F–22 COST CONTROLS: WILL PRODUCT COST SAVINGS MATERIALIZE?

HEARING

BEFORE THE

SUBCOMMITTEE ON NATIONAL SECURITY, VETERANS AFFAIRS, AND INTERNATIONAL RELATIONS

OF THE

COMMITTEE ON GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

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F–22 COST CONTROLS: WILL PRODUCT COST SAVINGS MATERIALIZE?

THURSDAY, JUNE 15, 2000

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON NATIONAL SECURITY, VETERANS AFFAIRS, AND INTERNATIONAL RELATIONS,
COMMITTEE ON GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m., in room 2154, Rayburn House Office Building, Hon. Christopher Shays (chairman of the subcommittee) presiding.

Present: Representatives Shays, Barr, Schakowsky, and Tierney.

Staff present: Lawrence J. Halloran, staff director and counsel; J. Vincent Chase, chief investigator; Jason M. Chung, clerk; Earley Green, minority assistant clerk; and David Rapallo, minority counsel.

Mr. SHAYS. Good morning. I'd like to call this hearing to order and to welcome our witnesses and our guests.

Last year, the Air Force's F–22 air superiority fighter encountered unexpected turbulence when House appropriators questioned the ability of the program to stay within congressional mandated caps on design and development costs. In December, we were assured those expenses were being rigorously monitored and successfully controlled.

But looming over the horizon even then were unacceptably high cost projections for the next more expensive phase of the program, aircraft production. So we asked the General Accounting Office [GAO], to evaluate cost production control plans being relied on to meet critical F–22 affordability goals. The results of their review indicate the Department of Defense [DOD], and the Air Force, and F–22 contractors, have made some progress, but have yet to tame the persistent cost growth that has long plagued the program.

GAO finds some planned cost control strategies unlikely to yield any real savings. According to DOD, $21 billion in cost reductions will be needed to keep F–22 production spending below the $37 billion ceiling. To achieve savings on that scale, hundreds of cost reduction plans have been formulated by F–22 airframe and engineer manufacturers. But assessments of the impact of those plans vary widely in both methodology and outcome.

One estimate by the Office of the Secretary of Defense concludes the program could exceed congressional production cost caps by more than $8 billion. The Air Force estimate conforms neatly with the cost cap, assuming almost complete success in trimming expenses, while pushing the risk of cost growth to the out years.

While reaching very different conclusions, the two estimates appear to share common flaws. Both include speculative savings and potential cost shifts. Significant savings are assumed for multi-year procurements that may not be approved. Additional savings are seen flowing from manufacturing efficiencies once the Joint Strike Fighter [JSF], begins production.

But Air Force support for the JSF may be waning. Savings attributed to contractor provided maintenance may only defer, not avoid, depot costs later in the program. Real savings are critical to the success of the Air Force's premier tactical air modernization effort. If high end estimates prove true and the program is to remain within budget, the total F–22 purchase would have to be reduced by 85 planes, nearly one-quarter of the planned production run of 339 aircraft. That would endanger the military utility and the fiscal viability of the F–22.

Our goal this morning is clearly understanding how the Air Force can achieve, not just plan, the ambitious F–22 production cost reduction program. Again, we welcome our witnesses and look forward to their testimony.

[The prepared statement of Hon. Christopher Shays follows:]

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Statement of Rep. Christopher Shays
June 15, 2000

Last year the Air Force's F-22 air superiority fighter encountered unexpected turbulence when House appropriators questioned the ability of the program to stay within congressionally mandated caps on design and development costs. In December, we were assured those expenses were being rigorously monitored and successfully controlled.

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But assessments of the impact of those plans vary widely in both methodology and outcome. One estimate by the Office of the Secretary of Defense concludes the program could exceed congressional production cost caps by more than $8 billion. The Air Force estimate conforms neatly with the cost cap, assuming almost complete success in trimming expenses while pushing the risk of cost growth to the out-years.

While reaching very different conclusions, the two estimates appear to share common flaws. Both include speculative savings and potential cost shifts. Significant savings are assumed from multi-year procurements that may not be approved. Additional savings are seen flowing from manufacturing efficiencies once the Joint Strike Fighter (JSF) begins production. But Air Force support for the JSF may be waning. Savings attributed to contractor-provided maintenance may only defer, not avoid, depot costs later in the program.

Real savings are critical to the success of the Air Force's premier tactical air modernization effort. If high-end estimates prove true, and the program is to remain within budget, the total F-22 purchase would have to be reduced by 85 planes, nearly one quarter of the planned production run of 339 aircraft. That would endanger the military utility and the fiscal viability of the F-22.

Our goal this morning is a clearer understanding how the Air Force can achieve, not just plan, the ambitious F-22 production cost reduction program.

We welcome our witnesses and look forward to their testimony.

Mr. SHAYS. We have testimony in our first panel from Mr. Allen Li, Associate Director, National Security and International Affairs Division, U.S. General Accounting Office, accompanied by Leonard Benson and Donald Springman, both senior evaluators of the same division of GAO.

Mr. Li, I'm going to swear you all in and then we're going to take your testimony.

If you would raise your right hands, please. Do you solemnly swear or affirm that the testimony you will give before this subcommittee will be the truth, the whole truth and nothing but the truth?

[Witnesses sworn.]

Mr. SHAYS. Note for the record that all three witnesses responded in the affirmative. And Mr. Li, it's very good to have you here.

STATEMENT OF ALLEN LI, ASSOCIATE DIRECTOR, DEFENSE ACQUISITIONS ISSUES, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION, U.S. GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY LEONARD L. BENSON, SENIOR EVALUATOR; AND DONALD SPRINGMAN, SENIOR EVALUATOR

Mr. LI. Thank you, sir.

Mr. Chairman and members of the subcommittee, I am pleased to be here today to discuss our ongoing work requested by the subcommittee on the impact of production cost reduction plans. With me today, as you said, are Leonard Benson and Donald Springman.

As you know, the F–22 is an air superiority aircraft being developed to replace the F–15. Development, which started in August 1991, is scheduled to be completed by August 2003. The Air Force plans to enter low rate initial production in December 2000.

Projections of higher production costs have been a source of concern for some time. In 1996, because of potential cost increases, the Air Force established the Joint Estimating Team [JET], to review the total estimated costs of the F–22 program. The JET concluded that the cost of production could grow substantially, but that cost reduction initiatives could be implemented to offset that cost growth.

The Congress has also weighed in on F–22 production costs. The 1998 National Defense Authorization Act limited the total cost of F–22 production. Most recent production cost estimates were completed by the Air Force and the Office of the Secretary of Defense in 1999. Both groups considered cost reduction initiatives, known as production cost reduction plans, in coming up with their estimate.

As you said, to date, hundreds of these plans have been identified by the airframe and engine contractors, with participation by the F–22 program office. These plans propose changes to business design processes and practices. Each plan must go through a series of analyses and meet specific criteria before it is considered to be implemented. For example, one criterion is that the impact of the reduction has been reflected in a current contract price by either the prime contractor or a supplier to the prime contractor.

At the subcommittee's request, we are now reviewing these production cost reduction plans. We are focusing on determining the status of cost reduction plans, including some plans not implemented, and comparing the 1999 estimates developed by the Air Force and the Office of the Secretary of Defense with the congressional cost limitation.

My statement today presents our preliminary observations. We plan to issue our final report later this summer.

Before I share our observations with you, the magnitude represented by these cost reduction plans should be put in perspective. A total of $21 billion has been identified to date. How big is that? Allocated equally over a planned procurement of 339 F–22 aircraft, a $21 billion cost reduction equates to about $62 million per copy.

In fiscal years 1996 through 1998, the Air Force paid an average unit cost of $46 million for an F–15. So I need not tell you how significant these cost reduction plans are.

I will make two points today. Point No. 1, implementing all cost reductions identified will be challenging. Of the total $21 billion identified, half of that amount is currently categorized as implemented. Transforming the other half will not be easy. Our review of 10 plans not yet implemented, indicates that achieving reductions from three of the plans would depend on decisions by the Office of the Secretary and/or the Congress. Therefore, implementation of these plans is beyond the Air Force's ability to control.

For example, one plan requires the Congress to approve a multi-year procurement of the F–22, which the airframe contractor estimates will reduce costs by about $1.5 billion. The contractor proposes that production be contracted for 5 years in advance, beginning in 2004. According to the plan, because of cost reductions available through long term commitments, such as the 5-year contract, the subcontractors and the contractor would accept lower prices for the aircraft being procured.

But a multi-year contract must meet specific criteria and be approved by the Congress. For example, the item being bought must have a stable design and not have excessive technical risks. Also, the estimated cost of the system and the estimated cost avoidance from the multi-year procurement must be realistic.

The Air Force plans to award a multi-year contract for fiscal year 2004 and will need congressional approval for a multi-year contract in fiscal year 2003 to support advance procurement funding. Since the F–22 development program is not scheduled to be over until August 2003, the potential exists that the F–22 program will not meet the multi-year procurement criteria by 2003.

Point No. 2. Both Office of the Secretary and Air Force cost estimators project that F–22 production costs have exceeded the congressional cost limitation. The two estimating groups did not use the same estimating methods and did not make the same assumptions about which plans were already implemented or about the cost reductions that could be achieved. For example, for plans not implemented, Air Force's estimating group allowed $10.2 billion for potential future cost reductions. Estimators from the Office of the Secretary allowed $6.1 billion.

After considering the potential of all the cost reduction plans, the Air Force estimated F–22 production costs at $40.8 billion and the

Office of the Secretary at $48.6 billion. Both estimates were based on the production of 339 aircraft.

The Office of the Secretary's estimate exceeded the Air Force's by $7.8 billion, or 19 percent. The difference is due to the Office's higher estimates of the cost of production and lower estimates of the impact of plans not implemented. The Office of the Secretary estimate exceeded the congressional cost limitation by about $8.8 billion.

Let me put this estimate in perspective. Assume that the Office of the Secretary estimate is correct, and additional cost reduction plans are not developed and implemented. If this happens, the Air Force would have to buy on the order of about 85 fewer F–22s to stay within the congressional cost limitation. I should note that although Air Force cost estimators projected a total of $40.8 billion in production costs, the official Air Force cost position is $39.8 billion, the same as the congressional cost limitation.

The Air Force officials said that the Air Force selected the lower figure as its official cost estimate because the difference between the estimate and the budget is primarily associated with the years after 2005. They also said that their estimate of $40.8 billion has a 50 percent probability. That means that there is as much likelihood for the actual cost to be higher as it is to be lower.

On the other hand, the official Air Force estimate of $39.8 billion, the one that matches the congressional cost limitation, has a confidence level of 33 percent. That means that it is twice as likely that the $39.8 billion estimate is understated.

Mr. Chairman, that concludes my statement. We'll be happy to respond to any questions you may have at this time.

