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September 1997

# AIRCRAFT ACQUISITION

## Affordability of DOD's Investment Strategy



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**National Security and  
International Affairs Division**

B-272636

September 8, 1997

The Honorable Duncan Hunter  
Chairman, Subcommittee on Military Procurement  
Committee on National Security  
House of Representatives

The Honorable Curt Weldon  
Chairman, Subcommittee on Military Research and Development  
Committee on National Security  
House of Representatives

The affordability of the Department of Defense's (DOD) aircraft modernization programs has been the subject of much recent debate and was the primary subject of hearings held by your Committee in June 1996 and March 1997. At those hearings, we testified that DOD's planned investments in aircraft were not achievable within likely future budgets and appeared to be inconsistent with the existing security environment.<sup>1</sup> The Congressional Budget Office (CBO) expressed similar concerns. However, DOD continues to believe that its aircraft investment strategy will be affordable. Since the March 1997 hearing, we have updated our analysis of DOD's aircraft investment strategy to reflect the December 1996 Selected Acquisition Reports. As you subsequently requested, we are issuing this report to assist you in your work on the fiscal year 1998 defense authorization bill and continuing review of the Quadrennial Defense Review.

The Congress will be faced with a number of critical decisions on DOD's aircraft investment strategy as the Nation proceeds in an environment of constrained budgets for the foreseeable future. The purpose of this report is to inform the Congress about the long-term implications and affordability of DOD's aircraft strategy. To gain a broad understanding of the affordability of DOD's aircraft investment strategy, we evaluated (1) DOD's and CBO's estimates of the annual funding needed for aircraft programs, as a percentage of the overall DOD budget, and compared that percentage to a long-term historical average percentage of the defense budget; (2) the potential long-term availability of funding for DOD's planned aircraft procurements; and (3) DOD's traditional approach to resolving funding shortfalls.

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<sup>1</sup>Combat Air Power: Joint Mission Assessments Needed Before Making Program and Budget Decisions (GAO/T-NSIAD-96-196, June 27, 1996) and Defense Aircraft Investments: Major Program Commitments Based on Optimistic Budget Projections (GAO/T-NSIAD-97-103, Mar. 5, 1997).

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The National Defense Authorization Act for Fiscal Year 1997 required DOD to conduct a Quadrennial Defense Review. As part of the review, DOD assessed a wide range of issues, including the defense strategy of the United States and the force structure required. As a result, DOD may reduce the quantities procured of some weapons programs. The details of how DOD plans to implement the recommendations of the Quadrennial Defense Review will not be available until the fiscal year 1999 budget is submitted to the Congress. Our analysis, therefore, does not take into account the potential effect of implementing the recommendations of the Quadrennial Defense Review.

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## Results in Brief

To meet its future aircraft inventory and modernization needs, DOD's current aircraft investment strategy involves the purchase or significant modification of at least 8,499 aircraft in 17 aircraft programs at a total procurement<sup>2</sup> cost of \$334.8 billion (fiscal year 1997 dollars) through their planned completions. DOD has maintained that its investment plans for aircraft modernization are affordable within expected future defense budgets. DOD had stated earlier that sufficient funds would be available for its aircraft programs based on its assumptions that (1) overall defense funding would begin to increase in real terms after fiscal year 2002 and (2) large savings would be generated from initiatives to downsize defense infrastructure and reform the acquisition process.

DOD's aircraft investment strategy may be unrealistic in view of current and projected budget constraints. Recent statements by DOD officials, as well as congressional projections, suggest that overall defense funding will be stable, at best, for the foreseeable future. The long-term impact of this change on DOD's aircraft program is not yet clear. Moreover, DOD's planned funding for the 17 aircraft programs in all but 1 year, between fiscal year 2000 and 2015, exceeds the long-term historical average percentage of the budget devoted to aircraft purchases and, for several of those years, approaches the percentages of the defense budget reached during the peak Cold War spending era of the early to mid-1980s. Compounding these funding difficulties is the fact that these projections are very conservative. They do not allow for real program cost growth, which historically has averaged at least 20 percent, nor do they allow for the procurement of additional systems, although DOD is considering replacing KC-135, C-5A, F-15E, F-117, EA-6B, and S-3B aircraft.

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<sup>2</sup>This report focuses on the procurement costs, in constant fiscal year 1997 dollars, that are involved in the purchase of new or significantly modified aircraft. It does not address development or operation and maintenance costs or the procurement costs of other aircraft modifications or spare parts.

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Further, the amount and availability of savings from infrastructure reductions and acquisition reform—two main claimed sources for increasing procurement funding—are not clearly evident today. Our recent reviews<sup>3</sup> of these initiatives indicate there are unlikely to be sufficient savings available to offset projected procurement increases. If the additional funding and the projected savings do not materialize as planned, DOD will face a significant imbalance between the aircraft programs' procurement funding requirements and the resources available for those purposes. To deal with such an imbalance, DOD may need to (1) reduce planned aircraft funding and procurement rates; (2) reduce funding for other procurement programs; (3) implement changes in force structure, operations, or other areas; or (4) increase total defense funding.

DOD's aircraft investment strategy is a "business-as-usual" approach—adding billions of dollars to defense acquisition costs and delaying delivery of weapon systems to the operational forces. DOD has historically made long-term commitments to acquire weapon systems based on optimistic procurement profiles and then significantly altered those profiles because of insufficient funding. Our recent report<sup>4</sup> on weapon system production rates showed that DOD's weapon system acquisition strategies were often optimistic and rarely achieved. As a result, a significant number of weapon systems were not procured at planned rates, leading to schedule stretchouts and billions of dollars of increased program costs. In other words, DOD often buys less than expected at a much higher cost than expected.

To avoid or minimize affordability problems, DOD needs to bring its aircraft investment strategy into line with more realistic, long-term projections of overall defense funding, as well as the amount of procurement funding expected to be available for aircraft purchases. Rather than continue its practice of starting aircraft procurement programs that cannot be executed as planned because of funding limitations, DOD needs to realistically project the long-term availability of procurement funding and then establish and adhere to an aircraft investment strategy that is militarily justified and can be executed within that amount. Bringing stability and realism to DOD's acquisition plans is crucial but will not be easy. It will require fundamental changes to a deeply entrenched

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<sup>3</sup>Defense Infrastructure: Budget Estimates for 1996-2001 Offer Little Savings for Modernization (GAO/NSIAD-96-131, Apr. 4, 1996) and Defense Aircraft Investments: Major Program Commitments Based on Optimistic Budget Projections (GAO/T-NSIAD-97-103, Mar. 5, 1997).

<sup>4</sup>Weapons Acquisition: Better Use of Limited DOD Acquisition Funding Would Reduce Costs (GAO/NSIAD-97-23, Feb. 13, 1997).

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acquisition culture. Difficult decisions will need to be made about restructuring and/or terminating some programs.

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## Background

Most of the funding in DOD's fiscal year 1997 aircraft investment strategy is for the procurement of new aircraft such as the F/A-18E/F, F-22, and Joint Strike Fighter (JSF), while some is for the retrofit or remanufacture of existing aircraft, such as the AV-8B and the Longbow Apache. Table 1 describes the 17 aircraft programs and their estimated procurement funding requirements and appendix I provides details on these programs.<sup>5</sup>

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<sup>5</sup>Funding estimates are the total procurement funding required for the programs from fiscal year 1997 through production completion. The estimates do not include any development or operation and maintenance costs.

