United States General Accounting Office

GAO

Report to the Honorable John F. Tierney, House of Representatives

February 2003

TACTICAL AIRCRAFT

DOD Needs to Better Inform Congress about Implications of Continuing F/A-22 Cost Growth

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GAO-03-280

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Highlights

Highlights of GAO-03-280, a report to Representative John F. Tierney

Why GAO Did This Study

In 1991, the Air Force began developing the F/A-22 aircraft with advanced features to make it less detectable to adversaries and capable of high speeds for long distances. After a history of program cost increases, Congress limited the cost of F/A-22 production to $37.5 billion in 1997. Congress has remained interested in the potential cost of production. As requested, we (1) identified the latest production cost estimate and assessed the planned offsets from cost reduction plans, (2) identified areas where additional cost growth is likely to occur, and (3) determined the extent that DOD has informed Congress about production costs.

What GAO Recommends

GAO recommends that the Air Force fund production improvement programs at the planned level to maximize its potential for cost reductions. To help ensure proper congressional oversight, GAO recommends that DOD provide Congress with documentation (1) showing that the Air Force is funding production improvement programs as planned and (2) reflecting the potential cost of production if offsets are not achieved as planned and the aircraft quantity that can be procured with the cost limit. DOD did not concur with GAO's recommendations. GAO believes that DOD's position lessens the opportunity to create greater production efficiencies and better inform Congress.

www.gao.gov/cgi-bin/getrpt?GAO-03-280.

To view the full report, including the scope and methodology, click on the link above. For more information, contact Allen Li at (202) 512-4841.

What GAO Found

The Department of Defense (DOD) has identified about $18 billion in estimated production cost growth over the last 6 years. Even though the Air Force has designed cost reduction plans to offset a significant amount of this estimated cost growth, DOD still estimates that the cost of production will exceed the cost limit established by Congress in 1997. Furthermore, the Air Force has not fully funded certain cost reduction plans called production improvement programs (PIPs), and as a result, these PIPs may not achieve their estimated $3.7 billion in offsets to cost growth.

In addition to the cost growth estimated by DOD, GAO identified areas where, in the future, F/A-22 production cost growth is likely to occur. First, the Office of the Secretary of Defense's current production cost estimate does not include about $1.3 billion in costs that should be considered in future cost estimates. Second, schedule delays in developmental testing could delay the start of a multiyear contract designed to control costs. These delays could also result in additional costs owing to the expiration of an Air Force agreement with the contractor designed to help control production costs in fiscal year 2005. Last, other risk factors may increase future production costs, including the dependency of certain cost reduction plans on the availability of funding and a reduction in funding for support costs.

DOD has not fully informed Congress (1) about what the total cost of the production program could be if cost reduction plans do not offset cost growth as planned or (2) about the aircraft quantity that can be procured within the production cost limit. If the cost limit is maintained and estimated production costs continue to rise, the Air Force will likely have to procure fewer F/A-22s.

Source: U.S. Air Force.

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Abbreviations

DAB	Defense Acquisition Board
DOD	Department of Defense
GAO	General Accounting Office
OSD	Office of the Secretary of Defense
PIPs	production improvement programs

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GAO
Accountability * Integrity * Reliability

United States General Accounting Office
Washington, DC 20548

February 28, 2003

The Honorable John F. Tierney
House of Representatives

Dear Mr. Tierney:

The Air Force is developing the F/A-22 aircraft[1] with advanced features designed to allow it to be less detectable to adversaries, capable of high speeds for long ranges, and able to provide the pilot with improved awareness of the surrounding situation.[2] Development of the aircraft, which started in 1991, is expected to be completed in early 2004. The Air Force approved the start of low-rate production in August 2001.

Congress established a production cost limitation in the National Defense Authorization Act for Fiscal Year 1998[3] following a history of program cost increases. The limitation, which allows for inflation adjustments, is currently $37.5 billion.[4] The act does not specify the total number of aircraft to be procured for this amount. During a high-level review by the Department of Defense's (DOD) Defense Acquisition Board[5] in August 2001, the Department of Defense estimated that production program costs

[1]"F/A" stands for fighter/attack aircraft. The Air Force changed the designation from F-22 to F/A-22 in September 2002 to reflect the aircraft's air-to-surface attack capability.

[2]These features are expected to permit the F/A-22 to penetrate adversary airspace, operate with limited interference, and destroy targets on the ground as well as in the air.

[3]Section 217, P.L.105-85, Nov. 18, 1997.

[4]The cost limitation, before adjustment under the act's provisions, was $43.4 billion. The cost limitation does not include $1.575 billion associated with six aircraft labeled Production Representative Test Vehicles, which are excluded from the production cost limitation. Those aircraft are funded mostly with appropriations for research, development, test and evaluation as approved by Congress.

[5]A DOD senior–level forum for advising the Under Secretary of Defense (Acquisition, Technology and Logistics) on critical decisions concerning major weapon systems programs.

would be $43 billion[6] and therefore exceed the production cost limit of $37.5 billion.

As requested, we reviewed the Air Force's F/A-22 production program and the service's efforts to offset estimated production cost growth through various cost reduction plans. Specifically, we (1) identified the F/A-22's latest production cost estimate acknowledged by DOD, including an assessment of the planned offsets from cost reduction plans; (2) identified areas where additional cost growth is likely to occur; and (3) determined the extent to which DOD has informed Congress about the effect of not achieving cost reduction plans, particularly on the number of aircraft that can be procured within the existing production cost limit.

