

CRS Report for Congress

Tactical Aircraft Modernization: Issues for Congress

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Summary

This report examines the Department of Defense's (DOD's) three largest tactical aircraft modernization programs. The "Background" section provides a brief description of each program and a discussion of how tactical aircraft fit into military air operations: the missions they typically perform and how they contrast to longer-range combat aircraft.

The "Analysis" section examines a number of policy issues, including affordability, capability required, force structure, and defense industrial base. The paper concludes with a synopsis of congressional action on these programs.

The Defense Department is procuring the F-22 fighter for the Air Force, the F/A-18E/F fighter/attack plane for the Navy, and the Joint Strike Fighter (JSF) aircraft in three variants, some of which might be operational around 2012.

Decisions in Congress and the Defense Department regarding these aircraft programs may have important long-term implications. The F/A-18E/F is in full-rate production. The F-22 is nearing the end of its planned production. The JSF might be in production through the 2020s. Decisions about the funding of these programs will influence the future of individual U.S. aircraft manufacturers, and may well affect the division of combat roles and missions among the services for decades.

Some in Congress have expressed concern about the need for some of these aircraft programs on grounds of cost and affordability, and military requirements. Some in Congress have also expressed concern over the potential impact of these aircraft programs on the defense industrial base. This report will be updated as events warrant.

This report replaces Issue Brief IB92115 of the same title.

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Tactical Aircraft Modernization: Issues for Congress

Introduction

Tactical or theater aircraft — fighter planes, fighter/attack planes, and attack planes — constitute a major component of U.S. military capability. They played a prominent role in the 1991 Gulf War, and are expected to play a leading role in contemporary and future military operations, particularly in situations where U.S. leaders hope to limit or avoid the commitment of U.S. ground forces. Operation Allied Force, the 1999 war in Kosovo, may have fueled these expectations. During this 78-day war, hundreds of coalition aircraft attacked Serbian targets, losing only two aircraft in the process. Navy tactical combat aircraft played a prominent role in the early stages of *Operation Enduring Freedom*, and tactical aircraft from all services continue fighting in the war in Afghanistan and Iraq.

Tactical aviation accounts for a significant part of the defense budget, counting the costs of developing, procuring, and operating aircraft, engines, avionics, and weapon systems, and personnel, training, and administrative costs. In round numbers, the U.S. Air Force, Navy, and Marine Corps operated approximately 4,200 fixed-wing tactical combat aircraft in 2007. Of these, the Air Force operated about 2,658 and the Navy and the Marine Corps 1,541. In addition to these fixed-wing combat aircraft, the Services operate about 1,300 armed helicopters.¹ This report focuses on fixed-wing aircraft programs: the Air Force F-22, the Navy F/A-18E/F, and the F-35 Joint Strike Fighter. The research and development, procurement, and military construction costs of these aircraft will combine to cost taxpayers an estimated \$418 billion in constant dollars.²

These aircraft have been traditionally referred to as “tactical” aircraft to distinguish them from the Air Force’s B-52, B-1, and B-2 “strategic” bombers. When applied to aircraft, “tactical” generally refers to smaller and shorter-ranged planes, while “strategic” generally refers to larger and longer-ranged aircraft. Both tactical and strategic types are operated by USAF’s Air Combat Command, which in 1992 replaced Strategic Air Command (SAC) and Tactical Air Command (TAC). Reflecting the post-Cold War demise of SAC and TAC, tactical aircraft are sometimes referred to as “theater aircraft.”

¹ See CRS Report RL32447, *Military Helicopter Modernization: Background and Issues for Congress*, by Christian Liles and Christopher Bolkom.

² *Selected Acquisition Report (SAR) Summary Tables*. Department of Defense. OUSD (AT&L) as of December 31, 2007.

