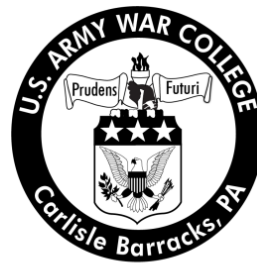


The Way Forward for America's Fighter Force

by

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United States Army War College
Class of 2012

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ABSTRACT

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A shift in warfare has taken place at an increasing rate since 2004, a shift that is more toward irregular warfare than conventional and employed by non-state actors. This shift toward irregular warfare is not entirely abandoning the concept of conventional warfare but rather a hybrid form of the two. Hybrid warfare demands changes to the way the United States modernizes its air forces at a critical time in light of fiscal constraints. Reduced defense spending will force a change to the way the United States military presents its air forces, specifically its fighters. Joint Strike Fighter costs and timelines may make a wholesale move to the F-35 impossible at this time, but the United States Air Force may have part of the answer on the drawing board. Air Combat Command's effort in OA-X could lead to a "hybrid fighter fleet" that if properly fielded throughout the Total Force could be the way forward. A fleet of legacy fighters, OA-X, and fifth generation fighters coupled with cost benefits of the Air National Guard could reduce defense spending and increase Building Partnership Capacity while providing an air force that can fight any fight.

THE WAY FORWARD FOR AMERICA'S FIGHTER FORCE

There are many aspects applying pressure to the way in which the United States military organizes, trains, and equips itself. Reduced defense spending, emerging states, failing states, changing strategies with regard to Irregular and Conventional Warfare are leading examples. Foremost among those aspects is the national deficit and the measures taken to reduce that deficit. In order to thoroughly examine truly effective ways of combating the deficit issue without decimating America's ability to defend herself and her allies, one must look at how wars are fought. The concept of modern warfare and how it moves within an Irregular – Conventional Warfare continuum must be considered with the understanding that future threats will drive decisions with regard to modernizing. The notion that state versus state war is a thing of the past and that state versus non-state conflict is the future has merit but may be oversimplified. The means by which America's air forces support the fight must be updated to keep pace with evolving enemies and a dramatically constrained fiscal environment. This paper will provide ideas on how to modernize the fighter fleet by providing some warfare theory, current cost facts, and background on the current modernization plan.

Modern Warfare

General Rupert Smith, a forty year veteran of the British Army and student of history uses Clausewitz to convey his theory on the evolution of warfare. In his book "The Utility of Force, The Art of War in the Modern World" he explains that a paradigm shift from war, to conflict or confrontation has occurred. General Smith sites Iraq in 2004 as a clear example of this shift where the state versus state war essentially ended and the fight against the insurgency took over. Since that time the United States along

with coalition forces have been engaged in a state versus non-state conflict in Iraq and in Afghanistan.

A successful force needs to be aware of the shift and adapt to it. This affects the utility of force on the modern battlefield, which has also changed as a result of modern warfare. “It is my experience in both national and international operations that without all three elements of the trinity – state, military and the people – it is not possible to conduct a successful military operation, especially not over time.”¹ Strategy has been depicted as the center link in a three link chain where it is intertwined with policy and tactics, with interaction between the three as both necessary and constant.² Similarly, “the commander at each level is also necessarily dependent on the actions and decisions of those above and below him in the hierarchy.”³ General Smith’s thoughts on command, rooted in Clausewitz theory can be found clearly in U.S. military doctrine documents and seem to follow a parallel pattern with regard to the view of strategy as the center link in a three link chain. It is the commander after all who will execute the strategy and endorse the tactics that will ultimately win, or lose the state policy objectives.

Just as strategy is rooted in state policy, the commander executing that strategy through tactics is affected by commanders up and down the chain of command. Where policy should be representative of the state’s interest, strategy should be representative of the commander responsible for carrying out that strategy. Placing the commander in the middle of the equation, General Smith articulates an up and down way of thinking that successful commanders employ and in turn seems to parallel the up and down, constant interaction between policy, strategy and tactics. Tactics that a military employs

should as well be representative of the people who make up the state, showing the constant interaction between State, Military and People through Policy, Strategy and Tactics.

