**F-117 Nighthawk**

*"F117" redirects here. For the F117-PW-100 turbofan engine, see* [*Pratt & Whitney PW2000*](http://en.wikipedia.org/wiki/Pratt_%26_Whitney_PW2000)*.*

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| **F-117 Nighthawk** |
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| **Role** | [Stealth](http://en.wikipedia.org/wiki/Stealth_aircraft) attack aircraft |
| **National origin** | [United States](http://en.wikipedia.org/wiki/United_States) |
| **Manufacturer** | [Lockheed](http://en.wikipedia.org/wiki/Lockheed)[Lockheed Martin](http://en.wikipedia.org/wiki/Lockheed_Martin) |
| **First flight** | 18 June 1981 |
| **Introduction** | 15 October 1983 |
| **Retired** | 22 April 2008 |
| **Primary user** | [United States Air Force](http://en.wikipedia.org/wiki/United_States_Air_Force) |
| **Number built** | 64 (5 YF-117A, 59 F-117A) |
| **Unit cost** | US$ 42.6 M (flyaway cost)US$ 111.2 M (total program)  |
| **Developed from** | [Lockheed Have Blue](http://en.wikipedia.org/wiki/Lockheed_Have_Blue) |

The [Lockheed](http://en.wikipedia.org/wiki/Lockheed_Corporation) **F-117 Nighthawk** is a [stealth](http://en.wikipedia.org/wiki/Stealth_technology) [ground attack aircraft](http://en.wikipedia.org/wiki/Ground_attack_aircraft) formerly operated by the [United States Air Force](http://en.wikipedia.org/wiki/United_States_Air_Force). The F-117A's first flight was in 1981, and it achieved Initial Operational Capability status in October 1983. The F-117A was "acknowledged" and revealed to the world in November 1988.

A product of the [Skunk Works](http://en.wikipedia.org/wiki/Skunk_Works) and a development of the [Have Blue](http://en.wikipedia.org/wiki/Lockheed_Have_Blue) technology demonstrator, it became the first operational aircraft initially designed around stealth technology. The F-117A was widely publicized during the [Persian Gulf War](http://en.wikipedia.org/wiki/Gulf_War) of 1991.

The Air Force retired the F-117 on 22 April 2008, primarily due to the acquisition and eventual deployment of the more effective [F-22 Raptor](http://en.wikipedia.org/wiki/F-22_Raptor) and B-2 Spirit.

**Development**

The F-117 was born after combat experience in the [Vietnam War](http://en.wikipedia.org/wiki/Vietnam_War) when increasingly sophisticated [Soviet](http://en.wikipedia.org/wiki/Soviet) [surface-to-air missiles](http://en.wikipedia.org/wiki/Surface-to-air_missile) (SAMs) downed heavy bomber flights.

In 1964, [Pyotr Ya. Ufimtsev](http://en.wikipedia.org/wiki/Pyotr_Ya._Ufimtsev), a Russian mathematician, published a seminal paper, "Method of Edge Waves in the Physical Theory of Diffraction", in the Journal of the Moscow Institute for Radio Engineering, in which he showed that the strength of a [radar](http://en.wikipedia.org/wiki/Radar) return is related to the edge configuration of an object, not its size. Ufimtsev was extending theoretical work published by the German physicist [Arnold Sommerfeld](http://en.wikipedia.org/wiki/Arnold_Sommerfeld). Ufimtsev demonstrated that he could calculate the radar cross-section across a wing's surface and along its edge. The obvious conclusion was that even a large airplane could be made stealthy by exploiting this principle. However, the airplane's design would make it aerodynamically unstable, and the state of computer science in the early 1960s could not provide the kinds of flight computers which allow aircraft such as the F-117, and [B-2 Spirit](http://en.wikipedia.org/wiki/B-2_Spirit) to stay airborne. However, by the 1970s, when a Lockheed analyst reviewing foreign literature found Ufimtsev's paper, computers and software had advanced significantly, and the stage was set for the development of a stealthy airplane.

***Senior Trend***

F-117A painted in "Gray Dragon" experimental camouflage scheme.

