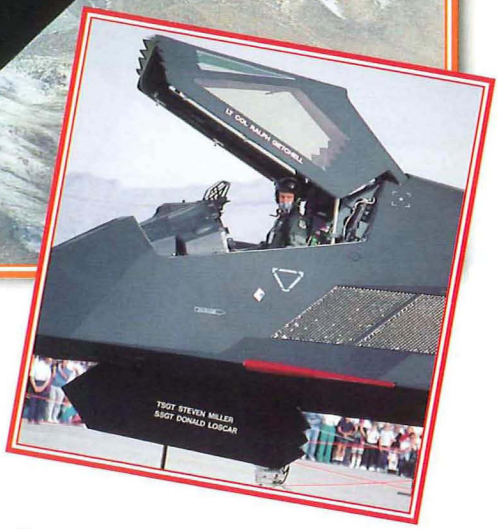
F-117 NIGHTHAWK

● 'Stealth' fighter ● Invisible to radar ● Deadly accurate attacker



▲ *The intense secrecy surrounding 'Stealth' meant that it was not until the late 1980s that the F-117's true shape was revealed. And that angled, faceted shape was like no other aircraft.*

Almost invisible to radar, the F-117A 'Stealth' fighter is one of the most sophisticated warplanes ever built and has revolutionised air warfare. It was operated at first under conditions of total secrecy, but in 1991 the US Air Force deployed it openly to Saudi Arabia for service in the Gulf War. Ranging the night skies over Baghdad, it struck the most heavily defended Iraqi targets to stunning effect.

SAMPLE!

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The invisible bomber

The sky over a modern battlefield is a dangerous place. Radar-guided missiles and guns endanger any aircraft flying more than a few inches above the ground. Flying fast and low makes survival more likely, but at the same time makes hitting the target a matter of split-second timing.

In an attempt to counteract the seemingly impossible advantage to the defenders, Lockheed's shadowy 'Skunk Works' – the Advanced Development Project Office – was contracted by the US Department of Defense in the late 1970s to produce a low-observable strike fighter. Operational by 1983, the F-117A 'Stealth' fighter is perhaps the most unusual aircraft ever flown.

The F-117's unusual shape and the advanced material from which it is manufactured make the 'Stealth' fighter all but invisible to radar. By flying at night, the black jet is also invisible to the eye.

Because it can't be detected, the F-117 can take its time in attack. This makes for remarkably accurate weapons delivery, as was shown to great effect during the Gulf War.

The unique arrow shape of the F-117 is naturally unstable. The aircraft is kept stable by computerised fly-by-wire controls.

SPECIFICATION
F-117A Nighthawk

Type: single-seat low-observable strike fighter

Powerplant: two 48.05-kN non-afterburning General Electric F404-GE-F1D2 engines

Maximum speed: Mach 1 (estimated)

Combat radius: 1200 km unrefuelled, with 2250 kg weapon load

Service ceiling: not revealed

Weights: empty 13600 kg; loaded 23814 kg

Armament: up to 2500 kg carried internally. Principal weapons are BLU-109 low-level or GBU10/GBU27 medium-level laser-guided bombs. Provision for two AIM-9L air-to-air missiles

Dimensions:

span	13.20 m
length	10.08 m
height	3.78 m
wing area (estimated)	106.00 m²

F-117A Nighthawk

The F-117A is operated by the 49th Fighter Wing (formerly the 37th FW) based at Holloman AFB in New Mexico.

The edges of the F-117's cockpit canopy, like all surfaces on the aircraft, have no right-angles – these are strong reflectors of radar.

Two imaging infra-red turrets are recessed into the nose of the F-117. One looks forwards to acquire targets; the other is on the underside, and is used for tracking and laser designation.

The F-117 can be refuelled in flight through a receptacle on its dorsal spine.

The skeleton of the F-117 is made mainly from aluminium. The aircraft's skin, by contrast, is mostly composite RAM, or radar-absorbent material.

Bombs are strong radar reflectors, so the F-117 carries its weapons internally. The bomb doors only open for a moment when the warload is released.

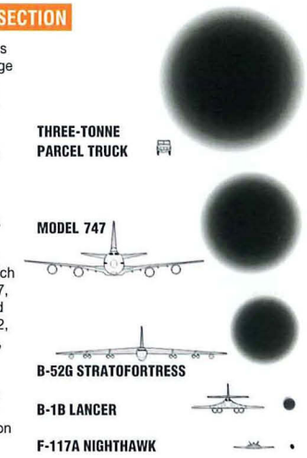
The Nighthawk's twin General Electric engines are buried deep in the fuselage. They have shallow 'platypus' exhausts, which cool and deflect the exhaust gases upward to minimise heat emissions.

The twin butterfly tail obscures the exhaust plume from infra-red sensors aboard pursuing fighters.

COMBAT DATA

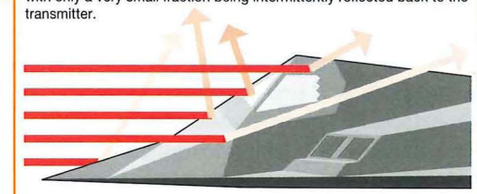
RADAR CROSS-SECTION

Radar cross-section is a measure of how large an object appears to be on a radar screen. Several things affect the cross-section. Right-angles are very good reflectors of energy, hence the immense signal returned by the truck. The fan blades in jet engines also return a significant signal, which is why the Boeing 747, with its huge exposed turbofans, or the B-52, with its eight engines, generate such large returns. Both of the more modern aircraft show how effectively the radar cross-section can be reduced.