Currently the United States and sovereign states around the globe are fighting Al Qaeda, a non-state terrorist organization that struck with no diplomacy prior to armed conflict, yet they seem to have policy, strategy and tactics. They have no state, but they have a military and they have people who accept their policy so much so that they become entirely their military. It could be argued that Clausewitz' theory does not have to be limited to states, or perhaps the term "state" needs to be redefined. General Smith's studies convey Clausewitz' theories but also show that today's enemy is not one of a sovereign state engaging in industrial war, but rather an enemy with no state affiliation. Therefore, while Clausewitz' theories still apply, warfare in the modern world has shifted and with it there needs to be a shift in engaging an enemy. Clausewitz said "force, to counter opposing force equips itself with the invention of art and science."⁴

America is at the point where it is absolutely necessary to equip its military with "the invention of art and science."⁵ Some of that art should come in the form of thinking differently about how to best organize, train and equip in a way that defends America's interests as well as those of current and future partner nations. The following pages will focus on the U.S. air forces' fighter aircraft fleet and examine risks with potential modernization options. In so doing, feasibility, acceptability, and sustainability considerations will be assessed if not inherently obvious.

Background to the Current Modernization Plan

The fleet which is the fourth generation of fighter aircraft, now referred to as "legacy fighters" (A-10, AV-8, F-15, F-16, F/A-18) will be replaced with "fifth generation

fighters” (F-22, F-35). Fifth generation fighters incorporate improved offensive and defensive systems, advanced avionics, and most significantly stealth technology. The currently operational F-22 and the F-35 Joint Strike Fighter (JSF), which is still under test and evaluation, make up the “fleet” of fifth generation fighters. The need for a modernized fighter fleet has been accelerated by the demands placed on the nation’s fourth generation legacy fighters over the past decade supporting Operations Iraqi Freedom and Enduring Freedom.

The JSF program is plagued by delays, increased costs and restructuring efforts. It has also been scrutinized in light of F-22 Raptor issues such as corrosion concerns and may likely be further scrutinized as the F-22 continues to experience growing pains. The Department of Defense is planning to procure 2,457 F-35 Joint Strike Fighters, made up of three variants to fit the needs of the Air Force, Marine Corps, Navy, and eight international partners. The estimated cost for this procurement is \$385 billion.⁶

The current global economy is not well suited to handle the fiscal risks associated with this type of costly investment, especially in light of the program’s track record thus far. With an estimated 64% increase in development cost from the original baseline and a four year schedule slip from the current baseline, the risk may be even greater when viewed from the partner nations’ points of view.⁷ To further complicate the issue, higher than expected life cycle cost estimates are considerably more expensive than the legacy fighters they are to replace.⁸ While there is progress being made within the program, the trend is that of cost overrun and late delivery – concepts that diverge from anticipated defense budget plans. This trend is counterproductive to Building

Partnership Capacity (BPC) if the cost exceeds what should be reasonably expected of those wanting to continue military relations or become partners with the U.S.

At the same time cost overruns and late deliveries are consuming the Department of Defense (DoD), the shelf life of legacy fighters is approaching more rapidly with every hour flown. Since 1991, the United States Air Force has flown combat or combat support missions over Iraq and/or Afghanistan that have been taking a toll on fighter aircraft in the form of accelerated aging. For example, the A-10 was designed with a life span of 8,000 flying hours. Replacement aircraft were to be designed, tested and operational at about the time the A-10 would be reaching 8,000 hours fleet wide. This plan has been jeopardized by greater than programmed sorties flown at greater than programmed sortie durations. The same holds true across the board for all legacy fighters. These aircraft are assets that can best serve the nation by returning them to their designed uses and utilization rates. While aircrews of the aircraft currently being employed for Close Air Support (CAS) have adapted to the mission, the airframes were neither designed nor intended for that use and therefore have until this time masked the problem of airframe shelf life.