The F-117 was a [black project](http://en.wikipedia.org/wiki/Black_project), an ultra-secret program for much of its life, until the late 1980s. The project began with a model called "The Hopeless Diamond" (a wordplay on the [Hope Diamond](http://en.wikipedia.org/wiki/Hope_Diamond)) in 1975 due to its bizarre appearance. In 1977 Lockheed produced two 60% scale models under the [Have Blue](http://en.wikipedia.org/wiki/Lockheed_Have_Blue) contract. The Have Blue program was a stealth technology demonstrator that lasted from 1976 to 1979. The success of Have Blue led the Air Force to create the *Senior Trend* program which developed the F-117.

The decision to produce the F-117A was made on 1 November 1978, and a contract awarded to Lockheed Advanced Development Projects, popularly known as the *Skunk Works*, in [Burbank, California](http://en.wikipedia.org/wiki/Burbank%2C_California). The program was led by [Ben Rich](http://en.wikipedia.org/wiki/Ben_Rich). Rich called on Bill Schroeder, a Lockheed mathematician, and Denys Overholser, a computer scientist, to exploit Ufimtsev's work. They designed a computer program called Echo, which made it possible to design an airplane with flat panels, called facets, which were arranged so as to scatter over 99% of a radar's signal energy "painting" the airplane.

The F-117 first flew in June 1981, only 31 months after the full-scale development decision. The first production F-117A was delivered in 1982, operational capability was achieved in October 1983, and the last of 59 airplanes was delivered in the summer of 1990. The Air Force denied the existence of the aircraft until 1988, when a grainy photograph was released to the public. In April 1990 two were flown into Nellis Air Force Base, Nevada, arriving during daylight and visible to a crowd of tens of thousands. Five Full Scale Development (FSD) aircraft built and were designated "YF-117A".

F-117 taxiing.

As the Air Force has stated, "Streamlined management by Aeronautical Systems Center, [Wright-Patterson AFB](http://en.wikipedia.org/wiki/Wright-Patterson_AFB), [Ohio](http://en.wikipedia.org/wiki/Ohio), combined breakthrough stealth technology with concurrent development and production to rapidly field the aircraft... The F-117A program demonstrates that a stealth aircraft can be designed for reliability and maintainability." The aircraft maintenance statistics are comparable to other tactical fighters of similar complexity. Logistically supported by Sacramento Air Logistics Center, [McClellan AFB](http://en.wikipedia.org/wiki/McClellan_AFB), California, the F-117A was kept at the forefront of technology through a planned weapon system improvement program located at USAF [Plant 42](http://en.wikipedia.org/wiki/Plant_42) at [Palmdale, California](http://en.wikipedia.org/wiki/Palmdale%2C_California).

Several of the F-117s were painted with a gray camouflage pattern in an experiment to determine the effectiveness of the F-117's stealth during daylight conditions. 2004 and 2005 saw several mid-life improvement programs implemented on the F-117, including an [avionics](http://en.wikipedia.org/wiki/Avionics) upgrade.

**Designation**

An F-117A parked at Langley AFB, [Virginia](http://en.wikipedia.org/wiki/Virginia).

The 59 operational aircraft had the official designation of "F-117A". Most modern U.S. military aircraft use [post-1962 designations](http://en.wikipedia.org/wiki/1962_United_States_Tri-Service_aircraft_designation_system) in which the designation "F" is usually an air-to-air fighter, "B" is usually a bomber, "A" is usually a ground-attack aircraft, etc. (Examples include the [F-15](http://en.wikipedia.org/wiki/F-15_Eagle), the [B-2](http://en.wikipedia.org/wiki/B-2_Spirit), and the [A-6](http://en.wikipedia.org/wiki/A-6_Intruder).) The Stealth Fighter is primarily a ground-attack aircraft so its "F" designation is inaccurate.

F-117 flight demonstration

The designation "F-117" seems to indicate that it was given an official designation prior to the 1962 U.S. Tri-Service Aircraft Designation System and could be considered numerically to be a part of the earlier "Century series" of fighters. The assumption prior to the revealing of the aircraft to the public was that it would likely receive the designation F-19 as that number had not been used. However there were no other aircraft to receive a "100" series number following the [F-111](http://en.wikipedia.org/wiki/General_Dynamics_F-111). Captured Soviet fighters were given F-series numbers for their evaluation by U.S. test pilots, and with the advent of the [Teen Series](http://en.wikipedia.org/wiki/Teen_Series) fighters, most often [Century Series](http://en.wikipedia.org/wiki/Century_Series) designations.