[The prepared statement of Mr. Li follows:]

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform, House of Representatives

For Release on Delivery
Expected At
10:00 a.m.
Thursday,
June 15, 2000

DEFENSE ACQUISITIONS

Use of Cost Reduction Plans in Estimating F-22 Total Production Costs

Statement of Allen Li, Associate Director
Defense Acquisitions Issues
National Security and International Affairs Division

GAO/T-NSIAD-00-200

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss our ongoing work on the impact that production cost reduction plans are projected to have on the Air Force's F-22 Raptor Program.

The F-22 Raptor is an air superiority aircraft being developed to replace F15 fighter aircraft. Lockheed Martin Corporation and Pratt & Whitney Corporation are the contractors for the airframe and engine, respectively. Development, which started in 1991,is scheduled to be completed in August 2003. The Air Force plans to enter low-rate initial production in December 2000. Appendix I lists products we have issued that relate to the F-22 program.

Projections of higher production costs have been a source of concern for several years. In 1996, because of potential cost increases, the Air Force established a team--known as the Joint Estimating Team--to review the total estimated cost of the F-22 program. The team concluded that the cost of production could grow substantially from the amounts planned, but that cost reduction initiatives could be implemented to offset that cost growth. The Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics generally adopted the team's recommendations to change certain aspects of the program, as well as a plan to define and implement cost reduction initiatives. F-22 production costs were also discussed in the National Defense Authorization Act for Fiscal Year 1998 (P.L. 105-85, Nov. 18, 1997). That act limited the total cost of F-22 production but did not specify the total number of aircraft to be procured. The most recent production costs estimates were completed by the Air Force and the Office of the Secretary of Defense in 1999. Both of these estimates considered cost reduction initiatives known as production cost reduction plans. Hundreds of these plans—totaling $21 billion--had been identified by the airframe and engine contractors, with participation by the Air Force's F-22 program office.

At the Subcommittee's request, we are now reviewing the impact of the production cost reduction plans on F-22 costs, specifically focusing on (1) determining the status of cost reduction plans, including some plans not yet implemented and identifying Air Force procedures for reporting on the plans, and (2) comparing the 1999 cost estimates developed

by the Air Force and the Office of the Secretary of Defense with the congressional cost limitation. My statement today presents our preliminary observations.

RESULTS IN BRIEF

Of the total $21 billion in cost reductions identified by the F-22 contractors in their plans, about half of that amount is categorized as implemented and the other half as not yet implemented. Our review of 10 cost reduction plans not yet implemented indicates that achieving reductions from 3 of the plans will depend on decisions by the Office of the Secretary and/or the Congress; implementing these cost reduction plans is therefore beyond the Air Force's ability to control. In addition, one of the three plans--to delay establishing an Air Force depot maintenance capability for the F-22--may only defer the costs to future years. Also, one of the three plans, estimated to reduce costs by almost a half billion dollars, was so uncertain that neither the Office of the Secretary nor the Air Force considered it to be likely to achieve the cost reduction proposed.

Both Office of the Secretary and Air Force cost estimators projected F-22 production costs that exceeded the congressional cost limitation of $39.8 billion in effect at that time. In 1999, after considering the potential of all the cost reduction plans, the Air Force estimated F-22 production costs at $40.8 billion, and the Office of the Secretary of Defense estimated production costs at $48.6 billion. Both estimates were based on the production of 339 aircraft. The two estimating groups did not use the same estimating methods, nor did they make the same assumptions about which cost reduction plans were already implemented or about the cost reductions achievable from plans not yet implemented. For example, for cost reduction plans that were not yet implemented, the Air Force's estimating group allowed $10.2 billion (of the total estimate of $10.8 billion) for potential future cost reductions, and estimators from the Office of the Secretary allowed $6.1 billion. The Office of the Secretary's estimate exceeded the Air Force's estimate by $7.8 billion, or 19 percent. The difference is attributable to the Office's higher estimates of the cost of production ($3.7 billion) and lower estimates of the impact of production cost reduction plans not yet implemented ($4.1 billion). The Office of the Secretary cost estimates exceeded the

congressional cost limitation by about $ 8.8 billion. Putting the higher estimate in perspective, if the Office of the Secretary estimate is correct and additional cost reduction plans are not developed and implemented, we estimate that the Air Force would have to buy about 85 fewer F-22 aircraft than now planned to stay within the congressional cost limitation. Although Air Force cost estimators projected a total of$40.8 billion in production costs, the official Air Force cost position was $39.8 billion, the same as the congressional cost limitation. Air Force officials said that the Air Force selected the $39.8 billion as its official cost estimate because the detailed breakout of the estimate for fiscal years 2001 through 2005 was about the same as that budgeted for those years. They said the difference between the estimate and the budget is primarily associated with the estimate for years after 2005.

F-22 COST REDUCTION PLANS WORTH BILLIONS
HAVE NOT YET BEEN IMPLEMENTED AND SOME DEPEND
ON CONGRESSIONAL OR DEFENSE DEPARTMENT ACTION

In response to recommendations of the Joint Estimating Team, contractors and the F-22 program office proposed cost reduction plans to use enhanced production technology, improved manufacturing techniques, and revised acquisition principles to buy materials. These plans show changes to business design, processes, and practices to realize cost reductions. Cost reduction plans are categorized "implemented" if they meet one of several criteria such as the impact of the reduction being reflected in a current contract price. The estimated value of cost reduction plans is shown in table 1.

Table 1: Status of Contractors' Production Cost Reduction Plans

Then-year dollars in billions

Reason for reduction	Implemented	To be implemented	Total
Improve manufacturing processes and incorporate new technology	$2.7	$5.2	$7.9
Improve efficiency and reduce supplier costs	2.0	1.7	3.7
Resolve obsolescence and diminishing sources issues	1.3	.3	1.6
Improve material procurement strategies	.7	.3	1.0
Apply performance-based contracting practices	.5	0	.5
Defer or avoid government investment in depot maintenance capability	3.0	.3	3.3
Award production contracts for multiple years	0	1.8	1.8
Manufacture Joint Strike Fighter and F-22 components in the same plants	0	1.2	1.2
Totals	**$10.2**	**$10.8**	**$21.0**

Note: The F-22 program office provided input to the contractors' plans.

Source: F-22 program office data.

As shown in table 1, about half of the estimated value of the identified cost reduction plans are categorized as implemented. Allocated equally over a planned procurement of 339 F-22 aircraft, a $21-billion cost reduction equates to about $62 million per F-22 to be produced. This amount of reduction per F-22, if achievable, is significant. For example, F15 aircraft, were procured in fiscal years 1996-98 at an average unit cost of about $46 million.

Implementation of Some Remaining Cost Reduction Plans Not Ensured

Achievement of reductions from 3 of the 10 plans not yet implemented that we reviewed will depend on decisions of the Office of the Secretary of Defense and/or the Congress. Thus, the Air Force cannot control implementation of the cost reduction plans.

One of the three plans estimates a cost reduction of about $2.6 billion and proposes that all F-22 depot-level maintenance be performed by the contractor until at least 2008. Under this proposal, the Air Force would not have to develop a capability to perform depot-level maintenance during production and would thus save production costs. Before this plan can be implemented, the Secretary of the Air Force must determine it conforms to 10 U.S.C. 2464, which describes the maintenance of a core logistics capability, and 10 U.S.C. 2466, which establishes a ceiling on contractor performance of depot maintenance.

This plan may only defer some costs until after completion of production. The plan states that its purpose is to reduce costs by delaying the establishment of government depot capabilities until the system matures, which is defined as accumulating 100,000 flying hours in fiscal year 2008. It also states that the contractor support concept will be implemented to reduce the required depot investment and that most of that expense to develop an Air Force capability will be deferred until about 2012. The last buy of F-22 production aircraft is scheduled for fiscal year 2011. The Air Force would decide at that time whether to fund the costs of an Air Force depot-maintenance capability with procurement or operation and maintenance appropriations. If these costs are deferred until after the F-22 production program is complete, they will no longer count against the congressional cost limitation.

Another cost reduction plan that is dependent on decisions by the Congress and the Office of the Secretary estimates that F-22 costs will be reduced by about $1.05 billion through lower overhead rates and increased buying power, since many of the same contractors and subcontractors that are building the F-22 will also build the Joint Strike Fighter. The Congress and the Office of the Secretary control the schedule and quantity of the Joint Strike Fighter aircraft. Therefore, this cost reduction is dependent on decisions being made on a program external to the F-22. If the Joint Strike Fighter program is not approved or is delayed, then the F-22 production program will not achieve the projected cost reductions.

The third cost reduction plan requires the Congress to approve the multiyear procurement of the F-22, which the airframe contractor estimates will reduce the cost of production by about $1.5 billion. The contractor proposes that production be contracted for 5 years in

advance, beginning in 2004. According to the plan, because of cost reductions available through long-term commitments such as a 5-year contract, the subcontractors and the contractor would accept lower prices for the aircraft being procured. A multiyear contract must meet specific criteria and be approved by the Congress. Specifically, the multiyear contract must result in substantial savings compared to awarding annual contracts, the item being bought must have a stable design and not have excessive technical risks, and the estimated cost of the system and the estimated cost avoidance from the multiyear procurement are realistic. The Air Force plans to award a multiyear contract for fiscal year 2004 contract and will need congressional approval for a multiyear contract in fiscal year 2003 to support advance procurement funding.[1] Since the F-22 development program is not scheduled for completion until August 2003, the potential exists that the F-22 program will not meet the multi-year procurement criteria by 2003.

Status of One Cost Reduction Plan Is Uncertain

Another cost reduction plan of uncertain status involves obtaining titanium sponge from the Defense Logistics Agency's National Defense Stockpile Center at no cost and providing it to the manufacturer instead of paying the manufacturer for the raw material. This plan is estimated to ultimately reduce the production cost of the F-22 by $458 million. It assumes that the cost of titanium sponge would be $3.00 per pound if purchased by the contractor and that about 30 million pounds would be needed. It further assumes that the funds not expended for titanium sponge, about $90 million, would be used to invest in additional cost reduction plans, and thus reduce the total cost by $458 million. Although the plan assumes that $4.00 to $5.00 in cost reductions will be achieved for each dollar invested, the contractor and the Air Force have not identified the specific projects in which the funds would be invested. This plan was not used to reduce estimated production costs by either cost estimators from the Office of the Secretary or the Air Force because of the uncertainty of congressional approval.

[1] The Air Force often requests advance procurement funding to initiate procurement of the long-lead time materials and effort needed to ensure that the delivery schedule can be met for aircraft that are to be procured in the next fiscal year.

Although this plan might reduce F-22 production costs, the cost to the government would not be reduced by that amount. If the National Defense Stockpile Center does not give titanium sponge to the F-22 program, it can sell it to the private sector and create income for its own fund. In fiscal year 1999 the Center's sales of titanium sponge averaged $1.94 per pound. Since the Air Force will need about 30 million pounds of titanium sponge for F-22 production, the lost revenue to the Center could be about $60 million ($1.94 per pound times 30 million pounds). Therefore, what may be significant cost reduction for the F-22 program could result in some lost revenue for the Defense Logistics Agency.

