Backgrounder

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The Growing Air Power Fighter Gap: Implications for U.S. National Security

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Since World War II, the U.S. military has used air power as a decisive force multiplier to prevail in peacetime and in combat. In fact, "American ground forces have not come under attack from enemy air forces since the Korean War."[1] Usually, the military with the best and most fighter aircraft achieves air superiority (control of the airspace over the operational zone).

Accordingly, Air Force leaders consider their air superiority mission their second highest priority, behind only nuclear deterrence.[2] The U.S. military has consistently gone one step further by establishing air supremacy, in which "the opposing air force is incapable of effective interference."[3] The Air Force attains air supremacy by destroying an enemy's ability to fight in the air. Indeed, the U.S. military's strength and capacity to shape the outcome of military operations depend heavily on the country's fighter aircraft.

No foreign nation or new advanced fighter platform poses an immediate threat to America's air power. Rather, President Barack Obama's fiscal year (FY) 2010 defense budget request is jeopardizing U.S. dominance in the air. The request continues the F-35 Joint Strike Fighter (JSF) program but would end production of the F-22A Raptor at 187 fighters and retire 250 of the oldest fighters.[4] This would not produce sufficient new fighters to replace the legacy planes as they retire from service.

Inadequate funding to replace the legacy fighter fleets, which have worn out faster than anticipated and

Talking Points

- Commander requirements, independent analysis, and military and civilian leadership have all confirmed a fighter gap in the U.S. Navy and Air Force tactical fighter fleets. However, instead of addressing the shortfalls, the Obama Administration has adjusted national defense requirements to fit within budgetary restraints, which will put U.S. pilots and ground forces at increasing risk.
- The immediate threat to America's air power does not originate from foreign nations, but from President Obama's fiscal year 2010 defense budget request that would halt funding for key replacement programs, such as the F-22.
- As the U.S. fighter fleet shrinks, peer competitors, such as Russia and China, are building and sustaining fourth-generation and fifth-generation fighter fleets.
- Congress needs to assert its leadership over the budgetary process and ensure that the U.S. military acquires new and replacement fighters to eliminate the fighter gap and to continue American air superiority and dominance into the next decade.

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are nearing the end of their service lives, constitutes the greatest dilemma for the services. Also problematic is the potential lack of funding for research and development for future upgrades of the latest U.S. fighters or for initial development of a sixth-generation fighter.

As the FY 2010 defense authorization and appropriations bills move through Congress, Members should provide additional funding to acquire enough new aircraft to replace the legacy fighters with additional fourth-generation and fifth-generation fighters. Congress needs to ensure that the nation maintains a substantial deterrent and should add funding for robust research and development of future upgrades to the latest U.S. fighter aircraft and for the development of a sixth-generation fighter.

The Growing Fighter Gap

Members of Congress and Department of Defense (DOD) officials have warned for years of an impending "fighter gap" and its implications for U.S. national security. A fighter gap is essentially a deficit between the services' fighter aircraft inventories and their operational requirements based on emerging and possible air threats to U.S. security.

In April 2008, Lieutenant General Daniel Darnell testified before the Senate Armed Services Committee that the Air Force could have a requirement gap of over 800 fighters by 2024.[5] However, after release of the President's FY 2010 budget, Air Force leaders announced a combat Air Force restructuring plan to "eliminate excessive overmatch in our tactical fighter force and consider alternatives in our capabilities."[6] Instead of seeking to address the projected fighter gap, the Air Force plans to accelerate the retirement of 250 legacy fighters, including 112 F-15s and 134 F-16s. The Air Force believes it can save $3.5 billion over the next five years and reinvest those funds to reduce current capability gaps. However, budgetary restrictions—not a changing threat environment—appear to be driving this fundamental shift in security policy.

During the same hearing, Rear Admiral Allen Myers projected a "most-optimistic" deficit of 125 strike fighters for the Department of the Navy, including 69 aircraft for the U.S. Navy and 56 for the Marine Corps.[7] This projected gap, set to peak around 2017, was considered optimistic because it assumed that the service life of F/A-18 Hornets could be extended from 8,000 flight hours to 10,000. The original service life was 6,000 flight hours.