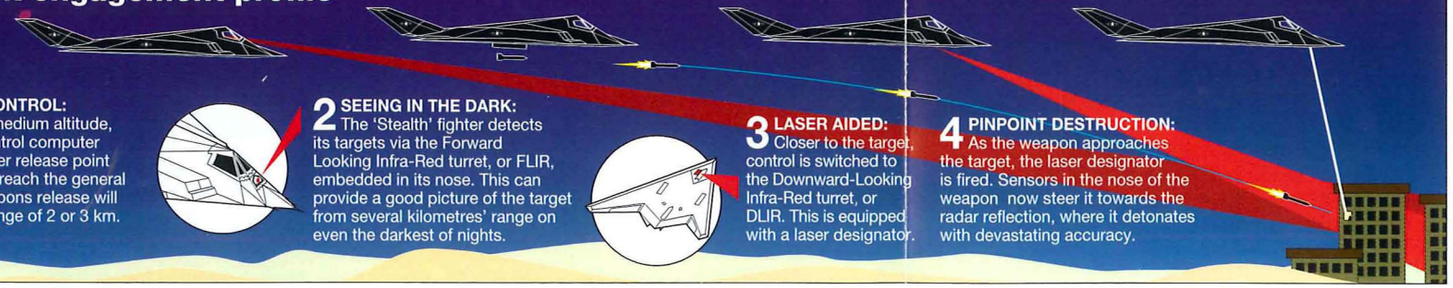
HOW STEALTH WORKS

The Stealth fighter has two main means of defeating enemy radar. The faceted construction deflects most radar energy in multiple directions, with only a very small fraction being intermittently reflected back to the transmitter.



Radar Absorbent Material (RAM) and composites absorb radar energy, leaving much less to be reflected.

Nighthawk engagement profile



1 COMPUTER CONTROL: Bombing from medium altitude, the F-117's fire-control computer calculates the proper release point for the weapons to reach the general target vicinity. Weapons release will generally be at a range of 2 or 3 km.

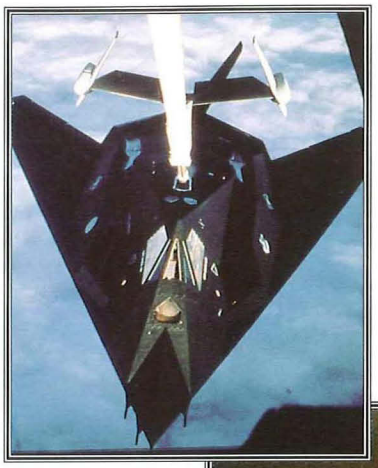
2 SEEING IN THE DARK: The 'Stealth' fighter detects its targets via the Forward Looking Infra-Red turret, or FLIR, embedded in its nose. This can provide a good picture of the target from several kilometres' range on even the darkest of nights.

3 LASER AIDED: Closer to the target, control is switched to the Downward-Looking Infra-Red turret, or DLIR. This is equipped with a laser designator.

4 PINPOINT DESTRUCTION: As the weapon approaches the target, the laser designator is fired. Sensors in the nose of the weapon now steer it towards the radar reflection, where it detonates with devastating accuracy.

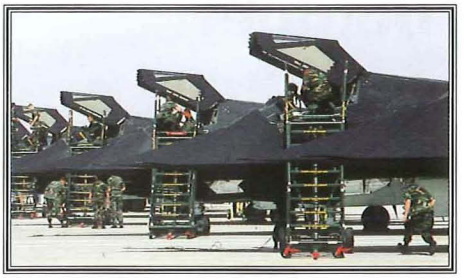
PHOTO FILE

LOCKHEED F-117 NIGHTHAWK



◀ The 'Wobblin' Goblin'

Rumours abounded that the handling of the F-117 was somewhat erratic, especially when refuelling. As a result, one of the first nicknames for the plane was the 'Wobblin' Goblin'.

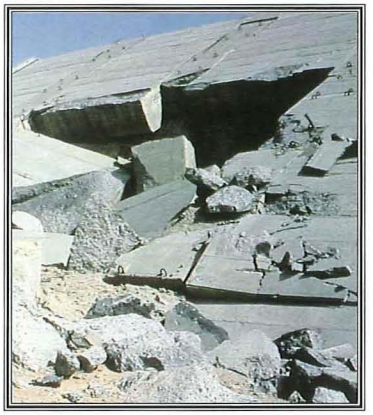


▲ An expensive bird

Only 59 production 117s were built, for a total programme cost of over six billion dollars.

In harm's way ▶

The F-117 was the only Coalition aircraft able to operate with impunity over Baghdad's extensive anti-aircraft defences.



▼ Gulf War spearhead

Forty F-117s were deployed to the Gulf.

▲ Lethal weapon

The Nighthawk used laser-guided weapons to destroy Iraqi headquarters and concrete bunkers.

FACTS AND FIGURES

- The 40 F-117s deployed to the Gulf flew more than 1,270 missions, dropping 30 per cent of all Coalition precision-guided munitions.
- One B-52 bomber has a larger radar cross-section than all of the F-117s put together.
- The F-117 was operational for seven years before it made its first public appearance.
- The F-117's weapons system can hit a target a metre square.
- The first combat use of the F-117 came in Panama on 21 December 1989.
- The F-117's radar cross-section is about one one-hundredth of a square metre – about the same as that of a seagull.

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