The Military Services use alpha-numeric designations (e.g., A-10, F-15, B-52, F/A-18) to identify the type of mission the aircraft is designed to perform. This taxonomy can be confusing because it is loosely defined (e.g., the Joint Strike Fighter is a multi-role aircraft, which would suggest an F/A-35 designation) and because, over time, an aircraft can be modified to perform additional missions. For example, the B-52 *Stratofortress* today exploits advanced targeting and precision guided munitions (PGMs) to conduct close air support (CAS) missions, which are historically performed by tactical aircraft, not long-range bombers. Generally speaking, however:

- **Fighter** planes primarily engage in air-to-air combat, either at close/visual range or at ranges requiring radar-guided missiles and stand-off munitions (including “precision-guided munitions”/PGMs).
- **Attack** planes focus on air-to-surface combat operations such as CAS for friendly ground forces engaged in battle, battlefield air interdiction (BAI) against enemy forces behind the lines, and deep interdiction (also known as “deep strike”) against the enemy’s military, political, and industrial infrastructure.
- **Fighter/attack** planes (also known as fighter-bombers, strike fighters, or multirole fighters) perform both air-to-air and air-to-surface missions.
- **Long-range bombers** and cruise missiles can also be used in BAI and deep strike operations.
- Increasingly, armed **Unmanned Aerial Vehicles**, or UAVs, are used to attack ground targets, especially in low-intensity combat or counterinsurgency missions.

Background

Major changes in the national security environment (e.g., the fall of the Soviet Union, the terror attacks of 9/11) have informed DOD plans for tactical aviation modernization. In response to an emerging congressional consensus and recommendations by the Defense Department’s 1993 Bottom-Up Review (BUR) of force structure requirements, the Clinton Administration decided in late 1993 to continue two major aircraft programs then underway — the F-22, a low-observable-to-radar (stealthy) fighter for the Air Force; and the F/A-18E/F version of the F/A-18 fighter/attack plane for the Navy — while also pursuing new aviation technology initiatives through the Joint Advanced Strike Technology (JAST) program, which later evolved into the Joint Strike Fighter (JSF) program.

The George H. Bush Administration’s plan for modernizing U.S. tactical aircraft had focused on four key aircraft programs: (1) the F-22, (2) the F/A-18E/F, (3) the AFX, a stealthy attack/fighter aircraft to be developed for the Navy and Air Force,

and (4) the Multi-Role Fighter (MRF), either a new aircraft or an upgraded version of the F-16 fighter/attack plane for the Air Force. Since there was no funding for the MRF and only minimal funding for the AFX, their rejection by the BUR in 1993 was more a recognition of their demise than the termination of viable programs.

The Defense Department's first Quadrennial Defense Review (QDR), released in May of 1997, recommended buying fewer tactical aircraft than was then projected, with reduced annual procurement of the F-22 and the F/A-18E/F. The George W. Bush administration took office with the aim to "transform" the Department of Defense rather than merely modernize its capabilities.³ Tactical aircraft programs were reviewed in this context, and in Program Budget Decision (PBD) 753 (December 23, 2004), DOD recommended that the F-22 program be terminated after the FY2008 purchase.

Current Programs

F-22A Raptor

Built by Lockheed Martin and Boeing, the F-22A features a stealthy design, advanced engines by Pratt and Whitney, and new avionics by Hughes and other subcontractors. It is replacing the F-15 as the Air Force's air superiority fighter. Like the F-15E, the F-22 will also have air-to-surface attack capabilities. The program was in competitive prototyping from 1986 to 1991 and then entered engineering and manufacturing development (EMD), with prototype flights beginning in 1997. On September 14, 2001, the Defense Acquisition Board (DAB) announced its much-awaited decision that the F-22 program had successfully completed EMD and was ready to move on to low-rate initial production. On December 15, 2005, the Air Force announced that a 12-aircraft detachment of F-22s had achieved initial operational capability (IOC).

Figure 1. F-22 Raptor



³ Unlike modernization, transformation is generally viewed as discontinuous change, or a "leap ahead" in capabilities. See CRS Report RL32238 for more information on military transformation.