A Congressional Research Service (CRS) report in April 2009 unveiled a potentially larger gap, citing a briefing to House Armed Services Committee staffers in which the Navy projected that its strike fighter shortfall could grow to 50 aircraft by FY 2010 and 243 by 2018 (129 Navy and 114 Marine Corps fighters).[8] However, in a move that emphasized lingering disagreement among the White House, Office of the Secretary of Defense, the Department of the Navy, and Congress, a senior Pentagon planner reportedly claimed on April 7, 2009, during a private briefing with lawmakers that the Pentagon's

1. Air Force Association, "Threats to Air Supremacy," at *http://www.afa.org/MPEG/Air_Supremacy.asp* (June 24, 2009).
2. Michael B. Donley and General Norton A. Schwartz, prepared statement before the Committee on Armed Services, U.S. House of Representatives, May 19, 2009, at *http://armedservices.house.gov/pdfs/FC051909/Donley_Schwartz_Testimony051909.pdf* (June 15, 2009).
3. National Museum of the U.S. Air Force, "Air Force Vocabulary A–C," at *http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=7687* (June 24, 2009).
4. Robert M. Gates, "Defense Budget Recommendation Statement," U.S. Department of Defense, April 6, 2009, at *http://www.defenselink.mil/speeches/speech.aspx?speechid=1341* (June 15, 2009).
5. Hearing on Air Force and Navy aviation programs, transcript, Subcommittee on Airland, Committee on Armed Services, U.S. Senate, 110th Cong., 2nd Sess., April 9, 2008, p. 16, at *http://www.senate.gov/~armed_services/Transcripts/2008/04%20April/Airland/08-36%20-%204-9-08.pdf* (June 4, 2009).
6. Michael B. Donley and General Norton A. Schwartz, presentation to the Committee on Armed Services, U.S. Senate, May 21, 2009, at *http://armed-services.senate.gov/statemnt/2009/May/Donley-Schwartz%2005-21-09.pdf* (June 12, 2009).
7. Hearing on Air Force and Navy aviation programs, p. 7.
8. Christopher Bolkcom, "Navy-Marine Corps Strike-Fighter Shortfall: Background and Options for Congress," Congressional Research Service *Report for Congress*, April 10, 2009, at *http://assets.opencrs.com/rpts/RS22875_20090410.pdf* (June 12, 2009).

Office of Program Analysis and Evaluation had concluded there was no Navy strike fighter shortfall.[9]

The data on available fighters did not change between April 2008 and April 2009, but the Pentagon is now dangerously altering its policy as if it had. This move reflects Secretary of Defense Robert M. Gates's desire to "reform" and "balance" Pentagon priorities by accepting more risk in the conventional military sphere. Although the upcoming Quadrennial Defense Review may scale back Air Force and Navy strike fighter requirements, both services will experience significant shortfalls for the coming decade under the current procurement program. With General Darnell and Admiral Myers publicly affirming the same troubling data identified by the CRS, Congress should act to mitigate and correct the fighter gap that is already upon the American military.

While both Republican and Democratic Members of Congress have expressed concern about projected gaps in strike fighter inventory, the Obama Administration has thus far deemphasized its relevance by insisting that a smaller, more capable force with "limited resources" can remain effective and continue to meet services' requirements.[10]

Foreign Capabilities

To assess fully the implications of the widening U.S. fighter gap, Congress needs to consider the future capabilities of states that may potentially challenge U.S. fighter aircraft in the coming decades as fifth-generation fighters become the mainstay of the future force and legacy aircraft retire. These capabilities include foreign advanced attack aircraft, jammers, infrared search and tracking sensors, ultra long-range missiles, surface-to-air missiles, radar detection, anti-stealth technologies, and electronic warfare.

Twenty years after the Cold War, new regional military powers and former peer competitors are expanding their military capabilities. Regional powers, such as China and possibly Iran,[11] are acquiring Russian air superiority and multirole fighters based on the Sukhoi Su-30 Flanker family. Closer to home, Venezuela is aggressively expanding its air force.[12]

The Russian Federation. Russia is expanding its fighter forces more than at any other time since the end of the Cold War. Russia is fielding the Su-34 Fullback strike aircraft, which is based on the Su-27 Flanker and can carry supersonic anti-ship cruise missiles and short-range air-to-air missiles for self-defense.[13] The Russian Air Force plans to field 58 by 2015 and 300 by 2022.[14] The Russian Air Force also has a requirement of about 300 Sukhoi PAK FA fifth-generation fighters.[15] However, Russia appears to be planning for a production run of 500 to 600,[16] which most likely includes planned exports.