Results in Brief

DOD has identified about $18 billion in estimated production cost growth over the last 6 years. Even though the Air Force has designed cost reduction plans to offset a significant amount of this estimated cost growth, DOD still estimates that the cost of production will exceed the cost limit of $37.5 billion established by Congress in 1997. In addition, the Air Force has not fully funded certain cost reduction plans; therefore, these plans may not achieve their planned offsets to cost growth. For example, the Air Force has not been able to fully fund improvements to production processes. As a result, the Air Force may not be able to achieve the planned $3.7 billion in offsets from improvements to production processes.

In addition to the cost growth estimated by DOD, we identified areas where F/A-22 production cost growth is likely to occur in the future. First, the current Office of the Secretary of Defense's production cost estimate does not include about $1.3 billion in costs that should be considered in future cost estimates. Second, schedule delays in developmental testing could delay the award of a multiyear contract designed to help control production costs. As a result of schedule delays, the Air Force has already delayed the effective date of this contract to fiscal year 2006. Consequently, the aircraft planned for fiscal year 2005 will not be included in any agreements with the contractor designed to help control production costs. Last, several risk factors may increase future production costs,

[6]The F/A-22 President's Budget for fiscal year 2004 would transfer $876 million in production funding to help fund estimated cost increases in development. As a result, the current production cost estimate is $42.2 billion, an amount that still exceeds the cost limit of $37.5 billion.

including the dependency of certain cost reduction plans on the availability of funding and a reduction in funding for support costs.

DOD has not fully informed Congress about the potential cost of the production program if cost reduction plans do not offset cost growth as planned. Moreover, DOD has not informed Congress about the quantity of aircraft that can be procured within the existing production cost limit. If the production cost limit is maintained and estimated production costs continue to rise, the Air Force will likely have to procure fewer than the 276 planned F/A-22s.

We are providing recommendations aimed at improving the Air Force's implementation of cost reduction plans and enhancing congressional oversight of the F/A-22 program. In written comments on a draft of this report, DOD stated that it did not concur with our recommendations.

Background

The F/A-22 is an air superiority[8] aircraft with advanced features to make it less detectable to adversaries (stealth characteristics) and capable of high speeds for long ranges. It is being developed under contracts with Lockheed Martin Corporation for the aircraft and Pratt & Whitney Corporation for the engine.

Because of potential cost increases, the Air Force established a team—the Joint Estimating Team—to review the total estimated cost of the F/A-22 program in 1996. This team reported that the cost of the F/A-22 production program could grow by $13.1 billion from the amount planned. In response to identified cost growth, Congress, in the National Defense Authorization Act for Fiscal Year 1998 established cost limits for the development and production phases of the F/A-22 program. The current production cost limit is $37.5 billion.

In August 2001, during a review by DOD's Defense Acquisition Board (DAB), DOD estimated that the production program would cost $43 billion, or $5.4 billion more than the production cost limit. However, the two major parties involved in DAB, the Office of the Secretary of

[7]"Air superiority" is the degree of air dominance that allows the conduct of operations by land, sea, and air forces without prohibitive interference by enemy aircraft.

[8]P.L.105-85, Nov. 18, 1997. The cost limit is adjusted for inflation and for compliance with changes in federal, state, and local laws.

Defense (OSD) and the Air Force, disagreed over how many aircraft could be purchased for $43 billion. OSD believed that only 297 aircraft could be purchased for $43 billion while the Air Force believed 333 aircraft could be purchased for the same amount. DOD informed Congress of these divergent viewpoints in September 2001. The F/A-22 President's Budget for fiscal year 2004 would transfer $876 million in production funding and reduce the number of aircraft to 276 to help fund estimated cost increases in development. As a result, the current production cost estimate is $42.2 billion, an amount that still exceeds the cost limit of $37.5 billion.

To fully offset the $13.1 billion in estimated cost growth, the Air Force and contractors designed cost reduction plans. Since 1997, the Air Force has been identifying and implementing these plans. (See appendix IV for a list of the major categories of cost reduction plans designed to offset the cost growth estimated in 1997.) A direct relationship cannot be established between the cost reduction plans and specific areas of cost growth. The reason is that the plans generally offset cost growth in broad areas by enhancing production technology, improving manufacturing techniques, and improving acquisition practices.

F/A-22 cost reduction plans are categorized as either "implemented" or "not yet implemented." The Air Force's and contractors' criteria for determining if a cost reduction plan is implemented include whether

- the contractor has submitted a firm, fixed price proposal that recognizes the impact of the cost reduction;
- the impact of the reduction has been reflected in a current contract price or negotiated in an agreement; or
- the contractor has reduced the number of hours allocated to a task.

Currently, $14 billion in cost reduction plans is considered "implemented."

Cost reduction plans are categorized as "not yet implemented" if the plans are well defined but none of the criteria listed above are met. Table 3 in appendix II shows the amounts the Air Force currently considers "implemented" and "not yet implemented."

DOD's F/A-22 Estimated Production Costs Exceed Cost Limitation

Over the last 6 years, $17.7 billion in estimated production cost growth has been identified during the course of two program reviews. As a result, the estimated cost of the production program currently exceeds the congressional cost limit despite the establishment of cost reduction plans designed to offset a significant amount of this estimated cost growth. The effectiveness of these cost reduction plans has varied.

DOD's Estimates of Production Costs Have Risen

During a review in 1997, the Air Force estimated cost growth of $13.1 billion.[9] The major contributing factors to this cost growth were inflation, increased estimates of labor costs and materials associated with the airframe and engine, and engineering changes to the airframe and engine. These factors made up about 75 percent of the cost growth identified in 1997. (See appendix III for a complete list of cost growth categories identified in 1997.)