**Table 1: DOD's Aircraft Procurement Plans (1997 and beyond)**

Billions of fiscal year 1997 dollars

Aircraft	Mission/procurement type	Quantity	Estimated procurement funding
<b>1. Joint Strike Fighter</b>	Strike fighter/new	2,978	\$144.8
<b>2. F/A-18E/F</b>	Multimission tactical/new	1,000	56.4
<b>3. F-22</b>	Air superiority fighter/new	438	37.7
<b>4. V-22</b>	Vertical assault/new	523	28.4
<b>5. Comanche</b>	Reconnaissance and attack helicopter/new	1,292	25.2
<b>6. C-17</b>	Airlift and cargo/new	80	17.6
<b>7. Longbow Apache</b>	Attack helicopter/modification	734	5.6
<b>8. SH-60R</b>	Antisubmarine and antisurface warfare helicopter/upgrade	184	3.8
<b>9. Joint Surveillance Target Attack Radar System</b>	Surveillance and targeting/new	11	3.1
<b>10. Joint Primary Aircraft Training System</b>	Primary trainer/new	702	2.5
<b>11. H-1</b>	Attack and utility helicopter/upgrade	280	2.3
<b>12. E-2C Hawkeye</b>	Combat information/new	29	2.2
<b>13. T-45 Training System</b>	Strike pilot trainer/new	91	2.1
<b>14. AV-8B</b>	Light attack/remanufacture	56	1.6
<b>15. UH-60L Black Hawk</b>	Air assault/cavalry/medical evacuation helicopter/modification	64	0.7
<b>16. C-130J</b>	Airlift and cargo/new	6	0.4
<b>17. E-3 AWACS <sup>a</sup></b>	Airborne warning and control/modification	31	0.4
<b>Total</b>		<b>8,499</b>	<b>\$334.8</b>

<sup>a</sup>Airborne Warning and Control System.

Source: Our analysis of (1) DOD's program cost estimates, except the JSF program and (2) CBO's JSF cost estimates based on DOD's unit cost goals and unadjusted for cost growth.

DOD is pursuing these aircraft programs at a time when the federal government is likely to be faced with significant budgetary pressure for the foreseeable future. This pressure comes from efforts to balance the budget, coupled with funding demands for such programs as Social Security, Medicare, and Medicaid. Consequently, there is likely to be

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limitations on all discretionary spending, including defense spending, for the long term.

This report addresses the availability of funding to support DOD's aircraft investment strategy as planned prior to the Quadrennial Defense Review, but does not address specific aircraft requirements. Our previous reports have questioned the need for and timing of a number of DOD's aircraft procurements. (A listing of prior reports is provided at the end of this report.)

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## Funding Needed for Aircraft Procurement Programs Will Exceed Historical Norms

DOD asserts that its aircraft modernization programs are affordable as planned. On June 27, 1996, DOD officials testified before House Subcommittees<sup>6</sup> that its overall aircraft investment plans were within historical norms and affordable within other service priorities. The officials further explained that the historical norms referred to were based on the aircraft funding experience of the early 1980s.

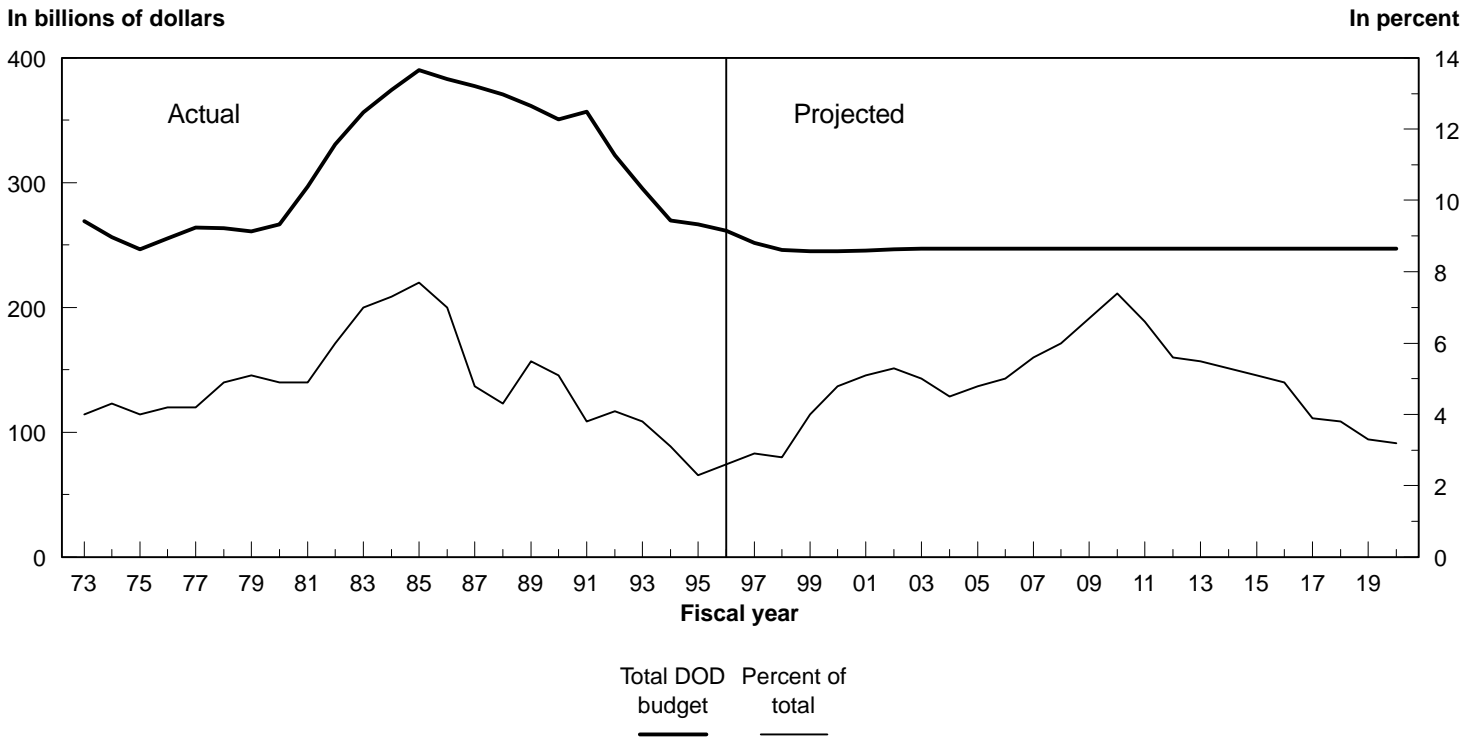
Our review indicated that using the early to mid-1980s, the peak Cold War defense spending years, as a historical norm for future aircraft investments is not realistic in today's budgetary and force structure environment. As shown in figure 1, DOD's overall appropriations, expressed in fiscal year 1997 dollars, have decreased significantly from their high point in fiscal year 1985, and the amounts appropriated in recent years are at, or near, the lowest point over the past 24 years.

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<sup>6</sup>Joint Statement of the Under Secretary of Defense for Acquisition and Technology and the Vice Chairman of the Joint Chiefs of Staff before the Subcommittee on Military Research and Development and the Subcommittee on Procurement of the House Committee on National Security—June 27, 1996.



