USAF photo by MSgt. Lance Cheung

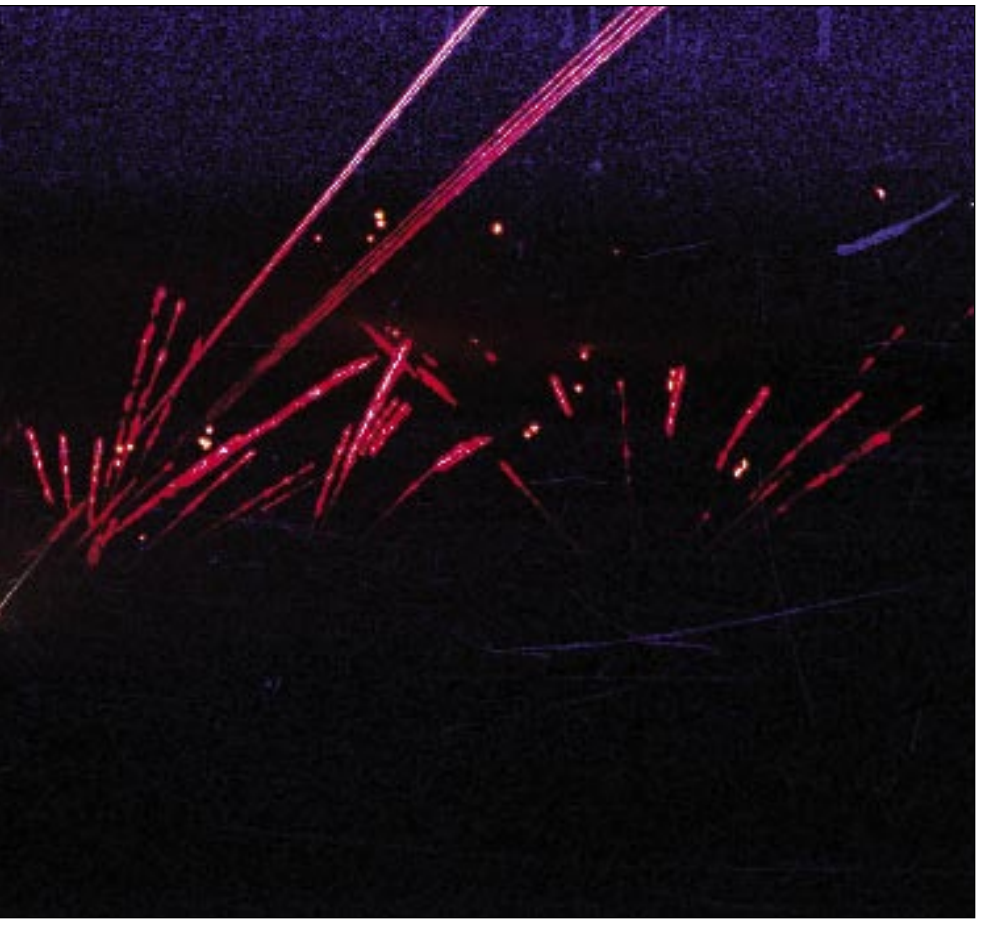
Fade

The F-117 Nighthawk combined low observable characteristics with the pinpoint accuracy of laser guided munitions. These features allowed it to operate with impunity in the dense air defenses around Baghdad, seen above, during Desert Storm.

The world's first operational stealth aircraft, the F-117, is nearing the end of an amazing career.

to Black

By Rebecca Grant



AP photo by Dominique Mollard

It's official. America's first operational stealth aircraft, the F-117 Nighthawk, is set for retirement.

"It is still a good airplane right now," Gen. T. Michael Moseley, Air Force Chief of Staff, said of this strange-looking but highly effective weapon. However, he added, "it's time to start looking at a transition" from the F-117 to something else.

Moseley noted that, after another 10 to 15 years, the service will have F-22s and F-35 Joint Strike Fighters possessing the same low observable characteristics and able to carry more than just two weapons—the F-117's limit.

The Air Force's 2007 budget request called for the retirement by 2008 of the entire fleet, but Moseley later allowed that the day could be postponed to a point at which a larger number of F-22s have entered into service.

The F-117 first saw action in Panama in 1989 during Operation Just Cause. Ever since, the "Black Jet" has been a star player in a new era of air warfare. That new era started with a bang in 1991, when the F-117 matched up stealth and precision during the first Gulf War.