In August 2001, DOD estimated an additional $5.4 billion in cost growth for the production of the F/A-22, bringing total estimated production costs to $43 billion.[10] The major contributing factors to this cost growth were again due to increased labor costs and airframe and engine costs. These factors totaled almost 70 percent of the cost growth. According to program officials, major contractors' and suppliers' inability to achieve the expected reductions in labor costs throughout the building of the development and early production aircraft has been the primary reason for estimating this additional cost growth. (See appendix VI for a complete list of the categories and sources of cost growth identified in 2001.)

Cost Reduction Plans Achieve Varied Results

The effectiveness of cost reduction plans has varied. The Air Force was able to implement cost reduction plans and offset cost growth in the first four production lot contracts awarded.[11] Air Force projections for cost reduction plans show that expected offsets are also planned for the

[9]Based on a plan to procure 438 aircraft.

[10]The F/A-22 President's Budget for fiscal year 2004 would transfer $876 million in production funding to help fund estimated cost increases in development. As a result, the current production cost estimate is $42.2 billion.

[11]These four production lots include: Production Representative Test Vehicle lot 1—fiscal year 1999, Production Representative Test Vehicle lot 2—fiscal year 2000, lot 1—fiscal year 2001, and lot 2—fiscal year 2002. Future production lots are planned annually from fiscal year 2003 to fiscal year 2011.

future production lot contracts to enable the production program to be completed within the current production cost estimate. However, the Air Force has not fully funded production improvement programs (PIPs), which are designed to offset cost growth by improving production processes. Consequently, planned offsets may not be achieved in the amount expected.

Implemented Cost Reduction Plans Are Offsetting Cost Growth

The Air Force was able to implement cost reduction plans and offset cost growth in the first four production contracts awarded. The total offsets for these contracts slightly exceeded earlier projections by about $0.5 million. Table 1 compares previous planned offsets with implemented cost reduction plan offsets in the first four production contracts.

Table 1: Comparison of Planned versus Implemented Cost Reduction Plan Offsets for Awarded Production Contracts

Dollars in millions

Production lot	Planned offsets	Implemented offsets	Difference
Fiscal year 1999 (2 aircraft)	$199.0	$200.5	$1.5
Fiscal year 2000 (6 aircraft)	329.3	336.4	7.1
Fiscal year 2001 (10 aircraft)	580.2	611.1	30.9
Fiscal year 2002 (13 aircraft)	827.2	788.2	(39.0)
Total	**$1,935.7**	**$1,936.2**	**$0.5**

Source: U.S. Air Force.

Cost reduction plans exist but have not yet been implemented for subsequent production lots planned for fiscal years 2003 through 2010 because contracts for these production lots have not yet been awarded. If implemented successfully, the Air Force expects these cost reduction plans to achieve billions of dollars in offsets to estimated cost growth and allow the production program to be completed within the current production cost estimate of $43 billion.[12] However, as we noted earlier in this report, this amount exceeds the congressionally imposed production cost limit of $37.5 billion.

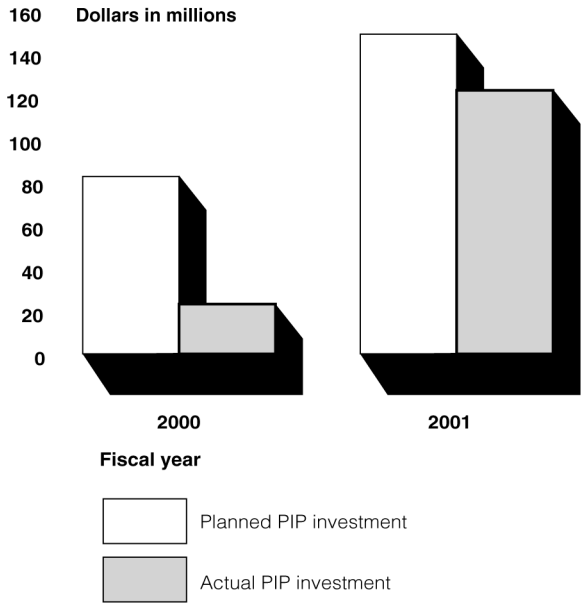
[12]The F/A-22 President's Budget for fiscal year 2004 would transfer $876 million in production funding to help fund estimated cost increases in development. As a result, the current production cost estimate is $42.2 billion.

Not Fully Funding Production Improvement Programs May Reduce Expected Offsets

A production improvement program is a type of cost reduction plan whereby the government must make an initial investment to realize savings. The earlier the Air Force implements PIPs, the greater the impact on the cost of production. Examples of PIPs previously implemented by the Air Force include manufacturing process improvements for avionics, improvements in the fabrication and assembly processes for the airframe, and the redesign of several components to enable lower production costs.

The Air Force reduced the funding available for investment in PIPs because of cost growth in production lots 1 and 2.[13] The Air Force subsequently used funding that it planned to invest in PIPs to cover the cost growth in production lots 1 and 2. As a result, there has not been as much funding available for investment in these PIPs as planned. Figure 1 shows that funding was reduced $61 million in fiscal year 2001 and $26 million in fiscal year 2002.