As with other exotic military aircraft types flying in the southern Nevada area, such as captured fighters, an arbitrary radio call of "117" was assigned. This same radio call had been used by the enigmatic 4477th "Red Hats/Red Eagles" unit that often had flown expatriated MiGs in the area, but there was no relationship to the call and the formal [F-19](http://en.wikipedia.org/wiki/F-19) designation then being considered by the Air Force. Apparently, use of the "117" radio call became commonplace and when Lockheed released its first flight manual ("dash one"), F-117A was the designation printed on the cover.

A recent televised documentary quoted a senior member of the F-117A development team as saying that the top-notch fighter pilots required to fly the new aircraft were more easily attracted to an "F" plane, as opposed to a "B" or "A" aircraft.

**Nicknames**

The aircraft's official name is "Night Hawk", however the alternative form "Nighthawk" is frequently used.

As it prioritized stealth over aerodynamics, the first concept design was nicknamed "The Hopeless Diamond". Similarly, it earned the nickname "Wobbly-Goblin" due to its alleged instability at low speeds; according to F-117 pilots, the nickname is undeserved. "Wobbly (or wobblin') Goblin" is likely a holdover from the early Have Blue / Senior Trend (FSD) days of the project when instability was a problem. In the USAF, "Goblin" (without wobbly) persists as a nickname because of the aircraft's appearance. Locals around [Holloman Air Force Base](http://en.wikipedia.org/wiki/Holloman_Air_Force_Base) call it the "Stealth", while the band of Air Force members, [Dos Gringos](http://en.wikipedia.org/wiki/Dos_Gringos), refer to it as the "Stinkbug".

F-117 pilots call themselves "Bandits". Each of the 558 Air Force pilots who have flown the F-117 have a Bandit number, such as "Bandit 52", that indicates the sequential order of their first flight in the F-117.

**F-117N “Seahawk”**

In the early 1990s, Lockheed began to pitch an upgraded, carrier capable variant of the F-117 dubbed the “Seahawk” as an alternative to the canceled A/F-X program. The unsolicited proposal was received poorly by the Department of Defense, who had little interest in the single mission capabilities of such an aircraft, particularly as it would take money away from the Joint Advanced Strike Technology program (which evolved into the [Joint Strike Fighter](http://en.wikipedia.org/wiki/Joint_Strike_Fighter)). The new aircraft would have differed from the land based F-117 in several ways, including the addition “of elevators, a bubble canopy, a less sharply swept wing and reconfigured tail". The “N” variant would also be re-engined to use [General Electric F414](http://en.wikipedia.org/wiki/General_Electric_F414) turbofans instead of the older [General Electric F404s](http://en.wikipedia.org/wiki/General_Electric_F404). Furthermore the aircraft would be optionally fitted with hardpoints, allowing for an additional 8,000 lb. of payload, and a new ground attack radar with air-to-air capability. In that role the F-117N could carry [AIM-120 AMRAAM](http://en.wikipedia.org/wiki/AIM-120_AMRAAM) air-to-air missiles.

After being rebuffed by the Navy, Lockheed submitted an updated proposal that included afterburning capability and a larger emphasis on the F-117N as a mult-imission aircraft, rather than just a strike aircraft. In efforts to boost interest, Lockheed also proposed an *F-117B* land-based variant that shared most of the F-117N capabilities. This variant was proposed to both the US Air Force and the RAF. This renewed F-117N proposal was also known as the *A/F-117X*. Neither the F-117N or the F-117B were purchased by any party.

