7, 2018, and operational testing was conducted at Nellis.

**Contractors:** Lockheed Martin; Raytheon.

**First Flight:** Early 1970s.



Airman 1st Class Jessi Monte

**IOC:** 1976.

#### Active Variants:

• GBU-10. Laser/GPS guided 2,000-lb bomb.

• GBU-12. Laser guided 500-lb bomb.

• GBU-16. Laser guided 1,000-lb bomb.

• GBU-49. Laser/GPS guided 500-lb bomb.



**Dimensions:** Span 5.5 ft, length approx. 14.8 ft, diameter 18 in (GBU-10); span 4.4 ft, length 10.8 ft, diameter 11-18 in (GBU-12/49).

**Performance:** CEP 29.7 ft, range 9.2 miles (GBU-10); CEP 29.7 ft, range about 6 miles (GBU-12/49).

**Guidance:** Semi-active laser.

**Warhead:** Mk 84 bomb 2,000 lb (GBU-10); Mk 82 500-lb blast/fragmentation bomb (GBU-12/49).

**Integration:** A-10, B-1B, B-52, F-15E, F-16C/D, F-35 (GBU-49), MQ-9.

## GBU-24/28 PAVEWAY III

Air-to-surface penetrating glide bomb

**Brief:** Paveway III is a laser-guided free-fall bomb for use against surface targets from medium standoff range. The third-generation laser-guided seeker/tail kit package enables greater precision over Paveway II, and its high-lift airframe enables longer glide slopes for greater standoff employment. It can be dropped from low, medium, or high altitude and is effective against a broad range of high-value targets. GBU-24 is fitted to a 2,000-lb bomb body with a BLU-109 penetrating warhead. GBU-28 variants are large 5,000-lb-class air-to-ground penetrators initially developed for use against Iraq's deeply buried, hardened C2 facilities. The GBU-28B adds GPS/INS guidance to the existing laser seeker for all-weather targeting. It entered production in 1999. The GBU-28C adds a more powerful penetrating BLU-122 warhead in addition to the enhanced guidance package. It



Master Sgt. Carl Clegg

entered production in 2005 and quantities are purchased as needed to replenish and maintain stockpiles. GBU-28 will eventually be replaced by the JDAM-based GBU-72 "A5K" penetrator currently finishing development.

**Contractor:** Raytheon.

**First Flight:** Early 1980s (GBU-24); Feb. 24, 1991 (GBU-28).

**IOC:** 1986 (GBU-24); 1991 (GBU-28).

**Active Variants:**

- GBU-24. Laser-guided 2,000-lb penetrating bomb.
- GBU-28B/B. Laser/GPS/INS-guided 5,000-lb penetrating bomb.
- GBU-28C/B. Laser/GPS/INS-guided 5,000-lb improved penetrating bomb.

**Dimensions:** Span 6.7 ft, length 14.4 ft, diameter 18 in (GBU-24); length approx. 20 ft, diameter 15 in (GBU-28).

**Performance:** Range more than 11 miles (GBU-24); range more than 5.75 miles (GBU-28).

**Guidance:** Semi-active laser.

**Warhead:** BLU-109 2,000-lb bomb (GBU-24); BLU-113 or BLU-122 5,000-lb bombs (GBU-28).

**Integration:** B-52, F-15E, F-16C/D (GBU-24); B-2A, B-52, F-15E (GBU-28).

## GBU-31/32/38 JOINT DIRECT ATTACK MUNITION (JDAM)

Air-to-surface guided bomb

**Brief:** JDAM is a GPS/INS-guided, autonomous, all-weather surface attack weapon. The joint USAF-Navy program upgrades the existing inventory of general-purpose bombs by adding a GPS/INS guidance kit for accurate all-weather attack from medium/high altitudes. The weapons acquire targeting information from the aircraft's avionics. After release, an inertial guidance kit directs the weapon aided by periodic GPS updates. JDAM seeker/tail kits can be mounted on general-purpose or penetrating warheads in each weight class. JDAM can also utilize the 500-lb carbon fiber-cased Very Low Collateral Damage Weapon (VLCDW) for sensitive targets. A JDAM kit is under development for the 5,000-lb BLU-113 penetrating weapon slated for



Ilka Cole/USAF

integration and flight-testing on the F-15E. The Advanced 2,000-lb (A2K) BLU-137/B weapon is also being developed for integration onto the F-15E and B-2A. A2K will improve both precision and penetration to strike a wider variety of targets, eventually replacing the BLU-109 bunker buster. JDAM-class weapons are the most frequent air-to-ground munition expended in combat. USAF is acquiring Strategic Anti-Jam Beamforming Receiver Y-Code (SABR-Y) tail kits and developing an advanced Military Code anti-jam GPS guidance for use in signal-degraded environments. The service is also working to field a lighter-weight successor class of weapons incorporating IR/GPS guidance, maneuver wings, stealth, and EW capabilities. The U.S. supplied winged JDAM-ER as part of weapons shipments to Ukraine which extend the weapons stand-off delivery to beyond 40 miles. USAF drastically reduced combat stockpile replenishment in FY22 before slightly increasing procurement to 4,200 tail kits in FY23. The FY25 request would procure 1,500 guidance kits. B-2s conducted a "QUICKSINK" demonstration using modified 2,000-lb JDAMs to supplement more expensive weapons in an anti-shipping role during Exercise RIMPAC in 2024.

