

What A Wonderful Airplane: YF-16 First Flight

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Phil Oestricher, the first pilot to fly YF-16 No. 1, was less than emotional when he saw the prototype again for the first time in years. The airplane showed considerable wear and tear after a lengthy "storage" at Wright-Patterson AFB in Ohio. No. 1's use in an escape systems study had left it in a condition reminiscent of some bizarre medical experiment. Oestricher's first comment: "Paint it, please!"

But after walking around the airplane for a few minutes, looking it over and kicking the tires, Oestricher smiled and revealed the place the craft must hold in his heart: "What a wonderful airplane."

Oestricher was shortly joined by Jim Rider, Neil Anderson, and Duke Johnston, who followed Oestricher as the second, third, and fourth pilots, respectively, to fly the prototype. No. 1 had returned to the place of its construction - Hangar 4 at the Fort Worth Division. Its first four pilots, all GD employees today, would have ample opportunity to reminisce about the early Viper test program during the several weeks it would take to prepare the airplane for its new life as the centerpiece of an aviation gallery.

One of the most frequently told, and retold, stories about the airplane concerns the events of 20 January 1974, when Oestricher, an unwilling hero, made what has since come to be called "the unintentional first flight."

For those Code One readers who are relative neophytes in F-16 lore, acquainted with the airplane no longer than it has carried the name Fighting Falcon, this is the story. Nothing more than a high-speed taxi was planned for that day at Edwards AFB. Oestricher, who was to split

flights in the initial test program with fellow GD pilot Anderson, had a run card to taxi the airplane up to 135 knots and then bring it safely to a halt after checking out the pre-takeoff handling characteristics. The first flight wasn't scheduled to occur until two weeks later on 2 February.

From here the tale tends to differ, depending on who's telling it and which version was heard. This much is fact: The high-speed taxi turned into a wild series of roll oscillations that ultimately caused the right horizontal stabilizer to strike the runway, at which point Oestricher took the airplane up to avoid wrecking it.

Thus, the high-speed taxi run became a highly unexpected first flight, and the YF-16 joined the ranks of real airplanes that have actually gotten off the ground, versus the legions of those that exist in the minds of engineers or as concepts on blueprint paper (in computer memory, nowadays). And Oestricher became the Man of the Day for saving GD's best hope for the future, the first airplane of a program that would bring the company one of the longest periods of employment growth in the up-and-down history of the aerospace industry.

But eighteen years later, Oestricher would have the disconcerting experience of standing in a hangar and looking at the bedraggled shell of the prototype while some well-meaning and much younger GD employees told him fractured versions of the first-flight story.

Some renditions of the tale are only slightly inaccurate, while others are enormously exaggerated. Most popular versions have it that an unintentional liftoff resulted from fly-by-wire flight controls that were much more sensitive than anyone had expected. This version is close, but not exactly correct. A Washington, DC, publication proclaimed as recently as last May that the unintentional prototype flight resulted from a "software problem." The YF-16's analog flight controls had no software.

At their most colorful, the stories have the tail and both wings hitting the runway. At their worst, some go so far as to say the unintentional first flight was intentional. According to this version, Oestricher - in a race with Anderson - wanted to ensure that he would be the first pilot to fly the F-16. This story doesn't hold water either because Oestricher had already been designated to make the first official flight, which he did on schedule twelve days later. Anderson would later gain distinction by making a wheels-up landing in the YF-16 No. 2 prototype (more about this later) and being the first to fly the full-scale development and production airplanes.

The return of the first F-16 prototype to Fort Worth prompted many to approach its first pilot for his recollections of flying the aircraft. Oestricher grumbles at the requests (he's had to retell the story thousands of times). But usually - out of a desire to set the record straight - he finally agrees.

Oestricher plays down the significance of the event. "We'd progressively taxied the airplane faster and faster and wanted to get a better idea of how it handled," he said. "Few people know this, but we actually intended to lift the airplane off the ground that day. Our intention

was to move the throttle to military power for a few seconds and let the main gear come up a couple of feet while we went down the runway.

"We encountered two problems," Oestricher continued. "First, the roll control was too sensitive, too much roll rate as a function of stick force. Second, the exhaust nozzle control for the prototype was wired incorrectly. You had to be on the ground for the nozzle to be wide open, so as soon as you took the weight off the wheels, the nozzle closed and essentially doubled the thrust at idle.