Individual Plans Tracked but
Regular Reporting Not Accomplished

The Air Force and airframe and engine contractors have established procedures to track the status of the production cost reduction plans. Both contractors have developed an information system that records the identified plans, the expected cost reduction from each of them, and their implementation status. The systems and the procedures were established to generate, evaluate and implement cost reduction plans. The Air Force and the contractors monitor the status of the plans using data from the system.

The Under Secretary of Defense for Acquisition, Technology, and Logistics requested the Air Force to report quarterly on the status of F-22 costs. However, Air Force quarterly reports to the Under Secretary have not included status information on cost reduction plans since June 1999. The data is available to make detailed reports. For example, the Air Force is able to categorize plans as implemented or yet to be implemented and to perform specific searches of the contractor's information system.

OFFICE OF THE SECRETARY AND
AIR FORCE ESTIMATES EXCEEDED
THE CONGRESSIONAL COST LIMITATION

The Air Force and Office of the Secretary cost estimating groups did not use the same methods to estimate the cost of F-22 production, nor did they use the same assumptions about which cost reduction plans were implemented or not yet implemented. After considering the potential cost reductions, both estimates exceeded the congressional cost limitation that was in effect at the time the estimates were prepared. However, the Air Force used the cost limitation as its cost position.

Differences Between the Air Force and the
Office of the Secretary Estimates

The two groups used different estimating methods, such as different assumptions regarding (1) production rates, (2) the impact of breaks in production, and (3) which historical data to use. These differences caused the Office of the Secretary estimate to be higher than the Air Force estimate for the following reasons:

- Air Force cost estimators assumed that the eight production representative test vehicles approved for purchase in fiscal years 1999 and 2000 would generally be produced as two lots of four aircraft each, based on the contractors' delivery schedules. Officeof the Secretary estimators assumed the contractors would produce the eight aircraft to fit their manufacturing schedules most efficiently.

- Air Force cost estimators assumed that as a result of a stop in production of some of the avionics items, the higher cost reductions normally experienced in manufacturing the early units would also occur on later units. Cost estimators from the Office of the Secretary did not assume the higher cost reductions would be experienced on the later units. As a result, the Air Force's estimate was significantly lower than the Office of the Secretary's estimate.

- The Air Force and the Office of the Secretary used different historical cost data to estimate the cost of the F-22 avionics. For example, the Air Force used experience on F/A-18 avionics and the Office of the Secretary used experience on multiple systems.

Different Allowances for Cost Reduction Plans Not Yet Implemented

The Air Force estimated that costs would be reduced by $10.2 billion as additional cost reduction plans were implemented, while the Office of the Secretary estimated it would achieve $6.1 billion in cost reductions. Among the reasons for the different amounts are that the estimators used different baselines from which to calculate a reduction, different estimated returns on funds invested to reduce costs, and different assumptions on the percent of reductions likely to occur by eliminating nonproductive steps. As a result of the differences, the Office of the Secretary allowed less for cost reductions than the Air Force.

According to Air Force officials, there were some differences because the two estimating groups used different assumptions about which plans were already implemented. For example, the Office of the Secretary considered about $1 billion in reductions associated with the Joint Strike Fighter and radar production as implemented. Because the Joint Strike Fighter has not been approved for production, the Air Force did not consider that cost reduction to have been implemented.

Comparison of Estimates With Congressional Limitation

As shown in table 2, the Air Force estimate was $40.8 billion after allowing for $10.2 billion of additional expected cost reductions that have not been implemented. The Office of the Secretary estimate was $48.6 billion after allowing $6.1 billion for additional cost reductions

that have not been implemented. Both of these estimates exceeded the cost limitation of $39.8 billion in effect at that time[2].

Table 2 Production Cost Estimates for the F-22

Then-year dollars in billions

Description	Office of the Secretary estimate	Air Force estimate	Difference
Cost estimate after considering cost reductions	$54.7	$51.0	$3.7
Allowance for cost reductions that have not been implemented	(6.1)	(10.2)	4.1
Net cost estimate	$48.6	$40.8	$7.8

Note: Parentheses indicate negative numbers.

Source: Office of the Secretary and Air Force data.

Consequently, as a result of the differences in estimating techniques and allowances for the cost reduction plans, the Office of the Secretary estimated the cost of the F-22 production program about $7.8 billion or 19 percent higher than the Air Force. Officials from the Office of the Secretary said they consider the 19 percent difference significant. We agree that the difference is significant. If the Office of the Secretary estimate is correct and additional cost reduction plans are not developed and implemented, the Air Force would have to buy about 85 fewer aircraft than are now planned to stay within the congressional cost limitation of $39.8 billion.

Air Force Selected Cost Limitation as Its Official Cost Position

Although the Air Force cost estimate was $40.8 billion, its official cost position is $39.8 billion, the same as the congressional cost limitation. According to Air Force officials, the Air Force would normally select an estimated cost that would provide an equal chance that the estimate was either higher or lower than the actual cost of the program. For the F-22

[2] In late 1999, the Air Force adjusted the cost limitation to $37.6 billion and revised the number of aircraft to be procured to 333 because 6 aircraft that were part of the production program will be procured as part of the

production cost estimate, that amount was $40.8 billion, which included about $1.2 billion for risk uncertainties. The Air Force, however, used $39.8 billion (the congressionalcost limitation amount) as its cost position, which, according to Air Force calculations, was twice as likely to be below the actual cost than above it. The Air Force said it selected the $39.8 billion as its cost position because the detailed breakout of the estimate by fiscal year was equal to or less than what the Air Force budgeted for fiscal years 2001 through 2005 and the estimate for the years beyond 2005 was more uncertain; that is, the further in the future the estimate is for, the less likely it is to be accurate. Therefore, rather than select an estimate that exceeds the cost limitation, the Air Force selected an estimate equal to the cost limitation.

Mr. Chairman, that concludes my statement. I will be happy to respond to any questions you other Members of the Subcommittee might have.

Contacts and Acknowledgments

For future questions regarding this testimony, please contact Allen Li, (202) 512-4841, or Robert Murphy, (937) 258-7904. Individuals making key contributions to this testimony include Mark Abraham, Leonard Benson, C. Todd Brannon, Edward Browning, and John Van Schaik.

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development program and thus are now subject to a separate cost limitation for F-22 development.

RELATED GAO PRODUCTS

Defense Acquisitions: Decisions on the Joint Strike Fighter Will Be Critical for Acquisition Reform (GAO/T-NSIAD-00-173, May 10, 2000).

Budget Issues: Budgetary Implications of Selected GAO Work for Fiscal Year 2001 (GAO/OCG-00-8, Mar. 31, 2000).

F-22 Aircraft: Development Cost Goal Achievable If Major Problems Are Avoided (GAO/NSIAD-00-68, Mar. 14, 2000).

Defense Acquisitions: Progress in Meeting F-22 Cost and Schedule Goals (GAO/T-NSIAD-00-58, Dec. 7, 1999).

Defense Acquisitions: Progress of the F-22 and F/A-18E/F Engineering and Manufacturing Development Programs (GAO/T-NSIAD-99-113, Mar. 17, 1999).

F-22 Aircraft: Issues in Achieving Engineering and Manufacturing Development Goals (GAO/NSIAD-99-55, Mar. 15, 1999).

F-22 Aircraft: Progress of the Engineering and Manufacturing Development Program (GAO/T-NSIAD-98-137, Mar. 25, 1998).

F-22 Aircraft: Progress in Achieving Engineering and Manufacturing Development Goals (GAO/NSIAD-98-67, Mar. 10, 1998).

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

Defense Aircraft Investments: Major Program Commitments Based on Optimistic Budget Projections (GAO/T-NSIAD-97-103, Mar. 5, 1997).

F-22 Restructuring (GAO/NSIAD-97-100BR, Feb. 28, 1997).

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Mr. SHAYS. I think what we'll do, Mr. Li, is just get rid of some housekeeping and go and vote and then come back. Mr. Tierney would like to make a statement maybe before we go, we'll do that too. But I'd first ask unanimous consent that all members of the subcommittee be permitted to place an opening statement in the record and that the record remain open for 3 days for that purpose.

Without objection, so ordered.

I ask further unanimous consent that all witnesses be permitted to include their written statement in the record, and without objection, so ordered.

Would the gentleman like to make an opening statement before we go vote?

Mr. TIERNEY. Yes, I would. I thank the Chair, and I apologize for my tardiness. I thank the witnesses for being here.

Chairman Shays, I want to thank you for your continuing efforts in this series of hearings on the F–22 aircraft program. Your leadership in this area obviously is appreciated, and I welcome the testimony of our witnesses here concerning the status of the F–22 and its costs and the attempt to control those costs.

I'd like to read a few lines from a statement that I believe is relevant to today's hearing. The quotation is, the broad question raised is whether the Air Force should be more realistic in terms of anticipating delays in construction, in subcontractor performance and in software development. Looking at the record for the past 10 years, it appears that the Air Force has consistently underestimated the length of delays and the increases in costs.

At some point, repeated upward adjustments cease to be unexpected. At some point, they reveal a strategy that is overly optimistic. As with any prioritization analysis, cost concerns for the F–22 program must inform the larger questions, such as the relevance of the F–22 program in light of the ongoing aircraft development programs.

Mr. Chairman, those are my own remarks that were made as part of the opening statement to this subcommittee's December 7, 1999 hearing on cost controls for the F–22. At that hearing, the Air Force responded by assuring us that cost control was a critical focus of the F–22 team. The Air Force Deputy Under Secretary Darleen Druyun estimated that the Air Force was on track to deliver the F–22 within the congressionally mandated cost cap of $39.8 billion.

Today, however, the General Accounting Office reports that the Air Force completed a revised production cost estimate later the same month as our hearing, last December. Apparently that new estimate indicated that production costs would be $1 billion over budget. Even worse, the GAO also reports that the Office of the Secretary of Defense completed its own production cost estimate, also last December.

This estimate predicted that production costs for the F–22 could exceed congressional cost caps by as much as $8.8 billion, almost $9 billion over budget.

Of course, I'm going to have questions later on about these two cost estimates and why they could possibly be so different. $1 billion compared to almost $9 billion is quite a wide range.

But I return to my original statement, that the Air Force has consistently underestimated cost increases in the F–22 program. On one hand, I want to commend the Air Force for initiating and implementing a wide range of cost reduction initiatives. These measures are forward thinking, they leverage initial investments today for savings throughout the life of the aircraft, and they can be utilized in various forms and other manufacturing lines.

On the other hand, however, I continue to have concerns when I hear about these cost saving initiatives. My first concern is that they do not address the fundamental problem with the Air Force being unable to control costs elsewhere. These reforms are new initiatives to streamline processes, to develop cheaper technologies and to utilize lean business practices. And I wholly endorse those efforts.

But they are not substitutes for more realistically estimating and more aggressively controlling other costs at the outset. Let's use an analogy. Suppose you're asked to go to the store to buy dinner, and you tell me it's going to cost $50. For some reason, the price of chicken keeps going up repeatedly. Instead of trying to determine why you're constantly underestimating the price of chicken, you go out and tell me how you're going to save money on milk. That seems to be what's going on here.