U.S. national interests include defense of the homeland, defense of our allies, and the security of current and future partner nations. In short, the Department of Defense cannot continue pursuing exorbitantly priced fighter aircraft in numbers that can neither be afforded by the U.S. nor by her allies. Additionally, the nation's airpower could be at significant risk by depending on a single Mission Design Series (MDS) to accomplish several mission sets across the Air Force, Marine Corps, and Navy. If the entire Joint Strike Fighter fleet were grounded due to an unforeseen design flaw similar

to what the Air Force recently experienced with the F-22 Raptor's oxygen system, the nation's airpower would rely solely on the Air Force's 185 Raptors. The grounding of an entire fleet of F-22s was significant. But, since the U.S. military employs multiple MDS aircraft, the risks associated with this lengthy grounding were mitigated by the legacy fighters that preceded the F-22. If the U.S. military faces a similar issue with the F-35 and the legacy fighters are retired, the United States air forces would be largely without a fighter force. A more feasible option includes a fleet of various types of fighter and attack aircraft, each capable of specific missions. In order to maintain national security, this hybrid fleet of various fighters will also need to be smartly fielded throughout the Total Force. The risks to U.S. national security associated with the cost prohibitive Joint Strike Fighter could also have implications with partner nations and the ripple effects could jeopardize stability in various regions. Those risks stem largely from removing a "safety net" now provided by multiple MDS airframes.

The United States Air Force is already well on its way to providing at least part of the answer to this national security issue. The Air Force has been studying Light Attack / Armed Reconnaissance (LAAR) airframes looking for ways to mitigate the risk of a fighter gap while at the same time reducing cost per flying hour. This program is referred to as OA-X where O = Observation, A = Attack (A), and X refers to a yet identified platform. Through the hard work of a small group of Air Force officers, this modernization initiative has grown to include many value added capabilities such as a dedicated CAS platform additionally capable of providing extended hours of Intelligence, Surveillance, and Reconnaissance (ISR) data. The airframes studied are currently flying in other mission sets (i.e. Training) but are easily modified to fill the role of combat

capable aircraft. There are positive indications the airframes being considered could provide a number of benefits to tomorrow's Air Force. Included in these benefits are dramatically reduced operating costs compared to today's fighter fleet, promise for Building Partner Capacity (BPC), and domestic operations to include border patrol and counter drug operations.

The Way Forward

In today's fiscally constrained environment, the objective must be to develop a way forward that is in stride with reduced defense spending. The way forward should include fifth generation fighters (F-22, F-35), legacy fighters (A-10, F-15, F-16, F/A-18) and OA-X aircraft efficiently fielded across the Total Force and Partner Nations. This plan would be more in line with reduced defense spending, provide "safety nets" currently missing beneath the bridge to JSF, provide a cost effective means of fighting the state versus non-state conflict, and provide a new aircraft (OA-X) that is both appealing to, and affordable for emerging partner nations. The Air Force alone has estimated fighter type aircraft shortfalls that range from 200 – 800 aircraft.⁹ However, since those estimates were made, JSF development and production has been hampered by delays and cost overruns, F-22 procurement numbers have been reduced, a new National Security Strategy has been developed, and concerns over future adversary threats have changed. In short, the thought process for an all stealth fighter force to defend against high end threats and anti access environments is not in line with the more current theory of modern warfare.¹⁰ While there absolutely is a need for stealth technology, fifth generation fighters and advanced capabilities, those needs should reflect potential future conflicts, incorporate advanced technologies into current

fighters and be a balanced mix of aircraft that can fight both Irregular and Conventional Warfare battles.

