

*U.S. Air Dominance in a Fiscally-Constrained Environment:
Defining Paths to the Future*

Tactical Aircraft and the Preservation of U.S. Air Dominance



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“It could be that those who think there’s never going to be an air-to-air engagement ever again in the history of the world could be wrong....

*– Admiral James Winnefeld,
Vice Chairman, Joint Chiefs of Staff, January 2012**

Control of the air is central to the American way of war. Yet it’s been a capability the U.S. has been able to take for granted in recent conflicts. That is changing, as sophisticated air defenses both on the ground and in the air will pose challenges to local and regional control of the air in the decades ahead.

*Jeff Schogol, “5 A-10 Squadrons To Be Cut,”
Air Force Times, January 30, 2012

Introduction

The case for focusing on air dominance has its roots in the most successful of U.S. military operations. One built around it was the invasion of Normandy. Air dominance was the basis of the whole plan as briefed to General George Marshall in early 1942. “The basis was the conviction that through an overpowering air force, numbering its combat strength in thousands rather than in hundreds, the German’s defenses could be beaten down or neutralized, his communications so badly impaired as to make counter-concentration difficult, his air force swept from the skies, and that our ground armies would have an ever-present asset of incalculable power,” wrote one of the planners. The plan at the time had to be taken “almost on faith,” he noted. Marshall won approval for the plan from the Allies in April 1942 and from that moment the U.S. war effort focused on the “interim step” of achieving air dominance over Europe. It was carried out with bombers and fighters gnawing at the Luftwaffe. When the time came, in June 1944, the air dominance pictured two and a half years earlier was secure and the officer who had helped put together the briefing was in command: General Dwight D. Eisenhower.¹ The victory was essential but the cost was high. In operations against Germany, the U.S. Army Air Forces lost 11,687 aircraft, with 4,274 falling to enemy aircraft.²

Air dominance was recognized as an essential condition for land and sea maneuver and proved so again in Korea. But in the 1950s, the growing atomic stand-off overshadowed war plans. The role of air dominance appeared to decline – and as a result, the U.S. struggled again with air dominance in Vietnam from 1965 to 1972. Aircraft of the United States Air Force, Navy and Marine Corps flew 1,875,644 attack sorties in South Vietnam, North Vietnam, Cambodia and Laos.³

The cost of air dominance was high mainly because the fighters of the day had been built for nuclear weapons delivery or short-range intercept. The North Vietnamese soon found tactics – with substantial help from Russia and China – that led to mounting losses for U.S. airmen. During the middle years of the war, attack aircraft losses were a near-daily event.

North Vietnam deployed SA-2 surface-to-air missiles (SAMs) supplied by Russia beginning in 1965. The U.S. deployed the ALQ-170 electronic countermeasures pod on the F-105 to counteract radar control for SAMs and the equally deadly anti-aircraft fire. North Vietnam stepped up MiG flights in response. From 1962 to 1967, the North Vietnamese total combat aircraft inventory never exceeded 97 fighters and the number of advanced MiG-21 Fishbed fighters with infrared missiles peaked at 16 in 1966. Eminent historian Walter Boyne summarized the tactics:

Operating under ground control, and making maximum use of both cloud cover and the almost benevolent American rules of engagement, the enemy aircraft were adroitly employed. The MiGs, especially the later model MiG-21s armed with heat-seeking missiles, sought to attack the strike flights and make them jettison their bomb loads prior to reaching the target areas.

The North Vietnamese ground controllers considered the fighter missions to be fulfilled if the bomb-carrying F-105s jettisoned bombs before the target but “they tried to score kills wherever possible,” noted Boyne.⁴

These enemy air combat tactics forced an ongoing battle to retain air superiority. As Boyne put it, “the mission of U.S. forces was to obtain air superiority, destroy the enemy air forces, and conduct long-range bombing operations. The mission of the enemy forces was to defend their most important targets by choosing to engage the American bombers on a selective basis.” Of course, tactical ingenuity again contributed mightily. Success came from using a wolfpack concept where F-4s with bombs and air-to-air missiles flowed a few minutes apart from the F-105s armed with bombs.⁵

However, the Vietnam air battles were costly. The majority of American prisoners of war were downed aircrew. In fighters alone, the U.S. Air Force lost 382 F-4s, 198 F-100s and 334 F-105s for a total of 914 fighters out of 1,737 total combat losses from February 1962 through October 31, 1973.⁶

Those who survived vowed never to suffer so many lost squadron-mates again. From the late 1960s to early 1970s, the Air Force and Navy designed new fighters with the best of air superiority in mind. Those aircraft were procured at high rates through the 1980s. In 1991, the Gulf War started off with a six-week air campaign. F-15s, F-16s, F/A-18s and other types dominated the skies over Iraq. Under this umbrella, General Norman Schwarzkopf planned a campaign tailored to win back Kuwait quickly with minimal loss of life. As in 1944, the victory of 1991 was built on air dominance. Winning a war takes more than air dominance, of course. But without it the chances are nil – as Eisenhower and Schwarzkopf knew.