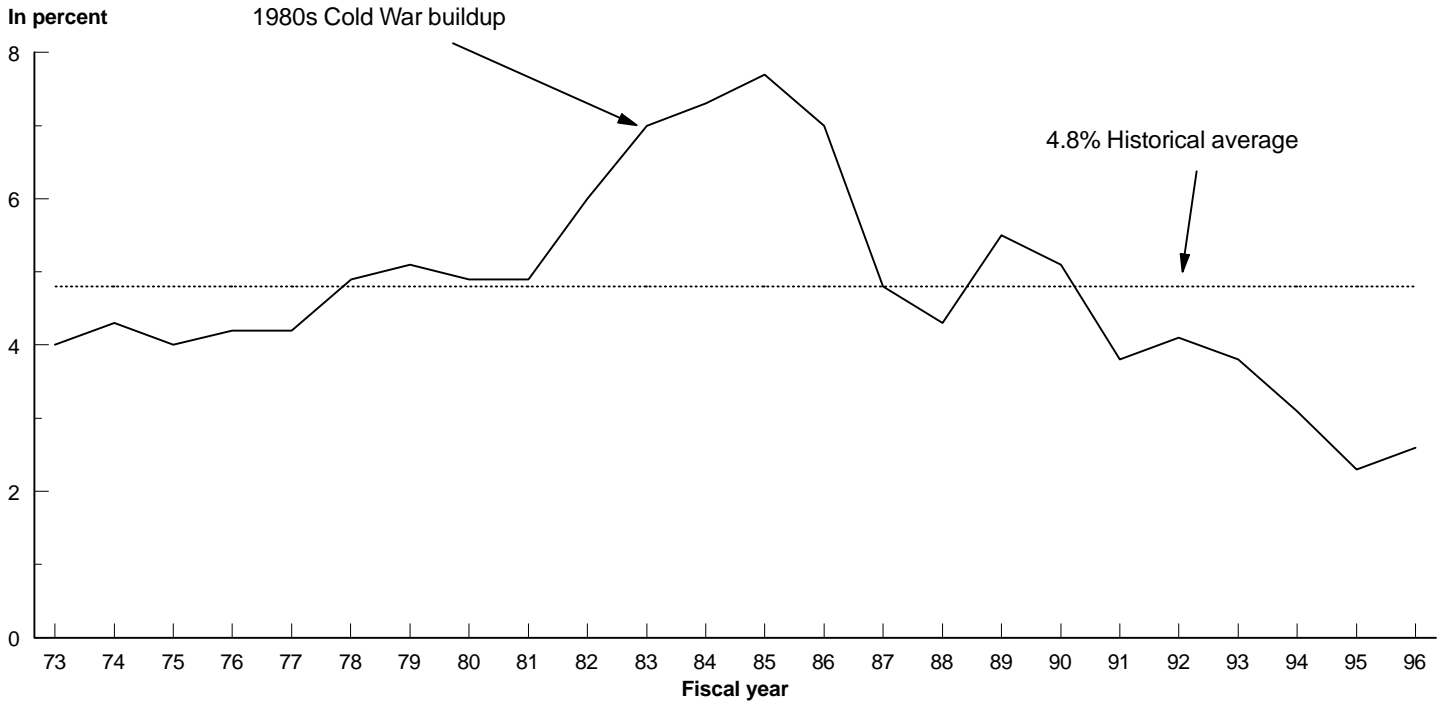
**Figure 1: Overall DOD Budget and Funding for Aircraft Purchases** (as a percentage of the overall DOD budget)



Source: Our analysis of DOD and CBO data.

As shown in figure 1, our review of aircraft procurement funding data from fiscal years 1973 through 1996, showed that funding for DOD’s aircraft purchases as a percentage of DOD’s overall budget fluctuated in relation to the changes in DOD’s overall budget. Funding for aircraft purchases increased significantly as DOD’s overall funding increased in the early 1980s and decreased sharply as the defense budget decreased in the late 1980s and early 1990s. In contrast, DOD’s planned aircraft investment strategy does not follow this pattern and calls for significantly increased funding for aircraft purchases during a period when DOD’s overall funding is expected to remain stable in real terms.

**Figure 2: Funding History for DOD's Aircraft Purchases as a Percentage of DOD's Overall Budget**



Source: Our analysis of DOD data.

Funding for DOD's aircraft purchases was at its highest point, both in dollar terms and as a percentage of the overall DOD budget, during the early to mid-1980s. Figure 2 shows the 24-year funding history for DOD's aircraft purchases from fiscal years 1973 through 1996. During that period, DOD spending on aircraft purchases fluctuated somewhat but averaged about 4.8 percent of the overall DOD budget. From fiscal years 1982 through 1986, DOD used from 6.0 percent to 7.7 percent of its overall annual funding on aircraft purchases. In contrast, since fiscal year 1973, the next highest level of annual aircraft funding was 5.5 percent in fiscal year 1989 and, in 12

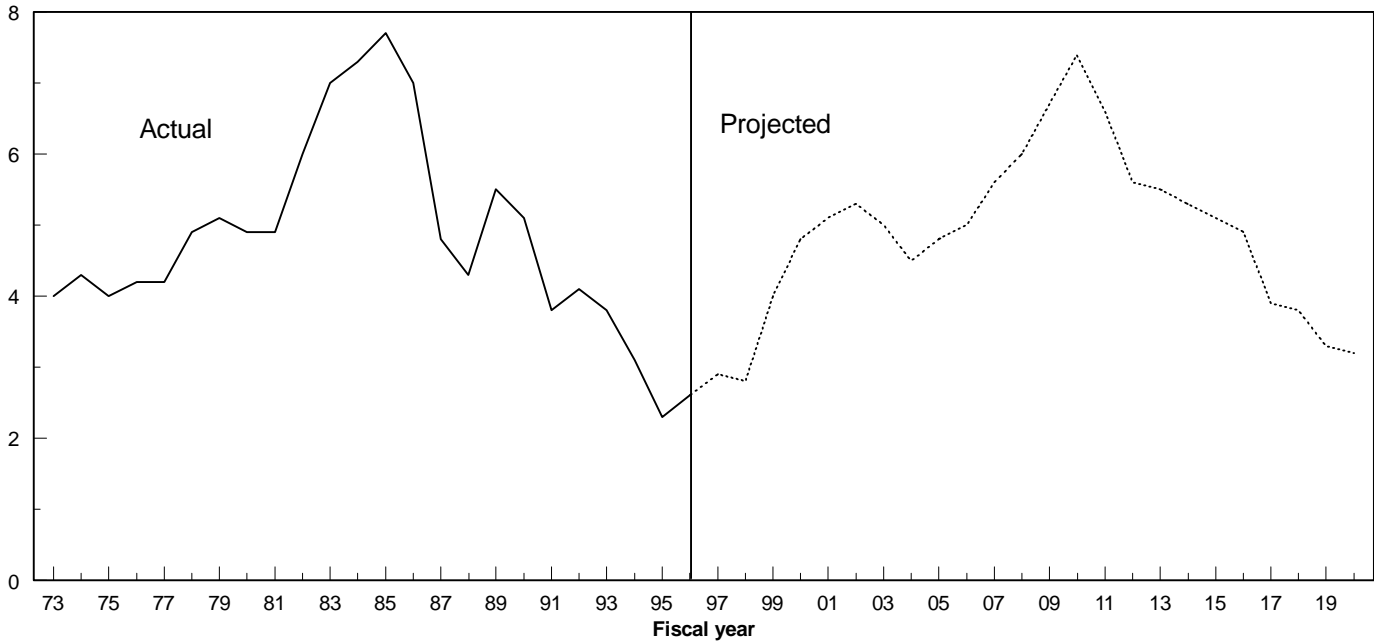
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other years, the funding was less than 4.5 percent of the overall DOD funding. Therefore, a long-term average would be more appropriate than early 1980's historical norms as a benchmark for an analysis of funding patterns, and its use would even out the high aircraft procurement funding of the early 1980s and the lower funding of the post-Vietnam and post-Cold War eras. However, such a benchmark should not be used as a threshold for spending on aircraft purchases because it may not reflect the changed nature of the defense requirements and U.S. strategy that occurred with the end of the Cold War.