State versus Non-State Actors

Since 2004, the United States and her allies have been fighting non-state, non-industrial, guerilla warfare-style counterinsurgency conflicts on reduced threat battlefields. This is a shift away from the state versus state warfare history has known. Additionally these non-industrial conflicts are increasing in frequency and are likely to continue. The significance of this phenomenon is evidenced in the Quadrennial Defense Review's (QDR) emphasis on rebalancing the force to ensure success today while preparing for a complex, uncertain tomorrow.¹¹

The U.S. Air Force has adapted to support these types of operations but has done so using the same equipment it has used to deter, or when necessary, fight state versus state wars. There are costs associated with this approach and those costs are currently disproportionate to the costs to the enemy. In short, on the same battlefield there are two sides fighting, separated by wildly disparate costs. In Iraq and Afghanistan the U.S. Air Force has provided 24-hour air support using primarily A-10, F-15E and F-16 aircraft providing Intelligence, Surveillance and Reconnaissance (ISR) and on-call strike. These legacy fighters are quite capable of accomplishing the mission but are not a cost effective means. In fact, only the A-10 was designed specifically for the CAS mission with loiter time and fuel efficiency in mind. The F-15E and F-16 were designed as multi-role fighters better suited for Air Interdiction and Air Superiority roles. The complex battlefield environment has dictated a greater need for CAS airframes and an even greater need for ISR. Therefore, in light of supporting the high demand CAS and ISR missions, the return on investment is minimal due in part to the amount of time

these aircraft spend striking targets versus the amount of time they are providing ISR. Regardless of how time “on-station” is utilized, the bottom line is the operating cost including fuel and maintenance required to provide this type of air support is unsustainable and inefficient.

OA-X

The United States cannot afford to maintain the status quo with regard to how national interests are defended. Aware of this, the Air Force’s Air Combat Command conducted a deployed cost comparison of an Operation Enduring Freedom (OEF) notional fleet of 18 OA-X aircraft versus Air Expeditionary Task Force One (AETF-1) consisting of one and a half squadrons of legacy fighters (F-15E and F-16). The report used 36 four-hour air-refueled legacy fighter sorties. In just one day those 36 sorties required 1,216,000 pounds of jet fuel. Of that total, 636,000 pounds were delivered from the fighters’ deployed base and another 420,000 pounds were delivered via air refueling. The air refueling (tanker) aircraft alone burned 160,000 pounds of fuel delivering that fuel to the legacy fighters. This translates to 443 million pounds of fuel annually.¹²

To add perspective to this issue, the Defense Science Board’s Energy Strategy Task Force reported that ground-delivered fuel costs \$15 per gallon and tanker delivered fuel costs \$42 per gallon.¹³ Applying these DoD fuel prices to the legacy fighter scenario, the fuel cost alone for one year is in excess of \$1.6 billion (Figure 1). A squadron flying 18 OA-X aircraft for the same 36 four-hour missions consumes 60,000 pounds of fuel per day and 21.9 million pounds per year. Applying the same fuel costs, the OA-X total fuel cost for one year is approximately \$49 million (Figure 2) which would reduce defense spending by more than \$1.5 billion.

AETF1 fuel costs	Fighter ground fuel	Aerially delivered fighter fuel	Tanker ground fuel	Totals
Fuel in pounds	636,000 lbs	420,000 lbs	160,000 lbs	1,216,000 lbs
Fuel in gallons (6.74 lbs/gallon)	94,362.02 gal	62,314.54 gal	23,738.87 gal	180,415.43 gal
Cost per gallon	\$15/gallon	\$42/gallon	\$15/gallon	N/A
Daily fuel cost	\$1,415,430.27	\$2,617,210.7	\$356,083.09	\$4,388,724.06
ANNUAL cost	N/A	N/A	N/A	\$1,601,884,281.90

Figure 1: Daily and annual CAS legacy fighter (F-15E, F-16) fuel costs for AETF 1¹⁴

OA-X fleet fuel	OA-X ground
Fuel in pounds	60,000 lbs
Fuel in gallons (6.74 lbs/gallon)	8,902.08 gal
Cost per gallon	\$15/gallon
Daily total	\$133,531.16
ANNUAL total	\$48,738,872.40