The Future Tasks for Air Dominance

Air dominance has come to the forefront of defense planning again – but after two decades of neglect. For 20 years after the Gulf War, air threats abated. The most likely adversaries were North Korea and Iraq; neither had a significant air force. New, advanced foreign fighters were not a big concern either. Air dominance again slipped in priority. The early termination of the F-22 program in a 2009 budget decision marked the last stage of this period.

Then the cycle shifted. The 2010 Quadrennial Defense Review (QDR) noted that U.S. air forces in future conflicts would encounter “integrated air defenses of far greater sophistication and lethality than those fielded by adversaries of the 1990s.” “Proliferation of modern surface-to-air missile systems by Russia and others will pose growing challenges for U.S. military operations worldwide,” the 2010 QDR also noted.⁷ Add in the challenge of adversary “red air” in some theaters and the risk is clearly rising.

Air dominance remains a necessity for joint operations. As defined here, air dominance is that suite of abilities necessary for control of the air. Joint forces – Air Force, Navy,

and Marine Corps – may all participate, although the bulk tends to fall to the service with the largest force structure for these tasks.⁸ Air-to-air combat can and does figure prominently in the tasking. However, U.S. doctrine typically defines air control tasks much more broadly. The Air Force, for example, describes the elements of air dominance as: offensive counter air and includes attack of surface-to-air missile sites, for example. According to Air Force doctrine:

Offensive Counterair (OCA) consists of offensive operations aimed at destroying, disrupting, or limiting enemy air and missile threats. Ideally, most OCA operations will prevent the launch of aircraft and missiles by destroying them and their supporting systems on the ground. Otherwise, OCA operations seek out and destroy these targets as close to their source as possible. These operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. *OCA operations include targets such as enemy air defense systems (aircraft, antiaircraft artillery [AAA], and SAMs), airfields, and supporting infrastructure; theater missiles (TMs), ground-, sea-, and air-based launch platforms, and supporting infrastructure; as well as command, control, communications, computers, and intelligence (C4I) nodes. OCA operations enable friendly use of contested airspace and reduce the air and missile threat posed against friendly forces. OCA is often required to enable the successful execution of other air operations such as strategic attack, interdiction, and close air support. (Italics in the original.)*⁹

The bulk of the U.S. fighter force structure is multi-role and was expressly designed so that an individual aircraft type (say, the F-16) can execute several of these tasks depending on training, armaments and mission profile. Air dominance also depends heavily on local and theater command and control systems. These begin with the air operations centers far from the fighting and extend to the battle's edge with platforms like Airborne Warning and Control Systems (AWACS). In fact, one of the evolving issues in air dominance is to what extent the F-22 and F-35 can pick up airborne battle management tasks once fulfilled exclusively by AWACS and E-2C/D. For force planning, the tasks are broad. They include:

- **Air control.** Air control takes two main forms. Combat air patrols are positioned over designated areas to intercept enemy aircraft, such as those attempting to violate a no-fly zone or to attack friendly targets. A second tactic is the sweep, where flights or packages of air superiority fighters make forays over enemy airspace to engage enemy fighters.
- **Attack of enemy air bases.** This is to suppress sortie generation.
- **Attack of enemy air defenses.** Here, the mission is suppression and destruction of air defenses. The primary forces for destroying air defenses depend on geolocation and the right weapons.
- **Command, control and air battle management.** Traditionally done by non-fighter platforms, establishing an integrated view of the air was pioneered late in the Vietnam War and remains central to air dominance operations today. Expect this ability to be challenged in contested airspace.

Together these tasks add up to air dominance.