If DOD's aircraft investment strategy is implemented as planned and the defense budget stabilizes at DOD's currently projected fiscal year 2003 level (about \$247 billion in constant fiscal year 1997 dollars), DOD's projected funding for aircraft purchases will exceed the historical average percentage of the defense budget for aircraft purchases in all but 1 year between fiscal year 2000 and 2015. For several years, it will approach the highest historical percentages of the defense budget for aircraft purchases. Those high percentages were attained during the peak Cold War spending of the early to mid-1980s.

**Figure 3: Historical Funding and Projected Funding Requirements for Aircraft Purchases as a Percentage of DOD's Overall Budget**

In percent



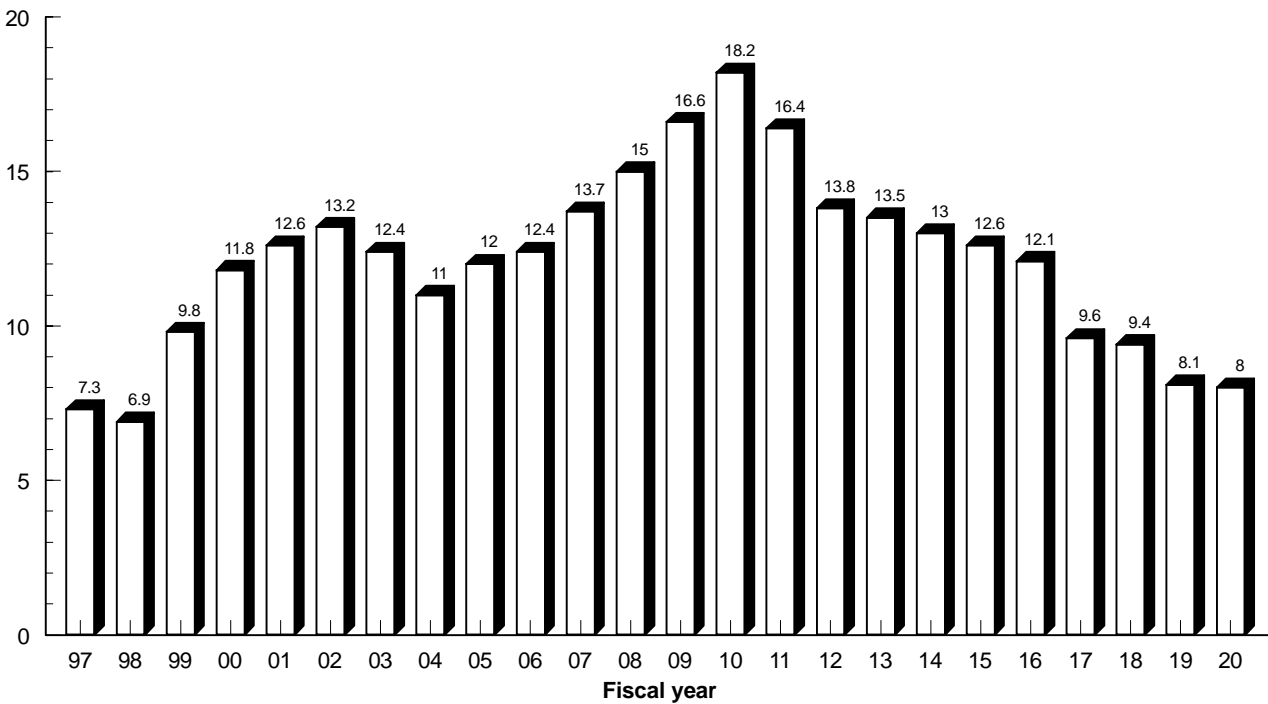
Source: Our analysis of DOD and CBO data.

In fiscal year 1996, DOD spent \$6.8 billion, or 2.6 percent of its overall budget, on aircraft purchases. To implement its aircraft investment strategy, DOD expects to increase its annual spending on aircraft purchases significantly from current levels and to sustain those higher levels for the indefinite future. For example, as shown in figure 4, DOD's annual spending on aircraft purchases is projected to increase about 94 percent from the fiscal year 1996 level to \$13.2 billion by fiscal year 2002. Also, for 15 of the next 20 fiscal years beginning in fiscal year 1997, DOD's projected spending for aircraft purchases is expected to equal or exceed \$11.9 billion

annually.<sup>7</sup> For 3 years during this period, DOD’s projected annual spending on aircraft purchases will exceed \$16 billion (6.5 percent of the budget) and for 1 of those years, it will exceed \$18 billion (7.3 percent of the budget).

**Figure 4: Projected Funding Requirements for DOD’s 17 Aircraft Programs (fiscal year 1997 dollars)**

In billions of dollars



Note: Funding for aircraft purchases seems to drop off after fiscal year 2010 because DOD has not yet approved additional programs for procurement. Several aircraft requirements are under consideration but have not yet been approved for procurement.

Source: Our analysis of (1) DOD’s program cost estimates, except the JSF program and (2) CBO’s JSF cost estimates based on DOD’s unit cost goals and unadjusted for cost growth.

<sup>7</sup>Applying the historical average spending level for aircraft—4.8 percent—to DOD’s fiscal year 2003 overall budget of \$247 billion equates to about \$11.9 billion.

In the current security and force structure environment, the need for that level of additional funding has not been made clear by DOD. Furthermore, other than stating that overall procurement funding in general will be increased, DOD has not identified specific reductions elsewhere within the procurement account or within the other major accounts to offset the significant proposed increases in aircraft procurement funding. Because the overall level of defense funding is expected to be stable, at best, any proposed increase in spending for a particular account or for a project will have to be offset elsewhere within the budget.

Historically, acquisition programs almost always cost more than originally projected. Figure 4 is a conservative projection of DOD's aircraft funding requirements because no cost growth beyond current estimates is considered. Research has shown that unanticipated cost growth has averaged at least 20 percent over the life of aircraft programs. For at least one current program, it appears the historical patterns will be repeated. In January 1997, DOD reported that the procurement cost of the F-22 was expected to increase by over 20 percent and devised significant initiatives to offset that growth. We reported about this potential cost growth in June 1997 and concluded that the initiatives to offset the cost growth were optimistic.<sup>8</sup>

In addition, the projected funding requirements shown in figures 3 and 4 may be understated because they do not include any projected funding for other aircraft programs that have not been approved for procurement. For example, potential requirements exist to replace the KC-135, C-5A, F-15E, F-117, EA-6B, S-3B, and other aircraft. Adding any of these requirements to DOD's aircraft investment strategy would further complicate the funding problems.

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## Funding for Increased Procurement Is Uncertain

The amount of funding likely to be available for national defense<sup>9</sup> in the near term has been projected by both the President and the Congress. Both have essentially agreed that the total national defense budget will not increase measurably in real terms through fiscal year 2002.

While the Congress has not expressed its sentiments regarding the defense budget beyond fiscal year 2002, last year DOD's long-term planning for its

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<sup>8</sup>Tactical Aircraft: Restructuring of the Air Force F-22 Fighter Program (GAO/NSIAD-97-156, June 4, 1997).

<sup>9</sup>The national defense budget includes the military activities of DOD, the atomic energy defense activities of the Department of Energy, and the defense-related activities of other agencies.

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aircraft investment strategy assumed a real annual growth factor of 1 percent. Accordingly, procurement funding to accomplish the aircraft modernization programs was partially dependent on some level of real growth in the defense budget. However, because of commitments to balance the federal budget by both the President and the Congress, it appears likely that the defense budget will stabilize at current levels or decrease further, rather than increase as DOD's aircraft investment plans have assumed. According to DOD officials, the long-term planning now assumes no real growth in the defense budget. The impact of this change on DOD's aircraft programs is not yet clear.