Figure 2: Daily and annual OA-X fuel costs¹⁵

Reduced defense spending can also come in the form of reduced maintenance costs for the military's fighter fleet. The cost to operate an A-10 (minus fuel costs) is \$4,864 per flight hour. The F-16C costs \$7,692 per flight hour and the F-15E costs \$15,879 per flight hour, which equates to more than ten times the operating cost of a turboprop driven OA-X which costs approximately \$1,500 per flight hour.¹⁶ Using the same cost comparison for maintenance as used in examining fuel costs, the OA-X model again illustrates the reduced spending effort (Figures 3 & 4). The total OA-X operating cost savings exceed \$2.1 billion per year (Figure 5).

AETF1 maintenance costs	F-16	F-15E	Tankers	Totals
Sorties	24	12	6	36
Sortie duration	4 hours	4 hours	8 hours	4 hours
Total hours	96 hours	48 hours	48 hours	144 hours
Cost per hour	\$7,692	\$15,879	\$7,700	N/A
Daily maintenance cost	\$738,432	\$762,192	\$372,960	\$1,873,584
Annual maintenance	\$269,527,680	\$278,200,080	\$136,130,400	\$683,858,160

Figure 3: Daily and annual maintenance costs of CAS fighters and supporting tankers in AETF-1¹⁷

	OA-X
Sorties	36
Duration (hours)	4
Total hours	144
Cost per hour	\$1500
Daily maintenance	\$216,000
Annual maintenance	\$78,840,000

Figure 4: Daily and annual maintenance costs of OA-X fleet¹⁸

	Fuel cost	Maintenance	Total
AETF1 (12 x F-16; 6 x F-15E)	\$1,601,884,282	\$683,858,160	\$2,285,742,442
OA-X (18 aircraft)	\$48,738,872	\$78,840,000	\$127,578,872
Total savings	\$1,553,145,410	\$605,018,160	\$2,158,163,570

Figure 5: Annual cost comparison of OA-X vs. legacy fighters¹⁹

Legacy Fighters

As legacy fighters phase out of the nation's defense arsenal, they can contribute to national interests by providing a "safety net" for the modernization program.

However, there are hidden costs associated with legacy fighters under the current

defense strategy and those costs stem from the fact that legacy fighters are aging at a rate that is more than six times that which was programmed. These aircraft continue to serve their part of the National Security Strategy well but cannot sustain the current tempo cost effectively. With defense spending and the deficit at the center of national security concerns, a change must occur and the Department of Defense has the means available to reduce spending especially with regard to its legacy fighter fleet. The cost data provided above paints a less than optimal picture of the legacy fighters but only when compared to the cost effectiveness of the yet acted on, OA-X. A Joint Strike Fighter comparison would paint yet another favorable picture of legacy fighters. These legacy work horses and the crews who operate, maintain and improve their capabilities have made Herculean efforts to best support the Soldier, Sailor, Airman or Marine on the ground. It has historically been the United States military men and women along with their allies who simply get the job done by doing more with less or in many cases, with what they currently possess.

The United States Air Force has been witness to legacy fighter aircraft groundings, most recently affecting A-10s and F-15s. For example, in 2008, 127 of the 356 A-10s found throughout the Total Force were grounded due to wing cracks. While this could have been catastrophic for the fleet, a worse scenario could have played out if it were not for a Service Life Extension Program (SLEP) strengthening the wings, which was already under way. The SLEP for A-10 wings was begun prior to wing cracks being discovered, which highlights the importance of Service Life Extension Programs. In this case, the A-10 SLEP took “thin wings” and replaced them with “thick wings” that were either already in stock or thin wings that had been upgraded to thick

wings in the process. This was an innovative, cost effective initiative that extends the service life of the A-10 and its benefits are being applied to other legacy fighters. It also delivered to the American taxpayer a cost savings, and averted an issue that would have incurred costs paid for by the Soldiers, Sailors, Airmen and Marines the A-10 was designed to support. The true value of SLEPs will be seen some time in the future as the JSF program falls short of expectations, exposing the United States to the risk of reduced capabilities in its air forces.