Figure 1: Planned versus Actual F/A-22 Production Improvement Program Investment for Production Lots 1 and 2

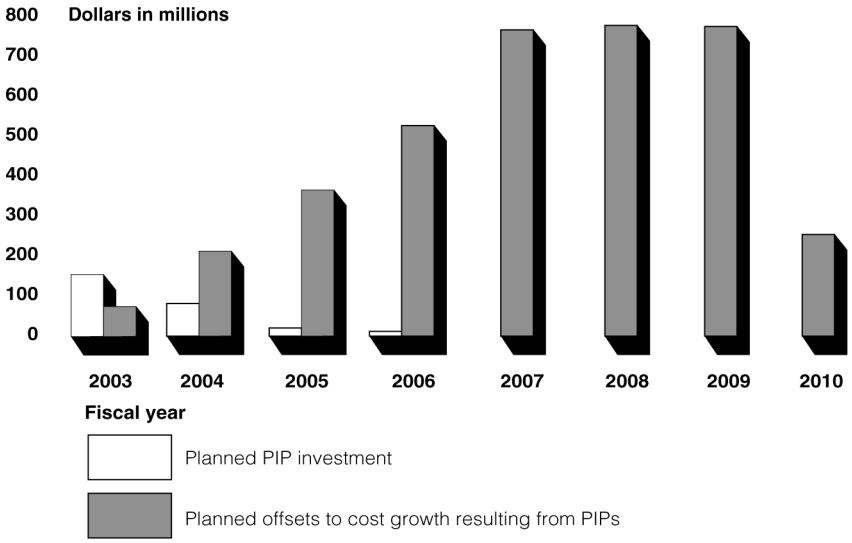


Source: U.S. Air Force.

[13]Production lot 1 was awarded in fiscal year 2001, and production lot 2 was awarded in fiscal year 2002.

It is unlikely that the Air Force will achieve the estimated $3.7 billion in cost growth offsets from the implementation of these PIPs if investment continues to be less than planned. Figure 2 shows the remaining planned investment in PIPs through fiscal year 2006 and the $3.7 billion in estimated cost growth that can potentially be offset through fiscal year 2010 if the Air Force invests as planned in these PIPs.

Figure 2: Planned Offsets to Cost Growth from Investing in and Implementing Production Improvement Programs



Source: U.S.Air Force.

In the past, Congress has been concerned about the Air Force's practice of requesting fiscal year funding for these PIPs but then using part of that funding for F/A-22 airframe cost increases. Recently, Congress directed the Air Force to submit a request if it plans to use PIP funds for an alternate purpose.

Estimated Production Costs Are Likely to Increase

We found indications that, in the future, F/A-22 production costs are likely to increase more than the latest $5.4 billion in cost growth recently estimated by the Air Force and OSD. First, the current OSD production estimate does not include all costs. Second, schedule delays in developmental testing could delay the start of a multiyear contract designed to help control production costs. Third, as a result of schedule delays that have already occurred, the Air Force has already delayed the awarding of this contract to fiscal year 2006. As a consequence, the aircraft

planned for fiscal year 2005 are not currently included in any agreements with the contractor that are designed to help control production costs. Last, we found several risk factors that may increase future production costs, including the dependency of certain cost reduction plans on congressional action and a reduction in funding for support costs.

Current OSD Production Cost Estimate Does Not Include All Costs

OSD's latest cost estimate does not include costs identified by the Air Force during the development of the Air Force's current F/A-22 acquisition plan. The Air Force developed this acquisition plan after OSD completed its estimate. Table 2 shows some areas of additional costs that the Air Force believes the program will incur.

Table 2: F/A-22's Production Cost Growth Not Included in OSD's Latest Estimate

Dollars in millions

Reason for cost growth	Cost growth
Delayed award of multiyear contract	$390
Inflation increases because new acquisition plan delays some early aircraft purchases	350
Decreased savings expected from Joint Strike Fighter program[a]	300
Change in avionics subcontractor	250
Total	**$1,290**

Source: GAO's analysis of Air Force and OSD Cost Analysis Improvement Group data.

[a]Resulting from changes in the prime contractor's accounting system and the calculation of overhead costs.

According to an OSD official, these additional costs should be considered in any future OSD production cost estimate, which would increase OSD's estimate by $1.29 billion.

Additional Program Delays May Further Delay Multiyear Procurement

If the F/A-22's developmental testing program experiences additional delays, there is a greater risk that operational testing, full-rate production, and multiyear procurement will be delayed as a result. Delays in production and multiyear procurement would likely increase production costs. The Air Force has not addressed ongoing problems with the developmental testing and therefore remains at high risk for further schedule delays.

For example, in March 2002, we reported that the Air Force's plan to complete the developmental airframe testing necessary for the start of operational testing was at high risk because (1) the planned number of test objectives per flight-hour was not being achieved and (2) most of the

planned flight-test program was essentially being performed by only one test aircraft rather than the three originally planned.[14] Air Force officials told us they understood that completing the tests as scheduled with only one development test aircraft was high risk. As a result of this strategy, in late 2001, the Air Force delayed the F/A-22's schedule, including the start of a multiyear contract designed to save production costs.

Acquisition Plan Contains Gap in Methods to Control Costs

The cost of the fiscal year 2005 production lot could increase because it is currently not included in plans to help control production costs. In late 1996, as part of a major program review, the Air Force and major F/A-22 contractors entered into a Target Price Curve agreement designed to help reduce production costs and ensure production affordability. The agreement established production cost goals for the first five production lots (fiscal years 1999-2003) and provided the contractors with incentives if they achieved these cost goals. Previously, the Air Force planned to transition directly to multiyear procurement starting with the next production lot. However, since the Air Force delayed the start of multiyear procurement from fiscal year 2004 to fiscal 2006, fiscal 2005 is now not covered by either the agreement with the contractor or the planned multiyear procurement contract. Therefore, there is less assurance that the cost of the fiscal year 2005 production lot will match the current estimate for this production lot. If a method to help control costs is not implemented for the fiscal year 2005 production lot, the cost of this production lot could increase more than expected.