The F-117 is also likely to retire with an amazing distinction: It suffered no combat fatalities. Although one F-117 was shot down in Yugoslavia in 1999, during NATO's Operation Allied Force, that pilot was rescued.

At first glance, it was hard to believe that the oddly shaped aircraft sometimes called the "cockroach" or "stinkbug" could achieve so much.

The Zowie Factor

"When I first looked at [the F-117A]," said Col. Al Whitley, an early Nighthawk pilot, "it reminded me of some Star Wars type of aircraft. I thought, 'Boy, is this the 21st century!'" Whitley later flew F-117s in Panama and Desert Storm as commander of the 37th Tactical Fighter Wing, Nellis AFB, Nev. (See "The Secret Doings at Tonopah," January 1993, p. 72.)

The F-117 began as an idea. Starting in the 1940s, aircraft designers had sought ways to spoof radar. Aircraft such as the SR-71 incorporated some signature reduction techniques. By 1974, the Defense Advanced Research Projects Agency's "Project Harvey" was casting about for ways to reduce radar cross section.

The breakthrough came in 1975, when a Lockheed computer scientist named Denys Overholser saw inspiration in a translated Soviet paper. Lockheed ginned up a computer program to measure and predict how different shapes could diminish the amount of energy reflected back to a tracking radar.

The trick was to combine radar absorbing materials with an aircraft built of angles and facets to reduce its radar cross section. If designed properly, according to these revolutionary principles, a full-scale fighter jet might send back no more energy than a tiny object.

Of course, it would look like no airplane ever seen before. The engineers nicknamed their concept the "Hopeless Diamond."

Ben Rich, the head of Lockheed's Skunk Works, sold the Air Force on the

Lockheed Martin photo

Lockheed Martin built the "Have Blue" F-117 prototype seen here for the Defense Advanced Research Projects Agency in the 1970s. The F-117 first flew in 1981, but the program remained under wraps for seven years.

idea, and the stealth era was born. (See "How the Skunk Works Fielded Stealth," November 1992, p. 22.)

Another big supporter was William J. Perry, who arrived at the Pentagon as defense undersecretary for research and engineering in 1977.

Two Have Blue prototypes were built for DARPA. The first began flying in December 1977. By that summer, and in a precursor to the aircraft's teething problems, both had crashed. Fortunately, the birds had flown long enough to demonstrate stealth's potential.

Radar range tests on the prototypes had quickly proved the theories of stealth. The F-117 was not exactly invisible. It was just extremely hard to detect and distinguish.

Aviation historian Don Holloway later described the F-117 on radar as "at most, a low-intensity, nebulous radar sparkle that was nearly indistinguishable on a radar scope from background noise until the aircraft was well within a ground missile's minimum launch range." The phenomenon gave the pilot of the stealth aircraft a tremendous advantage over the radar operators of the surface-to-air missile crew.

A total of 59 operational F-117s were secretly and quickly built, often using off-the-shelf parts. For years, Lockheed Martin maintained the aircraft under contract.

"We guaranteed to deliver an aircraft which would have stealth characteristics, be virtually undetectable by today's known radar technologies, and be able to deliver a weapons system with unprecedented accuracy," said Rich.

The Air Force also took the important step of making the F-117 a precision bomber. Armed with two laser guided GBU-27s, weighing 2,000 pounds apiece, the F-117 could attack hard targets with pinpoint accuracy.

The Nighthawk's fighter designation is a misnomer. Everything about it was optimized to excel at precision attack. It carries no air-to-air weapons, and its unorthodox shape had less-than-ideal aerodynamics. The aircraft would never "fight" another aircraft.

At First, Doubts

There were early doubts about what this secret aircraft could really do in air warfare.

One of the few who learned about the program in the early 1980s was Buster C. Glosson, then a colonel on the Air Staff. He remembered his boss telling him about a classified prototype based on radar cross section reduction.

"I didn't have any idea how good it was," Glosson wrote later. "We had to work it secretly with committees on Capitol Hill and enter that money in the budget in ways that were not obvious."

These were serious dollars. "It was awfully expensive," said Glosson, "but you had to be oblivious to warfighting not to see the benefits."

The F-117 remained one of the Air Force's biggest secrets. From the time of its first flight in June 1981, no one acknowledged the existence of the program. Production aircraft began flying steadily in 1982. Even fatal crashes in 1986 and 1987 did not unmask the program. The Air Force took extraordinary precautions, going so far as to plant parts from an F-101 after one of the crash sites had been cleansed.