If applied to all fighter aircraft, SLEP could serve the nation's interests in a couple of ways. First and perhaps most importantly, it would help put in place a safety net as the Department of Defense modernizes its fighter aircraft fleet. The Joint Strike Fighter will be an extremely capable weapon when operational but in light of budget cuts, does not seem feasible if continued with the current plan. Second, the legacy fighter fleet could best serve the nation by providing support to the fifth generation fighters. And, if a balanced number of legacy fighters are moved to the Air National Guard (ANG), the cost savings inherent to the Guard could be leveraged. As DoD grapples with the need for modernization it must do so with regard to significant budget cuts and a wide range of enemies encompassing both state and non-state actors employing tactics that move back and forth within the spectrum of Irregular and Conventional Warfare.

When managing risk, there is safety in numbers. The Air Force had a plan to move from fourth generation (legacy) fighters to the fifth generation JSF, but that plan relied too heavily on the F-22. When the Office of Secretary of Defense ended F-22 production, the Air Force found itself almost completely dependent on the JSF. And when studying the fighter modernization issue it becomes clear that until airframes

stand the test of time, greater numbers of aircraft types reduce risk in light of untested technology. Concerns about F-22 corrosion issues have led to concerns regarding F-35 corrosion issues and these stem largely from the composite structure of these airframes. A cause for concern lies in the fact that lessons learned from the F-22 may not have been applied to the F-35. Legacy fighters however, have proven to be durable, rugged aircraft, are structurally sound, and have the potential to bridge the gap to an entirely fifth generation Air Force. The Navy and Marines are faced with the exact same scenario with the exact same options available to them – maintain and improve legacy fighters (F/A-18, AV-8) to bridge the gap.

The F-15 Eagle is the latest example of creative, critical thinking where the world's premier air-to-air fighter is being upgraded and tested with modern technology making it capable of integrating with fifth generation fighters, eliminating the gap between fourth and fifth generation fighters. Boeing has already improved the stealth characteristics, Electronic Warfare systems, and fifth generation interoperability capabilities of both the F-15C and F-15E Strike Eagle in an effort to find cost effective ways to produce a "Generation 4.5" fighter suitable for the U.S. Air Force and partner nations. In December 2011 the Pentagon announced the \$30 billion sale of 84 F-15s to Saudi Arabia.²⁰ At \$68.5 million each, based on a 200 aircraft domestic purchase, the F-15 exemplifies the kind of forward thinking the U.S. can afford. The end result of Boeing's efforts is a 60% reduction in cost per flying hour when compared to the legacy F-15Cs with increased capabilities. Stealth capabilities needed for successful, initial penetration of enemy Integrated Air Defense Systems (IADS) and interoperability with fifth generation F-22s and F-35s are realized in this one very capable, cost effective

weapon system. Once IADS are destroyed or diminished, the need for pure stealth capability is correspondingly reduced. The Generation 4.5 Eagle incorporates technology that allows the airplane to be configured for stealthy, initial IADS Penetration and Strike, operability with fifth generation fighters and then reconfigured for Interdiction and possibly Close Air Support capabilities employing an increased variety of air-to-air and air-to-ground weapons. Remarkably, this reconfiguration can be accomplished in just three hours. This concept of reconfiguring the aircraft based on threats is actually an advantage the F-15 would have over the current version of fifth generation fighters. More importantly, it could come to fruition more quickly than the JSF and at roughly 60% of the cost.²¹