In recent years, tension has emerged between the Air Force, which states a requirement for 381 Raptors, and DOD's civilian leaders, who have restricted spending plans instead to 184 aircraft. F-22 supporters won the debate in the 109th Congress on whether to grant multiyear procurement (MYP) authority for the final 60 Raptors. (See CRS Report RL31673 for more information on the F-22.)

F/A-18E/F Super Hornet

Built by Boeing (since its acquisition of McDonnell Douglas in 1997) and Northrop Grumman, the Super Hornet is a larger and more expensive version of the older F/A-18C/D fighter/attack plane. It has more range/payload than the F/A-18s it will replace and has more potential for future modernization. In May 1992, the program entered EMD, with prototypes beginning flight-tests in late 1995 and procurement funding beginning in FY1997. In December 2003, the Navy awarded a five-year, \$8.6 billion multi-year procurement contract for 210 F/A-18E/Fs to the Boeing Company. Procurement of 493 F/A-18E/Fs is currently projected, at a cost \$46.3 billion in then-year dollars.⁴ Eighty-five electronic attack versions of the aircraft — the EA-18G will be procured as a replacement for the Navy's aging EA-6B Prowler fleet.⁵ A separate \$1 billion contract was also awarded to develop this aircraft, which is estimated to cost a total of \$8.6 billion. The first operational EA-18G was delivered to the Navy in June 2008.

Figure 2. F/A-18F Super Hornet



F-35 Lightning II

The F-35 Lightning II, also called the Joint Strike Fighter (JSF), began in FY1994 as the Joint Advanced Strike Technology (JAST) program, which emerged after cancellations of the AFX and MRF. The JSF program seeks to design, develop, and produce a family of affordable joint-service fighter/attack planes, with

⁴ "F/A-18E/F." *Selected Acquisition Report*. (SAR) Office of the Secretary of Defense (AT&L). December 25, 2007.

⁵ Electronic attack aircraft increase the survivability of attack aircraft by jamming radars used by enemy aircraft and air defenses and making it difficult for them to target U.S. aircraft. For more information about electronic warfare and the EA-6B. See CRS Report RL30639 and CRS Report RL30841.

conventional take-off and landing (CTOL) aircraft for the Air Force and Navy and short take-off vertical landing (STOVL) aircraft for the U.S. Marine Corps and the U.K. Royal Navy. In February 2004, Air Force leaders announced that the Air Force would also procure some number of STOVL variants to improve its ability to prosecute the close air support (CAS) mission and reduce reliance on access to forward bases.

The JSF is DOD's largest cooperative acquisition program. Eight foreign countries have pledged funds to the JSF program.⁶ A number of other countries are being considered for either JSF partnership or as purchasers.⁷ Participation is related to the financial contributions to the program by these governments, the British government being the major non-U.S. contributor of development funds.

From 1997 to 2001, the program was in a competitive design phase involving prototypes built by both Boeing and Lockheed Martin. On October 26, 2001, DOD announced that Lockheed Martin won the competition, and would move on to the production phase. In May 2005, DOD approved a plan to revamp the JSF program to account for developmental difficulties. The revised plan entails stretching out development efforts 16 to 22 months, adding \$11.7 billion in costs and cutting the number of aircraft the Defense Department will buy. As now projected, some 2,456 JSFs would be procured. Low rate production was approved in 2008, and operational service is scheduled for March 2012. The JSF program is currently estimated (December 2007) at \$298 billion.⁸ In its FY2009 budget, DOD requested no funds for the JSF F-136 alternate engine program, despite clear guidance from the 109th Congress that this program was to be pursued. The F-136 was initiated by Congress in FY1996.⁹ (See CRS Report RL33390 for more information on the F-136 issue.)

⁶ Australia, Denmark, Italy, Netherlands, Norway, Canada, Turkey, and United Kingdom.

⁷ Israel, Poland, Singapore.