The secrecy ended on Nov. 10, 1988 when the Air Force published a grainy picture of the F-117 and officially acknowledged its existence.

Still, few had seen the Black Jet up close. "Prior to April 21, 1990, nobody could get close to those airplanes," recalled Bobby Shelton, a former public affairs officer for the Air Force, in a February interview with the *Las Vegas Review-Journal.*

The rollout was a media sensation. "We had it cordoned off with a 50-foot cord and had a mini-open house at Nellis. We had about 350 media types from around the world in addition to tens

USAF photo by TSgt. Kevin J. Gruenwald

SSgt. Robin Walker (l) and SSgt. Greg Slavik prepare an F-117 for a Red Flag mission at Nellis AFB, Nev. F-117s are based at Holloman AFB, N.M.—where these two crew chiefs are assigned—and at Eglin AFB, Fla.

AP photo by Vladimir Dimitrijevic

The Black Jet's aura of invincibility ended in 1999 when one was shot down northwest of Belgrade during Operation Allied Force. The pilot was rescued. Above, a group of Yugoslavians inspects the wreckage.

of thousands of people from the Las Vegas area," Shelton said. "For some, it was probably the ugliest airplane that anybody had ever seen."

By then, the F-117s flying in the Nevada desert had already built a combat track record.

The original concept of operations saw the F-117s as a clandestine, silver bullet force. Special operations or intelligence agencies could direct the F-117 to attack key enemy facilities. Planners contemplated using the F-117 in the Operation El Dorado Canyon raid on Libya in 1986, for example, but scrapped the idea at the last minute. The risk of revealing the aircraft's existence at the height of the Cold War was deemed too great.

Room for Improvement

The F-117's combat debut came three years later in Operation Just Cause in December 1989. Six aircraft departed Tonopah for the flight to a target in Panama. This was not heavily defended airspace, so there was no true test of the F-117's effectiveness against an integrated air defense system.

Instead, planners called on the Nighthawk because they wanted the heavy-duty laser guided bombs carried in the F-117's bomb bay. Two F-117s attacked targets near the Panamanian Defense Force barracks on Dec. 19. It was an inauspicious combat debut—one of the bombs missed its target by more than 300 yards.

The real triumph of the F-117 came in Operation Desert Storm in 1991. The F-117's combination of stealth and precision attack capability proved its worth against a far more daunting target set: Iraq.

F-117s deployed to remote Khamis Mushayt, on the Red Sea coast of Saudi Arabia. Thirty-six of the aircraft were in place when the war began.

Still, no one was completely sure stealth would work. Commanders worried about sending the F-117s in alone to attack critical targets. A controlled test at Nellis using the best Air Force personnel in the adversary role suggested that, on a bad night, the Iraqi air defense system might shoot down one in 10 of the F-117s.

Glosson was now in theater helping Lt. Gen. Charles A. Horner, the combined forces air component commander, mastermind air campaign planning. The F-117's potential for strategic attack was so great that Glosson ignored the naysayers.

"Nobody ever guaranteed we wouldn't lose an F-117," Glosson told the Tactical Air Command chief, Gen. Robert D. Russ, but "unless we have a mechanical malfunction, the Iraqis won't put one hole in an F-117."

F-117 pilots had qualms, too. One pilot, Maj. Joe Salata, later told *Airman* magazine that squadron scuttlebutt estimated only half the pilots in the first wave of 10 would survive the Baghdad raid. "My biggest fear," said then-Maj. Mike Mahar, was that "if I live through tonight, I'll be the only F-117 pilot who survived."

As it turned out, the F-117 and its pilots did far better.

On the night of Jan. 17, 1991, the F-117s launched in three waves. Four, on different flight paths, became the first coalition aircraft to cross into Iraqi airspace that night.

Two Air Force special operations Pave Low helicopters led in four Apache helicopters from the Army's 101st Airborne Division to destroy early warning radars on the border at a site code-named Objective Omaha. By then, the first-wave F-117s were already 50 miles inside Iraq and heading to separate targets. They hit an Iraqi integrated air defense command center, communications centers, Iraqi Air Force headquarters, one of Saddam Hussein's many presidential palaces, and most famously the Iraqi communications tower known as the "AT&T building."

That's when CNN went off the air.

An hour later, wave two F-117 pilots had the awe-inspiring experience of seeing glowing anti-aircraft artillery fire on the horizon.

"When I saw the triple-A, I also didn't think we'd all make it through," Salata said.