9. Andrew Tighman, "Fighter Gap Expands Under Latest Estimate," *Navy Times*, May 19, 2009, at *http://www.navytimes.com/news/2009/05/navy_fightergap_051609w/* (June 12, 2009).
10. Donley and Schwartz, prepared statement.
11. Iran has ordered 250 Su-30MKM fighters and 20 Il-78 aerial tankers for long-range strike missions. See DEBKAfile, "DEBKA Reports: Iran Buys 250 Long-Distance Sukhoi Fighter-Bombers, 20 Fuel Tankers, from Russia," August 1, 2007, at *http://www.debka.com/headline_print.php?hid=4449* (May 16, 2009).
12. Venezuela has 24 Su-30MK2s, and 12 more will be delivered in 2009. Caracas has also ordered 24 Su-35s and two Il-78s. Jack Sweeney, "Venezuela Buys Russian Aircraft, Tanks to Boost Power," United Press International, October 15, 2008, at *http://www.upi.com/Security_Industry/2008/10/15/Venezuela-buys-Russian-aircraft-tanks-to-boost-power/UPI-11881224089163* (June 6, 2009).
13. RIA Novosti, "Russian Air Force to Receive Five Su-34 Warplanes in 2008," January 14, 2008, at *http://en.rian.ru/russia/20080114/96572867.html* (June 7, 2009).
14. Ilya Kramnik, "Flying High," *The Moscow News*, April 24, 2008, at *http://www.moscownews.ru/world/20080424/55325432.html* (June 6, 2009), and RIA Novosti, "Russia Launches Full-Scale Production of New-Generation Warplane," January 9, 2008, at *http://en.rian.ru/russia/20080109/95829755.html* (June 7, 2009).
15. Yefim Gordon, *Russian Air Power: Current Organization and Aircraft of All Russian Air Forces* (Hinckley, U.K.: Midland Publishing, 2009), p. 329.
16. Paul Jackson, ed., *Jane's All the World's Aircraft 2006–2007*, 97th ed. (Coulsdon, U.K.: Jane's Information Group, 2006), p. 800, and GlobalSecurity.org, "F-15E Strike Eagle," at *http://www.globalsecurity.org/military/systems/aircraft/f-15e.htm* (May 15, 2009).

In addition, several countries have multirole Russian-made fighters capable of firing supersonic antiship cruise missiles and high performance air-to-air missiles.[17] The main Russian export is several versions of the Su-30MK, a fourth-generation fighter that is the Russian equivalent of the F-14 and F-15.

Russia also appears to be in the early stages of developing a sixth-generation fighter.[18] A fourth-generation fighter would be no match against this type of capability. While President Obama is proposing to permanently close the F-22 production line, Russia plans to keep open the Sukhoi PAK-FA production line. Russia will likely fund production of two Sukhoi fifth-generation fighters, the PAK FA and a light multirole stealth fighter,[19] for both the Russian Air Force and the export market.

China. China has ordered an estimated 76 Su-30MKK Flanker-Gs and can produce an additional 250 under license, including at least 100 "knock-down kits" to be assembled in China.[20] It has also received at least 24 Su-30MK2 naval strike fighters. If China modernizes its 171 Su-27SK/UBs to the Su-27SKM standard and assembles another 105 Su-27SKMs under license, it will have roughly 626 multirole fighters available for air superiority missions. This would place China in the same league as the U.S., which has 522 F-15A/B/C/Ds, 217 F-15Es, and a planned endstrength of 186 F-22s.[21]

China is also developing a stealth fifth-generation fighter, variously identified in the West as the J-X.[22] It may also benefit from information allegedly stolen on the "design and electronics systems" of the F-35 Lightning II.[23]

As militaries expand and modernize, especially the Chinese People's Liberation Army, the probability of miscalculation grows. The 2009 DOD report on China's military power discusses two ways that China's growing power could lead to a miscalculation and possibly conflict. First, Chinese leaders may overestimate the proficiency of the Chinese military, leading them to overestimate its capability to achieve greater operational goals. Second, they could fail to appreciate how their decisions affect the perceptions and responses of other regional actors, inadvertently provoking a military confrontation.[24]

The increased potential for both competition and miscalculation between the United States and other countries raises the importance of America's conventional deterrence. Preventing war by convincing a would-be adversary that its goals are not achievable is a primary goal of the military. Thus, even though the wars in Iraq and Afghanistan are America's central focus and the U.S. may not currently face a potential great-power adversary, maintaining a strong fighter force is critical to

17. See U.S. Office of Naval Intelligence, "Worldwide Challenges to Naval Strike Warfare," January 1996, at *http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA314821&Location=U2&doc=GetTRDoc.pdf* (June 23, 2009).
18. RIA Novosti, "Russian Air Force to Cut Officer Staff by 30%—Commander," February 10, 2009, at *http://en.rian.ru/russia/20090210/120065059.html* (June 14, 2009).
19. ARMS-TASS, "Lëgkii istrebitel' 5-go pokoleniia budet sozdan na baze tekhnologii tiazhelogo perspektivnogo istrebitelia" (Light fighter of fifth-generation will be created on the basis of the technology of the heavy prospective fighter), April 16, 2008, at *http://arms-tass.su/?page=article&aid=53759&cid=25* (March 20, 2009). The "heavy prospective fighter" is the PAK FA.
20. GlobalSecurity.org, "J-11 [Su-27 FLANKER] Su-27UBK/Su-30MKK/Su-30MK2," at *http://www.globalsecurity.org/military/world/china/j-11.htm* (June 2, 2009); RIA Novosti, "Russia Diversifying Arms Exports," May 28, 2009, at *http://en.rian.ru/photolents/20090528/155112222_2.html* (May 29, 2009); Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Power," *Air Power Australia*, June 7, 2009, at *http://www.ausairpower.net/APA-Flanker.html* (June 7, 2009); and SinoDefence.com, "Su-30MKK Multirole Fighter Aircraft," February 20, 2009, at *http://www.sinodefence.com/airforce/fighter/su30.asp* (June 6, 2009).
21. International Institute for Strategic Studies, *Military Balance 2009* (Oxford, U.K.: Oxford University Press, 2009), pp. 40 and 45.
22. Jackson, *Jane's All the World's Aircraft 2006–2007*, p. 117, and Sergio Coniglio, "China Develops Stealth Fighter," *Military Technology*, February 2006, p. 44.
23. Siobhan Gorman, August Cole, and Yochi Dreazen, "Computer Spies Breach Fighter-Jet Project," *The Wall Street Journal*, April 21, 2009, at *http://online.wsj.com/article/SB124027491029837401.html* (June 25, 2009).
24. U.S. Department of Defense, "Military Power of the People's Republic of China: 2009," at *http://www.defenselink.mil/pubs/pdfs/China_Military_Power_Report_2009.pdf* (June 23, 2009).