My second concern is that underlying costs are continuing to escalate despite cost reduction initiatives. We can gauge these increases by the amounts the Air Force is now trying to save through reform initiatives. In 1997, the JET team estimated that production costs would grow by as much as $13 billion. In an April 1999 letter to the subcommittee, the Deputy Under Secretary of Defense for Acquisition Reform stated that contractors were pursuing $16 billion in savings initiatives. Now GAO reports that the Air Force is hoping to save $21 billion through these initiatives and measures.

But these savings are not being transferred back to the taxpayer, at least as far as we can see. So they must be compensating for costs that are increasing elsewhere in the program. Every time we hear about a new increased savings estimate, we know these savings are paying for a new increased cost somewhere else.

Although I'm happy to listen today to the good news about cost saving initiatives and their progress, I sincerely hope that the Department of Defense and the Air Force will address the more fundamental problems with their inability to accurately predict or control the costs of the F–22 program.

Thank you, Mr. Chairman.

Mr. SHAYS. I thank the gentleman.

We've been joined by Mr. Barr. Mr. Barr, we're going to take questions afterwards, but you're a member of the full committee and very welcome to participate here. I don't know if you'd like to make a statement.

Mr. BARR. Thank you very much, Mr. Chairman, and I won't overstay my welcome. I know we also have a vote on the floor.

I would like to state for the record that Mr. Shays is an outstanding member of the full committee and a standing chairman of this subcommittee. He's a very fair man. He asks tough questions, I know that, that in every instance they are heartfelt, they are sin-

cere, and they are designed to get at very, very important information for his constituents, for people all across this land. And he is a very, very legitimate and appropriate watchdog for those things of which we are stewards for the public, and that is the public moneys and so forth.

So I appreciate very much your work in this area, Mr. Chairman. I appreciate the courtesy extended to me as the representative for the Seventh District of Georgia, in which is located the Lockheed Martin plant, which is the final assembly point for both the F–22 and the C–130J, two very important long term procurement programs involving the Air Force and our other services.

I would like, Mr. Chairman, to ask the courtesy of unanimous consent to include my full statement in the record.

Mr. SHAYS. Without objection, so ordered.

[The prepared statement of Hon. Bob Barr follows:]

STATEMENT BY
CONGRESSMAN BOB BARR (R-GA)
NATIONAL SECURITY, VETERANS AFFAIRS, AND INTERNATIONAL RELATIONS SUBCOMMITTEE OF THE HOUSE GOVERNMENT REFORM COMMITTEE
JUNE 15, 2000

Mr. Chairman, I appreciate you holding this hearing today, and I thank you for giving me the opportunity to set the record straight about the F-22 program.

As our nation's next generation air superiority fighter, the F-22 will replace the aging F-15 aircraft which was designed in the early 1970s. Defense experts stress the urgency in maintaining our capability to control the skies through air superiority; and the F-22 performs a vital role in maintaining air superiority in future conflicts. The F-22 program is currently meeting or exceeding all key technical and performance parameters and is demonstrating extraordinary performance in flight test. To date, developmental test is over 85% complete.

The Department of Defense Authorization and Appropriations Conference Reports for Fiscal Year 2000 (P.L. No. 106-65 and P.L. No. 106-79) established stringent criteria that must be accomplished before the F-22 can proceed into Low Rate Initial Production. The Office of the Secretary of Defense has mandated additional criteria as well. To my knowledge, no other Department of Defense program has been subjected to so much scrutiny.

At today's hearing, opponents will outline the Air Force's status in controlling the cost of the F-22. It seems that every time a major weapon system approaches production, misleading cost analyses are reported. They remind me of the old "chicken little parable". The F-22 program has not been exempt from such allegations. The reality, however, is that the F-22 program ***is*** performing within the congressionally mandated cost caps. As is a challenge in every major weapons production program, controlling cost is difficult; but

important. The Air Force and the Industry Team have been successful in identifying cost savings to offset the entire amount and still remain within the cost cap.

Other opponents of the program have gone as far as categorizing the F-22 as the most expensive jet fighter ever. This claim fails to take into account the effects of inflation. For example, opponents argue the cost to build an F-22 today is over 10 times more than the cost to build an F-15 in the late 1960s -- $83.6 million versus $8.2 million. However, a more realistic cost to build a new F-15 today would be $50 million to $75 million. Once the F-22 is in regular production, the cost to build an F-15 will be comparable. It is relatively easy to greatly inflate the unit cost of an F-22 by including the cost of design and development, but the majority of that money has already been spent. It is important that when comparing the F-22 to other fighters, we adjust these nominal amounts for inflation and not mislead the public about the real cost of the F-22 program.

The reality is the F-22 has been and is executing under the congressional cost cap and is not expected to exceed this cap. In fact, the cost savings from multi-year contracts is estimated at $1.5 billion and the Air Force continues to pursue additional cost reductions. I believe the F-22 procurement process continues to serve as a model of effective and efficient contractual reltionships between the Pentagon and the defense industry.

Most important, the F-22 is the only opportunity our nation has to ensure America's military continues to control the sky and the 21st century. There is no other American aircraft in production or anywhere near production, that can offer the insurance and protection our solider's and their families need.

Again, thank you for holding this hearing today, and allowing me to submit these comments for the record.

Mr. BARR. Thank you.

And I would like to say, Mr. Chairman, that my support of the F–22 and my support of your efforts to ensure that it is a weapon system that is as cost effective as possible in today's environment, I would like to say that it is not born out of the fact that the final assembly point for the plane is in my district. That certainly is of concern to me as a Representative.

But my support for the F–22 is born out of the simple fact that within a very short number of years that could be counted on one hand, our Nation's security forces, the men and women that we send overseas to support and defend our Nation's interests anywhere in the world will be put at risk. And the reason they will be put at risk is we will no longer, with the current F–15 configuration and the other aircraft that we have, be able to guarantee or even be assured of air superiority.

This is a cold, hard fact of the world. Other nations are moving forward with the development of air superiority aircraft. The F–15, a magnificent aircraft, can only be modified so much. It is reaching the end of its useful life. The F–22 is the next generation, the only generation of air superiority aircraft we have. It has been and will continue and should continue to be very vigorously evaluated, constantly evaluated.

But I am assured, and I believe, Mr. Chairman, very sincerely, after talking with administration officials, with industry officials, with other Members on both the House and the Senate side and with Air Force officials, that this plane is and will continue to meet the criteria set down for it, which is more rigorous than any other aircraft or weapons system in our Nation's history.

But I do commend you and thank you, Mr. Chairman, for the fairness with which you approach this. And hope that and anticipate that this very, very vital weapon system will move forward.

Mr. SHAYS. I thank the gentleman for his very gracious comments, and appreciate his presence.

Mr. BARR. Thank you.

Mr. SHAYS. We'll just recess and go vote, and be right back. I'm sorry, we have two votes, so it may take us 15 minutes or so. Thank you.

[Recess.]

Mr. SHAYS. We call this hearing to order.

And I'll start with some questions, and then we'll go to Mr. Tierney and Mr. Barr also probably has questions that he might like to ask.

The chart in your draft on costs that have already been, reductions that have already taken place, and those to be implemented, I'd like you to walk down each of the chart items and just in brief discuss them with me. So you have the floor to do that.

Mr. LI. There are several, in talking about the individual and the grouping of production cost reduction plans, what we did was we tried to cluster them in areas that people would understand. For example, in improving manufacturing processes and incorporating new technology, we're talking about situations here where the Government and the contractors would want to make some investment in their processes and provide up front money, so that they could achieve some savings later on.

Improving the efficiency and reducing supplier costs. In the current manufacturing process, many industries are going to something called lean manufacturing. In that process, they're trying to do time and motion analyses to make sure that they've gotten rid of all the inefficiency associated with the manufacturing process.

Another category that they've identified—that's going to be for a total $1.6 million—is to resolve some obsolescence and diminishing source issues. And this is an interesting issue, because one of the initiatives is one in which they want to replace the computer, the main part, the CIP, that's going to be the primary focal point of bringing in all the information. That particular processor is being redesigned, and that's what their CIP 2000 computer is all about.

Another one is improving material procurement strategies. And that is also another interesting area, because what they're trying to do is to make some efficiencies in the way that they acquire material. One of the PCRPs that I reviewed, for example, is one in which the different contractors and subcontractors would actually be buying the material at the same time, and thereby, they would be achieving efficiencies.

Another one is their application of performance-based contracting practices. That is one which is closely aligned to some of the definitions of acquisition reform, which I know the chairman has talked about many, many times. In this particular case, they are envisioning being able to have less of a reporting requirement. The contractor would not have to report and write reports back to the Air Force as many times as has been envisioned in the past.

To defer and to avoid Government investing in depot maintenance, that is a very large area of savings that they have projected. That is one in which they have decided not to have what they call an organic depot maintenance capability. The contractor, in essence, will be doing that.

And finally, the one that the chairman has mentioned himself in terms of the Joint Strike Fighter, there are some efficiencies that they envision that combine individual pieces and components and the overhead that would be associated with one of the winning vendors of the JSF, they are envisioning getting some efficiencies from that.

Mr. SHAYS. Briefly describe how we get, the Office of the Secretary estimates $48 billion and the Air Force estimates $40.8 billion in total costs. What contributes to the difference there?

Mr. LI. It's very difficult to be able to explain on a line by line basis. The best explanation that I can provide to you, Mr. Chairman, is the fact that when they made these estimates—and these estimates are made by professionals—they made different assumptions on different things. For example, some people feel that some things would not be achieved, some at not the same rate. On return on investment one of the groups estimated a higher amount than the other one.

When all those things are considered, that's how these differences come about. And I understand your concern and your question, that how can this happen, that there is this magnitude. And as Mr. Tierney mentioned, he is also concerned about this.

The best that I can answer that particular question is that it's the knowledge that you have with which to make that estimate,

you have to have good knowledge to do that. In our best practices work, we have found that the best commercial companies go into production with having a good knowledge of how much it's going to cost to build something. And I don't believe that we're at that point here. That's what this is pointing toward.

Mr. SHAYS. Just a simple answer, it's just based on different assumptions?

Mr. LI. That's part of it, sir.

Mr. SHAYS. I want you to be more specific.

Mr. LI. For example, the assumption that the return rate, the amount of money that you would invest in a production enhancement.

Mr. SHAYS. Let me just tell you what I'm wrestling with. First off, I think it's difficult to estimate the cost of any major undertaking like this. But since we are making the effort do that for obvious reasons, I just would like to feel a little more comfortable that two bodies that basically should be making generally similar assumptions are not. And I would think that there must be some major differences in assumptions that would account for a difference of 20 percent in the cost of the product.

Mr. LI. Let me give you another example, maybe this will help. When they estimated the cost of the avionics, one body, the Air Force, estimated and used historical data using the F–18 as their basis. The Office of the Secretary used a larger basis using several aircraft. Perhaps I gave you some detail that would help.