⁸ See CRS Report RL30563, *F-35 Lightning II Joint Strike Fighter (JSF) Program: Background, Status, and Issues*, by Anthony Murch and Christopher Bolkcom.

⁹ Those in Congress who initiated the alternate engine program hoped to create a competitive environment during JSF production, in which engine manufacturers would compete against each other for business. This competition would generate cost savings and improved engine reliability and performance. Supporters believe the Air Force was successful in creating such an environment when it funded an alternate engine for the F-16 *Falcon*.

Figure 3. F-35 Joint Strike Fighter (JSF)



Unmanned Aerial Vehicles

The Defense Department has pursued unmanned aerial vehicles (UAVs) since World War I. The use of these aircraft for military missions increased very slowly until the commercial world experienced rapid advances in geo-positioning, communications, and information technologies in the 1980s and 1990s. Spending on UAVs has more than quadrupled between 2001 and 2009 (\$667 million to \$2.9 billion), and the variety of programs and missions is noteworthy.

The Air Force and the Army currently field three armed UAVs that have increasingly been used to attack ground targets in Afghanistan, Iraq, and elsewhere: the MQ-1 Predator, MQ-9 Reaper, and Extended Range Multi-Purpose (ERMP) Unmanned Aerial System (UAS) (which is based on the Shadow 200 UAV). The Air Force plans to purchase 38 Predators and 9 Reapers in FY2009 to add to the 268 Predators and 18 Reapers previously ordered. The Army has purchased 84 Shadow UAVs in the past, and asks to purchase one more in FY2009.

Armed UAVs appear to complement manned tactical combat aircraft. Advantages of UAVs include no risk of losing pilots and long dwell time (up to 30 hours), which provides persistent surveillance over the battlefield and the ability to attack promptly if necessary. Disadvantages of UAVs include a relatively high accident rate and less flexibility than manned aircraft. Presently, UAVs cannot engage in air-to-air combat, nor protect themselves effectively against enemy air defenses. Increased use of UAVs also creates concerns about congested airspace.¹⁰

Proposed FY2009 funding for these three UAVs is \$871.8 million in procurement and \$68.2 million in R&D. These figures reflect a healthy share of DOD's UAV funding but pale in comparison to the three manned aircraft programs in this report, which tally \$13.5 billion in FY2009.

¹⁰ See CRS Report RL31872 for more information.

Figure 4. ERMP



Figure 5. Predator



Analysis: Key Issues to Consider

Affordability

Given possible constraints on defense spending in future years, can we afford tactical aircraft modernization programs as currently projected?

For more than 20 years — since 1993 — some observers have predicted a “train wreck” in DOD’s tactical aviation programs. These observers see too many aircraft competing for too few dollars. In March 2005, for example, Tactical Air and Land Forces Subcommittee Chairman Representative Curt Weldon began a hearing by observing that tactical aviation is “in the midst of a massive train wreck financially.” Representative Weldon noted that the costs of the F-22 and JSF had increased by “well over 100” and 80% respectively, and one impact of these increases was reduced aircraft purchases.¹¹

It may be that a budgetary train wreck is looming. As the table below suggests, a more apt metaphor for the tactical aviation budget to date may be one of a “slow

¹¹ “Hearing of the Tactical Air and Land Forces Subcommittee of the House Armed Services Committee,” *Federal News Service*, March 25, 2005.

leak.” Over the past 14 years, budget pressures have reduced the number of aircraft that some estimate DOD can afford by more than 30%.

Table 1. Estimated Number of Aircraft to Be Procured

FY	F/A-22	JSF ^a	F/A-18E/F	Total
1991	648	2978	1000	4626
1993	442	2978	1000	4420
1997	339	2978	548	3865
2000	333	2866	548	3859
2004	279	2866	462 ^b	3607
2006	179	2443	462	3084
2008	183	2456	493	3132

Source: Estimates by DOD Comptroller, GAO, CBO, CRS.