**Contractors:** Boeing; Textron; Honeywell.

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

**IOC:** 1998.

**Active Variants:**

- GBU-31. GPS/INS-guided 2,000-lb GP, or BLU-109 penetrating weapon.
- GBU-32. GPS/INS-guided 1,000-lb GP, or BLU-110 penetrating weapon.
- GBU-38. GPS/INS-guided 500-lb GP, or BLU-140 (prev. BLU-111) penetrating weapon.

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

**Performance:** Range up to 15 miles, CEP with GPS 16.4 ft, CEP with only INS 98 ft.

**Guidance:** GPS/INS.

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

**Integration:** A-10C, B-52H, B-2A, B-1B, F-15E, F-16, F-22A, F-35A (GBU-31/32), and MQ-9.

## GBU-39 SMALL DIAMETER BOMB I (SDB I)

Guided air-to-surface glide bomb

**Brief:** SDB is a low-yield, all-weather precision guided munition designed to limit collateral damage and strike targets from up to 46 miles away. Experimentation began in 2001 in response to an ACC requirement for a miniaturized precision weapon. Boeing was selected to fully develop and produce the weapon in 2003 and low-rate initial production began in 2005. Its size allows it to be carried in fighter or bomber internal weapons bays or to increase overall loadout for more independent strikes per sortie. SDB I employs advanced anti-jam GPS/INS, and target coordinates are loaded on the ground or received from the aircraft before release. Several SDBs can be simultaneously released against multiple targets. The weapon was first employed by an F-15E over Iraq in 2006. The Focused Lethality Munition (FLM) is a low-collateral version employing a carbon fiber case to limit damage to structures. Laser SDB is capable of self-targeting as well as GPS-only modes and is equipped with a selectable HOB fuse to tailor kinetic effects. Current production versions incorporate Strategic Anti-Jam Beamforming Receiver Y-Code (SABR-Y) for use in GPS-denied/degraded environments. USAF reduced combat stockpile replenishment from over 2,000 weapons in FY21 to a total of 604 weapons in FY25, reflecting a shift to advanced standoff weapons to confront more advanced threats. Both air-launched GBU-39 and Ground-Launched SDB propelled by a 227 mm rocket are a significant part of U.S. military aid currently supplied to Ukraine.



William Lewis/USAF

**Contractor:** Boeing.  
**First Flight:** May 23, 2003.  
**IOC:** Oct. 2, 2006.  
**Production:** 24,000 (planned).

**Active Variant:**

- GBU-39/B SDB I. GPS/INS-guided 250-lb low-yield bomb.
- GBU-39A/B SDB I. GPS/INS-guided Focused Lethality Munition.
- GBU-39B/B SDB I. Semiactive laser/GPS-guided 250-lb low-yield bomb.

**Dimensions:** Length 6 ft, width 7.5 in; BRU-61/A carriage (four bombs) length 12 ft, width 16 in, height 16 in.  
**Performance:** Near-precision capability at standoff range up to 46 miles.  
**Guidance:** GPS/INS.  
**Warhead:** 250-lb class penetrating and blast fragmentation munition.  
**Integration:** A-10, AC-130J, F-15E, F-16, F-22, F-35A. Planned: B-1, B-52, B-21, MQ-9.

## GBU-53 STORMBREAKER (SMALL DIAMETER BOMB II)

Guided air-to-surface glide bomb

**Brief:** StormBreaker (formerly SDB II) is a joint USAF-Navy program to develop a low-yield, precision guided munition capable of striking moving targets in all weather from up to 46 miles away. Its size allows it to be carried in fighter or bomber internal weapons bays or to increase overall loadout to enable more independent strikes per sortie. Several StormBreakers can be simultaneously released against multiple targets. SDB II adds a millimeter-wave radar, imaging IR, and semi-active laser packaged into a tri-mode seeker. The bomb is retargetable after release. Improvements over SDB I include reduced susceptibility to countermeasures and network-enablement through Link 16/UHF data links. LRIP began in 2015, and USAF awarded the current production Lot 7 on April 30, 2021. Development includes integrating anti-jam GPS receiver, crypto and cyber security improvements, as well as guidance and lethality enhancements. SDB II began operational testing in June 2018 and achieved initial field-



Raytheon Missile and Defense

ing on the F-15E on Sept. 23, 2020, followed by IOC in September 2022. Navy testing is underway with the F-35B/C and the service declared early operational capability on the F-18E/F in October 2023 with IOC targeted for 2024. FY25 requested funding for up to 868 SDB IIs.