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### Uncertain Savings Available for Additional Procurement

DOD plans to increase overall funding for procurement programs over the next few years, and the aircraft programs are expected to be a prime beneficiary of that increased funding. DOD expects to increase procurement spending to a level of approximately \$61.2 billion per year, from the current level of about \$44.3 billion per year, while keeping overall defense spending at current levels, at least through fiscal year 2002. Of the \$39.0 billion cumulative increase in procurement spending that is expected through fiscal year 2002, about \$17.7 billion is projected to be used for DOD's aircraft investment strategy.

To increase procurement funding while keeping overall defense spending at current levels, DOD anticipates major savings will be generated from infrastructure reductions and acquisition reform initiatives, as well as increased purchasing power through significantly lower inflation projections. We found, however, that there are unlikely to be sufficient savings available to offset DOD's projected procurement increases.

DOD's planned procurement funding increase was partially predicated on base closure savings of \$17.8 billion (then-year dollars) through fiscal year 2001, a component of infrastructure, and shifting this money to pay for additional procurement. In 1996, however, we found no significant net infrastructure savings between fiscal year 1996 and 2001 because the proportion of infrastructure in the DOD budgets was projected to remain relatively constant through fiscal year 2001. Therefore, through fiscal year 2001, DOD will have less funds available than expected for procurement from its infrastructure reform initiatives.

In addition, our ongoing evaluation of acquisition reform savings on major weapon systems suggests that the amount of such savings that will be available to increase procurement spending is uncertain. Our work shows

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that the savings from acquisition reform have been used by the very programs generating the savings to fund other needs. This raises concern as to whether the latest acquisition reform initiatives will provide savings to realize modernization objectives for other weapons systems within the time frames envisioned. Without the level of savings expected from infrastructure reductions and acquisition reform, DOD will face difficult choices in funding its modernization plans.

Finally, based on changes in future inflation factors, DOD calculated in its 1997 future years defense plan (FYDP) that its purchases of goods and services from fiscal years 1997 through 2002 would cost about \$34.7 billion (then-year dollars) less than it had planned in its 1996 FYDP.<sup>10</sup> The “inflation dividend” allowed DOD to include about \$19.5 billion in additional programs in fiscal years 1997-2001 and permitted the executive branch to reduce DOD’s projected funding by \$15.2 billion over the same time period. However, using different inflation estimates, CBO calculated the cost reduction at only \$10.3 billion, or \$24.4 billion less than DOD’s estimate. Because DOD’s projected funding was reduced by \$15.2 billion, CBO’s estimate indicates that DOD’s real purchasing power, rather than increasing, may be reduced by about \$5 billion. If true, then DOD may have to make adjustments in its programs.

We recently raised an issue on the Air Force’s F-22 air superiority fighter that further complicates the situation.<sup>11</sup> In estimating the cost to produce the F-22, the Air Force used an inflation rate of about 2.2 percent per year for all years after 1996. However, in agreeing to restructure the F-22 program to address the recently acknowledged \$15 billion (then-year dollars) program cost increase, the Air Force and its contractors used an inflation rate of 3.2 percent per year. Increasing the inflation rate by 1 percent added billions of dollars to the F-22 program’s estimated cost. We are concerned that the higher inflation rates could have a significant budgetary impact for other DOD acquisition programs. Similar increases on other major weapon programs would add billions of dollars to the amounts needed and further jeopardize DOD’s ability to fund its modernization plans.

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<sup>10</sup>Future Years Defense Program: Lower Inflation Outlook Was Most Significant Change From 1996 to 1997 Program (GAO/NSIAD-97-36, Dec. 12, 1996).

<sup>11</sup>F-22 Restructuring (GAO/NSIAD-97-100R, Feb. 28, 1997).



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## Program Instability Causes Schedule Stretchouts and Higher Unit Costs

The basis for DOD's projections of total annual procurement funding is the cumulative annual funding needs of multiple weapons programs, each of which has typically been based on optimistic assumptions about procurement quantities and rates. Accordingly, DOD's projections of total annual procurement funding have been consistently optimistic. DOD's traditional approach to managing affordability problems is to reduce procurement quantities and extend production schedules without eliminating programs. Such actions normally result in significantly increased system procurement costs and delayed deliveries to operational units.

We recently reported that the costs for 17 of 22 full-rate production systems we reviewed increased by \$10 billion (fiscal year 1996 dollars) beyond original estimates through fiscal year 1996 due to stretching out the completion of the weapons' production.<sup>12</sup> We found that DOD had inappropriately placed a high priority on buying large numbers of untested weapons during low-rate initial production to ensure commitment to new programs and thus had to cut by more than half its planned full-rate production for many weapons that had already been tested. We also found that actual production rates were, on average, less than half of originally planned rates. Primarily because of funding limitations, DOD has reduced the annual full-rate production for 17 of the 22 proven weapons reviewed, stretching out the completion of the weapons' production an average of 8 years (or 170 percent) longer than planned. Our work showed that DOD develops weapon system acquisition strategies that are based on optimistic projections of funding that are rarely achieved. As a result, a significant number of DOD's weapon systems are not being procured at planned production rates, leading to program stretchouts and billions of dollars of increased costs. If DOD bought weapons at minimum rates during low-rate initial production, more funds would be available to buy proven weapons in full-rate production at more efficient rates and at lower costs.

If DOD's assumptions regarding future spending for its aircraft programs do not materialize, DOD may need to (1) reduce funding for some or all of the aircraft programs; (2) reduce funding for other procurement programs; (3) implement changes in infrastructure, operations, or other areas; or (4) increase overall defense funding. In other words, the likelihood of program stretchouts and significantly increased costs is very real.

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<sup>12</sup>Weapons Acquisition: Better Use of Limited DOD Acquisition Funding Would Reduce Costs (GAO/NSIAD-97-23, Feb. 13, 1997).

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## Conclusions and Recommendations

As the Nation proceeds into the 21st century faced with the prospect of a constrained budget, we believe DOD needs to take action now to address looming affordability problems with its aircraft investment strategy. Action needs to be taken now because, if major commitments are made to the initial procurement of all the planned aircraft programs (such as the F/A-18E/F, F-22, JSF, and the V-22) over the next several years, a significant imbalance is likely to result between funding requirements and available funding. Such imbalances have historically led to program stretchouts, higher unit costs, and delayed deliveries to operational units. Further, this imbalance may be long-term in nature, restricting DOD's ability to respond to other funding requirements.

DOD needs to reorient its aircraft investment strategy to recognize the reality of a constrained overall defense budget for the foreseeable future. Accordingly, instead of continuing to start aircraft procurement programs that are based on optimistic assumptions about available funds, DOD should determine how much procurement funding can realistically be expected and structure its aircraft investment strategy within those levels. DOD also needs to provide more concrete and lasting assurance that its aircraft procurement programs are not only militarily justified in the current security environment but clearly affordable as planned throughout their entire procurement. The key to ensuring the efficient production of systems is program stability. Understated cost estimates and overly optimistic funding assumptions result in too many programs chasing too few dollars.

We believe that bringing realism to DOD's acquisition plans will require very difficult decisions because programs will have to be terminated. While all involved may agree that there are too many programs chasing too few dollars, and could probably agree on the need to bring stability and executability to those programs that are pursued, it will be much more difficult to agree on which programs to cut. Nevertheless, the likelihood of continuing fiscal constraints and reduced national security threats should provide additional incentives for real progress in changing the structure and dominant culture of DOD's weapon system acquisition process.

Therefore, we recommend that the Secretary of Defense, in close consultation with the defense and budget committees of the Congress, define realistic, long-term projections of overall defense funding and, within those amounts, the portion of the annual procurement funding that can be expected to be made available to purchase new or significantly improved aircraft. In developing the projections, the Secretary should

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consider whether the historical average percentage of the total budget for aircraft purchases is appropriate in today's security and budgetary environment.