Mr. SHAYS. Let me ask you this way. Which cost estimate, the Air Force or the Secretary of Defense estimate do you consider more accurate?

Mr. LI. Again, this goes back to my initial point. I think only time will tell. I don't have that crystal ball that can say which one is better.

However, I can say this. I think the reason why we have this disparity of 19 percent between the two, in my personal opinion, is because we don't have the basis from which to make a good projection right now.

Mr. SHAYS. What would give you that basis?

Mr. LI. What would give me that better basis is if the processes were in better control, the statistical processes. I was mentioning before about private companies, what do they do before they launch into production. They have some processes under control, they know they can produce products consistently with the quality and the timeliness that they project. I don't believe we're at that point.

Mr. SHAYS. I'm going to yield the rest of my time to Mr. Tierney and I'm going to come back.

Mr. TIERNEY. Thank you.

We are talking about private companies. Who's making these things?

Mr. LI. I was talking about commercial practices, I'm sorry. I'm talking about commercial practices like the 777, producing a commercial product.

Mr. TIERNEY. Can you explain to me why these companies don't use those practices? Is it just because they've got an open checkbook here?

Mr. LI. No. In the work that we have done, and we have a body of work that we have completed in the past 2 years, in trying to talk about what are the best commercial, best practices in developing products. We have mentioned things, as the ones that I just talked about, which is not going and launching a production line before you have full knowledge of some of the details.

The issue that I'm raising is that also, in the work that we've done, we've talked about the barriers that DOD has in mimicking the same sort of commercial best practices. I'm giving DOD credit, they are recently, and they will be announcing a change to their procurement practices and their guidelines, in which they are going to be trying to alter and get better commercial practices within their process.

Mr. TIERNEY. And they're just getting to this point now, after how long?

Mr. LI. Well, yes, it does take a long time. But the incentives, and Mr. Tierney, you're well aware of this, the funding exigencies that occur are not an incentive for programs to be identifying problems. They're all competing for funds early on, and they're trying to do the best they can to say yes, this is a challenge, but we're going to come in at this particular price.

Mr. TIERNEY. I understand what you're saying. I'm a skeptic, I guess, on the whole process. My questions probably wouldn't get us much further along, except to say that it's beyond my comprehension that you can be 20 percent off and just at this date deciding some of your processes are wrong.

Mr. LI. I think perhaps, sir, that would be a good question to ask our witnesses from DOD and Air Force.

Mr. TIERNEY. You can bet it would be. We're talking now about the fact that you think there's going to be $8.8 billion over the congressional cap, right? And you base that on the $39.8 billion cap. But we look now that the cap has been adjusted to $37.6 billion, so if you base it on that, you're really kicking that estimate up to $11 billion over cost.

Mr. LI. Well, the difficulty in making that comparison, sir, is that the $37.6 billion was adjusted because some of the aircraft that were in the production phase are now being produced in the engineering and manufacturing development phase. So that was to compensate for that particular point.

Mr. TIERNEY. Really the only question that I hear, and you've pretty much answered it as far as you're able to go on this, is how can those costs get out of control. So a $40 billion production thing becomes a $60 billion production thing. And I think you've exhausted your analysis of that.

So I appreciate your comments. I'm frustrated with your answer, and I'm mindboggled how we get into this. There's a lot of questions you have about just the reason for even building this particular weapon. But when you start looking at these class configurations and the comparison and everything, it gets—and I just make the comment for no other reason than to get it off my chest, that here we go again with the national missile defense, of building something before we determine whether or not it can realistically be built.

I'll yield back to the chairman.

Mr. SHAYS. I think before going to Mr. Barr I just want to nail down some really simple stuff that I'm missing here. The $10.2 billion represents cost savings that are being implemented or will be implemented, in other words, explain to me implemented, to be implemented.

Mr. LI. Of course. In the total of $21 billion, that is what the contractor, in conjunction with the SPO, has identified as the whole universe of reduction plans.

Mr. SHAYS. Right.

Mr. LI. In that particular universe, when something is implemented, there are some criteria that have to be met in order to be implemented. If something is already reflected in the contract, if something has been submitted in terms of a contract, if some prices have already been reduced in getting the subcontractor to pay for things, selling things to the contractor, those are the criteria that must be met in the implemented category.

The things that are to be implemented——

Mr. SHAYS. Before you leave that, implemented doesn't mean that it's occurred yet, it just means it's a work in process, that they're on a plan to implement this.

Mr. LI. Yes. Len, can you please?

Mr. BENSON. It could be either. It could be some of the plans have actually been implemented, where the cost reductions have been reflected in firm fixed price contracts that they've got from either the supplier or the prime contractor. So they could be actually implemented.

Mr. SHAYS. Now, do both the Air Force and DOD accept the $10.2 billion figure?

Mr. BENSON. No.

Mr. SHAYS. Do they disagree? Whose numbers, these are the contractors' numbers. Where does the DOD disagree with these numbers on the implemented part, and where does the Air Force agree or disagree?

Mr. LI. We tried to get a definitive description and quantity amount of that $10.2 billion. The difficulty is that when each one of the estimators came up with their baseline, one considered, and one did not consider all of the ones that were identified as implemented within their baseline. And I know it's very complicated, and I'll ask Len again to explain that.

But the basic issue is that because the baselines, both from the Office of the Secretary of Defense and the Air Force, were different, they considered a different portion of those that were already implemented. Len.

Mr. BENSON. One of them that you talked about earlier is the Joint Strike Fighter. For example, on that one, the Office of the Secretary of Defense estimate assumed for estimating purposes that that was an implemented cost reduction plan. They just, one of their assumptions was that that's going to be——

Mr. SHAYS. Who did this, the Air Force?

Mr. BENSON. The Office of the Secretary of Defense assumed that that was an implemented recommendation.

Mr. SHAYS. On what basis could that make that?

Mr. BENSON. I can't speak for them. The Air Force, on the other hand, did not——

Mr. SHAYS. But under what criteria? I'm going to be willing to expose my ignorance more than I usually like to. But I'm having trouble first identifying whose chart this is. And is the chart that is up there, the reasons for reductions implemented, to be implemented, that is the contractor's chart. Is that your chart or the contractor's chart? Is it DOD's chart, is it the Air Force chart?

Mr. LI. It's a contractor identified split of all——

Mr. SHAYS. Well, why should this be helpful to me? Wouldn't I want to see two other charts? Wouldn't I want to see the Air Force's version of this chart and DOD's version of this chart?

Mr. BENSON. The Air Force provided this chart to us.

Mr. SHAYS. Does the Air Force accept this as the chart?

Mr. BENSON. This was the data the Air Force provided to us when we asked for information on cost reduction plans that had been implemented and those that remain to be implemented. So we had to assume since that was the data the Air Force provided that they were——

Mr. SHAYS. Is this the chart on which the Air Force bases their estimates?

Mr. BENSON. Yes.

Mr. SHAYS. OK. So the Air Force accepts this?

Mr. BENSON. Yes.

Mr. SHAYS. OK. So I'm going to say this was supplied by the contractor, unless I hear differently, and Air Force will speak later, I'm going to assume this is the Air Force's acceptance of what they think reality is.

Mr. LI. This particular chart is a summary of a data base which is a working data base which the contractor and the Air Force work with on a daily basis. And this is like a snapshot at the point in time which we asked for a run and we summarized it, and we said, this is the current status.

Mr. SHAYS. Do you accept the numbers as you see them, the $10.2 billion total, as what you think is the most reasonable thing to assume has been in fact implemented?

Mr. LI. We did not look at every single cost reduction plan. For the ones we looked at, we thought that they were reasonable.

Mr. SHAYS. What I'm confused by is under Joint Strike Fighter and F–22 components at the same plants, they have down zero. They don't think that's been implemented.

Mr. LI. But, they have utilized that in their cross-derivation in the "to be implemented" and they did accept that.

Mr. SHAYS. So then this chart doesn't represent what they think has been implemented.

You know, I can ask them that. But I'd like to know if you know the answer. Because if you don't know that answer, I'm getting uneasy.

Mr. BENSON. Specifically on the Joint Strike Fighter, see, we have two columns there. One is called implemented, the other is to be implemented.

Mr. SHAYS. I see those two differences.

Mr. BENSON. The Air Force originally came up with what they considered a baseline estimate. Their baseline estimate was about $51 billion. They then did an analysis of the production cost reduc-

tion plans that had been proposed by the contractors and reviewed and analyzed by the Air Force.

They interpreted those plans that $10.2 billion of those plans that had been proposed by the contractor would be a reduction to their baseline estimate of $51 billion. That got the Air Force's net estimate down to $40.8 billion.

And that's why I said——

Mr. SHAYS. I just want you to explain why I see zero under implemented. Manufactured Joint Strike Fighter F–22 components in the same plan. I see zero there under implemented. So they are not saying it's being implemented, if this is the Air Force's version.

Mr. LI. But they feel that it is a cost reduction plan that will be implemented in the future. And they have also——

Mr. SHAYS. I understand it's to be implemented in the future. It hasn't been implemented now, under this chart. I just want to understand whose chart this is. I want someone to take ownership of this chart and I want to then go from there. I'm just trying to find something to have an anchor on. I'm floating all around space right now.

Mr. LI. I apologize.

Mr. SHAYS. Well, so is it your testimony that this represents what the Air Force believes to be true, or have they modified this chart.

Mr. LI. They have not modified this chart. This is what they're identifying as what is implemented and——

Mr. SHAYS. OK, well, when I look at this chart, then, I am going to read it that the manufactured Joint Strike Fighter F–22 components in the same plants have not yet been implemented, and that they make the assumption of the 1.2 to be implemented.

Mr. LI. Correct.

Mr. SHAYS. I misunderstood you, then. I thought you said they thought it had been implemented.

Mr. BENSON. That was the Office of Secretary of Defense that said it had been implemented, not the Air Force.

Mr. SHAYS. Except the Office of Secretary of Defense has a higher estimate of the cost overruns.

Well, let's just take to be implemented. Mr. Barr, I'll take you in 1 second here. Thank you for your patience.

There's a difference of the $10.8 billion, a difference of $4.1 billion, is that accurate, in your statement, on page 6, that you read from? The difference is due to the Office's higher estimates of the cost of production, 3.7, and lower estimates the impact of the plans. Is this number, $10.8 billion, why don't you first tell me how I should view the $10.8 billion number?

Mr. LI. The $10.8 billion is that which, within the $21 billion, is considered to be cost reduction plans that have yet to be implemented. When I was talking about the $7.8 billion, that was the difference in the estimates, not the production cost reduction plans, but the total estimate difference between the Air Force and the Office of the Secretary.

Mr. SHAYS. Let me ask you this. What's the total cost of this project before we do any cost reductions by all the various parties?

Mr. LI. The estimate that we have in the testimony, and I'll have to, let me turn to that page if you don't mind, on page 10 of my written statement——

Mr. SHAYS. Page 10 of your statement, submitted statement or read?