- a. The United Kingdom plans to buy 150 JSFs. However, budget shortfalls may force the UK to reduce purchases.
- b. Does not include 90 EA-18G electronic attack aircraft.

This “slow leak” in tactical aviation funding may continue. Or, budgets may hold steady. (Few predict that tactical aviation budgets will increase in real terms.) However, other aircraft acquisition challenges may continue to erode tactical aviation’s budget. As mentioned above, spending on Unmanned Aerial Vehicles (UAVs) has more than quadrupled between 2001 and 2009, and DOD’s appetite for these systems show no sign of abating. All the services wish to recapitalize their helicopter fleets. Advocates of long-range bombers have been pressuring the Air Force to maintain its current inventory of bombers, and to field a replacement earlier than the planned date of 2037. Also, as Congress is well aware, replacing DOD’s aging fleet of long-range aerial refueling aircraft is a growing priority and will require sustained investment.

Some also believe that previously unanticipated costs associated with combating terrorism may mean that the “tac air train wreck” has fully arrived. CRS estimates that since the September 11 terrorist attacks, DOD has received over \$859 billion for combat operations, occupation, and support for military personnel deployed or supporting operations in Iraq and Afghanistan and for enhanced security at military installations. DOD and congressional initiatives to increase both personnel benefits and personnel “end strength” could also increase pressure to reduce tactical aviation budgets.

The act of matching resources (i.e., budget) to objectives in a procurement program can be called a “business case.” GAO, for one, has argued that the F-22 lacks a business case (GAO-05-304), and that the JSF’s business case is “unexecutable” (GAO-05-271). This assertion suggests to some, at least implicitly, that the relevance of these aircraft, as reflected in their currently planned procurement quantities, to the current military environment, is unclear.

Capability Required

Given the demise of the Soviet Union and the dominance U.S. air forces have demonstrated in recent conflicts, and the apparent growth of low-intensity conflicts, what capabilities are required in U.S. tactical aircraft?

The F-22 program was started in the mid-1980s, when the Soviet Union was expected to continue producing high-performance aircraft and air-defense missiles that could pose serious threats in the 1990s and beyond. The F-22 was then justified as an advanced aircraft capable of performing combat missions in a high-threat military environment. With the demise of the Soviet Union and a much changed politico-military environment, some question the need to procure large quantities of such expensive, high-capability aircraft. Alternatives would be to produce only limited numbers of these aircraft, while upgrading and extending the service lives of existing aircraft such as Air Force F-15Es and F-16Cs, Navy and Marine Corps F/A-18C/Ds, and Navy F/A-18E/Fs. Others argue that advanced combat aircraft are not the most applicable airpower resources for counterinsurgency and anti-terrorism operations. These observers would reduce planned combat aircraft procurement programs in favor of increased investments in unmanned aerial vehicles, special operations helicopters, medical evacuation aircraft, and training and equipping forward air controllers.¹²

Others argue that large numbers of high-capability aircraft are still necessary because Russian aircraft and surface-to-air missiles (SAMs) are available to potential adversaries of the United States and its allies, and some European and Asian companies may soon be able to market advanced aircraft and SAMs to potential enemies. In this view, the demise of the Soviet Union does not mean the end of potential high-threat areas requiring advanced aircraft. Recent acquisitions of fighter aircraft and surface-to-air missiles by China, and to a lesser degree India, have fueled some observers' concerns that these countries may effectively challenge U.S. airpower in the future. In recent conflicts in Iraq and Yugoslavia, the F-117 stealth attack plane played a crucial role in destroying targets in high-threat areas. Having large numbers of such advanced aircraft, it is argued, will help ensure operational success in future conflicts with well-armed adversaries.