From the basis of air dominance, U.S. forces are able to perform a full range of other missions. These include reconnaissance and surveillance, offensive strike, and the ability to conduct a variety of land and sea operations. Air dominance provides the blanket for bases carrying out not only air operations but associated logistics, command and control, supply and all that goes with the forward deployment and operations of joint forces of all types. On this point Eisenhower had a famous exchange with his son, who graduated from West Point in June 1944 and journeyed to England to visit his father. On a trip to Normandy the second lieutenant complained about the jammed up military traffic. “If you didn’t have air superiority you’d never get away with this,” he told his father. “I received an impatient snort. ‘If I didn’t have air superiority I wouldn’t be here.’”¹⁰

The retort still rings true as a military axiom today. The first virtue of air dominance is freedom from attack on supporting bases and what used to be called the “rear areas.” For example, air dominance affects support to ground forces, offensive strike options and what the military calls “Phase 0” of shaping operations. The strategic concept for Operation Enduring Freedom in Afghanistan in 2001 depended on placing bombers, fighters and C-17 cargo airplanes dropping food relief supplies in the airspace from the first night. The coalition’s complete control of the air allowed relatively few ground forces and a great expansion of close air support and surveillance in the years that followed.

The need to attain air dominance early in a future joint operation is even more important as a result of choices made by the Army with respect to investments in land-based air defenses. Simply put, the Army has only a limited capability to provide for the defense of its forces and critical facilities. The Army has cancelled both the SLAMRAAM and MEADS mobile air and cruise missile defense systems. While the improved Patriot can provide defense of fixed sites, it is not well suited for the protection of maneuver forces. As a result, for the foreseeable future, the Army and Marine Corps units ashore will be highly dependent on the ability of the Air Force and Navy to provide protection against air breathing threats.

Enabling offensive strike is another fundamental task for air dominance. Holding targets at risk is the term of art often used to state that the U.S., with international backing, can attack nearly any sort of target that may be threatening international order. This includes high-profile issues such as states with developing nuclear weapons capabilities. The role of long-range strike is predicated on strike aircraft being able to get through air defenses no matter the cost if the mission objective is sufficiently important.

Finally, U.S. national strategy places great importance on shaping operations such as exercises and engagement with regional partners. Humanitarian relief missions also fall into this category. Air dominance is simply assumed. But an adversary whose aircraft probe into the areas for these types of operations could raise the stakes.

To sum up, air dominance remains essential even in the age of ballistic and cruise missiles, cyber war and so forth. Controlling the air matters a great deal. Without it, the U.S. and allies have very few options indeed for influencing international security.

Challenges to U.S. Dominance of the Air

Many global hotspots now feature contested air environments. This is true in the Pacific where China's growing air defenses and air forces are moving into position to block access and vie for control of the air. However, there are other contested environments – including some posed by medium-sized adversaries.

Take the example of Syria. Gaining air dominance would be the first essential step if international forces intervened (for example, to head off weapons of mass destruction, or in the event of a massive humanitarian crisis). Syria's dated fighter aircraft mixed with surface-to-air missiles would force an international coalition to spend a period of time gaining mastery. The international forces could, with full U.S. assistance, manage the task. But it would take time, increasing the risks of the operation far beyond what was seen in Libya in 2011.

Dense air defenses do not have to be in top working order to cause problems. During Operation Iraqi Freedom, Saddam Hussein ordered fighter aircraft buried in the sand to protect them from coalition attacks. Twelve years of no-fly zones and more than a year of carefully-calibrated attacks against active surface-to-air missiles significantly degraded integrated air defenses. Still, the Iraqis were able to launch 2,884 surface-to-air missiles of various types such as SA-2, SA-3, SA-6 and Rolands against coalition aircraft in a 25-day period. The peak came on day 15 of the war when 190 SAMs were launched. None hit; most were unguided. The point is that the Air Force estimated 66 percent of these attacks were from unlocated SAMs despite the intensive effort to find and neutralize them.¹¹

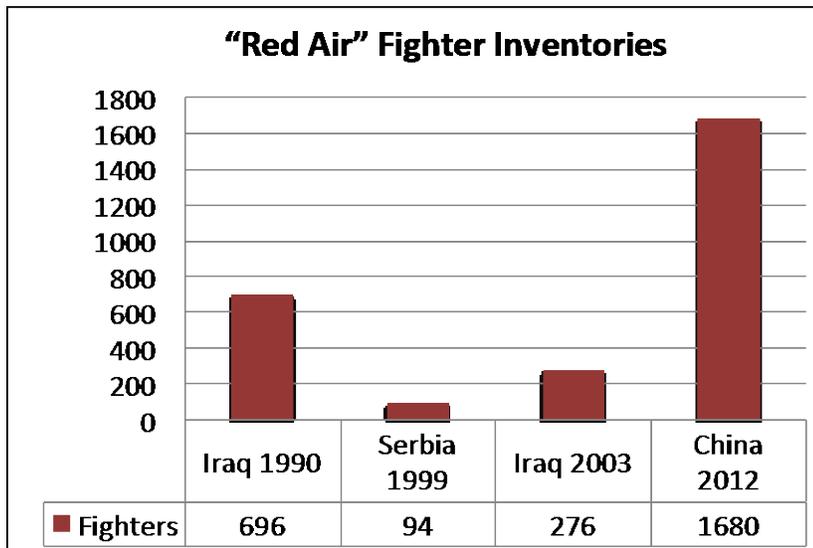
Iran poses a similar problem. An airstrike on Iran presumes enough air dominance for U.S.-led forces to carry out an attack on nuclear weapons capabilities, for example. Such targets might well require repeated bombing. Imagine the reaction if U.S. aircrews are downed during a multi-week campaign. A fast campaign would also be essential to containing risk of Iranian retribution through use of missile strikes or terrorist actions, for example. Here the degree of air dominance matters a lot to policy viability.