**Design**

The front side of an F-117

About the size of an [F-15C Eagle](http://en.wikipedia.org/wiki/F-15_Eagle), the single-seat F-117A is powered by two non-afterburning [General Electric](http://en.wikipedia.org/wiki/GE-Aviation) [F404](http://en.wikipedia.org/wiki/General_Electric_F404) turbofan engines, and has quadruple-redundant [fly-by-wire flight controls](http://en.wikipedia.org/wiki/Fly-by-wire). It is [air refuellable](http://en.wikipedia.org/wiki/Aerial_refueling). To lower development costs, the avionics, fly-by-wire systems, and other parts are derived from the [F-16 Fighting Falcon](http://en.wikipedia.org/wiki/F-16_Fighting_Falcon), [F/A-18 Hornet](http://en.wikipedia.org/wiki/F/A-18_Hornet) and [F-15E Strike Eagle](http://en.wikipedia.org/wiki/F-15E_Strike_Eagle).

Among the penalties for stealth are lower engine power thrust, due to losses in the inlet and outlet, a very low wing [aspect ratio](http://en.wikipedia.org/wiki/Aspect_ratio_%28wing%29), and a high [sweep angle](http://en.wikipedia.org/wiki/Sweep_angle) (50°) needed to deflect incoming radar waves to the sides. With these design considerations and no [afterburner](http://en.wikipedia.org/wiki/Afterburner), the F-117 is limited to subsonic speeds.

The F-117A is equipped with sophisticated navigation and attack systems integrated into a digital avionics suite. It carries no radar, which lowers emissions and cross-section. It navigates primarily by [GPS](http://en.wikipedia.org/wiki/Global_Positioning_System) and high-accuracy [inertial navigation](http://en.wikipedia.org/wiki/Inertial_navigation). Missions are coordinated by an automated planning system that can automatically perform all aspects of a strike mission, including weapons release. Targets are acquired by a [thermal imaging](http://en.wikipedia.org/wiki/Thermal_imaging) [infrared](http://en.wikipedia.org/wiki/Infrared) system, slaved to a [laser](http://en.wikipedia.org/wiki/Laser) that finds the range and designates targets for [laser-guided bombs](http://en.wikipedia.org/wiki/Laser-guided_bomb).

The F-117A's split internal bay can carry 5,000 lb. (2,300 kg) of ordnance. Typical weapons are a pair of [GBU-10](http://en.wikipedia.org/wiki/GBU-10), [GBU-12](http://en.wikipedia.org/wiki/GBU-12), or [GBU-27](http://en.wikipedia.org/wiki/GBU-27) laser-guided bombs, two [BLU-109](http://en.wikipedia.org/wiki/BLU-109) penetration bombs, or two Joint Direct Attack Munitions ([JDAMs](http://en.wikipedia.org/wiki/JDAM)), a GPS/INS guided stand-off bomb.

**Operational history**

An F-117A during landing employing a drag-chute.

During the program's early years, from 1984 to mid-1992, the F-117A fleet was based at [Tonopah Test Range Airport](http://en.wikipedia.org/wiki/Tonopah_Test_Range_Airport), [Nevada](http://en.wikipedia.org/wiki/Nevada) where it served under the [4450th Tactical Group](http://en.wikipedia.org/wiki/4450th_Tactical_Group). Because the F-117 was classified during this time, the 4450th Tactical Group was "officially" located at [Nellis Air Force Base](http://en.wikipedia.org/wiki/Nellis_Air_Force_Base), [Nevada](http://en.wikipedia.org/wiki/Nevada) and equipped with [A-7 Corsair II](http://en.wikipedia.org/wiki/A-7_Corsair_II) aircraft. The 4450th was absorbed by the 37th Tactical Fighter Wing in 1989. In 1992, the entire fleet was transferred to [Holloman Air Force Base](http://en.wikipedia.org/wiki/Holloman_Air_Force_Base), [New Mexico](http://en.wikipedia.org/wiki/New_Mexico), where it was placed under the command of the [49th Fighter Wing](http://en.wikipedia.org/wiki/49th_Fighter_Wing). The move eliminated Key Air flights, which flew 22,000 passenger trips on 300 flights from Nellis to Tonopah per month.

The F-117 has been used several times in war. Its first mission was during the [United States invasion of Panama](http://en.wikipedia.org/wiki/United_States_invasion_of_Panama) in 1989. During that invasion two F-117A Nighthawks dropped two bombs on Rio Hato airfield.