Most of those questioning the modernization plan acknowledge that proliferation of advanced aircraft and air-defense equipment in the Third World will require the United States to field some new-generation high-capability aircraft. They argue, however, that the Gulf War showed the United States has a formidable advantage in air-to-air combat, which can be maintained by procuring a limited number of F-22s for use against those adversaries who may be able to make effective use of modern Russian or European aircraft. They note that the stealthy F-117s used in the Gulf War constituted a tiny percentage of all tactical aircraft employed against Iraq, and only a few non-stealthy planes were shot down, even in the early days of the war. Moreover, they argue that cruise missiles and stealthy B-2 bombers and non-stealthy B-1s equipped with adequate standoff munitions could be used against

¹² See CRS Report RL32737 for more information on the application of airpower to counterinsurgency missions.

heavily defended targets. In this view, F-22s would be procured in some smaller quantity than the 381 planes currently desired by the Air Force and could be operated as special “silver bullet” forces.

Others take issue with the need for any F-22s, arguing that the Air Force and Navy will face generally the same adversary aircraft in the future, and these services now have roughly equal capability in air-to-air combat as well as considerable air-to-surface attack capabilities with F-15Es. Others point out that the Navy will eventually conduct its air-to-air combat mission primarily with the F/A-18E/F. If the Navy does not need a new generation stealth fighter for the post-Cold War era, they ask, why is such an aircraft required for the Air Force? Some also argue that the improved attack capability of the F/A-18E/F will be sufficient for carrier-based attack missions against the most likely adversaries in regional conflicts. Furthermore, it can be argued that the successful development of longer-range and more accurate and lethal standoff munitions would significantly increase the combat effectiveness of current-generation tactical aircraft.

Force Structure

How many tactical aircraft does the United States need?

The George H. Bush Administration’s proposed base force for the mid-1990s and beyond reduced force structure to 26.5 Air Force fighter and attack wings, 13 Navy carrier air wings, and 4 Marine Corps air wings (compared to 35, 15, and 4 air wings respectively in FY1990). Budgetary considerations and radically altered international conditions led to these reductions, which some argued were appropriate for the post-Cold War era, while others viewed this force structure as excessive. Secretary of Defense Les Aspin announced in September 1993 that the Clinton Administration projected a base force of 20 Air Force fighter/attack wings (13 active, 7 reserve), 11 Navy carrier air wings, and 4 Marine Corps air wings. The 1997 QDR recommended no major changes in this force structure, although the 20 Air Force tactical wings would comprise 12 active and 8 reserve wings.

The question of how many wings of tactical aircraft the United States needs for the “post-9/11” era, and how this number should be determined, is part of an ongoing debate in the Defense Department and Congress over the proper overall size of U.S. military forces. Decisions on this issue can affect views on the affordability and focus of plans for modernizing tactical aircraft. A reduction in the number of air wings would lead to a corresponding reduction in the number of aircraft to be procured. However, a reduction in the number of air wings may lead to a decision to increase the proportions of F-22s and F/A-18E/Fs in the force, on grounds that reduced forces need more capable equipment.

In an attempt to save money, but maintain combat capability, the Navy-Marine Corps Tactical Air Integration Plan, proposed in late 2002, reduced the number of Navy and Marine Corps combat aircraft squadrons by nine.¹³ Deputy Secretary of

¹³ See CRS Report RS21488, *Navy-Marine Corps Tactical Air Integration Plan*: (continued...)

Defense Gordon England reportedly views this reduction as a potential model for DOD's entire tactical aviation force. In a March 21, 2005 interview, Mr. England noted that by better integrating Navy and Marine Corps tactical aviation, the Defense Department was able to reduce aircraft purchases and save \$35 billion, while maintaining the same combat capabilities. Increased efficiencies that might be realized across DOD's tactical air enterprise might include better integration, and more common assets, he told reporters. Mr. England advocated that DOD examine its "whole [tactical aviation] enterprise" and search for efficiencies and savings."¹⁴