sustaining a credible conventional deterrent in the coming decades.

Military Requirements and Current Inventory

The U.S. achieves and maintains air superiority and supremacy with fighters from the Air Force, the Navy's aircraft carriers, and the Marines' carrier-based and land-based air wings. Typically, a fighter force is superior to any potential opponent if it has at least the following three elements:

- **Technically superior aircraft**, including flight performance (speed, range, and maneuverability), avionics (sensors, navigation systems, computers, sensor fusion, data displays, communications, electronic support measures), and armament.
- **Numerical sufficiency.**
- **Exceptionally trained pilots and crews** and an adequate pool of replacements and well-trained new pilots.

The modern battlefield demands that multi-mission combat aircraft perform air-to-air combat; air-to-ground strike missions with precision-guided bombs and autonomous cruise missiles; and intelligence, surveillance, and reconnaissance (ISR) missions.

Fifth-generation fighters are also highly effective in irregular warfare and counterinsurgency operations. In addition to carrying large payloads and operating over vast areas, such as Afghanistan, fifth-generation fighters can better coordinate attacks against insurgent forces by sharing the same tactical picture through data links and tracking moving ground targets with their active electronically scanned array (AESA) radar. Using sensor fusion capability to integrate targeting information from their own sensors and other sources into a single tactical picture, the F-22A and F-35 can more accurately identify and target enemy forces. This also helps to reduce casualties from friendly fire and collateral damage.

America's Air Superiority Fighter Force

The F-15 and F-16 have been the backbone of the Air Force's fighter fleet for the past 30 years, providing a superior fighting capability and a credible conventional deterrent against potential adversaries. However, the spread of advanced fighter technology has surpassed both planes, and the present number of fighters in the U.S. Air Force fleets is insufficient to meet the possible challenge from fifth-generation foreign fighters.

F-15 Eagle/Strike Eagle. The U.S. has 690 F-15A/B/C/D/Es. Extending their service life will require upgrading them with AESA radar, a new engine, and other equipment and structural improvements.[25] After the Cold War, the services were reduced by one-third during the 1990s, and the Air Force's fourth-generation fighter fleet was reduced by 57 percent from 1991 levels. In 1999, the Air Force had 714 operational F-15A/B/C/D/Es, including 205 F-15Es.[26] Thus, the plan to upgrade 396 F-15C/D/Es with AESA radar represents a 45 percent reduction from 1999.

However, the Air Force's declining air superiority capability is not just a matter of numbers. The F-15's service life is also an issue. The F-15C/D became operational in 1979, and the last production aircraft was delivered in November 1989.[27] About 179 upgraded F-15C/Ds will remain in service until 2025, which means extending their service life from the current 8,000 hours to 10,000 hours.

The structural strains of continuous service are affecting the F-15C/D with tragic consequences. In

25. Jackson, *Jane's All the World's Aircraft 2006–2007*, p. 658.
26. International Institute for Strategic Studies, *The Military Balance 1999–2000* (Oxford, U.K.: Oxford University Press, 1999), pp. 25–26.
27. Jamie Hunter, ed., *Jane's Aircraft Upgrades 2006-2007*, 14th ed. (Coulsdon, Surrey: Jane's Information Group, 2006), pp. 182–183; C. Todd Lopez, "Air Force Will Get New Bomber, Upgrades to Fighters," *Space Daily*, October 5, 2006, at *http://www.spacedaily.com/reports/Air_Force_Will_Get_New_Bomber_Upgrades_To_Fighters_999.html* (May 7, 2009); Christopher Marasky, "Iron Flow Program Concludes at Kadena," U.S. Air National Guard, updated April 25, 2008, at *http://www.ang.af.mil/news/story.asp?id=123095955* (June 23, 2009). Marasky gives the figure of 170 F-15s that would remain in service by 2025.