The pilot's report for that day shows that Oestricher rotated the airplane to about ten degrees when he reached a taxi speed of 130 knots, with the airplane still accelerating slightly. He made small lateral stick inputs to get a feel for the roll response but got nothing, presumably because the main gear were on the ground, which stopped the airplane from rolling. At this point, he slightly increased the angle of attack. Immediately upon rotating the second time, the airplane lifted off with the left wing dropping rather rapidly, the report states. After a right roll command was applied, the airplane immediately went into a fairly high-frequency, pilot-induced oscillation.

"Every time I tried to correct the oscillation, I got a full-rate roll," Oestricher explained. "And the airplane was continuing to accelerate all the while because the nozzle had closed, even though I had the throttle at idle power. We had way too much idle thrust to have a practical airplane."

Before the roll oscillation could be stopped, a rolleron wheel of the AIM-9 missile on the left wingtip lightly touched the runway, the right horizontal tail struck the ground, and the aircraft bounced off its main gear several times. This bouncing pointed the airplane off the runway. The latter factor prompted Oestricher to fly out of the situation, as he felt that it would be impossible to keep the airplane on the runway, even if the nose wheel could be quickly brought down.

Oestricher applied intermediate power and allowed the airplane to climb slowly in a shallow left turn. The report refers to the style of flying as, "understandably somewhat conservative." Oestricher flew a wide pattern to a long, decelerating final approach and touched down six minutes after the takeoff.

GD engineers had the problem of control sensitivity solved by that evening. "We just put in logic where you selected half-gain for taxiing, for takeoff, and for landing," he said. "You want the controls to be sensitive up-and-away, but you don't want that level of sensitivity down in the pattern." Oestricher said the control problem would have been discovered before the first flight if better visual displays had been available for flight simulators in the early 1970s. The YF-16 program taught General Dynamics a lot about the value of engineering flight simulators.

The knock on the runway badly damaged the airplane's right stabilizer. It required repair before the airplane could fly again. (The patchwork is still evident in the form of a diagonal seam on the stabilizer.) With the control change and a replacement stabilizer in place, Oestricher made the first planned flight on 2 February 1974. That one-and-one-half-hour sortie

was fairly uneventful. The pilot's report previewed some of the characteristics that would prove to be major selling points for the F-16:

The airplane was comfortable and enjoyable to fly immediately. No difficulty was experienced in adapting to the sidestick or to the thirty-degree inclined seat... The visibility is so great that it requires some time to adapt... The airplane is highly responsive about all three axes but can be flown smoothly with little effort...

The first flights also showed that the YF-16 could easily outperform the F-4 and T-38 chase aircraft while running them out of fuel.

The nozzle problem wasn't fixed until after the fifth prototype flight, which was made by Jim Rider, then an Air Force lieutenant colonel. The fix involved a change in switching logic to allow the nozzle to be commanded open with weight off the wheels.

YF-16 No. 1 reached Mach 1 on 5 February 1974 and Mach 2 on 11 March.

The No. 2 prototype flew for the first time in May 1974. No. 2 was nearly identical to No. 1, except that it had a gun, external tanks, and the ability to transfer fuel, which means it could be flown long distances with less need to refuel. Plans were made to take No. 2 to Le Bourget and on a tour of several European nations in the summer of 1975. By this time USAF had selected the F-16 as its new fighter. And Belgium, Denmark, the Netherlands, and Norway were considering the airplane.

No. 2's tour of Europe was canceled by the first real mishap in the YF-16 program's brief history, however. Neil Anderson performed a flight demonstration at a Fort Worth Division open house in May 1975. After completing his routine, he was unable to lower the landing gear. He finally had to skid the airplane in on its belly in the grass beside the Carswell AFB runway. Damage was surprisingly light, and the pilot walked away unharmed. But Paris was definitely out for ship No. 2. (No. 2 now resides at Rome Air Development Center in New York state.)

As a result of the mishap, YF-16 No. 1 made the first transatlantic flight for the Viper that same month.