Mr. LI. Submitted statement.

Mr. SHAYS. OK.

Mr. LI. In the submitted statement, we say that the Office of the Secretary, before, now, this is what, when I refer as the baseline, before considering those production reduction plans that have not yet been implemented, the Office of the Secretary estimated $54.7 billion. The Air Force estimate was $51 billion.

In subtracting, the Office of the Secretary identified $6.1 billion of those that were not yet implemented as those that they were willing to accept. Therefore——

Mr. SHAYS. You're answering a question I don't want to get into yet. I just want to first nail down, before the cost reductions, the Office of the Secretary, in other words, DOD, is looking at $54.7 billion. Correct?

Mr. LI. If you will allow me to just modify your statement, sir, the baseline of $54.7 billion includes those cost reduction plans which are already implemented that they agreed to.

Mr. SHAYS. OK. And that's the $6.1 billion? No, before the $6.1 billion?

Mr. LI. Correct.

Mr. SHAYS. OK. And how much of the—and what are they agreeing to? What brings that number down to $54.7 billion?

Mr. LI. They did not identify that specifically in their analysis. They have two numbers coming out with their analyses, Mr. Chairman. One is the baseline, in which they considered those reduction plans that were already implemented. That's one number. They don't have a subset that says, this is how much I'm going to take that is production cost reduction plan related.

Mr. SHAYS. It would just be helpful for me to know, because then I can see if we're double counting or not double counting.

Mr. LI. I understand, sir. They don't have that information.

Mr. SHAYS. But how can we even get to first base if we don't have that information?

Mr. LI. I understand your concern.

Mr. SHAYS. Explain the $51 billion.

Mr. LI. The $51 billion is the Air Force's estimate which includes those production cost reduction plans that are implemented. That's how much they've allowed. They've built that into there.

Mr. SHAYS. And are they using—that are already implemented?

Mr. LI. Yes.

Mr. SHAYS. Then they're subtracting another $10.2 billion that's been implemented as well?

Mr. LI. The $10.2 billion is the proportion of the $10.8 billion which is not yet implemented. There is a total of $10.8 billion——

Mr. SHAYS. I understand that. You're going to have another $10.8 billion that has to come off that number, correct, the $40.8 billion?

Mr. LI. No. No, sir.

Mr. SHAYS. I don't understand.

Mr. LI. The $51 billion is the baseline. The baseline includes their assessment of what reduction plans have already been implemented.

Mr. SHAYS. Yes, past that.

Mr. LI. The next thing that you can take off are the production reduction plans that have yet to be implemented. There's a maximum of $10.8 billion if they accepted everything. They accepted $10.2 billion.

Mr. SHAYS. I'm looking at your chart on page 10.

Mr. LI. Yes, sir.

Mr. SHAYS. OK. I see $51 billion. I see a reduction of $10.2 billion. It happens to match the implemented. Is that a coincidence?

Mr. LI. Yes.

Mr. SHAYS. That's just a coincidence? Well, that's helpful. So the $10.2 billion here is not the $10.2 here? It's the $10.8 billion but they don't take it all. You know what? I'm going to adjourn this hearing in a second if I don't see some sense here. If you guys can't help me, we're adjourning.

Mr. Tierney, we'll go to your questions.

Mr. TIERNEY. Well, let me just try a couple here. Essentially what I think we're seeing is the Air Force just accepts the manufacturer's numbers, by and large, except for, and the projected savings, instead of taking all $10.8 billion, they take $10.2 billion. They tank out on the rest and they buy whatever the manufacturer puts up there.

Mr. LI. The thing I would again try to add some more detail, we're not just talking about the contractor making estimates. The contractor develops these cost reduction plans in conjunction with the program office.

Mr. TIERNEY. Given the history of this thing, why should I have any confidence at all in the Air Force's projections?

Mr. LI. I don't have an answer for that, sir.

Mr. TIERNEY. Well, neither do I.

The Defense Appropriations bill that we just passed in the House is going to eliminate the two separate congressional caps, you're aware of that. So we'll no longer have a cap for development production, one for development and one for production. We're going to have one cap for the whole program. So development is over budget. It would look at, once you guessed, I guess the most immediate effect then would be to allow more of that money to go to development and we're going to have less left for production.

Mr. LI. That's correct.

Mr. TIERNEY. We're going to end up short on that end of the stick. Do you have any opinion about the capability or the ability of the Air Force to accurately predict any future cost increase?

Mr. LI. What I believe, and I think that the commitment, and I understand that commitment does not always translate into action, but I know that the Air Force and DOD and the contractor are very, very much aware of the fiscal constraints imposed on this program. As they find cost increases, they do go back and diligently try to develop new cost reduction plans.

Mr. TIERNEY. Let me speak to that. They're always talking about cost controls, the Air Force tells us they have cost controls, they're

going to keep costs down. Can you identify what precise mechanisms the Air Force apparently has to do that?

Mr. LI. To keep costs under control?

Mr. TIERNEY. What are they using to keep them down on individual projects, make sure they don't increase?

Mr. LI. As the Air Force's testimony will, that they will provide right after me, they do look at this on a monthly basis. They look at the production initiatives. However, what we found was that at the Office of the Secretary level, they are not provided with the detail on these cost reduction initiatives. We believe that that is something that they should have.

Mr. TIERNEY. I mean, I guess what happens is, they find out if they have this great analysis after the fact to find out that they are not saving money, in fact, they're spending more than they think. So they go somewhere else to try to save money, instead of looking at where they're consistently falling behind. They don't appear to be doing much about that, but they go look for a new avenue, like my analogy I used earlier, like the chicken price keeps going up, so let's save money on milk.

Mr. LI. The Air Force acknowledges the fact that some production cost reduction plans, when they first identify them and they think are promising, if they find that those are not achieving the types of savings that could be achieved, they will go to another area and develop and look at other areas. They acknowledge that.

Mr. TIERNEY. Thank you.

Mr. SHAYS. Just a brief question, and then we'll go to Ms. Schakowsky, and then Mr. Barr.

Just for my continued edification here, on the chart with the $54.7 billion on cost estimate for considering cost reductions, and the $51 billion of the Air Force, can I make the assumption, or are the numbers coincidental, $10.2 billion, that that number, $51 billion, would be $61.2 billion if the implemented cost savings, I had not yet taken?

Mr. LI. Correct, sir.

Mr. SHAYS. OK, so we have $61.2 billion.

Mr. LI. Correct.

Mr. SHAYS. Can I make the assumption, with the Office of the Secretary, that the $50.7 billion I could add the same $10.2 billion to get their higher base?

Mr. LI. No, you would add the $6.1 billion to the $54.7 billion.

Mr. SHAYS. No, no, you wouldn't.

Mr. LI. I'm sorry.

Mr. SHAYS. I'm going up, I'm not going down. The Air Force gross costs before any savings, I'm making the assumption is $61.2 billion. The Air Force can tell me differently. And I'm subtracting the implemented of $10.2 billion to get at the $51 billion.

Mr. LI. Correct.

Mr. SHAYS. And I'm taking another $10.2 billion which was part of the $10.8 billion to get the $40.8 billion. I am looking at the Office of the Secretary and wondering if I can make the same assumption that they both agree on the implemented at $10.2 billion as bringing their number down to $54.7 billion.

Anybody there answer it?

Mr. BENSON. The answer is no, you cannot make that assumption.

Mr. SHAYS. OK.

Mr. BENSON. The Office of the Secretary of Defense made different assumptions on what had been implemented or not implemented.

Mr. SHAYS. So is it conceivable that what they say may not have been implemented, they would shift over to the implemented?

Mr. BENSON. Yes.

Mr. SHAYS. OK. What I would like is a chart, I would like a chart sometime soon that would describe to me what the Secretary's office, how they view this chart of implemented-to be implemented, and I would like the same chart for the Air Force and the same chart for the contractors, the same basic terms. And then I'd just like to see how they differ.

The Air Force and the contractor, you are making the assumption, is the same?

Mr. LI. Yes.

Mr. SHAYS. OK. Ms. Schakowsky. Mr. Barr will follow but he'll ask as many questions as he wants. We have no time limit, but you're next in line.

Ms. SCHAKOWSKY. I'm a new member here, and I'm trying to figure all this out, and have been, I guess, more confused by what I've heard so far in trying to at least understand what we're trying to get at here. In response to a question you said you can't tell us why we should have confidence in the cost estimates that have been made and you also said you don't have a crystal ball and can't project which of the two estimates would be—we're not asking you to have a crystal ball. The reason that we come to you is to look at the objective criteria and help us figure out what really is accurate.

I mean, after all, we're talking about billions of dollars here. I just came from the floor where we're dealing with the housing budget, the Housing and Urban Development Budget. And I'm worrying about millions of dollars that are being cut from Chicago. And we're talking about discrepancies of billions.

I'm trying to understand why it is that you can't help us to figure out what is more likely to be true.

Mr. LI. And I certainly would like to do so, and provide some advice. What we were trying to do was to identify how these estimates were different. When you identify two different estimates, it's not necessarily going to lead toward somebody having a better estimate than somebody else. Those assumptions are projections into the future that may or may not materialize.

Ms. SCHAKOWSKY. Yes, that's right, but it's the assumptions, isn't it, that we have to look at?

Mr. LI. Correct. And the assumption on individual things, like if I looked at one individual cost reduction initiative, if somebody made an estimate, for example, and one of the examples that we have was talking about being able to have multi-year procurement. There are some savings associated with that. $1.5 billion would be achieved through multi-year is what their assumption was.

What we raised to this body was that, don't take that $1.5 billion to the bank just yet. Because that requires the Congress and the

Office of the Secretary of Defense to weigh in on it. That is the level at which we made our analysis, to point out those issues.

If you take all of those into account, I don't think it's a possible situation for me to be able to say, therefore, as a result, I think that the Air Force's estimate is better than——

Ms. SCHAKOWSKY. Well, one way to do it might be to look at what has been implemented in that rather confusing debate on, or discussion on implemented and to be implemented. Let me ask you this. That chart that we're looking at, what's the date of that chart?

Mr. LI. As of December——

Mr. BENSON. Dated as of July 1999.

Ms. SCHAKOWSKY. OK, as of July 1999, and that gets back to your criticism that there has not been timely or as required quarterly updating?

Mr. LI. To the Office of the Secretary of Defense.

Ms. SCHAKOWSKY. To the Office of the Secretary. So is that one of the reasons why this whole thing is harder to project?

Mr. LI. It is. I believe that currently the visibility of the production cost reduction plans and I know that the chairman is concerned about a good explanation of these, that visibility has not been put on until today, I believe. I think the discussion of these is healthy. Because the bottom line of my testimony is that this is such a large issue in terms of amount that we're going to have to achieve that we need to keep an eye on this.

That is the message that I'm trying to provide today, that it's a large amount of money, that there are differences and yet there are some things that won't occur until a few years. Trying to apply that visibility is important.