Other Factors Could Increase Future Production Costs

We found several additional risk factors that may increase production costs in the future. As we have also previously reported, the Air Force is depending on both multiyear procurement and the Joint Strike Fighter initiatives to achieve offsets to estimated cost growth.[15] Multiyear procurement, because of the cost reductions available through long-term commitments such as a 5-year contract, make it possible for the contractors and subcontractors to charge lower prices for the aircraft being procured. Joint Strike Fighter-related savings are planned

[14]See U.S. General Accounting Office, *Tactical Aircraft: F-22 Delays Indicate Initial Production Rates Should Be Lower to Reduce Risks*, GAO-02-298 (Washington, D.C.: Mar. 5, 2002).

[15]See U.S. General Accounting Office, *Defense Acquisitions: Recent F-22 Production Cost Estimates Exceeded Congressional Limitation*, GAO/NSIAD-00-178 (Washington, D.C.: Aug. 15, 2000).

because the Air Force plans to use many of the same contractors and subcontractors as with the Joint Strike Fighter in the F/A-22 program, thereby lowering overhead rates and increasing buying power.

Even though the Air Force is depending on both the multiyear procurement and Joint Strike Fighter initiatives to achieve offsets to estimated cost growth, approval to proceed with multiyear procurement is determined from the availability of funding.[16] Thus, if entry into a multiyear procurement contract does not occur as planned, offsets from the implementation of multiyear procurement cannot be achieved. Similarly, the success of the Joint Strike Fighter cost reduction plan is dependent on the schedule of the Joint Strike Fighter program and the quantity of the aircraft procured, which are determined by Congress and OSD. In an earlier report, we cautioned that if the Joint Strike Fighter program were not approved or were delayed, then the F/A-22 production program would not achieve the estimated cost reductions.[17]

Furthermore, the Air Force reduced estimated funding for F/A-22 support costs by $1.8 billion in its latest production cost estimate. Support costs are for such items as spare components for the aircraft and engines, spare engines, and equipment used to support and maintain aircraft. F/A-22 program officials explained that the latest support costs estimate is a detailed, requirements-based estimate that is more accurate than previous estimates, but they could not provide us with the detailed rationale for this new estimate. At the same time, we also observed that the Air Force added about $1.8 billion to the estimated production costs associated with the aircraft and engine. If it is determined the F/A-22 program will require the same level of support cost funding identified by the Defense Acquisition Board's review, the production cost estimate will increase.

[16]Under 10 U.S.C. 2306b, a multiyear contract must meet specific criteria and be approved by Congress. The criteria must include the following: (1) the contract must result in substantial savings compared with the awarding of annual contracts, (2) the item being bought must have a stable design and not have excessive technical risks, and (3) the estimated cost of the system and the estimated cost avoidance from the multiyear procurement are to be realistic.

[17]See GAO/NSIAD-00-178.

DOD Has Not Fully Informed Congress about Potential Impact of Reduced Offsets to Estimated Cost Growth

DOD has not fully informed Congress about specifics related to the total cost of the F/A-22 production program or the quantity of aircraft that can be purchased within the cost limitation. DOD uses selected acquisition reports and the President's budget submissions to inform Congress about weapon systems programs.[18] Since 1999, neither the F/A-22 selected acquisition reports nor the President's annual budget submissions to Congress have included details about the amount of cost reduction plans identified to offset cost growth. More importantly, these documents have not included the potential cost of the F/A-22 production program if cost reduction plans do not offset cost growth as planned. From 1996 to 1998, selected acquisition reports did inform Congress about the potential cost of production if cost reduction plans did not offset cost growth as planned. If cost growth is not offset as planned, the cost of F/A-22 production could be several billion dollars higher than currently estimated.

Furthermore, recent documentation, including the latest selected acquisition report (December 2001) and Fiscal Year 2003 President's Budget submission have also not provided Congress with information about the quantity of aircraft DOD believes can be procured under the existing production cost limitation. Even though the production cost limitation remains, as adjusted, at $37.5 billion, the official documentation provided to Congress to date has not provided the number of aircraft that can be purchased for this amount. Even at the higher cost estimate of $43 billion,[19] OSD and the Air Force have not been able to agree on the aircraft quantity that can be purchased. In July 2001, we projected that the Air Force would have to buy 85 fewer F/A-22s rather than the 333 that it planned to buy to stay within the cost limit.[20]

Conclusions

Despite the success of early cost reduction plans, we identified estimated cost growth beyond the amounts recognized by the Air Force and DOD.

[18]The U.S. Code (10 U.S.C. Sec. 2432) requires DOD-selected acquisition reports to report the status of all the costs of production, and the President's budgets are meant to do the same on an annual basis.

[19]The F/A-22 President's Budget for fiscal year 2004 would transfer $876 million in production funding to help fund estimated cost increases in development. As a result, the current production cost estimate is $42.2 billion, an amount that still exceeds the cost limit of $37.5 billion.

[20]See U.S. General Accounting Office, *Tactical Aircraft: Continuing Difficulty Keeping F-22 Production Costs Within the Congressional Limitation*, GAO-01-782 (Washington D.C.: July 16, 2001).

Therefore, it is important for the Air Force to take advantage of every opportunity to offset cost growth. PIPs can be an important mechanism for offsetting this cost growth. However, the Air Force is not investing funding as planned in F/A-22 PIPs designed to offset estimated cost growth. The failure to invest in PIPs at the planned level will likely not allow estimated cost growth to be offset as planned and therefore may affect the quantity of aircraft that can be acquired.

The F/A-22 production program has experienced a number of schedule delays and problems that have increased the estimated costs of a program that already requires a significant investment. DOD has not fully informed Congress about the amount of cost reduction plans identified to offset cost growth, the potential cost of production if cost reduction plans are not as effective as planned, or the quantity of aircraft that can be produced within the production cost limit. Congress would be able to utilize this information to help exercise proper program oversight.