We also recommend that the Secretary reassess and report to the Congress on the overall affordability of DOD's aircraft investment strategy in light of the funding that is expected to be available. The Secretary should clearly identify the amount of funding required by source, including (1) any projected savings from infrastructure and acquisition reform initiatives and (2) any reductions elsewhere within the procurement account or within the other major accounts.

We further recommend that the Secretary fully consider the availability of long-term funding for any aircraft program before approving the procurement planned for that system.

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## Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD partially concurred with our recommendations and stated that it is fully aware of the investment challenge highlighted in this report. DOD stated that its recent Quadrennial Defense Review addressed the affordability of the modernization programs that it believes are needed to meet the requirements of the defense strategy. The Quadrennial Defense Review recommended reductions in aircraft procurement plans. However, even to modernize the slightly smaller force that will result from the Quadrennial Defense Review, DOD believes that procurement funding must also rise to about \$60 billion annually by fiscal year 2001, from about \$44 billion in fiscal year 1997. Recognizing that overall defense budgets are not likely to increase substantially for the foreseeable future, DOD indicated that the additional procurement funds would be created by continuing efforts to reduce the costs of defense infrastructure and to fundamentally reengineer its business practices.

Our recent reviews of DOD's previous initiatives to reduce the costs of defense infrastructure and reengineer business practices indicate that the amount and availability of savings from such initiatives may be substantially less than DOD has estimated. If the projected savings do not materialize as planned, or if estimates of the procurement costs of weapon systems prove to be too optimistic, DOD will need to rebalance the procurement plans to match the available resources. This action would likely result in further program adjustments and extensions.

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Concerning aircraft procurement projections, we continue to believe that a clearer understanding of DOD's long-term budgetary assumptions—including specific, realistic projections of funding availability and planned aircraft procurement spending—is necessary to determine the overall affordability of DOD's aircraft investment strategy. Without this information, neither DOD nor the Congress will have reasonable assurances that the long-term affordability of near-term procurement decisions has been adequately considered.

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## Scope and Methodology

We gathered, assembled, and analyzed historical data on the overall defense budget, the services' budget shares, the procurement budgets, and the aircraft procurement budgets. Much of this data was derived from DOD's historical FYDP databases. We did not establish the reliability of this data because the FYDP is the most comprehensive and continuous source of current and historical defense resource data. The FYDP is used extensively for analytical purposes and for making programming and budgeting decisions at all DOD management levels. In addition, we reviewed historical information and studies—ours, CBO, and others—on program financing and affordability. We also gathered, assembled, and analyzed DOD-generated data on its aircraft programs and supplemented that, where necessary, with data from CBO. We reviewed DOD's detailed positions on the affordability of its aircraft modernization programs, as presented to the Congress in a June 1996 hearing. We followed up with DOD and service officials on key aspects of that position.

Our analysis included tactical aircraft, bombers, transports, helicopters, other aircraft purchases and major aircraft modification programs. This approach removes any cyclical effects on the investment in aircraft by allowing us to view the overall amount invested, as well as the major subcomponents of that investment. We focused on procurement figures and excluded research and development costs because we could not forecast what development programs DOD will undertake over the course of the next 20 to 30 years. We used DOD's projections for the costs of these aircraft programs (except for the JSF costs, which are CBO projections based on DOD unit cost goals) and did not project cost increases, even though cost increases have occurred in almost all previous aircraft procurement programs. All dollar figures are in constant 1997 dollars, unless otherwise noted.

The National Defense Authorization Act for Fiscal Year 1997 required DOD to conduct a Quadrennial Defense Review. As part of the review, DOD

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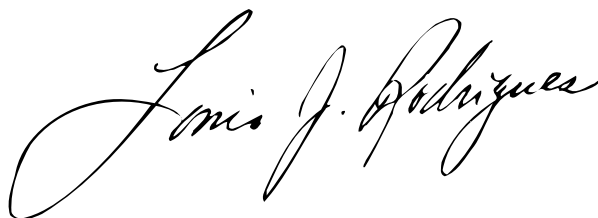
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We performed our work from March 1996 to July 1997 in accordance with generally accepted government auditing standards.

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As agreed with your offices, we plan no further distribution of this report until 30 days from its issue date unless you publicly announce its contents earlier. At that time, we will send copies to other congressional committees; the Secretaries of Defense, the Army, the Navy, and the Air Force; the Commandant of the Marine Corps; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others upon request.

Please contact me at (202) 512-4841 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix III.

A handwritten signature in black ink that reads "Louis J. Rodriguez". The signature is written in a cursive style with a large, looping initial "L".

Louis J. Rodriguez  
Director, Defense Acquisitions Issues

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## Abbreviations

CBO	Congressional Budget Office
DOD	Department of Defense
FYDP	future years defense plan
JSF	Joint Strike Fighter

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# Descriptions of Planned Aircraft Acquisitions

Aircraft	Description
AV-8B	<b>Marine Corps aircraft.</b> A single-piloted, light-attack, vertical/short take-off and landing aircraft used primarily for responsive close air support. This is a remanufacture program that converts older versions to the most recent production version and provides night fighting capability.
C-17	<b>Air Force aircraft.</b> A new production aircraft that modernizes the airlift fleet. It will augment the C-5, C-141, and C-130 aircraft; carry outside cargo into austere airfields; and introduce a direct deployment capability.
Comanche	<b>Army helicopter.</b> A new production, 24-hour, all-weather, survivable aerial reconnaissance helicopter to replace the AH-1, OH-6, and OH-58A/C helicopters and complement the AH-64 Apache. A little more than one-third of the total production aircraft will be equipped with Longbow capability.
C-130J	<b>Air Force aircraft.</b> A new production, medium-range, tactical airlift aircraft designed primarily for transport of cargo and personnel within a theater of operations. This model uses latest technology to reduce life-cycle costs and has more modern displays, digital avionics, computerized aircraft functions, fewer crew members, and improved cargo handling and delivery systems.
E-2C Hawkeye	<b>Navy aircraft.</b> A new production, all-weather, carrier-based airborne Combat Information Center providing tactical early warning, surveillance, intercept, search and rescue, communications relay, and strike and air traffic control.
E-3 AWACS Radar System Improvement Program	<b>Air Force aircraft.</b> A major modification to provide the Air Combat Command with new and improved capabilities for the AWACS radar. It involves both hardware and software changes to the AWACS.
F-22	<b>Air Force aircraft.</b> A new production, next-generation stealthy air superiority fighter with first-look, first-kill capability against multiple targets. It will replace the F-15C aircraft in the air superiority role.
F/A-18E/F	<b>Navy aircraft.</b> A new-production, major model upgrade to the F/A-18C/D multimission tactical aircraft for Navy fighter escort, interdiction, fleet air defense, and close-air support mission requirements. Planned enhancements over the F/A-18C/D include increased range, improved survivability, and improved carrier suitability. It will replace F/A-18C/D models, A-6, and F-14 aircraft.
H-1	<b>Marine Corps helicopter.</b> An upgrade to the Marine Corps AH-1W attack and UH-1N utility versions of this helicopter to convert both versions from 2-bladed to 4-bladed rotor systems and provide the attack version with fully integrated cockpits. The attack version provides close air support, anti-armor, armed escort, armed/visual reconnaissance and fire support coordination under day/night and adverse weather conditions. The utility version provides day/night and adverse weather command and control, combat assault support, and aeromedical evacuation.
Joint STARS	<b>Air Force and Army aircraft.</b> (Joint Surveillance Target Attack Radar System) A new production joint surveillance, battle management and targeting radar system on a modified E-8 aircraft that performs real time detection and tracking of enemy ground targets.
Joint Strike Fighter	<b>Air Force and Navy aircraft.</b> A new production, next-generation, multimission strike fighter. It will replace the Air Force's F-16 and A-10, the Marine Corps' AV-8B and F-18A/C/Ds, and be a "first-day survivable complement" to the Navy's F-18 C/D and E/F aircraft.