The new canonical case is China. China's air force now poses a particular threat that should move to the center of defense planning. While the U.S. was scaling back its fighter and strike forces to cut costs and fulfill urgent operational needs in Iraq and Afghanistan, China was discovering the value of air superiority. Other forces such as ballistic missiles, submarines, naval vessels and space and cyber warfare capabilities figure prominently, too. For these reasons, the rise of China's air dominance abilities merits extended discussion.

China has made no secret of its admiration for air superiority or its determination to achieve it. Noted a recent CSIS report to Congress on force levels for the Pacific:

The Chinese desire for advanced military capabilities developed over the last 15-20 years stems from extensive analysis of the pillars of U.S. military power projection as demonstrated in the 1991 Iraq War, the 1995-1996 Taiwan Strait crisis, the former Yugoslavia conflict, and more recently Iraq and Afghanistan operations. In particular, China realized after the Taiwan confrontations that it possessed a limited set of military options (short of nuclear weapons) and that U.S. power projection in the form of aircraft carriers and long-range precision strike (e.g., B-2 bombers) to deter Chinese aggression were insurmountable for the PLA [*People's Liberation Army*].¹²

If and when China can achieve local air superiority, this will be a major notch up in its capabilities. The result will be to extend and enhance freedom of action for People's Liberation Army forces and create problems for the U.S. and allies.



The chart shows how the trend in “red air” has shifted. From the low threats of the 1990s and 2000s, the trend line is now pointing toward very different conditions. China’s air forces have 1,680 fighters as depicted. In addition, China has 620 bombers like the H-6 and fighter-bombers are listed along with 1,450 older aircraft, many of which are also fighters. The trend line shows that going forward, U.S. fighter force structure will again have to reckon with “red air” and in significant quantities.

The People’s Liberation Army Air Force (PLAAF) presents the first true fighter adversary that the U.S. has faced since the end of the Cold War. Most of this change crystallized after the mid-2000s while the U.S. was preoccupied with burgeoning intelligence, surveillance and reconnaissance (ISR) and ground force support requirements in Iraq and Afghanistan. As a result, extended discussion of the growing

“red air” threat skipped a generation and remained on the sidelines of defense policy and force structure decisions until the new strategy debuted in 2012. China as a near peer is not a mirror image of well-rounded U.S. forces. Instead, China has prioritized development of air, naval, space, missile and cyber forces.

China’s air forces are smaller than those of the U.S. However, the PLAAF has been restructured since the early 2000s to focus on dominating air battles. In the 2000s, the PLAAF acquired the Su-30MKK2 fighter from Russia. This variant is based on modifications from the early 2000s that give the Su-30MKK2 the ability to carry a long-range anti-ship missile known as the Kh-17 or by its NATO name Krypton-A. The unrefueled combat radius of the Su-30MKK2 is about 1,600 km and can be extended to 2,600 km with one air refueling.¹³ Significantly, the PLAAF also has airborne early warning aircraft whose powerful radars detect, identify and track other aircraft.

China will also field fighters for its aircraft carriers. Current projections suggest China will build between two and five aircraft carriers. The first, the Liaoning, was christened by outgoing President Hu Jintao in September 2012. Chinese have enquired into obtaining the Su-33 from the Ukraine as a possible carrier-based fighter. Admiral Wu Shengli said the PLA Navy wanted a “supercruise” fighter, implying that they could press for a variant of the J-20 or the multirole fighter. Another option is the J-15 “Flying Shark,” a modification of the J-11 fighter.¹⁴

The PLAAF also has a pair of stealthy fighters in development. The J-20 “Mighty Dragon” is the culmination of two decades of research and development. The first open mention of the program came from an Office of Naval Intelligence report in 1997. As late as 2009, officials believed that the stealth fighter would not be operational until long after 2020. However, the J-20’s first publicly-known flight came in January 2011 during a visit to China by U.S. Secretary of Defense Robert Gates.