Recommendations for Executive Action

For the Air Force to achieve planned offsets to estimated cost growth, we recommend that the Secretary of the Air Force make the funding of PIPs at the planned level a priority.

To ensure proper congressional oversight of the F/A-22 program, we also recommend that the Secretary of Defense provide Congress with documentation

- showing that funding for PIPs is being invested at the planned level each fiscal year, and if not, explaining the reasons why and the potential consequences of not fully investing and potentially not offsetting cost growth as planned;
- reflecting the potential cost of F/A-22 production if cost reduction plans do not offset cost growth as planned; and
- reflecting the quantity of aircraft DOD believes can be procured with the existing production cost limit.

Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD stated that it did not concur with either of our recommendations. Regarding our first recommendation on making investments in PIPs a priority, DOD said that while it believes that PIP investments in general are a good idea, the Department intends to implement PIPs on a case-by-case basis, using expected return-on-investment criteria. DOD also commented that our report does not provide evidence that investments in PIPs reduce costs.

Our recommendation that the Air Force make the funding of PIPs at the planned level a priority is based on evidence from both the Air Force and OSD that investment in PIPs at the planned level will generate a significant return-on-investment. In addition, during the course of our review, Air Force officials told us they planned to make up for not fully investing in PIPs during the last 2 fiscal years by investing more in subsequent years in order to achieve the planned savings. The Air Force's plan appears to recognize that it has moved beyond a case-by-case approach. Our recommendation would support such a plan. Finally, the reluctance to embrace PIPs in DOD's comments appears to be contrary to the position taken within the Department. The potential benefits of investing in PIPs continue to be highlighted in high-level F/A-22 meetings[21] and correspondence to Congress. A September 2001 letter to Congress from the Under Secretary of Defense for Acquisition, Technology and Logistics estimates that the quantity of F/A-22 aircraft will need to be reduced, but more aircraft can be procured if cost reduction plans (which include PIPs) prove more successful than OSD's estimates. We believe our recommendation to make the funding of PIPs at the planned level a priority puts DOD in a better position to enhance the affordability of the F/A-22. Conversely, by not funding PIPs at the planned level, DOD may lose opportunities to create greater production efficiencies and as a result, have to acquire fewer aircraft.

Regarding our second recommendation related to providing documentation to Congress on cost reduction plans, the implications of not investing in PIPs as planned, and the aircraft quantities that can be acquired within the existing production cost limit, DOD stated that our recommendation is inconsistent with its decision to use a "buy-to-budget" approach for the F/A-22 (buying the highest quantity of aircraft possible each year on the basis of appropriated funding each year). DOD also stated that providing this information to Congress would not provide a reliable projection of the number of aircraft possible because (1) there are other factors that affect cost and (2) the projected savings are uncertain and may not materialize as the estimator expects.

We continue to believe that the Secretary of Defense should provide Congress with this documentation. As we have discussed in this and

[21]PIPs were highlighted in the most recent F/A-22 Defense Acquisition Board meeting involving both Air Force and OSD officials.

several earlier reports,[22] we agree that there are indeed many factors that can cause F/A-22 production costs to rise. And, as we have also noted, projected offsets generated by PIPs and other cost reduction plans are uncertain and may not all materialize, even if investments are made as planned. Shifts in these realities are frequent and create a constantly changing picture of F/A-22 production costs, offsets, and aircraft quantities. This is particularly the case when PIP investments are not made as planned. Hence, it is important that updated and accurate information be regularly and routinely made available to Congress as the picture changes. DOD's argument that it is implementing a "buy-to-budget" approach makes our recommendation more compelling because aircraft quantities planned each fiscal year can change in the few months between when fiscal year funding is appropriated and when a production contract is negotiated with the prime contractor and awarded. Providing visibility to the projection of how many aircraft can be acquired within the cost limitation would enhance program oversight.

DOD has several extant reporting options that can be used to provide this information. A new report is not required. For example, DOD could return to its former practice of using annual selected acquisition reports to inform Congress about the potential cost of production if cost reduction plans do not offset cost growth as planned. This information was included in these reports from 1996 to 1998. In addition, the President's Budget submission could be used as a vehicle to provide Congress with updated information about the quantity of aircraft DOD believes can be acquired under the existing production cost limitation. Finally, requests to reprogram PIP investment funds could be expanded to include this information along with justification for PIP reprogramming.

Scope and Methodology

To identify the F/A-22 production cost growth, we examined documents related to the Joint Estimating Team's review completed in January 1997 and received clarification on some review conclusions from the F/A-22 program office. We also reviewed documentation and discussed with program officials the results of the 2001 F/A-22 Defense Acquisition Board's review that estimated $5.4 billion more in production cost growth.

[22]See U.S. General Accounting Office, *Tactical Aircraft: Continuing Difficulty Keeping F-22 Production Costs Within the Congressional Cost Limitation.* GAO-01-782 (Washington D.C.: July 16, 2001), and *Defense Acquisitions: Recent F-22 Production Cost Estimates Exceeded Congressional Limitation*, GAO/NSIAD-00-178 (Washington D.C.: Aug. 15, 2000).

To evaluate the planned effectiveness of cost reduction plans designed to offset production cost growth, we assessed the reliability of a contractor's and the Air Force's database on cost reduction plans to ensure that the data were complete, sufficient, and relevant to our work. We reviewed information from this database on implemented and not yet implemented cost reduction plans. We compared estimated cost reduction plan offsets from fiscal years 2000 and 2002 to determine current versus planned estimated offsets for F/A-22 production lots. We also analyzed cost information from the Air Force to determine the amount of planned and actual funding invested in PIPs designed to offset estimated cost growth by improving production processes.

