



# Why the F/A-18 Is Such a Badass Plane

The 35-year odyssey of the mighty Hornet.



By Eric Tegler Dec 29, 2016

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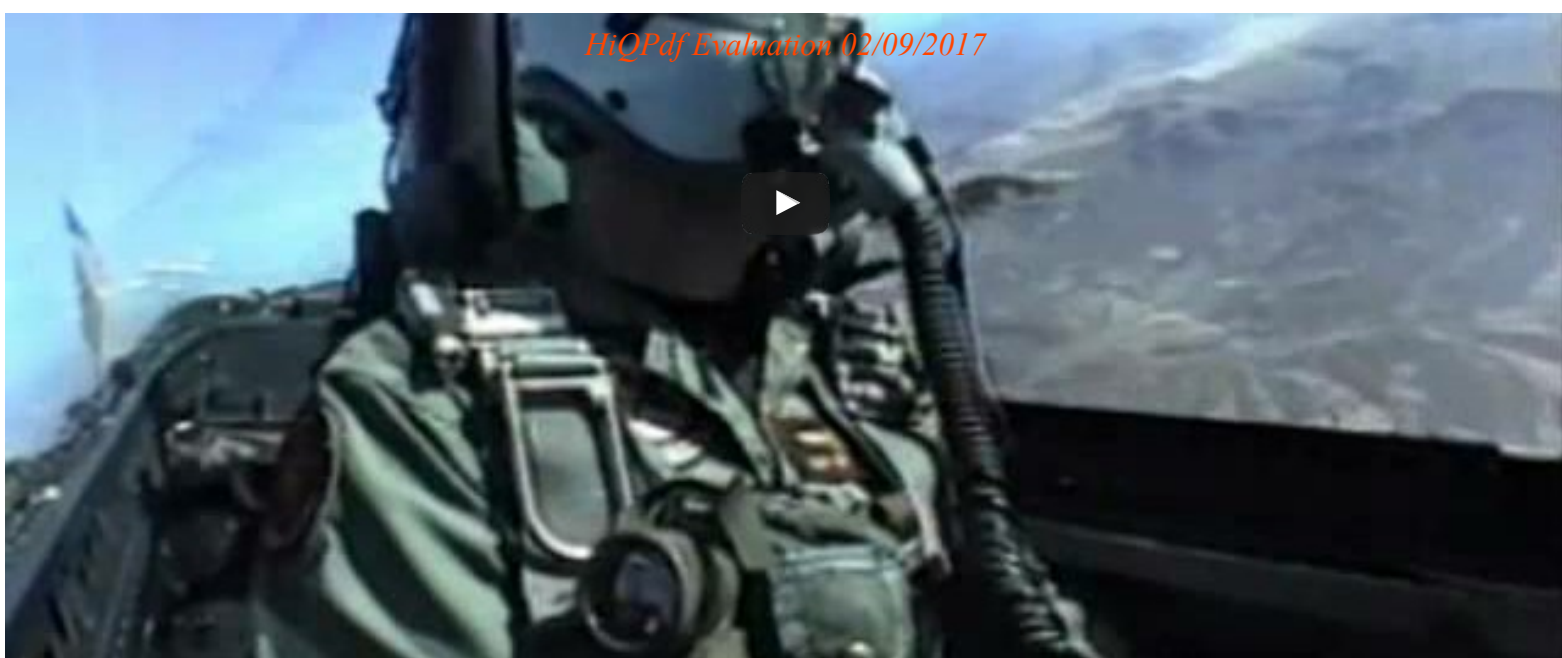
On the first day of the Persian Gulf War, four F/A-18Cs took off from the USS *Saratoga* to bomb an airfield in southwestern Iraq. These F/A-18s were heavy. Each carried four MK 84 2000-lb. bombs, two AIM-7 Sparrows, two AIM-9L Sidewinders, and a centerline drop tank. As the Hornets from VFA-81 (the "Sunliners") made their approach, an E-2 Hawkeye airborne control aircraft passed word to the pilots: Two Iraqi MiG-21s were on the hunt.

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The MiGs turned to intercept the Hornets, closing at 1.2 Mach. While two of the Hornets stood off, Navy Lieutenant Commander [Mark I. Fox](#) and his wingman, Lieutenant Nick Mongilio, turned into the enemy. Fox locked onto one plane, firing both a Sparrow and a Sidewinder, while Mongilio launched a single Sidewinder at the other. In a heartbeat, both Iraqi planes were destroyed. A mere 40 seconds passed from the initial E-2 warning to downing the Iraqi jets.

F/A-18 Hornet Dogfight Kill on Mig-21 Plus Bombing Gulf War





Those two Iraqi MiGs are the only aerial victories for the F/A-18 Hornet/Super Hornet during its decades of service—no surprise, since the opponents in America's recent conflicts lacked the air power to challenge the U.S. Even so, the swift manner of success showed what the F/A-18 could do and why it was built.