November 2007, an F-15C/D "broke apart during flight" after "failure of the upper right longeron, a critical support structure." An investigation of the F-15 fleet showed "more structural damage."[28] Extending the F-15C/D's service life seems likely to result in more frequent structural failures.

Even with better structural conditions than the modernized 179 F-15C/Ds, the F-15E may prove inferior to Russia's Sukhoi PAK FA, which is scheduled to enter mass production in 2015. The F-15E may be equal to the fourth-plus-plus-generation Sukhoi Su-35BM, which will enter production in 2011.[29]

F-16 Falcon. The single-engine F-16 is the Air Force's most widely fielded multirole fighter. The Air Force has 1,200 F-16s with an average age of 20 years. The F-16's low cost and versatility have made it one of the most exported fighter aircraft in the world. As part of its proposed combat restructuring plan, the Air Force plans to retire 123 aging F-16s. The Air Force variant of the F-35A is designed to replace the F-16 and A-10 Warthog and has a larger payload and longer range than the F-15C.

F-22A Raptor. Initially, the Air Force wanted to procure 750 F-22A fighters, which was later reduced to 381 aircraft. Before President Obama's decision to limit production of the F-22A to 187 aircraft, the Air Force's stated requirement was to increase the previously approved number of 183 fighters to 243.[30] The 187 F-22As would provide about 127 combat-coded fighters at any given time, with the remaining fighters used for training, testing, backup, and reserve missions.[31] The Air Force's original requirement of 381 F-22s would have provided 240 combat-coded fighters.

More than 30 air campaign studies over the past 15 years have confirmed a minimum requirement for 260 Raptors. Although the F-22A is the world's sole fifth-generation fighter, numerous studies have concluded that its quality can be stretched only so far to make up for a lack of quantity.[32] A shortfall would also prevent the Air Force from filling out the service's 10 Air Expeditionary Forces (AEFs), undermining AEF stability by requiring them to rotate F-22s.[33]

The Navy's Air Superiority Fighters. The Navy's aircraft carriers are the country's first visible line of defense in the world's oceans.[34] The backbone of the aircraft carrier's air component is the fighter force, which fulfills the air superiority mission and ultimately ensures the carrier's survival and the continued operation in the face of a potential or actual enemy air threat. After defeating the enemy fighter threat, the fighters can then clear the skies of all enemy air activity and achieve unopposed control of the air. This in turn allows the carrier's strike aircraft to carry out interdiction and ISR missions unimpeded.

Since the Cold War, the U.S. Navy has reduced both the number of aircraft carriers and the number and quality of its sea-based air superiority fighter force. In 1991, the Navy had 15 aircraft carriers and

28. GlobalSecurity.org, "F-15 Eagle: Service Life," at *http://www.globalsecurity.org/military/systems/aircraft/f-15-life.htm* (May 8, 2009), and U.S. Air National Guard, "Oregon F-15s to Fly Again," updated January 15, 2008, at *http://www.ang.af.mil/news/story.asp?id=123082470* (May 8, 2009).
29. RIA Novosti, "Tests of Russia's New Fighter Must Start in 2009—Deputy PM," January 21, 2009, at *http://en.rian.ru/russia/20090121/119733326.html* (June 23, 2009), and "Sukhoi Confirms Su-35 Deliveries to Russian Air Force in 2011," February 19, 2009, at *http://en.rian.ru/russia/20090219/120219966.html* (June 23, 2009).
30. Jim Wolf, "U.S. Air Force Says Needs More F-22 Fighters," Reuters, February 17, 2009, at *http://www.reuters.com/articlePrint?articleId=USN1719852220090217* (May 7, 2009).
31. Adam J. Herbert, "The Fighter Numbers Flap," *Air Force Magazine*, April 2008, at *http://www.airforce-magazine.com/MagazineArchive/Pages/2008/April%202008/0408IssBf.aspx* (May 7, 2009).
32. John Stillion and Scott Perdue, "Air Combat Past, Present and Future," RAND Project Air Force, August 2008, at *http://www.defenseindustrydaily.com/files/2008_RAND_Pacific_View_Air_Combat_Briefing.pdf* (June 12, 2009).
33. Christopher Bolkcom, "F-22A Raptor," Congressional Research Service *Report for Congress*, March 5, 2009, p. 12, at *http://assets.opencrs.com/rpts/RL31673_20090305.pdf* (June 12, 2009).
34. Mackenzie Eaglen, "Aircraft Carriers Are Crucial," *The Washington Post*, July 31, 2008, at *http://www.washingtonpost.com/wp-dyn/content/article/2008/07/30/AR2008073003078.html* (June 13, 2009).

