The Lightning II's Media Thunderstorm

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Imagine a new 5th generation fighter which exceeds all expectations. Three variants for each branch of the military. Incredibly sophisticated, flexible, and reliable. It has the most advanced stealth system created for a fighter jet, and provides the greatest situational awareness for the pilot with a variety of logistics systems. "By the time the enemy can hear you, it's too late for them to react," Paul Poitras of Lockheed Martin suggests. If what enters the mind is the relatively new F-35 Lightning II, then you're on the right track. This plane, developed through nine nations as a joint strike fighter, has boasted to be the most advanced multi-role fighter of this generation (Air Combat Command). However, the F-35 isn't just fantastic technology. The program and plane have been riddled with criticism from multiple parties. The costs of the plane when estimated with maintenance and flying costs are exorbitant. Reliability issues with software and hardware have plagued initial operating capability (IOC) dates and further development. Over budget and over timeframe, one has to ask; exactly what went wrong with the F-35?

The Joint Strike Fighter has quite the storied past, beginning in 2001. After Lockheed won the contract with their X-35 mockup, they began to develop the new plane based in the X-35's image. Although the USA is the main supporter of this project, multiple NATO countries have played a role in funding its development. In 2006 the first Lightning II came hot off the press, and had its maiden flight in February of 2011. Throughout testing, the F-35 became integrated in various flight technologies. It helped further test trials with the Navy's electromagnetic launch system on carriers. To further support the navy, it performed up to 268 vertical takeoffs, and 395 short takeoffs (Lockheed Martin). The plane performed aerial refuelling tests, maturity flights, and various testing of its proprietary software. All of this in the same year as the first flight. Not only was the range and frequency of the testing impressive, but it set a new standard of what could be achieved with regards to gaining quick flight experience.

Interestingly, Lockheed Martin started to ship out models to the Marine Corps and to the United Kingdom in the next year. Although they were sending out units of the plane, they continued performing tests and developing the craft. In the following years, more countries started to purchase the F-35 with the idea of slowly replacing their fleets. Japan, Israel, and the Republic of Korea were the first three buyers. (Lockheed Martin) A fair number cited the rushed production of the F-35's as a contributor to their reliability problems. It's not usually standard

practice to test the plane whilst also mass producing and delivering the aircraft. However, the models sent out in these early years were for the military's testing purposes as well. The Marines declared the Lightning II as an operational craft in the middle of 2015, and more countries soon followed suit with the deliveries of their craft.

With the operations and maintenance of a fleet of F-35 craft, the total cost of the program will easily cap a trillion dollars in the next decade. Small tweaking of multiple versions of the jet have contributed to these high costs, as have delays, reliability issues, and more (Barret). Although nobody should be surprised at the high cost of a fifth generation fighter program, especially one with such advanced technology and the goal to replace nearly every fighter in the military, at this point even the Pentagon may be fed up. Donald Trump has suggested that the program is out of control, and has given rise to rumors that the United States could cut back orders of the F-35. Many have been wondering, with the slightly over 200 fighters that have been delivered, is the program simply too big to fail?

A key example of the unrestrained cost of the program lies in the fighter helmet. This advanced piece of technology costs a whopping $400,000 per helmet. Despite the technological advancement, many critics suggest that such an item is simply unnecessary. "The designers of this have come up with a very complicated, very finicky solution for a relatively simple problem," said Dan Grazier, with the Project on Government Oversight (Swarts). The total cost of the helmets through the whole program may actually top a billion dollars; all of this adds to the complaints against the exorbitant F-35 agenda. The fighter helmet may be a symptom of a larger problem: attempting to achieve too much with a single concept. Being technologically ahead of others is the goal for the military, but what point do you have to call it excessive? Too many features and systems in the plane brings with it negative effects. Dr. Thomas P. Ehrhard, an expert within the Air Force leadership hierarchy as the Special Assistant to the Chief of Staff of the U.S. Air Force, frames the F-35 "as a classic 'middle' capability that lacks critical performance characteristics needed to meet high-end challenges, while it is over-specified and over-priced for the low-end challenges" (Maldonado).