The second fighter debuted on October 31, 2012: the Shenyang Aircraft Corporation J-31 which had been spotted in roll-out photographs earlier. The J-31 appeared to be a more compact and advanced design, perhaps mimicking the scale of the F-35 in contrast to the F-22. “The J-31 is almost certainly designed with the intention to have the potential of operating on aircraft carriers, judging from its enhanced double-wheel nose landing gear” and vertical stabilizers, aviation analyst Bai Wei told *The Times of India* in a report also cited by Reuters.¹⁵

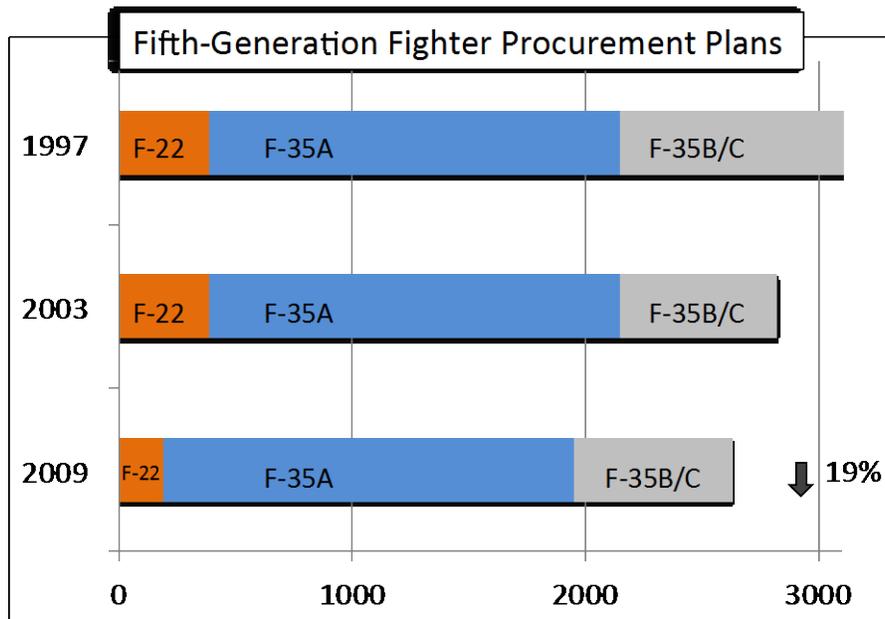
On top of this, China has several advanced missile types which can transform even its older fighters into lethal team players in the battlespace. Specific missiles include the R-27/AA-10 semi-active radar/infrared missile; the infrared-guided R-73/AA-11 with a range of 30 km; and the active radar homing R-77/AA-12 whose range is estimated at 50 to 80 km. Three of the four main types of fourth-generation fighters, the J-10, J-11, and Su-30 carry the long-range advanced air-to-air missiles R-77/AA-12 and the indigenous variant PL-12. So does the J-8, bringing the number of potential missile platforms to 776.

China has converted its air forces from a mass of outdated fighters to a large force with a modern spearhead. For U.S. forces to extend deterrence, they will have to be able to counter China’s power projection capabilities and to hold targets at risk in China itself. The credibility of deterrence (and its diplomatic and policy value) rests on the balance of forces and to a great degree, whether China’s forces could cut off access to certain areas or mount offensive moves with a great chance of success.

Force Structure Status

With air dominance challenges rising, the capability gaps in the fighter force pose a significant risk to U.S. national security objectives in the decades ahead. The path toward a better position is a difficult one, due primarily to failure to produce the F-35 on schedule. This section examines major issues in establishing a sound acquisition path toward a fighter force capable of meeting the Pacific’s most stressing scenarios.

With minimal air threats over the past several years, the U.S. took higher risk and rationed its investment in the tools of air superiority. For example, production of the F-22 fleet was terminated at 187 aircraft to meet budget goals in 2009. This was less than half of the original requirement set in 1997 to match with 1,763 Air Force F-35s.



Procurement plans for fifth-generation fighters declined by nearly 19 percent over the fifteen-year period.

As a result, investment in air dominance has languished as budgets stretched to meet wartime urgent operation needs. The recent budget cuts seeking current-year savings

have also been particularly hard on air dominance programs because of the availability of procurement dollars.