Joint Strike Fighter

The Joint Strike Fighter consists of three variants: Air Force F-35A Conventional Takeoff and Landing (CTOL); Marine Corps F-35B Short Takeoff and Vertical Landing (STOVL); Navy F-35C designed for carrier operations. The Joint Strike Fighter will be an extremely capable airplane when it reaches Initial Operating Capability (IOC), but its test results thus far, and associated cost overruns highlight a need to modify DoD's fighter aircraft modernization plan. According to the Government Accountability Office, the JSF program established 12 clearly-stated goals in testing, contracting, and manufacturing for completion in calendar year 2010. It saw very limited success, achieving six goals and was making varying degrees of progress on the other six.²² Failure to meet test goals according to *Defense Technology International* resulted in contractor Lockheed Martin forfeiting \$28 million of a possible \$35 million in award fees for 2010.²³

Of primary concern within the JSF program is the F-35B, which has experienced massive delays and cost overruns. Three major technical issues unique to the B-Model are of such magnitude, the aircraft may require redesign of its structure and propulsion systems. The first issue was premature wear on hinges for the auxiliary inlet door feeding the lift fan, which caused the F-35B fleet to be grounded in September 2010 however a technical fix was in place by January 2011. The second issue arose when cracks were discovered in a bulkhead of an F-35B used for fatigue testing after the airplane had been subjected to the equivalent of about 1,500 hours of flight time out of a total 16,000 hours planned. The third issue, that the driveshaft contracts and expands more than expected and that other components experience more heat than anticipated during flight operations, will demand that the driveshaft, lift fan clutch, and actuator for the roll post nozzles be redesigned.²⁴

Cutting the F-35B from the JSF program would eliminate \$17.6 billion in defense spending but leave the Marine Corps without a fifth generation fighter. However, a portion of those recovered funds could be applied to updating some number of AV-8B and F/A-18Es making them compatible with fifth generation fighters, an option already being looked at by the Department of Defense. Similarly, according to the National Commission on Fiscal Responsibility and Reform, substituting F-16s and F/A-18Es for half of the planned F-35A and C purchases would produce a fighter mix that would save \$9.5 billion through fiscal year 2015.²⁵

The team of engineers must clear several, significant hurdles to get the F-35B back on track and will likely involve substantial costs. These are hurdles that should have been cleared back in the design phase of the program, not this far into the original

procurement timeframe. Additionally, does the demand for Short Takeoff and Vertical Landing aircraft warrant the level of investment the F-35B is receiving, especially in light of reduced defense spending? If there is a need for short takeoff and landing operations, the OA-X may be better suited, especially if that capability is needed in austere locations, as one would expect. In fact, austere locations were the premise behind the design of STOVL aircraft like the AV-8B, which the F-35B is to replace. It would seem unlikely that a \$150 million²⁶ aircraft is a cost effective way of operating from austere locations, and seems contradictory to the original Joint Strike Fighter design theory of stealth capability. If carrier based operations are the objective, then a better way forward may be to eliminate F-35Bs and increase the number of F-35Cs allowing the Marine Corps and the Navy to operate the same variant.

Reduced Defense Spending and The Air National Guard

Air National Guard members operate 16 of the 18 Air Sovereignty Alert sites located across the United States and they do so operating legacy fighters. The Air National Guard currently accounts for 30 percent of fighter, 40 percent of tanker, and 30 percent of airlift capability for the total Air Force. More importantly, the Air National Guard does so using less than 7 percent of the Air Force's 2010 budget.²⁷ These cost efficiencies are expanded by fielding the hybrid fighter fleet of OA-X, legacy, and fifth generation fighters equitably throughout the Total Force.