**Contractor:** Raytheon.  
**First Flight:** 2012.  
**IOC:** September 2022.

**Production:** 21,610 (planned).

**Active Variant:**

- GBU-53/B SDB II. Tri-mode guided 250-lb low-yield bomb.

**Dimensions:** Length 5.75 ft, wingspan 5.6 ft, diameter 7 in.  
**Performance:** Near-precision capability at standoff range up to 46 miles.  
**Guidance:** Tri-mode seeker millimeter-wave radar, uncooled IIR, and digital semi-active laser.  
**Warhead:** 250-lb-class penetrating blast fragmentation munition.  
**Integration:** F-15E. Planned: A-10, AC-130J, B-1, B-2, B-52, F-16, F-22, F-35, MQ-9.

## GBU-69 SMALL GLIDE MUNITION

Guided air-to-surface glide bomb

**Brief:** Small Glide Munition is a standoff precision guided munition tailored to SOF mission requirements. Internally carried GBU-69/B were integrated onto the next-generation AC-103J gunship as part of Block 20+ upgrades following initial operational testing. USSOCOM is working to integrate the weapon onto RPA platforms including the MQ-9. The weapon is deployable from the AC-130J's ramp-mounted Common Launch Tubes or dropped conventionally. It is capable of quietly reaching targets from standoff range using its deployable wings to minimize risk to delivery platforms. The weapon utilizes semi-active laser and lattice-type control



Dynetics

fins (similar to the GBU-57) for guidance and terminal stability, and is capable of receiving in-flight targeting updates via two-way data link. The weapon was jointly developed between Dynetics and USSOCOM. The company was awarded two contracts in FY18 totaling \$104 million for delivery of approximately 1,000 weapons through 2022. Procurement beyond FY21 decreased to align with future priorities such as Stand-Off Precision Guided Munitions (SOPGM) for use in contested environments. AFSOC is testing the Leidos "Black Arrow" small cruise missile on the AC-130J as a potential capability to meet future threats.

**Contractor:** Dynetics.

**First Flight:** Feb. 16, 2000 (USAF).

**Delivered:** 2020-present.

**IOC:** 2017 (USSOCOM).

**Active Variants:**

- GBU-69. Semi-active laser-guided 36-lb low-yield bomb.

**Dimensions:** Span 28 in, length 3.5 ft, diameter 4.5 in.  
**Propulsion:** None.  
**Performance:** Near-precision capability at standoff range of 20+ miles.  
**Guidance:** Semi-active laser. Warhead: 36-lb blast fragmentation.  
**Integration:** AC-130J; planned: MQ-9.

## GBU-72 ADVANCED 5,000-POUND PENETRATOR

Massive PGM

**Brief:** A5K is a GPS/INS-guided next-generation penetrating weapon for striking high-priority hardened and deeply buried targets. The GBU-72 comprises the BLU-138 5,000-lb-class weapon paired with a modified JDAM tail kit. The weapon is being developed as a more survivable, lethal, and affordable replacement to the current Paveway III-based GBU-28. A5K's successful ground detonation test was the largest open-air "Arena" test ever conducted at Eglin, and an F-15E successfully completed the first weapon release over the Eglin Range on July 23, 2021. The drop was the first of a three flight-test series and demonstrated both safe separation from the aircraft and the JDAM tail kit's ability to guide the weapon. GBU-72 completed captive-carry flights on the B-1B on Oct. 31, 2023, as part of the aircraft's external pylon testing and USAF has discussed integration on the B-2A. The weapon is undergoing integration test flights that were planned for completion by the end of FY24.



**Contractor:** Air Force Armament Directorate.

**First Flight:** July 23, 2021.

**Delivered:** 2022-present.

**IOC:** N/A.

**Active Variants:**

•GBU-72. GPS/INS guided 5,000-lb BLU-138 penetrating weapon.