Still, they struck their targets, and a third wave hit suspected biological weapons bunkers just before dawn.

Everybody Made It

Heading home, Salata listened for his fellow F-117 pilots to check in. "Initially, I heard only five of the 10 guys check in," he said. "So when I landed back at Khamis Mushayt, I thought we'd lost five guys. It was a real relief when I went around the squadron and saw everybody there."

The critical role of the F-117s in Desert Storm did not cease after night one. Under wartime conditions, the pilots and their Black Jets proved adept and flexible.

On one occasion, two F-117s flew in under a cloud deck at 5,000 feet and attacked two separate targets over downtown Baghdad. To mitigate risk, they approached from the north, which added to the flying time.

On Jan. 24, F-117s went north to attack bioweapons bunkers in the vicinity of Mosul. The target area was so far north aerial tankers had to cross well into Iraqi airspace to give the F-117s prestrike and poststrike refueling. "There was no other aircraft that could have successfully completed that mission," Glosson attested.

Many times F-117s changed their targets on short notice. Risk reduction demanded the F-117s fly a carefully planned route to keep their signature

USAF photo by A1C Vanessa LaBoy

low while entering a threat zone. Most pilots rehearsed the mission routes in simulators. Still, the pilots changed targets 40 minutes before takeoff on one particular occasion.

Not that the missions were easy. One pilot likened the feel of anti-aircraft fire around an airfield target to being "inside a popcorn popper."

The F-117's success came from the synergy of stealth and precision. It was the only aircraft able to provide that overmatch during most of the 1980s and 1990s.

Salata's description of a mission where he attacked a bridge in Baghdad showed just what an incredible edge the F-117 delivered. Salata started to aim for the attack, then noticed a car starting to drive across the bridge. "I actually aimed behind him, so he could pass over the bridge," he said.

Thanks to laser designation, "you can pick and choose a little bit in the F-117," Salata explained. "In any other type of aircraft, I would've never had the opportunity to move my spot. I would've missed everything, and then I wouldn't have been able to see what happened anyway. Stealth allows us to look longer at the targets before release, as well as after release."

The F-117s flew 1,271 sorties in Desert Storm. The Pentagon's official report put the achievement in perspective. "Over the course of the war, the deployed F-117s flew approximately two percent of the total attack sorties, yet struck about 40 percent of the strategic targets attacked," the report stated. "It was the only aircraft to attack targets in downtown Baghdad and to hit targets in all 12 categories."

USAF officials stuck to a policy of revealing no details about the crash or the rescue. Sources cited evidence suggesting "the plane was hit by a Yugoslav SA-3 missile" active in the area at the time. Other reports hinted that the Serbs tracked the fighter optically using an intricate network of ground observers. Fortunately, an audacious rescue retrieved the pilot from enemy territory.

The Air Force decided not to bomb the wreckage. Gen. John P. Jumper, commander of US Air Forces in Europe at the time, later said it would have been "very, very hard to duplicate" a stealth aircraft by reverse engineering it from the wreckage. In any event, the F-117 used "second generation" stealth—technology that was already 20 years old.

USAF photo by SSgt. Vince Parker

The F-117 at top receives a coat of primer from technicians of the 49th Aircraft Maintenance Squadron at Holloman. Above, a group of Nighthawks wait on the flight line during a stopover at Langley AFB, Va.

Even more incredible, no F-117s were lost or even damaged due to air defenses.

During Operation Allied Force, the NATO air war over Yugoslavia in 1999, a total of 24 F-117s deployed to Aviano AB, Italy, where they flew more than 300 sorties.

The Black Mark

Serbian integrated air defenses were dense and deadly. Three nights into the war, the seeming invincibility of the F-117 came to an end.

On March 27, 1999, an F-117 with the call sign Vega 21 went down. Public interest spiked with dramatic television pictures of the wreckage clearly showing the aircraft's Holloman Air Force Base markings.

Jumper still praised the F-117's performance. He said in August 1999 that "we put our stealth assets into the most dangerous places night after night and after the hundreds of sorties that have been flown in most dangerous situations, the loss of one is certainly better than any of us expected."

The passage of time was beginning to raise questions about the F-117's long-term future. Air Combat Command set a tentative retirement date of 2018 for the F-117. That would take the aircraft just beyond 30 years of service life. However, officials told *Air Force* Magazine in 2001 that the F-117 had not been maneuvered very aggressively, and ACC believed its airframe could conceivably last until 2030 or later. (See "Two Decades of Stealth," June 2001, p. 32.)