F-117s in formation

During the Persian Gulf War in 1991, the F-117A flew approximately 1,300 sorties and scored direct hits on 1,600 high-value targets in Iraq while flying 6,905 combat flying hours. The F-117 comprised only 2.5% of the American aircraft in Iraq yet struck more than 40% of the strategic targets. "During their mission, the F-117A pilots delivered over 2,000 tons of precision-guided ordnance with a hit rate of better than 80 percent. Although the 37th Tactical Fighter Wing Provisional and its 42 stealth fighters represented just 2 1/2 percent of all allied fighter and attack aircraft in the [Persian Gulf](http://en.wikipedia.org/wiki/Persian_Gulf), the F-117As were assigned against more than 31 percent of the strategic Iraqi military targets attacked during the first 24 hours of the air campaign." During the war, it performed poorly dropping [smart bombs](http://en.wikipedia.org/wiki/Smart_bomb) on military targets, achieving a success rate of only 40%.

Lockheed F-117 Nighthawk USAF video

It was among the only U.S. or coalition aircraft to strike targets in downtown Baghdad. Among the aircraft with which the Nighthawk shared this distinction were the F-16s which attacked Baghdad during daylight on 19 January 1991 during the "Package Q" mission—the largest single strike flown during the war.

Since moving to [Holloman AFB](http://en.wikipedia.org/wiki/Holloman_AFB) in 1992, the F-117A and the men and women of the 49th Fighter Wing have deployed to Southwest Asia more than once. On their first trip, the F-117s flew non-stop from Holloman to Kuwait, a flight of approximately 18.5 hours – a record for single-seat fighters that stands today.

It has since been used in [Operation Allied Force](http://en.wikipedia.org/wiki/Operation_Allied_Force) in 1999, [Operation Enduring Freedom](http://en.wikipedia.org/wiki/Operation_Enduring_Freedom) in 2001 and in [Operation Iraqi Freedom](http://en.wikipedia.org/wiki/Operation_Iraqi_Freedom) in 2003.

**Combat losses**

Canopy of F-117 shot down on 27 March 1999, near the village of [Buđanovci](http://en.wikipedia.org/wiki/Bu%C4%91anovci), [Serbia](http://en.wikipedia.org/wiki/Serbia) ([Museum of Aviation in Belgrade](http://en.wikipedia.org/wiki/Museum_of_Aviation_in_Belgrade))

One F-117 has been lost in combat, to the [Yugoslav Army](http://en.wikipedia.org/wiki/Yugoslav_Army). On 27 March 1999, during the [Kosovo War](http://en.wikipedia.org/wiki/Kosovo_War), the 3rd Battalion of the [250th Air Defense Missile Brigade](http://en.wikipedia.org/wiki/250th_Air_Defence_Missile_Brigade) under the command of Colonel [Zoltán Dani](http://en.wikipedia.org/wiki/Zolt%C3%A1n_Dani), equipped with the [Isayev S-125 'Neva'](http://en.wikipedia.org/wiki/S-125) (NATO designation SA-3 'Goa') anti-aircraft missile system, downed a F-117A callsign "Vega 31", AF Serial Number 82-0806, with a Serbian-improved Neva-M missile. According to [NATO Commander](http://en.wikipedia.org/wiki/Supreme_Headquarters_Allied_Powers_Europe) [Wesley Clark](http://en.wikipedia.org/wiki/Wesley_Clark) and other NATO generals, Yugoslav air defenses detected F-117s by operating their radars on unusually long wavelengths, making them visible to radar for brief periods.

Reportedly, several SA-3s were launched from approximately 8 miles out, one of which detonated near the F-117A, forcing the pilot to eject. Though still classified, it is believed that the F-117 has no radar warning indicator, so the pilot's first indication of an incoming missile was likely seeing its flame. At this distance and combined speed the pilot had about six seconds to react before impact. According to an interview, Zoltán Dani kept most of his missile sites intact by frequently moving them, and had spotters looking for F-117s and other NATO aircraft. He oversaw the modification of his targeting radar to improve its detection. The commanders and crews of the SAMs guessed the flight paths of earlier F-117A strikes from rare radar spotting and positioned their SAM launchers and spotters accordingly. It is believed that the SA-3 crews and spotters were able to locate and track F-117A *82-806* visually, probably with infra-red and night vision systems. He claimed that his battery shot down an F-16 as well.

