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The Warplane You Have

It may be high-tech but it's also flawed — for better or worse, the US' F-35 Joint Strike Fighter is here to stay. Today, David Axe walks us through the developmental problems that have plagued this troubled aircraft from the start.

By David Axe for ISN

The development, entry into service and widespread worldwide use of the United States' controversial new stealth fighter is, by now, a foregone conclusion. The F-35 Joint Strike Fighter (JSF), produced by aerospace giant Lockheed Martin, has been in full-scale development for 11 years -- and low-rate production for six. More than 120 of the single-engine jets have rolled out of Lockheed's sprawling factory in Ft. Worth, Texas, and the first training and operational squadrons have stood up in the United States, with operational use slated for as early as 2015.

Military and political backing for the squat, silver-painted warplane is strong. "We need the F-35; it's not going away," U.S. Congresswoman Loretta Sanchez, who sits a key military-funding committee, said in April. What's less clear, however, is just how good the JSF is as a jet fighter. Flight testing has turned up a long and growing list of performance gaps, design flaws and safety concerns. Compared to older American jets, to say nothing of the latest Russian and Chinese fighter designs, the F-35 is looking worse and worse. "Can't turn, can't climb, can't run," is how one independent analysis summarized the new plane's performance.

Given political, industrial and budgetary realities, the F-35 is here to stay. And that could mean disaster for the air arms of the U.S. and allied countries. "You go to war with the army you have," former U.S. defense secretary Donald Rumsfeld once said, trying to explain away shortfalls in American military capabilities amid increasing casualties in Iraq and Afghanistan. The sentiment reflected could equally be applied to the F-35. For the U.S. and many allied nations, the Joint Strike Fighter, flaws and all, is the warplane they will have in any future air battle against a serious foe.

The 'Perfect' Fighter

As imagined in the mid-1990s, the design concept that would become the F-35 was the perfect fighter: fast, maneuverable, long-ranged and all but invisible to radar -- and cheaper to buy and maintain than previous warplanes. The Joint Strike Fighter would meet all the requirements of the U.S. Air Force, Navy and Marine Corps as well as those of allied air arms. Production would run into the thousands.

There would be three versions: the A-model for the Air Force and most foreign militaries, the vertical-landing B-version and the C-model for launching from aircraft carriers. All together, the three

F-35 variants would replace the full range of existing warplanes, from the low-flying, subsonic A-10 tank killer to the lightweight, supersonic F-16 and the AV-8 jump jet.

In 2001 the basic F-35A was expected to cost \$39 million apiece in then-year dollars, not counting development expenses, making it no more expensive than a late-model F-16 and *less* costly than a contemporary F-15. Cheaper, better and universal, the new plane represented a "new way of doing business," according to a 1996 Congressional document.

Only there was nothing new about the JSF's ambitions. In fact, it represented no less than the third attempt since the Korean War to equip all branches of the U.S. military with a common fighter. The McDonnell Douglas F-4 began as a heavyweight Navy fighter in the early 1960s and was successfully adapted, with minimal changes, to land-based use by the Air Force and Marines and several foreign countries. The General Dynamics F-111, by contrast, was developed during the same timeframe with all the branches' needs in mind -- and ended up too heavy, complex and expensive. Ultimately only the Air Force acquired the type, and it wasn't until near the end of the F-111's 30-year service that its bugs were finally worked out.

Experience taught that the F-35 might work if, like the F-4, it were optimized for one military branch and then borrowed by the others. Instead the JSF's developers chose to follow the F-111's ill-fated example in trying to stretch a single basic design to fit diverse needs. As systems development got underway in 2002, the F-35 quickly grew heavier and more complex -- and as a consequence more expensive and late. The per-plane price more than tripled. Service entry was delayed from 2010 to 2015 at the earliest.

And performance suffered, with the government progressively reducing requirements for range, acceleration and takeoff distance. The new plane's stealth qualities suffered, too. A jack of all trades, the JSF became master of none. "A virtual flying piano, the F-35 lacks the F-16's agility in the air-to-air mode and the F-15E's range and payload in the bombing mode," commented national security expert Winslow Wheeler from the Center for Defense Information in Washington, D.C., "and it can't even begin to compare to the A-10 at low-altitude close air support for troops engaged in combat."

Reality Bites

A key test came in August 2008. Analysts at RAND, a California think tank with close ties to the Air Force, simulated a near-future air war pitting the U.S. against China over the Taiwan Strait. Computer-modeled F-35s fought against computer-modeled Chinese jets ... and lost badly. The F-35 is "double inferior compared to modern Russian/Chinese designs," the analysis claimed, adding that the JSF suffers from "inferior acceleration, inferior climb [and] inferior sustained turn capability." The radar-evading plane "can't turn, can't climb, can't run," the analysis concluded.

A year later, then-Defense Secretary Robert Gates also identified serious problems inside the Joint Strike Fighter program, especially its unrealistic development timeline. Gates restructured the projected \$400-billion effort, adding billions to the budget and a year to the schedule.

But by then it was too late. Meant as a universal fighter to replace essentially all other planes, the F-35 resulted in a near-monopoly for Lockheed. Any armed service requiring a stealthy warplane from a Western manufacturer had only the one option. And in any event Lockheed had buttressed the program with a relentless public-relations campaign plus millions of dollars in lobbying and campaign donations to key American legislators.

So as the F-35 lost altitude, dragged down by design compromises and poor management, potential customers had little choice but to stick with the troubled plane -- and find extra money to cover the

rising cost. The U.S. Air Force cut 400 A-10s, F-15s and F-16s -- nearly a fifth of the fighter fleet -- from its force structure in order to fund the F-35. Amid the growing crisis, Australia, Canada, Italy, the U.K., the Netherlands and Turkey reduced or delayed their F-35 orders. Yet the JSF survived - flaws and all.

The bad news intensified in early 2013. In February all F-35s were grounded following the discovery of a crack in an engine turbine, apparently the consequence of a heavy, draggy fighter being powered by just one maxed-out engine. Also in February, the Pentagon once again downgraded the JSFs performance requirements -- a tacit admission that the new fighter would never be as fast, maneuverable or long-legged as originally envisioned. And in March a testing report was leaked that included scathing comments from pilots directed at the sloppy design of the F-35's cockpit, which features poor rearward visibility -- a major liability in aerial combat. "Aft visibility will get the pilot gunned [down] every time," one pilot warned.

But the warning is only the latest in a long chain stretching back years to the origins of the F-35 monopoly. They were ignored in the beginning and they're being ignored even more intently now that the JSF program is politically destined to endure. It will be cold comfort to the Joint Strike Fighter naysayers if, in some future conflict, they are proved right and F-35s are knocked out of the sky like overweight flying targets. "I told you so" will not bring back dead pilots or restore Western air dominance.

For additional reading on this topic please see:

[Joint Strike Fighter](#)

[F-35 Joint Strike Fighter](#)

[Air and Space Power Journal: May-June 2012](#)

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David Axe is an American military correspondent who writes widely on military life and aspects of current conflicts.

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