Lockheed Martin photo

USAF continued to improve the F-117's capabilities, even as plans were made for the F-22 Raptor to take over most of its missions. The exact retirement date for the Black Jet has not been set, and there is Congressional opposition to the move.

Last Hurrah?

Two years later, the F-117s played their critical and unique role again at the start of Operation Iraqi Freedom on March 19, 2003. Intelligence sources thought they had pinpointed Saddam Hussein, which called for an immediate strike just hours before the war was set to begin.

The deployed squadron was on a wartime footing and had two F-117s in pristine condition—with low observable maintenance complete to combat standards—and ready to go. To solve the problem of low clouds over Baghdad, the F-117s were armed with the EGBU-27s whose seekers could track targets using GPS coordinates.

Mission pilots Lt. Col. David F. Toomey III and Maj. Mark J. Hoehn had a two-hour flight to Baghdad. It was a dangerous mission for the F-117s, because dawn would be breaking about the time the pilots dropped their bombs.

At 5:34 a.m. Baghdad time, four 2,000-pound bombs exploded on their targets. Army Gen. Tommy R. Franks, head of US Central Command, praised the F-117 mission as "about as close a [feat of] coordination as I have ever seen work a time-sensitive or an emerging target." Unfortunately, Saddam was not at the location.

All told, 12 F-117s flew more than 100 sorties during Iraqi Freedom's major combat operations phase. As was the case in 1991, none were damaged or lost. Maintainers kept the F-117 mission capable rate at a laudable 89.3 per cent, better than the rates for the deployed F-15Cs and F-15Es.

The Air Force continued to improve the F-117's capabilities, especially avionics, maintainability, and weapons.

Given that track record, even the tentative retirement date of 2018 did not seem real. But the F-22 Raptor was on the way.

Initial design plans for the F-22 were laid out while the F-117 was still in the black world and flying at Tonopah. With the passage of time, the Air Force had developed the technology to make a jet aircraft stealthy as well as fast and maneuverable. Vastly improved radar absorbing materials enhanced performance and made maintenance easier.

By late 2003, the Air Force was moving to operational tests on its newest stealth platform: the F-22. The first serious move to retire F-117s came in early 2004 with a proposal to cut up to 12 jets. That initiative evaporated in the face of Congressional resistance.

Still, the grand plan was clear. When the F-22 was ready, it would take over the roster of missions previously flown by the F-117.

In December 2005, the Air Force declared the F-22s of the 27th Fighter Squadron at Langley AFB, Va., ready for operations. Today's F-22 is not a perfect replacement for the F-117, however. Raptors do not currently offer the pinpoint accuracy of the Nighthawk's laser guided weaponry.

As the F-22 became operational, final work on the 2006 Quadrennial Defense Review and the Fiscal 2007 budget was under way at the Pentagon.

Given the Air Force's goal of recapitalization, the F-117 fleet was a natural target for retirement. One estimate projected savings up to $1.1 billion from the procurement accounts and $5.1 billion from associated manpower accounts stemming from the F-117 retirement.

Still a Shock

Even so, the decision to begin F-117 retirement came as a shock to many. "The Pentagon has not made a credible case for wanting to retire these stealth fighters," protested New Mexico Sen. Jeff Bingaman (D). "In my view, the F-117s remain an important part of the Air Force's fleet, and there is no good reason to retire them."

"I am strongly opposed to the retirement of F-117s. They are vital to the overall Air Force mission," echoed Sen. Pete V. Domenici (R-N.M.).

Balm on the wounds came in the form of strong indications that USAF would base F-22s at Holloman. "The announcement of Holloman as a preferred location for beddown of an operational F-22A unit makes sense," said Gen. Ronald E. Keys, Air Combat Command chief, in March 2005. "This is a clear acknowledgement of the outstanding flying weather, ranges, facilities, and community support the base enjoys."

The F-117 will stay combat ready even as F-22s are slated to begin arriving at Holloman as soon as 2008.

"We remain focused on providing combat-ready F-117s and aircrews for any worldwide location, should we receive the call to send them into combat," said Maj. Gen. Kurt A. Cichowski, who was 49th Fighter Wing commander at Holloman until May.

The exact retirement plans have yet to be worked out between the Administration and lawmakers, so the F-117 fleet enters its last days much as it began. The F-117 stands ready in the desert, prepared to bring stealth and precision wherever it is sent. ■

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