(continued)



**Appendix I  
Descriptions of Planned Aircraft  
Acquisitions**

<b>Aircraft</b>	<b>Description</b>
<b>JPATS</b>	<b>Air Force and Navy aircraft.</b> (Joint Primary Aircraft Training System) A new production joint training aircraft and ground based training system, including simulators, that replaces the Air Force T-37B trainer aircraft, Navy T-34C trainer aircraft, and their associated ground systems.
<b>Longbow Apache</b>	<b>Army helicopter.</b> A modification program to develop and provide weapons enhancements to the AH-64 Apache attack helicopter. The Longbow program will provide a fire-and-forget Hellfire missile capability to the AH-64 Apache helicopter that can operate in night, all-weather, and countermeasures environments.
<b>SH-60R</b>	<b>Navy helicopter.</b> A Block II weapon systems upgrade of the Navy version of the Army Black Hawk to enhance mission areas performance. It is a twin-engine medium lift, utility or assault helicopter performing anti-submarine warfare, search and rescue, anti-ship warfare, cargo lift, and special operations.
<b>T-45 Training System</b>	<b>Navy aircraft.</b> A strike pilot training system to replace the T-2C and TA-4J for strike and E2 and C2 pilots. It includes the T-45A aircraft, simulators, and training equipment and materials.
<b>UH-60L Black Hawk</b>	<b>Army helicopter.</b> A new production, twin-engine air assault, air cavalry, and aeromedical evacuation helicopter that transports up to 14 troops and equipment into battle. It continues to replace the UH-1H Iroquois helicopter.
<b>V-22</b>	<b>Navy, Marine Corps, and Air Force aircraft.</b> A new production, tilt-rotor, vertical take-off, and landing aircraft designed to provide amphibious and vertical assault capability to the Marine Corps and replace or supplement troop carrier and cargo helicopters in the Marines, the Air Force, and the Navy.

Source: DOD Selected Acquisition Reports.

# Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



**OFFICE OF THE UNDER SECRETARY OF DEFENSE**

3000 DEFENSE PENTAGON  
WASHINGTON DC 20301-3000



June 8, 1997

Mr. Louis J. Rodrigues  
Director, Defense Acquisition Issues  
National Security and International  
Affairs Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Rodrigues:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "AIRCRAFT ACQUISITION: DOD'S INVESTMENT STRATEGY MAY BE UNREALISTICALLY AMBITIOUS," dated May 7, 1997 (GAO CODE 707240), OSD Case 1352. The DoD has previously responded to the GAO reports referenced in the footnotes and appendix of this latest effort, and the Department comments contained in those reports remain valid.

The Department is fully aware of the investment challenge highlighted in the GAO report. The affordability of the Department's modernization program has been addressed in the recently-released Report of the Quadrennial Defense Review (QDR). The QDR included consideration of the fiscal environment in developing a program to meet the requirements of the defense strategy. Moreover, an important task of the QDR was to determine, on the basis of the strategy, where to make program adjustments that would improve the Department's financial posture.

Fulfilling a strategy of shaping the international environment, responding to the full spectrum of crises and aggression, and preparing now for the future require a substantial and ready force, together with a focused program of investments to improve the equipment those forces will employ. Although existing plans continue to project significantly increased funding for modernization, the Department's record of having to pay operating expenses out of funding planned for investment threatens the viability of those plans. Therefore a focus of the QDR was to build a solid financial foundation for a modernization program that could reliably support the future warfighting capabilities called for by the Joint Chiefs of Staff document *Joint Vision 2010*.

To modernize the force, the Department established a goal of increased procurement funding to roughly \$60 billion by FY 2001. The Chairman of the Joint



See comment 1.

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**Appendix II**  
**Comments From the Department of Defense**

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Chiefs of Staff affirmed that goal during preparation and presentation to Congress of the last two defense budgets. Although we have made some reductions in the modernization program as a result of the QDR, \$60 billion remains the rough level of procurement funding the Department believes is necessary to modernize even the slightly smaller force that will result from the QDR. On the path to that goal, the Department has established intermediate targets of \$49 billion in FY 1999 and \$54 billion in FY 2000 that will provide for a stable ramp-up to the \$60 billion target and preclude a procurement spike that could not be executed cost-effectively. Continuing efforts to reduce the costs of defense infrastructure, and to fundamentally reengineer our business practices will be needed to achieve those targets.

See comment 2.

The QDR review of tactical aircraft programs focused on the F-22 Raptor, the F/A-18E/F Super Hornet, and the Joint Strike Fighter (JSF). The Department assessed alternatives to the programs from the standpoint of both warfighting risk and acquisition cost. Termination of any of the three fighter programs was not considered prudent given the warfighting risk of such a decision and the significant adverse impact it would have on technology development and the defense industrial base. However, the Department also needed to balance such warfighting risk against the need to use scarce modernization funds prudently and to support acquisition program stability by planning for that which we can truly afford. Accordingly, the Department has reduced procurement quantities, and adjusted the ramp-up to full production of the F-22 and F/A-18E/F, and reduced the total procurement of the JSF.

See comment 3.

It should be noted that the Department has previously non-concurred with the GAO assertion that the F/A-18E/F "did not provide significant performance advantages over the less expensive C/D..." On the contrary, the F/A-18E/F has significantly greater range, carrier payload recovery capability, and survivability. It also will be able to function as a tanker for in-flight refueling. Further, as the Department has previously stated in response to GAO reports, the F/A-18E/F affords valuable growth capability and more payload flexibility to effectively employ the next generation of stand-off weapons.

See comment 4.

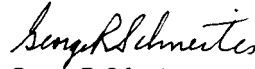
The Department continues to take issue with the conclusions in GAO reports "TACTICAL AIRCRAFT: Concurrency in Development and Production of F-22 Aircraft Should Be Reduced" (GAO/NSIAD-95-59, Apr 19, 1995) and "TACTICAL AIRCRAFT: F-15 Replacement is Premature as Currently Planned" (GAO/NSIAD-94-118, Mar 25, 1994). The F-22 schedule is neither too concurrent nor premature. The F-22 is an important program that will provide air dominance for future joint force commanders.

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**Appendix II**  
**Comments From the Department of Defense**

The Department appreciates the opportunity to comment on the draft report and includes specific comments in the enclosure.

Sincerely,



George R. Schneider  
Director  
Strategic and Tactical Systems

Enclosure

**Appendix II**  
**Comments From the Department of Defense**

GENERAL ACCOUNTING OFFICE DRAFT REPORT DATED MAY 7, 1997  
(GAO CODE 707240) OSD CASE 1352  
"AIRCRAFT ACQUISITION: DOD'S INVESTMENT STRATEGY MAY BE  
UNREALISTICALLY AMBITIOUS"

RECOMMENDATIONS

o RECOMMENDATION 1: The GAO recommended that the Secretary of Defense, in close consultation with the Defense and Budget committees of the Congress, define realistic, long-term projections of overall Defense funding and, within those amounts, the portion of the annual procurement funding that can be expected to be made available for the purchase of new or significantly improved aircraft. The GAO recommended that the Secretary, in developing the projections, consider whether the historical average percentage of the total budget for aircraft purchases is appropriate in today's security and budgetary environment. (p. 24/GAO Draft Report)

Now on p. 16.