Falling off the planned modernization schedule has created force structure gaps for the Air Force, Navy and Marine Corps. It has widened into perhaps the single biggest obstacle to rebalancing the joint force to meet the new strategic guidance laid out in January 2012.

The current force structure is not optimal for a sustained fight in an anti-access and area denial (A2/AD) environment. The current mix of aging, legacy fighters with a small number of F-22s does not provide warfighting capability appropriate for the new Asia-Pacific strategy. At the moment, the U.S. lacks a fighter force configured to survive against China's anti-access environment. "The F-22 is the only fielded U.S. fighter capable of operating in A2/AD environments," stated two Air Force major generals in joint testimony in March 2012.

Each of the services are handling the problem differently.

U.S. Air Force. The Air Force steered away from buying additional F-16s in order to wait for the F-35. Reacting to an aging force and to budget cuts, the Air Force shed 559 fighters from 2000 to 2010 dropping from 2,564 to 2,015 in the total inventory including the Active, Guard and Reserve.

In March 2012, the Air Force lowered its fighter requirement to 1,900 total aircraft to carry out the national military strategy with increased risk.¹⁶ The 1,900 aircraft were expected to yield 1,100 primary aircraft available for operations under a standard formula accounting for training, back-up aircraft inventory and aircraft in periodic depot maintenance.

The Air Force is now planning for expensive service life extension and upgrades for portions of their F-15 and F-16 fleets. Over the Future Years Defense Program (FYDP), the Air Force will spend:

- \$2.1 billion on improvements to the F-15E
- \$1.4 billion on upgrades and service life extension adding six to eight years of utility to 300 F-16s
- \$1.7 billion on the F-15C/D fleet including a program to equip 175 with active electronically scanned array radars
- \$854 million on F-22 configuration upgrades to yield a fleet of 139 combat coded Block 30/35 F-22s with the remainder allocated to training and test

U.S. Navy. The Navy was first to recognize that it could encounter a shortfall in strike aircraft. The Navy took out insurance in the form of additional purchases of the F/A-18E/F to ward off a strike fighter shortfall. This move was anticipated as early as the 1997 QDR, which granted the Navy headroom for more Super Hornet purchases if the F-35 was delayed. Recently the Navy has exercised its option to purchase more

F/A-18E/Fs through a multiyear contract. In addition, the Navy developed the EA-18G as an electronic warfare aircraft. In 2011, purchases of the EA-18G increased by 29 to a total of 114 aircraft under current plans.

U.S. Marine Corps. Program changes actually moved up testing and production of the F-35B short take-off vertical landing variant for the Marine Corps, due in part to concerns about a shortfall. However, the Corps is still at risk because it has not purchased new strike aircraft while awaiting the F-35. The Marine Corps recently paid a modest sum to acquire all 74 of Britain's remaining AV-8B Harriers. The Marines will not fly the British Harriers, but will use them for spare parts to maintain readiness until the AV-8Bs can be fully retired.

What's most unfortunate is that the three services truly are "buying time" only. In the final analysis, legacy aircraft are not well-suited for the A2/AD environment because they lack the integrated stealth and sensors that come as ready-made advantages on the F-35.

Options & Alternatives

Blunt force sequester threats have largely passed. However, the Budget Control Act continues to make its impact felt. The Pentagon budget has been notched down in large increments since fiscal 2010. Any budget deals ahead are likely to at least raise the question of deeper cuts. At the same time, the Obama Administration in its second term is in a unique position to rebalance accounts in support of new strategy priorities. Under these conditions, investment in the programs that contribute to air dominance could rise or fall.

The days when specific program dollars funded air superiority capabilities exclusively have long since passed. As such, programs do not fall neatly into the "air dominance" category. Most, like the F-35, cross over into other airpower areas including precision strike and non-traditional ISR.

Perhaps the best way to consider budget alternatives is a trade of quantity and quality. Which options have the greatest potential impact on air dominance? Both, of course, are necessary against a major peer competitor. However, with the budget pressures, trade-offs are a given.

The original modernization plan aimed for both by centering tri-service acquisition around the F-35. Since then, many compromises have been made. Most notable has been the Navy's extension of its F/A-18E/F Super Hornet line in order to replace old force structure since F-35s were not ready in quantity.

Three options stand out. First is to continue on the current path encompassing selective modernization of legacy assets, plus recapitalization. Option two funds quality over quantity, making early cuts in legacy force structure to fully fund advanced capabilities.

Option three is the “doomsday” scenario of cutting both “quantity” force structure and “quality” advanced systems.