Anderson, Rider, and Lt. Col. Duke Johnston were the demonstration pilots for aerial displays presented at Paris and at military bases throughout Europe. An RF-4 accompanied the airplane to transport two of the pilots, fly comparison shows, and to be No. 1's eyes, since the prototype had no navigational equipment. "We made it a point to stay within visual range of the RF-4 at all times," Johnston recalled. "Otherwise we were lost."

The trip to Europe proved to be a high point of the early F-16 program. Those who participated as pilots or support personnel also remember it as a high point of their careers. The aircraft flew fifty-two times in fifty days, including nearly forty air shows. They remembered the excitement, too, like the time GD flight test engineer Gordon Smith had to fly

commercially from Fort Worth to Spain on short notice to deliver a spare part to prevent cancellation of a flight demo.

While the return trip from Europe to Langley AFB in Virginia marked the end of No. 1's life in its original prototype configuration, the trip did not mark the end of its service. During the next few months, the prototype was modified to the Control Configured Vehicle configuration with canards, or fins, mounted below the inlet on the forward fuselage. When the CCV airplane flew for the first time on 8 April 1976, a company press release said the canards gave the airplane a "fishy" appearance. The CCV used the canards and fly-by-wire flight controls to demonstrate such capabilities as pointing the nose without changing the aircraft's flight path.

CCV flight testing was cut short after company pilot Dave Thigpen made a hard landing just short of the planned touchdown point during one mission at Edwards, just ten weeks into the planned eight-month program. The accident was attributed to a loss of power. The basic features of the CCV configuration would appear later on the highly successful AFTI/F-16 flying testbed.

The CCV's hard landing, however, wasn't the end of experimentation with the No. 1 airframe. The airplane was eventually sent to Wright-Patterson AFB, where it was used in studies of a potential escape module application for the F-16. The fuselage skins were cut all the way around the cockpit to show how it could be converted to an ejection capsule similar to those on the F-111 and B-58 Hustler. Hiding evidence of this study was a major part of the recent restoration task.

The escape system modification was apparently abandoned before much could be accomplished. After this program, the airplane was more or less forgotten, stowed away somewhere at Wright-Patterson. It remained there until the Virginia Air and Space Center arranged custody, and GD agreed to make it look presentable for a berth at the Hampton Roads History Center. That's its history.

Some say the F-16 was never quite the same after development progressed from the prototype to full-scale development. The pilots who flew the prototype agree that it had unique handling characteristics, owing to the absence of weapons and radar. The airplane was thus lighter than later versions. It also had a trimmer nose, which provided some advantages in maneuverability. In fact, the whole airplane was smaller than subsequent F-16s.

While attesting that the YF-16 was great fun to fly, however, the pilots point out that it would have been absolutely useless in combat. The F-16 has continuously gained capability at the same time it has gained weight and girth, all the way from the original production airplanes to the most modern Block 50.

Oestricher maintains that the first flight of the YF-16 was no big deal, even though it occurred the way it did. The brief flight was a useful step toward making a longer one. "It's nice to sneak up on a plane," he said, "and learn as much as you can before you commit to taking off and flying it for an extended period."

He pointed out that the prototype of the F-4 Phantom was flown for the first time in similar circumstances after pitch oscillations occurred during a high-speed taxi. "I'm beginning to believe that events like this can be good omens," he said.



The fundamental strengths of the original F-16 design remain. At the heart of every Fighting Falcon is the lightweight fighter concept championed by John Boyd and the other members of what came to be known as the Lightweight Fighter Mafia in the Air Force and Department of Defense.



The thirty-degree seatback angle and a raised heel rest line provided increased tolerance to g forces in the YF-16. Side-mounted stick and throttle controllers allowed for more precise control under high g's. Locating combat-critical functions on these side-mounted throttle and stick controllers further enhanced the pilot-vehicle interface for the high-g regime. The bubble canopy on the YF-16 design improved pilot vision for air-to-air combat.



Phil Oestricher in the cockpit of YF-16 No. 1 during a photo session at Compass Rose at Carswell AFB, Fort Worth, Texas, before the official rollout on 13 December 1973.



The initial YF-16 taxi tests took place in Fort Worth, Texas, before the aircraft rolled out (under its own power) in a public rollout ceremony on 13 December 1973.