The F-117 pilot survived and was later rescued by U.S. [Air Force Pararescue](http://en.wikipedia.org/wiki/Air_Force_Pararescue) personnel. The wreckage of the F-117 was not promptly bombed, due to possible media fallout from news footage of civilians around the wreckage. The Serbs are believed to have invited Russian personnel to inspect the remains, compromising the then 25-year old U.S. stealth technology. The remains are displayed at the [Museum of Aviation in Belgrade](http://en.wikipedia.org/wiki/Museum_of_Aviation_in_Belgrade) close to [Belgrade Nikola Tesla Airport](http://en.wikipedia.org/wiki/Belgrade_Nikola_Tesla_Airport). An error was made by many about the pilot's identity. While the name "Capt. Ken 'Wiz' Dwelle" was painted on the canopy, it was revealed in 2007 that the pilot was Lt Col Dale Zelko, USAF.

Some American sources acknowledge that a second F-117A was damaged during the same campaign, allegedly on 30 April. Although the aircraft returned to base, it supposedly never flew again.

**Retirement**

Despite its productive combat service, the F-117 was designed with late 1970s technologies. Its stealth technology, while more advanced than that of any other aircraft except the [B-2 Spirit](http://en.wikipedia.org/wiki/B-2_Spirit) and the [F-22](http://en.wikipedia.org/wiki/F-22) ], is maintenance intensive. Furthermore, the facet-based stealth design has been surpassed by newer technology. Program Budget Decision 720 (PBD 720), dated 28 December 2005, proposed retiring the entire fleet by October 2008 to permit buying more F-22As. PBD 720 called for 10 aircraft to be retired in FY 2007 and the remaining 42 aircraft in FY 2008 and stated there were more capable Air Force assets that could provide low observable, precision penetrating weapons capability including the B-2, F-22 and [JASSM](http://en.wikipedia.org/wiki/JASSM). The Air Force originally planned to retire the F-117 in 2011. The Air Force later decided to retire the F-117 sooner to shift funds to modernizing the rest of the fleet. This would save an estimated $1.07 billion.

A pair of specially painted F-117 Nighthawks fly off from their last refueling by the Ohio Air National Guard's [121st Air Refueling Wing](http://en.wikipedia.org/wiki/121st_Air_Refueling_Wing)

In late 2006, the Air Force closed the F-117 pilot school, and announced the retirement of the F-117. The first six aircraft to be retired made the last flight on [12 March](http://en.wikipedia.org/wiki/March_12) [2007](http://en.wikipedia.org/wiki/2007) after a ceremony at Holloman AFB to commemorate the aircraft's career. Brigadier General David Goldfein, commander of the 49th Fighter Wing, said at the ceremony, "With the launch of these great aircraft today, the circle comes to a close — their service to our nation's defense fulfilled, their mission accomplished and a job well done. We send them today to their final resting place — a home they are intimately familiar with — their first, and only, home outside of Holloman."

Unlike most other Air Force aircraft which are retired to [Davis-Monthan AFB](http://en.wikipedia.org/wiki/Davis-Monthan_AFB), the F-117s are being retired to the [Tonopah Test Range Airport](http://en.wikipedia.org/wiki/Tonopah_Test_Range_Airport). At Tonopah, their wings will be removed and the aircraft will be stored in their original hangars. On 11 March 2008, it was reported that the last F-117s in service would touch down on 22 April 2008 in Tonopah Test Range Airfield in Nevada, the site of the F-117's first flight. The F-117 was retired during ceremonies at Palmdale and Tonopah on 22 April 2008. Four aircraft were kept flying beyond April by the 410th Flight Test Squadron at Palmdale for flight test. By the beginning of August, two were remaining, and the last F-117 left Palmdale to fly to Tonopah on 11 August 2008. With the last aircraft leaving for retirement, the 410th was deactivated in a ceremony on 1 August 2008.