Ms. SCHAKOWSKY. But when we talk about what concrete data we have, we're looking at numbers that will be a year old in June, the end of June or July.

Mr. LI. The Office of the Secretary of Defense and the Air Force, in conjunction with the decision that will occur this December, are going to be updating these numbers. I believe, and again, I'm addressing you and the chairman, I think that a request should be made for the Air Force and the Office of the Secretary to make sure that they can reconcile the basis on which they're making these projections so we don't have this discussion again.

I feel, if I may say, I feel that these are questions that should be asked of the Office of the Secretary of Defense and the Air Force. I understand, I'm trying to provide you with the information. But this is the level of information that I can provide to you.

Ms. SCHAKOWSKY. Thank you.

Mr. SHAYS. I thank the gentlelady for her question. It relates to this bottom line on page 7. And I want to be clear. What has the Air Force not been providing since June 1999?

Mr. LI. They have not provided the detailed description of, at the detail level, of the production cost reduction plan. They've provided an overall summary of, this is how much we've achieved. But they haven't provided information at the level of detail to be able to identify for the OSD level which specific production plans have been successful and which ones haven't.

Mr. SHAYS. And what I am gathering from your report, you are merely, and I use merely in a very loose way, describing the discrepancies between the Secretary's estimates of alternately the program after cost savings are made, and the Air Force's. You haven't evaluated whether either are accurate or not.

Mr. LI. Correct. That is a correct statement.

Mr. SHAYS. So, I mean, it could be, the Secretary's could be on target or off, the Air Force could be on target or off, or it could be something even much different than that. You haven't tried to ascertain which is more accurate. You just tried to disclose to us today that they're different?

Mr. LI. That's correct, sir.

Mr. SHAYS. That's the extent of what I should make?

Mr. LI. That is correct.

Mr. SHAYS. That's amazing. So we're kind of like chasing smoke.

I would say then we have a disagreement on what the total cost of the project is by both entities. And a disagreement about the total cost savings by each entity.

Mr. LI. I would not use the word savings, sir. I would use the word cost reduction.

Mr. SHAYS. Cost reduction, fine.

Mr. LI. Because they're not savings.

Mr. SHAYS. And I'm saying this as someone who is still supportive of this program. I'm not here saying we don't need the F–22. But I guess my expectation was that you were in a sense evaluating the estimates that you were seeing and therefore would be able to speak in greater depth. You're basically able to say there are differences in cost and there are differences in reduction, cost reductions. But you don't even, you can't speak to the validity of any of it.

Mr. LI. Mr. Chairman, our central focus was the production cost reduction plans. And to identify for the subcommittee how much the extent to which those have been identified. The concern was that, the genesis being Mr. Tierney's letter that he received from the Air Force that $16 billion were identified. We were asked to identify, is it $16 billion, how much is there? We identified $21 billion.

The next question was, well, were those cost reduction plans incorporated in their estimates? And that's what we did, sir.

Mr. SHAYS. Well, to some extent. Because you still can't tell me whether the Secretary's account is making the assumption that some have been implemented and some haven't been, correct? You're not able to dissect the differences. You know there's differences, but you haven't been able to clearly identify all that.

Mr. LI. We went to the level that data was available.

Mr. SHAYS. OK. And this is, I think, the most shocking thing, to me. And I want to know, shouldn't they be providing, shouldn't the Air Force be providing quarterly reports to the Under Secretary on cost reduction plans?

Mr. LI. Yes, I think they should.

Mr. SHAYS. OK. And the problem we encountered at the last hearing was a recognition that the Air Force kept saying they were meeting their caps, but we kept changing the caps to meet the Air Force. That was my interpretation.

But I felt like we were finally agreeing to the caps and those wouldn't change. But now we have a different kind of floating uncertainty here.

Mr. Barr. You have as much time as you want.

Mr. BARR. Thank you, Mr. Chairman.

I think one could probably drive oneself crazy trying to find a degree of certainty that is very difficult to find in current projection, much less trying to project into the future. And I think that Mr. Li and his colleagues have done a very good job of trying to bring into focus perhaps not the same kind of focus and certainty that we would have if we go to the automobile showroom and ask for the price of a particular car compared to another car compared to that same car with different options. These are things that are currently in production, we know exactly how much they cost to be produced, to be added on, and the profit margins.

It is impossible to have that same degree of certainty in the development of any weapon systems. And if one looks for that, one will be searching, I suppose as Diogenes did, quite in vain.

I don't think that our job here in the Congress is to demand absolutely certainty, that we know precisely how much each and every plane is going to cost. Our job, though, rather is, as Mr. Li says in his draft report at page 4, this is in his narrative following this chart, "Allocated equally over a planned procurement of 339 F–22 aircraft, a $21 billion cost reduction equates to about $62 million per F–22 produced. This amount of reduction per F–22, if achievable, is significant. For example, F–15 aircraft, which the F–22 is planned to replace, were procured in fiscal years 1996 to 1998 at an average unit cost of about $46 million."

This places in some appropriate perspective what we're dealing with here. We are trying to develop an aircraft that is generations ahead of that which we currently use for air superiority. And we are trying to do so within reasonable strictures of finances. And I think really the job of GAO and the job of the Air Force and the Secretary of Defense and our job are all the same, and that is to continue to monitor the development of these processes as much as possible to make sure that the projected cost reductions are in fact implemented, that the Air Force continues to search out for new cost reductions that can be implemented, that we make sure that they do, so that year to year to year, we bring each one of these plans more into focus.

But to demand absolute certainty at this point about hypotheticals upon hypotheticals, I think is a little bit unfair and gets us off track from what I think ought to be the main focus here. And that is, our fighting forces need the F–22. If they do not have the F–22, they will be at risk. There is no aircraft currently in production or even anywhere near production that provides the capability that the F–22 does.

And rather than try and drive ourselves crazy by arguing over hypotheticals on hypotheticals, I think what we ought to do is take the materials that Mr. Li and his colleagues have presented to us here, ask critical questions about them, monitor it, demand that as more information comes in, as more and more of those hypotheticals become reality, which they inevitably will as we move

forward with production, that we make sure that the feet are held to the fire and that these cost savings are in fact implemented.

But I think there is an awful lot of material here, and yes, it can be deceiving, if one, as is easy to do, looks at any one of these figures four or five different ways to Sunday. But I think GAO, Mr. Chairman, and I presume you would agree, is doing a very good job with what they have and is asking the questions as the chairman is doing, to continue to ask these questions, hold periodic hearings, but not to lose sight of the forest for the trees.

Because there is an awful lot at stake here, Mr. Chairman, with the need for this aircraft. Because if we don't, as even outside groups have done, they have looked at comparisons between the F–22 and fighter foreign aircraft, the MG–29 and the SE–27, the projected Eurofighter, the Raphael, and the SU–35. And the F–15, there's no way that it can compete with those aircraft that will be coming on line within the next few years.

The F–22 can, it will. And I think we ought to, again, Mr. Chairman, not lose sight of the goal here. But again, I commend you, Mr. Chairman, for having this followup hearing. I hope that you will have additional hearings. But I would hope also that we would not get so bogged down into trying to have a degree of certainty about future hypotheticals that it's impossible anywhere that we cutoff our nose to spite our face.

Thank you, Mr. Chairman.

Mr. SHAYS. I thank the gentleman.

The bottom line is that Congress, DOD, White House all agreed that we have a cap of $39.8 billion for the entire production of this plane.

Mr. LI. Not to correct you, Mr. Chairman, but the current cap because of inflation and the number of changes is now at $37.6 billion for production.

Mr. SHAYS. $37.6. So how do I relate to the $40.8 billion of the net cost to the Air Force? So am I to assume that we are nearly, so we are $3 billion over?

Mr. LI. Since the basis is different, 339 aircraft was the basis on which they made those projections of the $40.8 billion, you would have to make some adjustments to it to equate to the $37.6 billion. So it would not be comparing apples with apples if you compare the $37.6 billion with the $40.8 billion.

Mr. SHAYS. Before we let you go, then, let me compare apples to apples. Do I make an assumption, comparing apples to apples, that the $40.8 billion is $1 billion over?

Mr. LI. Yes.

Mr. SHAYS. And I make an assumption that the $40.6 billion is $8.8 billion over?

Mr. LI. Correct, sir.

Mr. SHAYS. OK. But I also hear your testimony that you can't speak with certainty about the validity of either the cost, the foundation point of the cost of the aircraft, or you can't speak with any comfort level about the validity of the cost, reasons for reduction implemented or to be implemented. You can't speak on that?

Mr. LI. Right. I cannot, because the information is not available from either the Air Force or the contractor.

Mr. SHAYS. So in the end, I'm going to accept as your primary contribution now that you are alerting this committee to the fact that in either case, the Air Force or the Secretary are acknowledging that to date, even with cost reductions, we are going to be over the cap level. And that second, between them, they have a disagreement of about $7.8 billion?

Mr. LI. That's correct.

Mr. SHAYS. Would you say that that would be a fair thing for me to gain from this?

Mr. LI. Yes, sir.

Mr. SHAYS. OK. I feel that there are probably some other things that you wish we had discussed and focused on. Is there anything, Mr. Benson or Mr. Springman, that you think you need to state for the record? I don't want you all to come to me later and say, well, you know, by the way, this is a factor as well. I think in fairness to the Air Force, who will testify later, what else do you think needs to be put on the table that they could then be able to respond to? Is there anything else?

Mr. LI. I think the issue that you're raising, and your frustration with our not being able to identify for you the discrete portion of what has been implemented and to track those is part of that concern that I expressed and that we talked about, which is they should be giving that information.

Mr. SHAYS. I'm less concerned now, because you made no attempt to verify those numbers. Seems like you made an attempt to understand them, but you couldn't. But it wasn't like you didn't try.

Mr. LI. Correct, sir.

Mr. SHAYS. And can I make an assumption as well that one of the most significant findings as well is that you have a hard time accepting the fact that the Air Force has not been providing quarterly reports since June 1999?

Mr. LI. That's correct.

Mr. SHAYS. And should they be quarterly, or should they be even more often than that?

Mr. LI. No, I think quarterly would be a reasonable time.

Mr. SHAYS. Had they been doing that before that time?

Mr. LI. They had provided some information, but——

Mr. SHAYS. But not on a quarterly basis?

Mr. LI. No.

Mr. SHAYS. OK. So we're at a point now where we need to be able to do that. Do you think that they have those numbers?

Mr. LI. Yes.

Mr. SHAYS. They just haven't been providing them?

Mr. LI. Correct.

Mr. SHAYS. OK. Mr. Springman, is there anything that you want to add?

Mr. SPRINGMAN. Sir, I was here to provide an update to the development side of the F–22, if you wanted an update to the flight test program, if that came up, as an update to when I was here in December.

Mr. SHAYS. OK, why don't you do that.

Mr. SPRINGMAN. OK, sure.

In December 1999, we testified before your subcommittee that we had concerns about the lack of progress in the F–22 flight test program, mainly because manufacturing problems had led to significant delays in the delivery of test aircraft.