Debate over the size of current and projected tactical aviation forces continues in the 110th Congress. Despite its integration plan described above, the Navy and Marine Corps now project a shortfall of up to 90 aircraft in FY2017-FY2020.¹⁵ In congressional testimony, Air Force leaders testified that they anticipate a gap of 800 fighter aircraft in 2024 under current procurement plans.¹⁶ Critics of Air Force claims that a fighter gap will emerge argue that such projections are strongly influenced by assumptions on threats and whether the United States will fight alone or part of a coalition. Also, some argue that Air Force demands for more fighter aircraft are driven more by organizational constraints than by actual war fighting needs, an argument akin to that levied against the Army when it organized itself principally by Division, rather than by today's more deployable Brigade Combat Teams.¹⁷

Defense Industrial Base

How should industrial-base considerations be factored into decisions on tactical aircraft modernization?

The health of the U.S. defense industrial base is a perennial and unsettled issue. A report by the Defense Science Board published in the Spring of 2000 noted that the defense industry was in the midst of a painful transition that was complicated by the "new economy," which was draining human and financial resources. Unless steps were taken promptly, the study concluded, the U.S. defense industry would likely be less competitive and financially viable in 5 to 10 years than it was in 2000. A July 2000 study by Booz-Allen Hamilton reported that the U.S. defense industrial base was in a state of decline and national security would be affected if then-current trends

¹³ (...continued)

Background and Issues for Congress, by Christopher Bolkcom and Ronald O'Rourke. A Carrier Air Wing typically includes four strike fighter squadrons.

¹⁴ Christopher J. Castelli, "DEPSECDEF Nominee Sees Potential For DOD-Wide TACAIR Integration," *Inside the Navy*, April 4, 2005.

¹⁵ See CRS Report RS22875.

¹⁶ Lieutenant General Daniel Darnell, Deputy Chief of Staff Air, Space and Information Operations, Plans and Requirements. "Senate Armed Services Subcommittee on Airland Holds Hearing on the Fiscal 2009 Budget for Air Force and Navy Aviation Programs." *Congressional Quarterly*. Congressional Transcripts. April 9, 2008. p.16

¹⁷ William Matthews. "Coming up short; Is the Air Force's 'Fighter-gap' truth or spin?" *Armed Forces Journal International*. July 2008. p.26.

went unchecked.¹⁸ A 2005 study by DOD, however, found no major problems with U.S. defense industry.¹⁹

Congressional decisions on tactical aviation programs have serious implications for the aerospace sector of the U.S. industrial base, which is a major source of technological innovations as well as export earnings. Aerospace is the nation's leading net exporter of manufactured goods, with exports exceeding imports in 2005 by \$39.7 billion (including \$10.2 billion in military exports), according to the Aerospace Industries Association. There is general agreement that there were more aircraft manufacturers and subcontractors than recent levels of defense spending could sustain. Consequently, the aerospace industry, like other industries heavily dependent on Pentagon spending, has been undergoing a shakeout, with some companies leaving the military aircraft business and others merging with financially stronger competitors and downsizing production lines.

Congressional decisions on which military aircraft programs to support could determine which aircraft manufacturers and subcontractors remain in business. Although the U.S. economy as a whole regularly absorbs declines equal in magnitude to that projected for defense aerospace, in the short- and medium-term, thousands of skilled engineering and manufacturing jobs as well as the health of local and regional economies could be at stake. Some argue that preservation of critical components of U.S. defense industry is now as important as military requirements, which have always been matters of judgment based on threat assumptions that are subject to change. There is no apparent consensus, however, about what is most critical to future U.S. military requirements or how excess military industrial capabilities can be converted to civilian production that might enhance international competitiveness in export trade.

Several questions arise out of the industrial base issue: How many aircraft manufacturers are needed to support U.S. military needs? To what extent should the survivability of these firms be taken into account in deciding which aircraft programs to pursue? Which aspects of the aerospace industry are genuinely unique and vital to production of U.S. tactical aircraft? How can competitiveness among U.S. defense contractors be maintained with fewer firms, particularly regarding different design concepts and cost-reduction innovations in the development and production of planes? Should foreign sales of U.S. military aircraft be factored into decisions on which tactical aircraft programs to pursue? How might decisions on tactical aircraft programs affect U.S. export earnings and international competitiveness of the U.S. aerospace industry? There are no easy answers to such questions and no consensus on these industrial base issues, which confront all industrial nations in the early 2000s.