DOD RESPONSE: Partially concur. The Quadrennial Defense Review addressed both near and longer-term affordability of all of the Department's modernization programs, including those for aircraft. Moreover, consistent with the existing budget process, the President submits a budget request to the Congress each year as well as a Future Years Defense Program (FYDP) containing a projection of needed defense resources and program plans for aircraft purchases. The Department's views regarding the appropriate use of longer-term projections in developing its near-term plans is provided in the response to recommendation 3.

See comment 2.

o RECOMMENDATION 2: The GAO also recommended that the Secretary of Defense reassess and report to the Congress on the overall affordability of DoD's aircraft investment strategy in light of the funding expected to be available. In addition, the GAO recommended that the Secretary clearly identify the amount of funding required by source, including (1) any projected savings from infrastructure and acquisition reform initiatives, and (2) any reductions elsewhere within the procurement account or within the other major accounts. (p. 24/GAO Draft Report)

Now on p. 17.

DOD RESPONSE: Partially concur. The Quadrennial Defense Review has essentially fulfilled this recommendation.

See comment 2.

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**Appendix II**  
**Comments From the Department of Defense**

Now on p. 17.

See comment 5.

o **RECOMMENDATION 3:** The GAO further recommended that the Secretary of Defense not approve any procurement funding for any aircraft program unless all of the projected funding to complete the planned acquisition is clearly available within long-term funding projections. (p. 24/GAO Draft Report)

**DOD RESPONSE:** Partially Concur. The Department agrees with the need to ensure that its programs are fully funded within the overall fiscal constraints used to develop the Future Years Defense Program (FYDP). DoD's acquisition and programming processes are designed to provide thorough and objective estimates of program costs before development and procurement decisions are made. These estimates are used to construct the plan displayed in the FYDP provided to the Congress each year in conjunction with the President's Budget.

The Department also uses a number of planning tools to assess the potential long-term tradeoffs between forces, acquisition programs, and defense resources implied by the current FYDP. For example, the long-term implications of the current tension between operating and support expenses and the resources available for modernization was an important consideration in the recently completed Quadrennial Defense Review. Based on analysis of the current FYDP and projections of its long-term consequences, the Secretary made a number of near- and long-term changes to the Department's forces and acquisition programs—including tactical aircraft—to mitigate both near- and long-term affordability problems. In addition to these actions, the Secretary determined that infrastructure reform—including base closures—is needed to ensure the viability of the Department's modernization plans beyond FY 2003.

Thus, the Department agrees that long-term projections can play a very useful role in informing near-term decisions on defense programs. It is the Department's view, however, that the uncertainties inherent in objective long-term planning—including the large set of potential programmatic tradeoffs available over a 12-to 18-year period—preclude its use for development of binding constraints to be applied to any particular element of the near-term defense program.

## GAO Comments

The following are our comments on the Department of Defense's (DOD) letter dated June 8, 1997.

1. Although the Quadrennial Defense Review report recommended that adjustments be made to the number of aircraft to be procured and the rates at which they are to be procured, the report projected that additional procurement funding would be made available through base closures and other initiatives to reduce defense infrastructure and reengineer business practices. The details of these initiatives are not expected to be available until the fiscal year 1999 budget is submitted to the Congress. At this time, the availability of savings from planned initiatives is not clearly evident.
2. The Quadrennial Defense Review does not provide sufficiently detailed projections to judge the affordability of DOD's new aircraft procurement plans by comparing the long-term funding expected to be available with the funding needed to fully implement those plans. We continue to believe that this type of long-term projection is needed by both DOD and the Congress to ensure that DOD's aircraft procurement programs are clearly affordable as planned through the span of procurement.
3. We continue to believe that the \$17 billion increased cost of procuring F/18-E/F aircraft compared to F/A-18C/Ds is not warranted by the limited increases in performance that would be obtained. We recognize that, while the F/A-18E/F will provide some improvements over the F/A-18C/D, most notably in range, the F/A-18C/D's current capabilities are adequate to accomplish its assigned missions. Our rebuttals to DOD's specific comment are contained in our report, Naval Aviation: F/A-18E/F Will Provide Marginal Operational Improvement at High Cost ([GAO/NSIAD-96-98](#), June 18, 1996).
4. Although procurement rates for F-22s during the planned low-rate initial production period were to be lowered in accordance with the Quadrennial Defense Review report, we continue to believe that the degree of overlap between development and production of the F-22 is high and that procurement of F-22s should be minimized until the aircraft demonstrates that it can successfully meet the established performance requirements during operational testing and evaluation. There has also been congressional concern about the cost and progress of the F-22 program. The Senate has initiated legislation to require us to review the F-22 development program annually.

5. We clarified the language in the report to more explicitly recommend that long-term projections of the availability of funds should be used as a guide to assess the likely availability of funds to carry out a program at the time of the procurement approval decision. The Quadrennial Defense Review recognized that more procurement dollars were being planned to be spent than were likely to be available over the long term. Our intent in making this recommendation is to recognize the difficulty DOD and the Congress face and to suggest some solid analysis that would aid in evaluating the long-term commitments that are inherent in nearer term decisions to procure weapon systems. A better understanding of the long-term budgetary assumptions underlying near-term decisions would clearly aid both DOD and the Congress in ensuring that needed weapon systems are affordable in both the near and long term.



# Major Contributors to This Report

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**Appendix III**  
**Major Contributors to This Report**

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# Related GAO Products

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Combat Air Power: Joint Assessment of Air Superiority Can Be Improved  
(GAO/NSIAD-97-77, Feb. 26, 1997).

B-2 Bomber: Status of Efforts to Acquire 21 Operational Aircraft  
(GAO/NSIAD-97-11, Oct. 22, 1996).

Air Force Bombers: Options to Retire or Restructure the Force Would Reduce Planned Spending (GAO/NSIAD-96-192, Sept. 30, 1996).

U.S. Combat Air Power: Aging Refueling Aircraft Are Costly to Maintain and Operate (GAO/NSIAD-96-160, Aug. 8, 1996).

Combat Air Power: Assessment of Joint Close Support Requirements and Capabilities Is Needed (GAO/NSIAD-96-45, June 28, 1996).

U.S. Combat Air Power: Reassessing Plans to Modernize Interdiction Capabilities Could Save Billions (GAO/NSIAD-96-72, May 13, 1996).

Combat Air Power: Funding Priority for Suppression of Enemy Air Defenses May Be Too Low (GAO/NSIAD-96-128, Apr. 10, 1996).

Navy Aviation: AV-8B Harrier Remanufacture Strategy Is Not the Most Cost-Effective Option (GAO/NSIAD-96-49, Feb. 27, 1996).

Future Years Defense Program: 1996 Program Is Considerably Different From the 1995 Program (GAO/NSIAD-95-213, Sept. 15, 1995).

Aircraft Requirements: Air Force and Navy Need to Establish Realistic Criteria for Backup Aircraft (GAO/NSIAD-95-180, Sept. 29, 1995).

Longbow Apache Helicopter: System Procurement Issues Need to Be Resolved (GAO/NSIAD-95-159, Aug. 24 1995).

Comanche Helicopter: Testing Needs to Be Completed Prior to Production Decisions (GAO/NSIAD-95-112, May 18, 1995).

Cruise Missiles: Proven Capability Should Affect Aircraft and Force Structure Requirements (GAO/NSIAD-95-116, Apr. 20, 1995).

Army Aviation: Modernization Strategy Needs to Be Reassessed  
(GAO/NSIAD-95-9, Nov. 21, 1994).

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**Related GAO Products**

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Future Years Defense Program: Optimistic Estimates Lead to Billions in Overprogramming ([GAO/NSIAD-94-210](#), July 29, 1994).

Continental Air Defense: A Dedicated Force Is No Longer Needed ([GAO/NSIAD-94-76](#), May 3, 1994).

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