377 F-14s in 26 squadrons, including 68 F-14As, 21 F-14Ds, and 48 F-14As in the Navy Reserve.[35] In 1999, the Navy had 12 carriers (10 operational) and 235 F-14 Tomcats, including 77 F-14Bs and 46 F-14Ds, and 14 F-14As in the Navy Reserve.[36] Hence, between 1991 and 1999, the Navy's air superiority fighter force was reduced by nearly 40 percent and the carrier force was effectively reduced by one-third.[37]

In 2006, the Navy retired its last operational F-14. Cost considerations weighed heavily in this decision. An hour of flight time in the F/A-18E/F Super Hornet costs half as much as an hour in the F-14.[38] Yet in terms of speed, range, and air-to-air missile armament, the F-14 is superior to the F/A-18E/F. The Tomcat has a top speed of Mach 2.34 at altitude and a range of 3,200 kilometers compared with the Super Hornet's "more than" Mach 1.8 and range of about 2,944 kilometers.[39] The F-14 was retired for financial purposes, not because the F/A-18 was superior.

Joint Strike Fighter. The F-35 Joint Strike Fighter is the third DOD fighter modernization program after the F/A-18E/F and F-22A. JSF variants are being built for the Air Force, Navy, Marine Corps, and several foreign partners. The Air Force variant, a conventional takeoff and landing fighter, will replace the F-16 and A-10 Warthog. The Navy's version is designed to be carrier-capable, although this has not yet been achieved. The Marine JSF will have short take-off vertical landing capability and replace the current fleet of AV-8B Harriers.

After proposing to end production of the F-22, Secretary Gates announced that he was prepared to recommend the President procure 2,443 F-35s, including 513 frames in the next five years. However, this will leave the U.S. without enough fighters designed specifically for air superiority. The Navy's F/A-18E/F was designed more as a bomber, and the F-35 was designed "to be the world's premier strike aircraft through 2040" with an emphasis on internal payloads and greater internal fuel capacity to maintain radar stealth.[40] Both the F/A-18E/F and the F-35C may have difficulty engaging high-performance fighters, such as the latest Flanker variants.

The Air National Guard and Air Sovereignty Alert Missions

Reducing the number of F-15C/Ds to 179 and phasing out the remaining 126 F-15A/Bs means reducing the number of operational U.S. Air National Guard units. In 1999, the Air National Guard had nine F-15 squadrons, six equipped with F-15A/Bs and three equipped with F-15C/Ds.[41] In 2009, the Air National Guard has only five squadrons of F-15s,[42] a 44 percent reduction since 1999. The additional planned reductions would mean the phasing out of all F-15A/Bs, including those attached to the Air National Guard. This will leave the Guard with only 48 F-15C/Ds for air sovereignty missions until 2025, unless F-22A fighters are assigned to the Guard or additional fourth-generation fighters are purchased.

35. One of the nuclear-powered aircraft carriers was then in "long refit/refuel" and a conventional-powered carrier was in service life extension program (SLEP). See International Institute for Strategic Studies, *Military Balance 1991–1992* (Oxford, U.K.: Oxford University Press, 1991), pp. 21–23.
36. Two of the nuclear-powered aircraft carriers were undergoing refit at the time and a conventional-powered carrier was in reserve. See International Institute for Strategic Studies, *Military Balance 1999–2000* (Oxford, U.K.: Oxford University Press, 1999), pp. 22–23.
37. International Institute for Strategic Studies, *Military Balance 2009*, p. 34.
38. GlobalSecurity.org, "F-14 Tomcat," at *http://www.globalsecurity.org/military/systems/aircraft/f-14.htm* (May 16, 2009).
39. Bill Gunston, ed., *The Encyclopedia of World Air Power* (New York: Crescent Books, 1980), p. 194, and Jackson, *Jane's All the World's Aircraft 2006–2007*, p. 662.
40. Jim Garamone, "Lockheed-Martin Team Wins Joint Strike Fighter Competition," DefenseLink News, October 26, 2001, at *http://www.defenselink.mil/news/newsarticle.aspx?id=44605* (June 24, 2009).
41. International Institute for Strategic Studies, *Military Balance 1999–2000*, p. 25, and International Institute for Strategic Studies, *The Military Balance 2002–2003* (Oxford, U.K.: Oxford University Press, 2002), p. 22.
42. International Institute for Strategic Studies, *Military Balance 2009*, p. 39.

Furthermore, based on current budget requests and plans, the JSF will not be available in time to replace the vast majority of F-16s currently fulfilling this mission over the next decade. As a result, the air sovereignty alert mission would evaporate. Operation Noble Eagle after the attacks of September 11, 2001, demonstrates the ongoing need for operational Guard fighter units to sustain the air sovereignty mission. Fighting and winning overseas helps to protect Americans at home. Likewise, protecting the homeland includes vigilantly guarding sovereign airspace over the homeland with modern and upgraded fighters. If enacted, the FY 2010 defense budget request could end the air sovereignty mission over the U.S. within just a few short years.

The proposed 2010 defense budget would result in a smaller Air Force. By extension, this will have a disproportionately negative effect on the Air National Guard. National Guard force structure should not be a bill payer for the Joint Strike Fighter. Instead, Air Force leaders should be pursuing active associate wings at Guard bases to expand the Reserve Components at a fraction of the operational cost for active units.