Option One. This option has the primary virtue of preserving current force structure levels. Proponents argue that all this force structure and legacy fighters in particular are necessary to cover several global hotspots at once and to combat an adversary like China which has a large force. Under this option, the U.S. will continue to procure the full buy of F-35 although given the slow progress to date, the aircraft will not be fielded in numbers until the 2020s. As a result, upgrades to selected tranche of legacy fighters will have to continue.

Option one itself does have inherent risk. The current path does not yield enough high-end forces to gain air dominance quickly against a large and capable foe. In this case, gaining air dominance may take weeks or months and significant losses. Having to think twice about military operations due to a lack of air dominance could cramp Presidential and international options in a crisis. Under the current plan, for at least a decade the U.S. will not have a large stealth fighter force. In addition to the operational risk, there is a question of whether other budget pressures in that decade could lead to a “full stop” on modernization.

Option Two. In contrast, this option invests in new and advanced systems while explicitly cutting back on legacy force modernization. The rationale is that air dominance forces will be essential for countering growing threats in the Pacific and for assuring easy access in places akin to Syria. The concept would be to use dramatic budget moves to enhance the overall technical capability of the air dominance force: quality over quantity.

For example it’s possible the Pentagon could increase dollars spent on air dominance as part of the rebalance to the Pacific. The move to a quality force might include increasing production rates for F-35. Another move would be to fully fund a range of upgrades such as weapons integration, sensors, electronic warfare capabilities and new ISR systems for F-22 and F-35 fighters. The “quality” option could also increase investment into next generation air dominance technology such as fuel-efficient, super-cruise engines and materials science.

To help pay for the investment, one option would be to take deep and early cuts in older force structure. For example, this could entail earlier retirement of legacy F-15, F-16 and F/A-18 fighters.

Option Three. The third option is to take deep cuts. This could come about through a decision to apportion more spending for ISR, for example, or for some other mission area. Perhaps more likely is that the budget is not tied to strategy. Under budget austerity, a cut of 20 percent in air dominance programs across the FYDP is not unthinkable. The nominations here are based on a particular premise. Air dominance is an area that has already taken a disproportionate share of budget cuts – such as the F-22 termination – in very recent budgets. Cuts as deep as 20 percent would increase risk of

execution of operations and war plans. The cuts proposed here take this risk immediately and dramatically in order to preserve the advancing technology edge for this mission area.

Deep defense cuts to meet overall fiscal targets could hit air dominance modernization in two ways. First might be deep cuts to programs such as F-35 because those dollars are easy to access within the budget. Of course, it is hard to pull out air dominance capabilities without affecting other mission areas. The second course within this option might be to curtail updates even to legacy aircraft. While air dominance threats are rising, there has been little acknowledgement that the 1970s design aircraft are overdue for retirement no matter when they rolled off the production line. The problem is not confined to those large blocks of aircraft (like the F-16s) that are aging out of their design life. Their utility in recent wars has obscured the inherent risks they now carry in an opposed air dominance environment. As a result, their value in the equation of conventional deterrence is diminishing.

Unmanned Options?

An undercurrent of thinking suggests that the future of air dominance may lie in unmanned aircraft. Given the progress in unmanned aircraft, can these systems substitute for part of the tasking of manned fighters? Analysts have raised the possibility of an unmanned aerial system (UAS) as “an ultimate future successor for the fourth-generation fighters remaining after a reduced F-35 procurement” and presented the argument that: “Pursuing strike UAS will eventually enable the Air Force to reduce its overall inventory requirement because unlike manned aircraft, UAS do not require training aircraft because operators train on simulators.”¹⁷

The question has come up frequently as analysts eye defense budget cuts and begin to consider forces for the Asia-Pacific. The MQ-9 Reaper at first glance looks more like a lightweight fighter or attack aircraft than any unmanned plane before it. Reapers carry up to 3,750 lbs. of external ordnance, which translates to six 500 lb. bombs or a mix of 500 lb. bombs and Hellfire missiles. As far as ground forces are concerned, Reapers have proven capable of delivering precision ground fires in tight situations.

Whether the MQ-9 Reapers can take on fighter missions is another matter. The characteristics of the aircraft differ substantially from the fighters in weight, range and total payload. Note the A-10’s maximum take-off weight is almost five times that of the MQ-9.