Our ability to advance constructive cooperation is essential to the security and prosperity of specific regions, and to facilitating global cooperation on issues ranging from violent extremism and nuclear proliferation, to climate change, and global economic instability – issues that challenge all nations, but that no one nation alone can meet... Successful engagement will depend upon the effective use and integration of different elements of American power.²⁸

The National Guard's 20 year old State Partnership Program, now 65 nations strong, understands this strategic necessity and communicates it clearly in its vision statement. Key components of that vision are enduring relationships with partner nations of strategic value in conjunction with the National Security Strategy, National Military Strategy, Department of State and Combatant Command Theatre Security Cooperation guidance, regional stability, and partner capacity.²⁹ OA-X is one way to build those relationships with its simple design and ease of maintenance; attractive characteristics for nations wishing to fly the same equipment as America, but less well suited to handle the maintenance, operations and logistics demands of high-tech, high-priced jet aircraft. From maintenance to operations to logistics, OA-X stands to provide partnership options that start with international training at home and abroad. And that partnership will culminate when the U.S. and partner nations fly, fight and win together – where winning is measured by regional security at reasonable expenses. OA-X is the logical next airframe to continue this tradition already established by legacy fighters.

Conclusion

The Volatile, Uncertain, Complex, Ambiguous (VUCA) world in which strategic leaders operate knows no boundaries and presents itself across the spectrum of Joint Interagency, Intercultural, Multinational environments. A look at the performance of U.S. Congress Joint Select Committee on Deficit Reduction bears this out and in its wake remain decisions as how to best organize, train and equip the United States military while keeping it ready, reliable and relevant. Also in that wake is the very real need for a modernized fighter aircraft fleet – a fleet which may look dramatically different from the currently proposed one and possibly even different from what was envisioned just a few months ago. The state of the world economy is driving changes

that were not in the equation when the fifth generation fighter force was in its earliest design stages. The U.S. fighter fleet must maneuver through this VUCA world in relation to economic constraints and those at the controls may need to adjust the objectives originally set.

There is no way around the issue of reduced defense spending. It simply must be tackled head-on and the agency that can lead the way is the Department of Defense. The stakes are high but fortunately the United States military is capable of moving to the next level if all parties are willing to make the tough choices. If the air forces need a fifth generation fighter, then the military needs fifth generation thinking to get it. While the Marine Corps may not initially favor the idea of losing its F-35B, OA-X and recapitalized legacy fighters could bridge the gap to its fifth generation fighter. And in doing so, may actually increase the air combat capability of the Marine Corps. Likewise, the Air Force may not like the notion of fielding a single engine turbo-prop aircraft as its frontline CAS/ISR platform, but again it may prove to be an improvement over the current strategy. There appears to be little room for arguing the fiscal benefits of the OA-X and those involved in the program share a passion and enthusiasm for moving this program forward.

The hybrid system will likely be the system of the future, on the ground and in the air, on the battlefield and on the planning board. If the air component genuinely wants to support the land component, it must do so from out front with truly “out of the box” thinking and the willingness to field a fleet of legacy and fifth generation fighters, as well as OA-X. Simply stated, the defense budget is driving dramatic changes and the byproduct of such budget cuts could end up being the best thing that happens to

America's military and the militaries of her allies. Already in Iraq, United States Air Force Instructor Pilots are training Iraqi Air Force pilots how to fly the T-6A Texan – the same aircraft in which every pilot in the United States Air Force and Navy trains. This is just one step in the process to building partner nation relationships. And if the Air Force goes forward with OA-X then the Iraqi Air Force would be well positioned to buy OA-X should the AT-6 be that airframe. Furthermore, OA-X will be the kind of cost effective, simple airframe capable of multiple uses that will be attractive to emerging states.

Similarly, Boeing's development of the Generation 4.5 Eagle provides options to U.S. modernization plans and represents a feasible approach to foreign military sales of updated legacy fighters. With nations like Israel, Japan and Saudi Arabia already flying the F-15 and with more than 20 nations flying the F-16, and eight nations planning on purchasing the F-35, the United States military is poised to put forward the next generation of nation building that will be the gold standard for air forces with increased capabilities in a VUCA, fiscally constrained world. Domestically, a fleet of OA-X, legacy fighters and fifth generation fighters properly fielded across the Total Force will support reduced defense spending, increase Homeland Defense capabilities and fit neatly in the global air forces with whom the United States will continue to protect national and global interests.

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