**Aircraft on display**

The first YF-117A is currently on pedestal display at Nellis Air Force Base, Nevada ([36°13′38.00″N 115°3′33.28″W﻿ / ﻿36.2272222°N 115.0592444°W﻿ / 36.2272222; -115.0592444](http://stable.toolserver.org/geohack/geohack.php?pagename=F-117_Nighthawk&params=36_13_38.00_N_115_3_33.28_W_)) and is visible from outside the base on Nellis Blvd. The second YF-117A is currently on static display at the [National Museum of the Air Force](http://en.wikipedia.org/wiki/National_Museum_of_the_United_States_Air_Force) at [Wright-Patterson Air Force Base](http://en.wikipedia.org/wiki/Wright-Patterson_Air_Force_Base), Ohio. The third YF-117A built is on static display at Holloman Air Force Base, repainted to resemble the first F-117A used to drop weapons in combat. The fourth YF-117A built is currently on static display in the Blackbird Airpark at [Air Force Plant 42](http://en.wikipedia.org/wiki/Air_Force_Plant_42) in Palmdale, California. Parts of a downed F-117A are also on display at the [Museum of Aviation in Belgrade](http://en.wikipedia.org/wiki/Museum_of_Aviation_in_Belgrade).

**Specifications**

An F-117 conducts a live exercise bombing run using GBU-27 laser-guided bombs.

A front view of an F-117, showing its shielded air-intakes.

*Data from* National Museum

**General characteristics**

* **Crew:** 1
* **Length:** 65 ft 11 in (20.09 m)
* [Wingspan](http://en.wikipedia.org/wiki/Wingspan)**:** 43 ft 4 in (13.20 m)
* **Height:** 12 ft 9.5 in (3.78 m)
* **Wing area:** 780 ft² (73 m²)
* **Empty weight:** 29,500 [lb.](http://en.wikipedia.org/wiki/Pound_%28mass%29) (13,380 kg)
* **Loaded weight:** 52,500 lb. (23,800 kg)
* **Powerplant:** 2× [General Electric](http://en.wikipedia.org/wiki/General_Electric_Aviation) [F404-F1D2](http://en.wikipedia.org/wiki/General_Electric_F404) [turbofans](http://en.wikipedia.org/wiki/Turbofan), 10,600 [lbf](http://en.wikipedia.org/wiki/Pound-force) (48.0 kN) each

**Performance**

* [Maximum speed](http://en.wikipedia.org/wiki/V_speeds#Vno): [Mach](http://en.wikipedia.org/wiki/Mach_number) 0.92 (617 mph, 993 km/h)
* [Cruise speed](http://en.wikipedia.org/wiki/V_speeds#Vc): Mach 0.92
* [Range](http://en.wikipedia.org/wiki/Range_%28aircraft%29): 930 [NM](http://en.wikipedia.org/wiki/Nautical_mile) (1720 km)
* [Service ceiling](http://en.wikipedia.org/wiki/Ceiling_%28aeronautics%29): 69,000 ft (20,000 m)
* [Wing loading](http://en.wikipedia.org/wiki/Wing_loading): 65 lb./ft² (330 kg/m²)
* [Thrust/weight](http://en.wikipedia.org/wiki/Thrust-to-weight_ratio): 0.40

**Armament**

* 2 × internal weapons bays with one [hardpoint](http://en.wikipedia.org/wiki/Hardpoint) each (total of two weapons) equipped to carry:
* **Bombs:**
	+ [BLU-109](http://en.wikipedia.org/wiki/BLU-109_bomb) hardened penetrator
	+ [GBU-10 Paveway II](http://en.wikipedia.org/wiki/GBU-10_Paveway_II) laser-guided bomb
	+ [GBU-12 Paveway II](http://en.wikipedia.org/wiki/GBU-12_Paveway_II) laser-guided bomb
	+ [GBU-27 Paveway III](http://en.wikipedia.org/wiki/GBU-27_Paveway_III) laser-guided bomb
	+ [JDAM](http://en.wikipedia.org/wiki/JDAM) [INS](http://en.wikipedia.org/wiki/Inertial_guidance)/[GPS](http://en.wikipedia.org/wiki/GPS) guided munition