To identify areas where additional production cost growth has occurred and may occur, we reviewed several aspects of the F/A-22 program that were likely to contribute to future cost growth. We examined previous and current OSD and Air Force production cost estimates, expected delays in the F/A-22 program's completion of operational testing, aircraft unit price estimates and controls, and funding for support costs.

To evaluate the degree to which DOD has informed Congress about the potential cost of F/A-22 production, we examined the content of recent official documentation (selected acquisition reports and President's budgets) provided to Congress and compared them with required content and content that would be expected considering the congressionally imposed F/A-22 production cost limitation.

In performing our work, we obtained information or interviewed officials from the Office of the Secretary of Defense, Washington D.C.; the F/A-22 Program Office, Wright-Patterson Air Force Base, Ohio; and the Defense Contract Management Agency, Marietta, Georgia. We performed our work from March 2002 through February 2003 in accordance with generally accepted government auditing standards.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from the date of this report. At that time, we will send copies to interested congressional committees; the Secretary of Defense; the Secretary of the Air Force; and the Director, Office of Management and Budget. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov.

Please contact me at (202) 512-4841 or Catherine Baltzell at (202) 512-8001 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix VII.

Sincerely yours,

Allen Li
Director
Acquisition and Sourcing Management

Appendix I: Comments from the Department of Defense

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

ACQUISITION, TECHNOLOGY AND LOGISTICS

24 JAN 2003

Mr. Allen Li
Director, Acquisition and Sourcing Management
U.S. General Accounting Office
441 G Street, NW
Washington, D.C. 20548

Dear Mr. Li:

This is the Department of Defense's (DoD) response to the General Accounting Office's Draft Report, GAO-03-280, "TACTICAL AIRCRAFT: F/A-22 Production Cost Growth Continues Despite Some Effective Offsetting Efforts," Dated December 13, 2002 (GAO Code 120128). The Department appreciates the opportunity to comment on the draft report.

The Under Secretary of Defense (Acquisition, Technology and Logistics) has targeted, and continues to address, cost control as a key oversight issue on the F/A-22 program. The GAO's report, however, fails to provide credible evidence that investments in Production Improvement Programs (PIPs) reduce costs. The Department intends to implement PIPs on a case-by-case basis, using expected return-on-investment criteria, rather than using a generalized formula that is not sufficient across the wide range of projects.

The GAO's report makes two recommendations. The Department does not concur with Recommendation 1 which requires the Secretary of the Air Force to make funding of the PIPs at the planned level a priority, because there is no evidence to support this recommendation, and its implementation, therefore, would not be prudent. Recommendation 2 requires the Secretary of Defense to provide documentation to Congress concerning investment in PIPs, and the consequences of any decision not to invest in PIPs. The Department does not concur with this recommendation because it would require the Secretary to submit redundant reports, since justification already is required as a part of a request to reprogram funds designated for PIPs.

The Department believes that focusing F/A-22 program cost management on the PIPs is too narrow. The absence of a measurable, direct cause-and-effect relationship between the PIP investments and production costs does not support the GAO's recommendations.

Detailed comments regarding the recommendation are enclosed. The Department is prepared to discuss these comments with you in more detail should you desire.

Sincerely,

for Glenn F. Lamartin
Director
Strategic and Tactical Systems

Enclosure

GENERAL ACCOUNTING OFFICE DRAFT REPORT
Dated December 13, 2002 (GAO-03-280/GAO Code 120128)

"TACTICAL AIRCRAFT: F/A-22 Production Cost Growth Continues Despite Some Effective Offsetting Efforts"

DEPARTMENT OF DEFENSE COMMENTS TO THE RECOMMENDATIONS

****

RECOMMENDATION 1: The GAO recommended that the Secretary of the Air Force make the funding of production improvement plans (PIPs) at the planned level a priority. (Draft Report/p. 19)

DOD RESPONSE: **Non Concur.** The Department believes that there is no evidence to support this recommendation. The future PIP-related cost savings of $3.7 billion appear to be based on a 15:1 return on investment (from the data presented in Figure 2, page 11). The specific source of these data is not provided. We believe that the PIP investments in general are a good idea, and they should be funded based upon expected return-on-investment criteria.

RECOMMENDATION 2: The GAO recommended that the Secretary of Defense provide documentation to Congress a) showing that funding for PIPs is being invested at the planned level each fiscal year, and if not, provide an explanation to Congress on the reasons why and the potential consequences, and b) reflecting both the potential cost of F/A-22 production if cost reduction plans do not offset cost growth as planned and the quantity of aircraft DOD believes can be procured with the existing production cost limit. (Draft Report/p. 19)

DOD RESPONSE: **Non Concur.** Part (a) of the recommendation would create redundant reporting requirements, given that the conferees from the appropriations committees, in the conference report regarding the Department of Defense Appropriations Act, 2003, directed the Air Force to submit a request for reprogramming to use PIP funds for alternate purposes (page 12 of the draft report). That request must include a justification for the Air force's decision not to use these funds for investments in PIPs. There is no reason that the Air Force and the Secretary of Defense should provide reports that contain essentially identical information. Part (b) of the recommendation is inconsistent with the Department's August 2001 decision to approve a "buy-to-budget" approach for F/A-22, and reflects the GAO's failure to recognize that other factors can cause costs to rise. Any report would, of necessity, be based on either the Air Force's or the contractor's projection of savings. However, this estimate would not provide a reliable projection of the number of aircraft possible because (a) there are other factors that impact cost such as: prime labor and materials costs, supplier pricing strategies, economic order quantities, and uncertainty of the F/A-22 development program, and (b) the projected savings are uncertain and may not materialize as the estimator expects.