As it turns out, overambitious design has led to reliability issues in the fighter jet. In an early dogfighting test, the F-35 received poor marks after being out maneuvered by an old F-16. The multiple versions of the jet have led to special parts that have to be manufactured in specific ways, which has led to a shortage of many replacement parts for current F-35s (Haberman). According to a Pentagon report, the jet had "reliability issues with their avionics processors, landing gear tires, thermal management systems, ejection seat assemblies, cockpit display electronics unit, helmet display units, seat survival kits, igniter-spark in the turbine engines, and on-board oxygen generating systems (Bender)." One should expect with any software that bugs exist, yet you would think that proprietary software would be worked out when the requirement

is a working fighter jet. Unfortunately, deficiencies with the Block 2B software system were detected, a crucial portion that helps control navigation and weapon systems. Slow fixes to these software problems contribute to the high cost in program maintenance, further dragging it down. The automatic logistics information system of the F-35, which has been highlighted as a revolutionary control system, was also plagued with difficulties. Multiple pieces of the system were slated for a later date, behind the original schedule. The system itself is heavier and larger than was originally planned as well (Bender). All of these problems add to the chorus of critics arguing that the F-35 is too gone to be saved.

It's clear that this joint strike fighter has been marred by problems and critics almost from the get-go. Yet, at the same time it has propelled many fields in fighter jet technology. Without a doubt the F-35 program, despite still being deployed, will have a lasting impact on the aviation industry. Firstly, we can wonder if the future of military technology lies in single systems to fit multiple roles. The aim of the F-35 is to fill the place of the multi-role fighter across the board, and in doing so aims to implement economics of scale, and introduce savings (Laird). We've seen the problems with this already, and it doesn't seem to live up to the hype. However, the idea of systems that all branches understand, and where parts can be easily sourced, is a tempting one. Imagine some Navy pilots are forced to use another branches aircraft in an emergency situation. The fact that the other branches have only slightly altered versions of the craft could provide a compelling case of ease, where lesser trained pilots can still operate the other craft. Even though many suggest not placing all the eggs in one basket, a fighter that can operate under a variety of roles can ease maintenance and upkeep costs on a far larger sized fleet. Perhaps the F-35 is a step in the right direction for military concepts, but it failed to deliver on its demands.

Politics are heavily interwoven with immense engineering projects such as these, and especially in the case of U.S military projects. As we saw earlier, the concurrent development, testing, and shipping of units resulted in a low tolerance for setbacks in the program. This further elevated difficulties when IOC's of various military branches, such as the Marines, were almost impossible to keep. All of this falls back to politics, where the branches declare unreasonable IOC's to garner support in Congress and gain increased budgetal help. With the political disaster that the F-35 has brought in, one should wonder if we will see greater political involvement with similar projects in the future. Of course, no military project of this magnitude will be without government involvement, but aerospace corporations should be pushing for less false deadlines (Maldonado). Pushing dates and deadlines to ridiculously early under the pretense of national security just hurts the projects more. It has resulted in so many issues in reliability with the F-35, because when things get rushed, these small issues tend to be ignored and inevitably return at upsetting times.

On the surface, the Lightning II Joint Strike Fighter is a shiny gold plane. It touts itself as the future of air domination, but the only thing it has dominated has been newspaper headlines. Praise or criticism aside, this plane has created lasting innovation and impact in multiple fields. The concurrent testing and production of the craft, although it led to problems in part acquisition, may pave the path for future programs to save deployment time and money. Exorbitant costs throughout development could lead both aerospace corporations and the government to take a harder look at what costs truly need to be spent to protect national security. Reliability issues and software malfunctions will drive aerospace companies like Lockheed Martin to push back against incessant deadlines for political gain. The F-35 is just one mistake of many where the american people are seeing that money may hold too high of a place in the political sphere. No project should be “too big to fail” and this philosophy is what leads to continuations of bad practices in engineering projects. Although the F-35 project will weather this storm, it’s doubtful it will come out at full health. The requested 2,000+ jets will more than likely not be finished. It’s unsure how our air force will be crippled from this offset in future combat situations demanding fifth generation fighters, but one thing is for certain: the Lightning II will go down as a learning example of what not to do with a large military engineering project.

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