Fifth-Generation Fighters vs. Unmanned Aerial Vehicles

Unmanned aerial vehicles (UAVs) have capabilities that complement, not substitute, the superior range of the F-22A and the F-35. Yet the Air Force's fifth-generation manned fighters with their sophisticated integration of sensors, weapons, communications, avionics, and computer systems can carry out intelligence, surveillance, reconnaissance, and target acquisition faster and more effectively than fourth-generation fighters. If required, these advanced fighters can deliver air strikes against insurgents over a wide area of operations. When time is critical, the sensor fusion, real-time information display, and shared tactical picture capabilities of fifth-generation fighters can provide the faster response needed to engage the enemy accurately and promptly.

Even the Predator C UAV cannot match the supersonic speeds of the F-22A and F-35 to fly quickly to remote areas in Afghanistan where air strikes would need to be delivered promptly to support ground troops under enemy fire or to eliminate a concentration of otherwise elusive insurgents. The F-22A has the added advantage of flying at supersonic speeds without using an afterburner, conserving fuel and reducing its heat signature—a capability the F-35 lacks.

By FY 2011, Secretary Gates wants to field and sustain "50 Predator class unmanned aerial vehicle orbits." Deploying and maintaining 50 aerial vehicle orbits "represents a 62 percent increase over current levels and a 127 percent rise from a year ago."[43] Pentagon leaders are undoubtedly drawn to UAVs and Unmanned Combat Aerial Vehicles (UCAVs), which in the mind of some may one day replace a large portion of manned combat flights. However, UCAV technology is still in its infancy at the operational level.

A clear danger is that the Pentagon, in its enthusiasm for cutting-edge technologies that might save money, would acquire UCAVs at the expense of manned fifth-generation fighters, substituting them for strike missions beyond suppression of enemy air defenses.

On the assumption that the main near-to-medium-term mission of the U.S. military will be counterinsurgency, defense leaders may seek to buy armed UAVs and UCAVs in place of stealth fighters to carry out a considerable amount of the tactical air strike role. The problem is that in a conflict with a peer competitor with a powerful air force, UCAVs might become easy prey to enemy fighters with AESA radar.

Future of the U.S. Fighter Force

President Obama's proposed FY 2010 budget would dangerously diminish U.S. fighter capability. The President has proposed reducing acquisitions of fifth-generation fighters and limiting their upgrades. If Congress complies, the U.S. will risk

43. Sara A. Carter, "Defense Budget 'Overhaul' Meets Resistance," *The Washington Times*, April 7, 2009, *http://www.washingtontimes.com/news/2009/apr/07/defense-budget-39overhaul39-meets-resistance* (May 1, 2009), and Martin Streetly, ed., *Jane's Electronic Mission Aircraft*, no. 21(Coulsdon, U.K.: Jane's Information Group, 2008), pp. 122–23 and 130.

falling behind internationally and in the technological race for air power. Congress and the President would do well to remember how France, despite having pioneered the use of military aircraft, tanks, and motor transport in World War I, had fallen behind Germany by the beginning of World War II.

Large production runs of air superiority fourth-plus-generation fighters equipped with fifth-generation technology, such as the Su-35BM in Russia and China, could put the U.S. Air Force with its fewer numbers of F-22s and an aging F-15C fleet at a serious disadvantage. History and the ongoing technological arms race suggest that it would be dangerous for the U.S. to assume that the F-22 will have no equal and thus have a decisive advantage over any other fighter aircraft for the next 20 years.

Congress Should Close the Fighter Gap

The fighter gap is often considered to be far in the future, but the reality is that Congress needs to begin closing the gap in the pending FY 2010 defense bills. If enacted, the President's budget request would eliminate one of the two remaining fifth-generation fighter production lines. This would severely limit the options available to Congress if it wants to restart production at some later date. The cost to the taxpayer would also be much higher than if production continues. Finally, the nation would permanently lose many highly skilled aerospace designers and engineers if they are laid off because of insufficient work.

Specifically, the U.S. should:

- **Purchase additional F-22s in 2010.** The proposed FY 2010 budget would end F-22 production, limiting the ability of the U.S. to achieve air superiority in the future. Russia's state-run military industrial base is focusing on producing advanced fifth-generation fighters with some nearly sixth-generation capabilities. If Russia exports these advanced fighters, it will multiply the potential threats and opportunities for U.S. fighters to engage in combat with enemy fifth-generation aircraft. Additionally, given the U.S. military's global commitments, the 187 F-22s will likely operate in the different theaters, all but ensuring that they will be outnumbered in any potential engagement. Congress should appropriate funds to buy at least the full initial order of 286 F-22s to ensure air superiority over the next two decades, beginning with a purchase of 20 F-22s in FY 2010.
- **Encourage sales of F-22 allied variant to Japan and Australia.** With time running short on the F-22 manufacturing line and the Obey Amendment preventing the foreign sales of the F-22, the prospects for selling the F-22 to the most interested buyers among America's core allies, including Japan and Australia, remain bleak. Nevertheless, this option is worth considering, and Congress should repeal the Obey amendment this year. It would provide U.S. allies with the most advanced fighter on the market, increase their interoperability with U.S. forces, reinforce America's hedging strategy in the Pacific, and keep the production line open while reducing the unit cost.
- **Research viability of building a strike variant of F-22.** Stealth technology has increased the survival rate of aircraft due to their ability to remain undetected. The U.S. should consider acquiring the FB-22, the strike variant of the F-22. The FB-22 has a greater bomb load capacity than the F-35, could replace the F-15E, and carry out many missions currently performed by the B-1 and B-2 strategic bombers.[44] The FB-22 could also then become a platform to introduce operational sixth-generation fighter technology. Congress should direct a DOD study on the viability of pursuing the FB-22 this year.
- **Immediately begin research and development of a sixth-generation fighter.** Congress should fund the development of a sixth-generation fighter. Sixth-generation technologies may include a flying wing with morphic wings that deflect and minimize its radar signature and a visual stealth structure that would use micro cameras to take on the appearance of the sky and the ground to make it invisible. It might also feature a laser weapon in place of a 20 mm or 25 mm cannon and a thought-controlled helmet-mounted display.

44. GlobalSecurity.org, "FB-22 Fighter Bomber," at *http://www.globalsecurity.org/military/systems/aircraft/fb-22.htm* (June 11, 2009).

- **Study the formation of composite units.** Composite units of F-22s, F-15s, F-16s, and F-18s, along with the future F-35s might help to offset the reduced number of F-22s. Using fighter aircraft attached to the Air Expeditionary Forces to form ad hoc composite units as required by the operational situation would provide commanders more flexibility. Such Fighter Fire Brigades, similar to the concept of the German Flying Circus, would contain smaller numbers of fighters and bombers in the AEF of 90 aircraft. These brigades could also be reconfigured for multirole, swing interceptor, and strike missions. They would have their own command staff, logistical, and maintenance support resources, and be capable of operating autonomously. One precedent is the formation led by the 187th Fighter Wing, when it deployed in 2003 to the Middle East to support the air operations of the Second Gulf War. In theater, the 187th was "the lead unit, commanding a mixture of Air National Guard, Air Force Reserve, Active Air Force, and British Air Force units comprising the 410th Air Expeditionary Wing."[45]

  Similar units could also be amalgamated to form the equivalent of *panzer kampfgruppen*. Aircraft from the services can constitute these tactical air formations established in the theater of operation to defeat an immediate air/ground threat. The fighter *kampfgruppe* (battle group) can be formed with mixed units of fourth-generation and fifth-generation fighters, which could include bombers depending on the type of mission. This composite unit would be an ad hoc formation tailored to meet mission requirements and equipped with support aircraft, such as airborne early warning, tanker, and electronic warfare aircraft. Pilots from the Air Force, Navy, and Marine Corps—together with support aircraft—should be trained to operate together in new tactical scenarios. Forming the equivalent to *kampfgruppen* with units smaller than the fighter wings would provide commanders flexibility. Once the mission of the fighter unit is accomplished, the battle group would dissolve, and the aircraft would return to their original units.
- **Purchase additional fourth-generation fighters for the Air National Guard.** The air sovereignty mission remains a critical component of America's homeland defense posture. Many at the Pentagon and in Congress seem prepared to gamble in the medium term that the F-35 will eventually help the atrophying Air National Guard to sustain the air sovereignty mission, but an interim "bridge" is required to reach this stage. Extending the service life of the Air National Guard's current fleet is possible, but expensive ($20 million) and would add just 1,500 hours. Instead, Congress should purchase additional fourth-generation fighters, which are relatively inexpensive, to bridge the coming gap in FY 2010.

Conclusion

Congress needs to examine carefully whether the planned numbers of new and modernized fighters in the Air Force, Navy, and Marine Corps inventories will meet service and operational requirements. Careful scrutiny is required given the reported structural problems caused by the stress of combat operations, the current and planned numbers of fifth-generation fighters, and the scheduled phase out of legacy fighters. In the ongoing Quadrennial Defense Review process, Congress and the Pentagon should carefully examine the inherent capabilities and qualities of each model of fighter to verify that it can fulfill these requirements and defeat the technological challenges that may be posed by future challengers.

Congress must ensure that the U.S. military maintains both its technological edge and adequate numbers of aircraft to maintain U.S. air superiority well into the 21st century.

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45. U.S. Air National Guard, "Heritage of the 187th Fighter Wing," at *http://www.almont.ang.af.mil/187_history.htm* (May 8, 2009; unavailable June 23, 2009).