Appendix II: Amounts Associated with Cost Reduction Plan Categories

F/A-22 cost reduction plans are categorized as either "implemented" or "not yet implemented." The Air Force and contractors' criteria for determining if a cost reduction plan is implemented include (1) whether the contractor has submitted a firm-fixed price proposal that recognizes the impact of the cost reduction, (2) whether the impact of the reduction has been reflected in a current contract price or negotiated in an agreement, or (3) whether the contractor has reduced the number of hours allocated to a task.

Cost reduction plans are categorized as "not yet implemented" if the plans are well defined but none of the criteria listed above are met.

Table 3: Current Amounts Associated with Cost Reduction Plan Categories

Dollars in billions	
Cost reduction plan category	**Amount**
Implemented	$14.0
Not yet implemented	13.3
Total	**$27.3**

Source: U.S. Air Force.

Appendix III: F/A-22 Estimated Production Cost Growth in 1997

Dollars in billions

Category of cost growth	Source of cost growth	Cost growth	Cost growth as a percentage
Inflation	Inflation	$5.8	43.3
Airframe labor and materials	Increased estimates of the cost of labor and materials	2.4	17.9
All categories	Increase in fee provided to contractor	1.1	8.2
Airframe and engine	Engineering changes to airframe and engine	1.8	13.4
Analysis and integration of components and training	Increased costs associated with analysis and integration of aircraft components	0.6	4.5
Defensive countermeasure and a classified program	Funding for defensive countermeasures and a classified program	0.6	4.5
Equipment provided to contractor by the government and equipment used to support the aircraft	Increased costs of equipment	0.4	3.0
Avionics	Increased cost associated with buying large quantities of parts that industry may not continue to produce	0.3	2.2
Aircraft utilities and subsystems	Increased estimate of the cost to produce aircraft utilities and subsystems	0.2	1.5
Contractor costs	Increased estimate of the cost of contractor support	0.1	0.7
Mission support requirements	Increased estimate for mission support requirements	0.1	0.7
Total cost growth (aircraft)		**13.4**	
Engine and materials	Not purchasing a training engine and outsourcing a wiring harness	(0.2)	
Net cost growth[a]		**$13.1[b]**	

Source: U.S. Air Force.

[a]Based on a plan to procure 438 aircraft.

[b]Does not add because of rounding.

Appendix IV: Cost Reduction Plan Categories and Planned Offsets to Estimated Cost Growth

Dollars in billions

Cost reduction plan category	Planned offsets to estimated cost growth	
	Dollar amount	Percentage
Lean manufacturing—Improving manufacturing processes and incorporating new technology	$9.1	33.7
Production improvement programs—Improving production processes	8.4	30.8
Acquisition reform—Applying performance-based contracting practices	0.5	2.9
Material efficiencies—Improving material procurement strategies	1.0	3.7
Diminishing manufacturing sources—Resolving obsolescence and diminishing sources issues	1.5	5.5
Production support—Defer or avoid government investment in depot maintenance capability	3.0	11.0
Multiyear procurement—Award a production contract for multiple years	2.2	8.1
Joint Strike Fighter—Manufacturing Joint Strike Fighter and F/A-22 components in the same plants	1.1	4.0
Strategic sourcing—Procurement initiatives to identify suppliers to reduce costs	0.3	
Additional learning—Various methods and process improvements	0.1	
Total	**$27.3**[a]	**100**[a]

Source: U.S. Air Force.

[a]Does not add because of rounding.

Appendix V: Estimated F/A-22 Production Cost Growth in 2001

Dollars in billions

Category of cost growth	Source of cost growth	Cost growth	Cost growth as a percentage
Airframe and engine	Increased estimated labor costs of prime contractors and subcontractors	$4.60	69
Inflation	Adjustments for inflation	0.95	14
Risk	Increased estimate for risk	0.50	8
Avionics	Change in contractor required revised cost estimate	0.25	4
Tools to produce airframe and engine	Increase in production rate required more tooling	0.20	3
Other government costs	Production of pilot helmet designed to help fire short-range missiles more effectively	0.14	2
Total cost growth		**$6.64**	**100**
Spare parts	Reassessment of quantity of spare parts needed	(0.80)[a]	
Production rate savings	Lowered production rate charges by using new accounting system	(0.30)[a]	
Cost reduction plans	Change is estimated offset amount	(0.13)[a]	
Net cost growth		**$5.40**[b]	

Source: U.S. Air Force.

[a]Expected offsets to estimated cost growth.

[b]Does not add because of rounding.

Appendix VI: Estimated Cost Reduction Plan Offsets for Future Production Lot Contracts

Dollars in billions	
Production lot	**Estimated offsets**
Lot 3 (fiscal year 2003)	$1.1
Lot 4 (fiscal year 2004)	1.5
Lot 5 (fiscal year 2005)	1.9
Lot 6 (fiscal year 2006)	2.5
Lot 7 (fiscal year 2007)	2.9
Lot 8 (fiscal year 2008)	2.8
Lot 9 (fiscal year 2009)	2.8
Lot 10 (fiscal year 2010)	1.7
Total	**$17.2**

Source: U.S. Air Force.

Appendix VII: GAO Staff Acknowledgments

Acknowledgments

Catherine Baltzell, Marvin Bonner, Edward Browning, Gary Middleton, Sameena Nooruddin, Robert Pelletier, and Don M. Springman made key contributions to this report.

Related GAO Products

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