**Guidance:** Semi-active laser.

**Warhead:** 5,000-lb (BLU-138/GBU-72) penetrating warhead.

**Dimensions:** N/A.

**Integration:** Planned: B-1B , B-2A , F-15E.

## GBU-43 MASSIVE ORDNANCE AIR BLAST (MOAB) BOMB

Massive guided bomb

**Brief:** MOAB is the largest satellite-guided, air-delivered weapon ever employed. It is designed for use against large area targets, deeply buried targets, or targets in tunnels or caves. The conventional HE bomb is GPS-guided, with fins and inertial gyro for pitch and roll. It was developed by the Air Force Research Laboratory Munitions Directorate at Eglin in only nine weeks to be available for the 2003 Iraq campaign. The weapon was designated Massive Ordnance Air Blast (MOAB) but is unofficially known as "Mother of All Bombs." The weapon was designed for deployment from the ramp of the now-retired MC-130H without a parachute. A total of 18,700 lb of the weapon's 21,000-lb weight is attributed to the BLU-120/B warhead. It was used operationally for the first time in April 2017 against an ISIS-occupied cave complex in Afghanistan.

**Contractors:** AFRL; Dynetics.

**First Flight:** March 11, 2003.

**IOC:** April 2003.

**Active Variant:**

•GBU-43/B. GPS-guided 21,000-lb bomb.

**Guidance:** GPS/INS.

**Warhead:** BLU-120/B 18,700-lb HE.

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

**Integration:** MC-130H.

## GBU-54 LASER JOINT DIRECT ATTACK MUNITION (LJDAM)

Air-to-surface guided bomb

**Brief:** LJDAM is a GPS/INS-guided, autonomous, all-weather attack weapon for use against fixed as well as moving ground and maritime targets. It is a joint USAF-Navy development that combines a laser guidance kit with the GPS/INS-based navigation of the existing GBU-38 JDAM. Laser JDAM made



Photo: Alex Fox Echols III

its combat debut in Iraq in August 2008. The initial LJDAM was a dual-mode, 500-lb guided weapon capable of attacking moving targets with precision using a semi-active laser guidance set. It was developed as an urgent operational need, and testing was completed in less than 17 months. The 500-lb variant was delivered in May 2008 and deployed in combat in Iraq three months later. Boeing more recently developed the GBU-56 (2,000-lb) variant, which uses

a similar semi-active laser guidance set. A Navy F-35C conducted the first simultaneous release of two externally carried GBU-54s as part of ongoing integration on all three variants of the Lightning II in early 2024.

**Contractor:** Boeing.

**First Flight:** 2005.

**IOC:** 2008.

**Active Variant:**

•GBU-54 Laser JDAM. Laser/GPS/INS-guided 500-lb GP, or BLU-111 penetrating weapon.

•GBU-56 Laser JDAM. Laser/GPS/INS-guided 2,000-lb GP, or BLU-109 penetrating weapon.

**Dimensions:** Length 7.7 ft, diameter 17 in. (GBU-54); length 12.6 ft, diameter 25.3 in (GBU-56).

**Performance:** Range up to 15 miles (40+ miles with JDAM ER wing set).

**Guidance:** GPS/INS with semi-active laser.

**Warhead:** Mk 82/BLU-111/BLU-126/BLU-129 500-lb munition (GBU-54); Mk 84/BLU-117/BLU-109/BLU-116 2,000-lb munition (GBU-56).

**Integration:** Planned: F-35.

## GBU-57 MASSIVE ORDNANCE PENETRATOR (MOP)

Massive PGM

**Brief:** MOP is a GPS-guided, earth-penetrating strike weapon for use against hardened and deeply buried targets. It was developed and tested through a USAF and Defense Threat Reduction Agency partnership in 2004 and is now managed by AFGSC. Flight-testing was conducted from 2008 to 2010, when the program transitioned to USAF. A B-2 successfully test-dropped the GBU-57 in 2014, 2015, and 2016. Several B-2s completed



a total of four test drops at White Sands Missile Range in 2017 validating the effectiveness of mods made under the Enhanced Threat Response IV upgrade. MOP proved effective, clearing the way for potential early fielding, though the Air Force's recommendation was classified. The service is currently testing the Large Penetrator Smart Fuse (LPSF) to increase precision and lethality, though delays constructing representative test targets have pushed potential fielding of the upgrade to FY25 or beyond. A B-2 employed an LPSF-equipped weapon against a tunnel test target in 2020 to validate the design, followed by a series of three performance test drops between August 2021 and May 2022. USAF conducted two full-scale tests in 2024 to validate B-2 integration fixes and Smart Fuse functionality, in addition to small-scale lethality tests.

**Contractor:** Boeing.

**First Flight:** 2008.

**IOC:** 2011.

**Operator:** AFGSC.

**Active Variant:**

•GBU-57B. GPS-guided 30,000-lb penetrating weapon.

**Guidance:** GPS.

**Warhead:** 5,740-lb HE.

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

**Integration:** B-2A (tests also conducted on the B-52).

**Aaron M. U. Church** is a freelance aviation writer and Active-duty officer stationed at JBSA Randolph, Texas. He is a former Air & Space Forces Magazine senior editor.