Hornets weren't always the Navy's first choice. But they became the go-to choice for decades.

## Strike Fighter

The first thing to notice about the [Hornet](#) is the "F/A" in the F/A-18 designation, meaning the jet was designed to be both a fighter and an attack aircraft. This plane was a way for the Navy to replace multiple single-mission aircraft with a jet that could do it all, but it was a long time coming.

The aircraft carrier-based fighter planes of World War II, such as the Grumman F6F Hellcat and Vought F4U Corsair, could carry bomb loads as heavy as the dive bombers of the day, successfully combining fighter and attack capabilities into a single aircraft. But the low power-to-weight ratio of these early jets forced the U.S. military to go in a different direction. The carrier aircraft of the 1950s and '60s tended to be specialized fighter or attack airplanes.



The legendary F-4 Phantom of the Vietnam War era demonstrated the potential of a fighter/attack airplane. Even so, the Navy's concern for air superiority and defending its carriers from enemy aircraft led it to order the Grumman F-14 Tomcat in 1969. The Tomcat was a good plane, but an expensive one. As a result, the Navy was directed to seek a cheaper alternative by adopting one of the competitors from the Air Force's Lightweight Fighter Program.

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The choice was between the single-engined General Dynamics YF-16 or the twin-engined Northrop YF-17. The former would go on into service in the Air Force as the F-16 Fighting Falcon. The Navy, however, preferred two engines. After Northrop teamed with McDonnell Douglas, the two defense companies

jointly furnished a heavily redesigned version of the YF-17 for the Navy. It would be called the **F-18**.

It was to be produced in three models: a single-seat F-18 to replace the F-4, a single-seat A-18 to succeed the A-7 Corsair, and a two-seat TF-18 trainer that could also serve as a fighter. However, Northrop/McDonnell Douglas merged the single seat variants into a single F/A-18A, then renamed the two-seater as the F/A-18B.

## Takeoff



NASA

With its canted tails, the new airplane certainly looked like the YF-17, but key additions got the jet ready for service in the Navy. The airframe and landing gear were strengthened for carrier suitability, and an arrestor hook and wing-fold



mechanisms were added. The F/A-18's trapezoidal wing had a 20-degree sweep on the leading edge and a straight trailing edge. Leading Edge Extensions (LEX) below the canopy blended back into the wing, allowing the airplane to remain controllable at high angles of attack.

The builders added more internal fuel to meet Navy range requirements, and incorporated 16,000-lb. thrust General Electric F404-400 engines with fixed inlets. The new jet had fly-by-wire control, a heads-up display, multi-function CRT displays, and the latest Hughes AN/APG-65 radar. Infrared Sidewinder missiles lived on the Hornet's wingtips, while radar-guided Sparrows would hang on one of four wing stations that also could be used for bombs or external fuel tanks. A 20-mm M61 cannon mounted in the nose.

The new airplane, now officially called the Hornet, first flew in November 1978. It wasn't all good news at first. Testing revealed problems including excessive liftoff speed and takeoff roll that had to be addressed by changes to the horizontal stabilators. Insufficient transonic acceleration showed up, too. It was lessened by engine modifications but remained an issue. And the strike fighter's 460-mile combat radius was little improvement on the F-4, and 10-12 percent less than that of the A-7.

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None of these deficiencies were enough to forestall the Navy's order, though. The first F/A-18As entered service with Marine Corps squadron VMFA-314 at MCAS El Toro, and the F/A-18 was immediately praised for its strike accuracy and reliability, requiring half the maintenance-hours of the F-14A and A-6E Intruder. As Hornets deployed, stress from high angle of attack flying resulted in fatigue-related cracks in the tail. McDonnell (no longer partnered with Northrop) developed structural modification kits to solve the problem.

The Hornet's public profile got a big shot in the arm when the Blue Angels chose the airplane to replace their A-4 Skyhawks in 1986. The Hornet saw its first combat that same year as F/A-18s from USS *Coral Sea* flew missions against Libyan air defenses. Success bolstered sales, and by the end of 1989 the air forces of Canada, Australia, Spain, Kuwait, and Switzerland had ordered F/A-18s.

2014 U.S.N. Blue Angels @ LA County Air Show



Complaints about the Hornet's lack of range, acceleration and ability to bring unexpended ordinance/fuel back to the carrier persisted. To address these, and to make the jet a more effective night and all-weather machine, McDonnell Douglas introduced the F/A-18C and two-seat D in 1987. The C/D incorporated upgraded radar, avionics, and AIM-120 AMRAAM, AGM-65 Maverick, and AGM-84 Harpoon air-to-air/surface missiles. NITE Hawk forward-looking infrared pods increased the Hornet's lethality. Up-rated F404-GE-402 engines gave the F/A-18C/D 10 percent more static thrust.