Recently, U.S. companies have lost a number of competitions to European companies in an area of historic dominance: domestic, U.S. defense aviation.

¹⁸ Anthony Velocci, "Industry Prognosis Flags Ominous Trends," *Aviation Week & Space Technology*, July 17, 2000.

¹⁹ Sharon Weinberger, "Annual Report Paints Rosy Picture of Defense Industrial Base," *Defense Daily*, March 28, 2005.

European companies beat U.S. companies in competition for the prestigious VH-71 Presidential Helicopter, the lucrative KC-X aerial refueling aircraft (tanker) program, and the Joint Cargo Aircraft (JCA).²⁰ These awards may encourage lawmakers to look more closely at the defense industrial base dimension of aviation acquisition decisions.

Congressional Action

This section presents recent legislative activity on DOD's four major tactical aircraft modernization programs. It includes the Administration's annual budget request, and annual authorization and appropriations. The Bush Administration's FY2009 defense budget included the following requests for tactical aircraft programs: F-22 (\$4.1 billion); JSF (\$6.9 billion); F/A-18E/F (\$2.4 billion); EA-18G (\$1.8 billion). Details of the request are summarized in **Table 2**, below.

Table 2. FY2009 Budget Request
(\$ millions)

Program	USAF Procure		USN Procure		USAF RDT&E	USN RDT&E
	\$	#	\$	#		
F-22	3164.2 0.0 327.0	20 APCY Mods			700.3	
JSF	1796.5 136.9	8 APCY	1720.9 258.8	8 APCY	1524.0	1532.7
F/A-18E/F			1917.9 42.6 450.9 ^a	23 APCY Mods		71.2 ^a
EA-18G			1655.6 46.8	22 APCY		128.9

Sources: Procurement Programs (P-1), *Department of Defense Budget for FY2009*, February 2008. RDT&E Programs (R-1), *Department of Defense Budget for FY2009*, February 2008.

Note: APCY = Advanced Procurement, Current Year.

a. Some of these funds would be spent on F/A-18A/C/D models as well as E/F models.

In their report 110-652 (H.R. 5658), House authorizers cut a total of \$85 million from F/A-18E/F and EA-18G procurement (due to foreign sales of F/A-18E/Fs which will reduce lower unit costs for U.S. aircraft) and added \$31 million to Air Force APCY to fund the JSF competitive engine. Authorizers expressed frustration that DOD had not followed Section 213 of P.L. 110-181, which requires continued development of this program. The committee encouraged the Air Force to procure

²⁰ The KC-X award process was found to be flawed and the award to Northrop Grumman and its partner EADS has been rescinded. See CRS Report RL34398 for more information.

more than the 183 F-22s on budget and provided \$523 million in advanced procurement for an additional lot of 20 F-22s in 2010. House authorizers matched all other funding requests represented in **Table 2** above.

In their report 110-335 (S. 3001), Senate authorizers added \$35 million to Air Force procurement and \$465 million to the services' R&D accounts to fund competitive development of the JSF engine. Like their counterparts in the House, the Senate Armed Services Committee noted that additional purchases of F-22s in FY2010 would be necessary to keep the production line open. Senate authorizers did not advocate additional purchases, but provided \$497 million that could be used for this purpose or, conversely, to shut down the production line. Senate authorizers matched all other funding requests represented in **Table 2** above. Concerned by testimony that it received from DOD regarding aircraft shortfalls, the committee requires (Sec. 171) that DOD annually submit a long-term plan for procuring tactical aircraft so that Congress can make rational judgements about which aircraft programs to fund.