	Top Speed	Ferry Range	Payload	Take Off Gross Weight	Inventory
MQ-1 Predator	135	770	450	2,250	169
MQ-9 Reaper	230	1,150	3,750	10,500	77
A-10	450	2,580	16,000	51,000	245
F-16	1,500+	2,000	12,000	37,500	1,020

The Reaper's top speed is 230 mph with a published range of 1,150 miles. This compares favorably to the Predator but falls far short of the F-16. Slow speed limits the survivability of MQ-9s in anything but the most permissive skies. It also means MQ-9s will take much longer to reach target areas. Lost datalinks add vulnerability. The MQ-9 is not stealthy, nor was it designed to carry significant defensive armament or electronic countermeasures.

The Air Force has just 71 MQ-9s in its active duty fleet and another 6 with the Air National Guard for a total of 77 aircraft. The Reaper has excellent mission success in what it was designed to do: provide reconnaissance and surveillance augmented by light attack. However, the U.S. at this time simply does not have a UAS fleet ready to take over the tasks of manned fighters.

A developmental program for a UAS with performance characteristics to replace current fighters is a complex prospect. The anti-access and area denial environment alters the calculus. Successful unmanned aircraft may take on more of the characteristics of fighters such as greater speed, weight, armament and systems. Alternatively, they may scale down toward miniaturized, expendable decoys. In either case, unmanned systems are not currently on track to provide a light, cheap replacement for manned fighters.

Conclusion

The ability to keep air superiority is central to deterrence and to the freedom of the air and maritime commons. General Charles Horner built and commanded the air campaign in Operation Desert Storm in 1991. He put it best when he said: **“If you don't control the air, you'd better not go to war.”**

Across the Pacific lies a military strong enough to disrupt freedom of action by the U.S. and its allies. While the U.S. was engaged in Iraq and Afghanistan, China shed outdated forces, revamped its doctrine and accelerated the build-up of new fighters, ships, submarines and missiles. In a scrape, China could wield big home-field advantages or even project force toward U.S. bases in a way that would demand immediate response with no guaranteed outcome.

Air dominance is again becoming the indispensable prerequisite for air and sea operations in the Pacific. As such, it will be a key element of conventional deterrence – a factor which should be considered carefully in the budget cuts and force reshaping which lie ahead.

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- ¹ Dwight D. Eisenhower, *Crusade in Europe*, (Garden City, NY: Doubleday, 1949), pp. 46-47.
- ² Army Air Forces Statistical Digest, World War II, at <http://www.usaaf.net/digest/t159.htm>.
- ³ For original data see John Correll, *The Air Force in the Vietnam War*, (Arlington, VA: Air Force Association, 2004), p. 14.
- ⁴ Walter Boyne, "MiG Sweep," *Air Force Magazine*, November 1998.
- ⁵ *Ibid.*
- ⁶ John T. Correll, *The Air Force in Vietnam*, (Arlington, VA: Eaker Institute, Air Force Association, 2004), p. 25. The USAF and USN combined had 5 aces in Vietnam. North Vietnam had 16. See p. 35. Helicopter losses were even higher at over 5,000.
- ⁷ U.S. Department of Defense, *Quadrennial Defense Review Report*, February 2010, pp. 31-32.
- ⁸ The allocation changes over time. During the Vietnam War era, both services took assignments in the northern "route packs." In recent campaigns, more of the offensive counter air tasks have been assigned to the U.S. Air Force.
- ⁹ U.S. Air Force, *Counterair Operations*, Air Force Doctrine Document 2-1.1, May 6, 1998.
- ¹⁰ John S. D. Eisenhower, *Strictly Personal: A Memoir*, (Garden City, NY: Doubleday, 1974), p. 72.
- ¹¹ Source: U.S. Air Force. During the Kosovo campaign in 1999, the Serbs launched 894 SAMs in 78 days peaking on Day 39 with 43 launches.
- ¹² Center for Strategic and International Studies, *U.S. Force Posture Strategy in the Asia Pacific Region: An Independent Assessment*, August 15, 2012, pp. 40, at http://csis.org/files/publication/120814_FINAL_PACOM_optimized.pdf.
- ¹³ The combat radius estimate does not specify configuration. See "Su-30MKK Multirole Fighter Aircraft," at <http://www.sinodefence.com/airforce/fighter/su30.asp>.
- ¹⁴ See Wendell Minnick, "China's F-XX Program Faces Engine Problems," *Defense News*, July 19, 2010.
- ¹⁵ Ajai Shukla, "Chinese J-31 stealth fighter for global market," *Business Standard*, India, November 13, 2012.
- ¹⁶ See Joint Statement of Maj Gen John Posner and Maj Gen Michael Holmes, to House Armed Services Committee, March 20, 2012.
- ¹⁷ CNAS Report, p. 45.



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