The Hornet shined during the [Gulf War](#) with historically high readiness and accurate strikes. Just three were lost, including one flown by Marine Capt. Michael Scott Speicher, who is believed to be the first combat casualty of the conflict. The F/A-18 soon took over the precision strike mission from the A-6E. It served over Bosnia and Kosovo in the 1990s, struck targets in Afghanistan after 9/11, and flew in Operation Iraqi Freedom. The last F/A-18C was assembled in Finland and delivered Finnish Air Force in August 2000. The last F/A-18D was delivered to the USMC the same month.

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## A Super Hornet



While the Hornet was dominating the skies, the Navy started looking around for its

eventual replacement. A 1980s program to replace the A-6 led to the McDonnell Douglas A-12 Avenger, a stealthy flying-wing aircraft with advanced radar capable of carrying precision weapons. Separately, the Navy sought to replace the F-14 with a carrier-friendly variant of the F-22 Raptor. Meanwhile, Grumman proposed advanced strike and air superiority versions of the F-14.

And then, the Soviet Union folded. With America's rival superpower falling apart, new defense programs found themselves under a microscope. Cost and engineering problems led the Navy to cancel the A-12 in 1991 and give up on its own version of the F-22 in 1992. Dick Cheney, then the secretary of defense, rejected Grumman's proposals for a souped-up F-14. The Navy had only one alternative: the [Super Hornet](#).

The Navy ordered the single-seat F/A-18E and two-seat F version in 1992. And while these planes share many characteristics with the original Hornet, they are different aircraft. The E/F is about 20 percent larger with a heavier maximum weight. It carries one-third more internal fuel, offering an increase in range over the older Hornet (though still not equaling the F-14). A 25 percent larger wing area yields more payload capacity via two additional wing stations. Bigger leading edge extensions provide improved lift and better pitch characteristics.



An F/A-18 executes in-flight refueling through an aerial refueling system. The systems are required for all carrier-based tanking missions. (U.S.Navy photo)

US Navy

General Electric F414-GE-400 turbofans with 22,000 lbs. maximum thrust add 35 percent more power, enabling the F/A-18E/F to match the Hornet's Mach 1.8 top speed. The Super Hornet shared most of its avionics and software with the F/A-18C/D, but newer systems including the AN/APG-79 active electronically scanned array radar make the E/F more effective. A new system for refueling other aircraft gave the Navy a capability it had lost with the retirement of the KA-6D and Lockheed S-3B. The E/F even incorporates a measure of stealth with design features that significantly reduce its front and rear radar cross-section.

The Super Hornet first flew on November 29, 1995, embarking on a five-year test program, during which time McDonnell Douglas merged with [Boeing](#). The test program was praised, but also showed that the Super Hornet's range improvements were marginal—and came at the expense of performance. The E/F cannot climb as fast or maneuver as crisply as the Hornet, a fact the Blue Angels recently acknowledged in announcing their transition to the Super Hornet.

## Super Duper Hornet?





F/A-18F Super Hornet of VFA-211.

Even with those limitations, the "Rhino," as it's nicknamed, has shown its worth. It entered service in 2001 and took out surface-to-air missile launchers in Iraq in 2002. Rhinos flew close air support, strike, and aerial refueling sorties during the Iraq War and have flown combat missions over Afghanistan continuously. They've been involved in the fight against ISIS, striking the group's strongholds, providing reconnaissance and forward air control.

Another variant, the EA-18G Growler went into production in 2007 and entered service in 2009, replacing the EA-6B Prowler in the electronic attack role. The Growler demonstrated again the versatility of the F/A-18 design, placing an electronic warfare package into a strike fighter.

More than 500 Super Hornets have been built, and more are on their way. Because of delays in fielding the F-35C, the aircraft carrier version of the Joint Strike Fighter, the Navy has ordered more Super Hornets to fill a "fighter gap" as legacy Hornets wear out. Australia has acquired F/A-18Fs and a Kuwaiti buy was recently approved. [Canada recently announced](#) it will buy 18 Super Hornets instead of the F-35. Even Donald Trump has taken notice. The President-elect caused a ruckus by tweeting that he'd ask Boeing to price out an even better Super Hornet because of the F-35's extravagant cost.

Based on the tremendous cost and cost overruns of the Lockheed Martin F-35, I have asked Boeing to price-out a comparable F-18 Super Hornet!

— Donald J. Trump (@realDonaldTrump) [December 22, 2016](#)

It's fair to say that the F/A-18 is a badass because history and circumstances have forced it to be. It may not have always been the most highly desired option but it has been the go-to tool for almost every job.

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