Also in our March 2000 report, we indicated that as much as 37 to 50 percent of the flight test program might not be completed as planned, for three reasons. One was that the continued delayed delivery of the flight test aircraft. Two was that the completed test aircraft were requiring more modifications than expected. And three was that the flight test program efficiency was less than planned, meaning they were not completing as many test points per flying hour than they had planned.

Since that time, since our March 2000 report, we have not seen anything to indicate that this situation has improved. In fact, for several reasons, we believe it has worsened.

First, there continues to be additional delays in the delivery of flight test aircraft for testing. As a result, the Air Force has now almost 45 fewer flight test months available to complete the flight test program, and has lost over 971 potential flight test hours.

Second, a problem with cracks in the F–22 canopies halted flight testing from May 9th to June 5th, and this problem is not yet resolved. Currently, there is only one usable canopy on one test aircraft available for use in the flight test program.

These delays and other factors have resulted in the program not currently achieving flight test program goals for the year 2000. The program is 21 percent behind their flight test hour goal and 16 percent behind their flight test point goal for the year 2000. And in no month this year has the program achieved its goal of flying each available test aircraft over 26 hours per month.

That concludes my update.

Mr. SHAYS. Do you have any other information like that? I would be pretty unhappy to find that out after you had left.

Mr. SPRINGMAN. Sir, I can get you anything you want on updates to the flight test program.

Mr. SHAYS. Pardon me?

Mr. SPRINGMAN. I can get you anything you want on updates to the flight test program. I can give you some more information.

Mr. LI. I think in reading the Air Force's statement, I think they make reference to all those issues of the canopy.

Mr. SHAYS. What risks does a reduced flight test schedule pose to active production costs? What's the significance of, besides the fact that we're not meeting our goal, what does it have ultimately, it's impact on production?

Mr. SPRINGMAN. Immediately, it has an impact on EMD costs. If you're behind in your flight test program but you still have the same planned date of completion for your flight test program, and you get to the end and you haven't completed what you need to complete in your flight test program and things have to be extended, there's more money involved.

Mr. SHAYS. Do we wait for the production to make sure that we've done all the testing, or do we begin to produce before we've done all the testing?

Mr. LI. The Air Force has chosen a strategy of not one phase starting and the next on stopping. In other words, they don't go

through development, finish development and then go into production. There's a concurrency, overlap issue here. The low rate initial production decision will be made in December and our concern that we have expressed many times before was that the operational test and evaluation was not completed by the time at which that decision was made.

Mr. SHAYS. What other concerns do you have, other than what we've read in your report or that you've testified?

Mr. LI. I think we've expressed our concern over the past few years on the accelerated rate in which we're going to go into production. That's directly tied in with some of the concerns that we expressed today. If you don't have full knowledge of how to produce this particular aircraft, we don't think it's wise for us to be going into an accelerated rate of producing 10 aircraft per year.

We think that six per year is a more reasonable number. We think that number is such that if some changes had to be made, because of problems that could come out during OT&E, that the changing of whatever has been produced would be lessened. That has been our position.

Mr. SHAYS. Mr. Benson, is there any other complaint or concern that you feel we need to express at this hearing right now?

Mr. BENSON. I would just like to say that as we were trying to get a comparison of the Air Force and the Office of Secretary of Defense estimates to get a better understanding of why they did vary by the $7.8 billion, we asked both the Air Force and OSD cost estimators about that. They weren't able to do that themselves. They did in fact try to get together to resolve some of the differences to identify why the estimates differed. And because they used different cost estimating techniques, they were not able to do that.

They both advised us that, as part of the current estimate they're working on, they have resolved some of those differences. So hopefully this December, when they come out with their new estimate, they will at least be able to compare those and address why they differ.

Mr. SHAYS. Thank you very much, gentlemen. It's been very enlightening, thank you.

We'll go to the next panel. Thank you so much.

I would now call our second panel and ask them to remain standing until we swear them in, so you don't have to sit and stand. Ms. Darleen A. Druyun is Principal Deputy Assistant Secretary of the Air Force, Acquisition and Management, Department of Defense, accompanied by Mr. Joseph T. Kammerer, Deputy Assistant Secretary of the Air Force, Cost and Economics, Department of Defense. And also, we'll hear testimony from Dr. George Schneiter, Director of Strategic and Tactical Systems, Department of Defense.

I think Dr. Schneiter, we'll have you go first, and then we'll go with the Air Force. Thank you.

If you would raise your right hands, please.

[Witnesses sworn.]

Mr. SHAYS. Thank you. Note for the record that all three witnesses have answered in the affirmative. And I want to welcome you all back. I appreciated the testimony we received last time, and we look forward to your testimony.

OK, Dr. Schneiter, I think you're first.

STATEMENTS OF GEORGE R. SCHNEITER, DIRECTOR, STRATEGIC AND TACTICAL SYSTEMS, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS; AND DARLEEN A. DRUYUN, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION AND MANAGEMENT, ACCOMPANIED BY JOSEPH T. KAMMERER, DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE, COST AND ECONOMICS

Mr. SCHNEITER. Thank you, Mr. Chairman. I appreciate the opportunity to be back to discuss the Department's efforts to control and monitor the cost of the F–22 aircraft program, particularly with regard to the production cost reduction plans.

As you know, and as has been stated here, the F–22 is a technically challenging development program. It has a goal of providing a tactical fighter aircraft with unprecedented capabilities in the areas of low observability, the ability to fly supersonically without afterburner, and advanced avionics and sensors. The F–22 is intended to ensure our air forces remain dominant in the 21st century.

Thus far, the program has demonstrated technical progress that meets or exceeds the technical performance measures established for the program. However, there have been some delays in static structural testing, delamination issues with composite parts, a professional engineer's strike at the Boeing company, and more recently, cracking of aircraft canopies.

These factors have affected the pace of flight testing at a time when a more aggressive flight test tempo was planned. The good news is that of these, only the canopy issue remains unresolved at this time, and significant progress is being made toward a solution for that. Mrs. Druyun will discuss some of these more in her statement.

Despite these slowdowns, the Air Force is continuing to aggressively pursue the test program, so they can successfully complete the key exit criteria established for the low rate initial production decision planned for this December. As the GAO witnesses indicated in June 1996, the Air Force established an F–22 Joint Estimating Team, called the JET, to produce a solid estimate of the cost of completing the F–22 EMD production programs. They were later directed to identify cost-reduction initiatives that would enable the F–22 program to be completed within the established funding caps.

The latter assignment gave rise to the restructuring of the program, to a set of cost-reduction initiatives, and to a memorandum of agreement between the Air Force and the prime contractors designed to motivate them to achieve prices consistent with planned F–22 resources. This part of the JET plan focused on production affordability for attaining unit cost goals jointly agreed.

A key aspect of this was to use industry and Government investments to reduce unit costs. We successfully employed the same strategy to lower production costs of the C–17.

As a result of Defense Acquisition Executive Dr. Gansler's review of the F–22 program in December 1998, he approved the go-ahead for production of the two-aircraft lot, and reiterated the importance of maintaining continued emphasis on executing the F–22 program

within the congressional cost caps. He challenged the Air Force and its contractors to continue efforts to reduce costs and directed the Air Force to provide him quarterly briefings on development and production cost status. We've used these special quarterly reviews to examine cost and schedule trends, and to track the program's status.

The Office of the Secretary of Defense made cost estimates in November 1998 and December 1999. These included assessments of the effects of the PCRPs, these production cost reduction plans. The estimates were broadly prepared in two steps. First, the recurring costs incurred to date on the engineering and manufacturing development units were used to forecast production costs. These actual costs reflect the degree of success, or lack thereof, of the PCRPs that have been implemented to date.

Second, a separate estimate was made of savings to be expected from the still unimplemented PCRPs. And these were combined to give a final production estimate.

All of the contractor, Air Force, and OSD estimators that looked into the effects of the PCRPs agree they will have a significant effect on reducing costs, and they are well worth undertaking. This is not at issue. There have been and are some disagreements about the magnitude of the reductions that will be achieved by the PCRPs. The OSD staff generally favored lower realization rates and was not willing to take large reductions on the basis of PCRPs that had not yet been fully defined.

There also have been disagreements about what the cost experience to date implies for the future, apart from the PCRPs. The key disagreements here have had to do with how rapidly the cost of purchased materials and subsystems will decline from the levels observed in engineering and manufacturing development and the first lot of production—representative test vehicles.

We continue to employ the best oversight and insight tools available to us to ensure the F–22 program will be accomplished for an acceptable cost and on an acceptable schedule.

That completes my remarks, sir.

[The prepared statement of Mr. Schneiter follows:]

Embargoed Until Release by the
House Committee on Government Reform

Statement of

George R. Schneiter

Director, Strategic and Tactical Systems
Office of the Under Secretary of Defense for Acquisition, Technology and Logistics

Before the
Subcommittee on National Security, Veterans Affairs, and International Relations
of the
House Committee on Government Reform

on

F-22 Cost Controls: Will Production Cost Savings Materialize?

June 15, 2000

Embargoed Until release by the
House Committee on Government Reform

Mr.Chairman, members of the committee, thank you for the opportunity to discuss with you the Department of Defense's efforts to control and monitor the cost of the F-22 aircraft program, particularly with regard to the Production Cost Reduction Plans (PCRPs).

As you know, the F-22 is a technically challenging development program with the goal of providing a tactical fighter aircraft with unprecedented capabilities in the areas of low observability, the ability to fly supersonically without afterburner, and advanced avionics and sensors. The F-22 is intended to ensure that our air forces remain dominant in the 21st century.

A program as technically challenging as the F-22 brings with it a concomitant challenge regarding cost and schedule performance. Section 217 of the National Defense Authorization Act for Fiscal Year 1998 imposed separate cost caps on the Engineering and Manufacturing Development (EMD) phase (now $20.4 billion) and on the production phase (now $37.6 billion) of the program.

Thus far, the program has demonstrated technical progress that meets or exceeds the technical performance measures established for the program. However, during this calendar year, progress on the program has been impeded by delays in static structural testing, delamination issues with composite parts, a professional engineer's strike at the Boeing Company, and more recently by cracking of the aircraft canopies. All of these factors have affected the pace of flight testing at a time when a more aggressive flight test tempo was planned. The good news is that only the canopy issue remains unresolved at this time, but significant progress is being made toward a solution. Mrs. Druyun will cover the technical status of the program more thoroughly in her statement. Despite these

slow-downs, the Air Force is continuing to aggressively pursue the test program so they can successfully complete the key exit criteria established for the Low Rate Initial Production decision planned for December of this year.

In June 1996, the Air Force established an F-22 Joint Estimating Team (JET). One task assigned the JET was to produce a solid estimate of the cost of completing the F-22 EMD and production programs. The JET was later directed to identify cost-reduction initiatives that would enable the F-22 program to be completed within established budgetary limits. The latter assignment gave rise to the restructuring of the F-22 program, to a set of cost-reduction initiatives (some of which are yet to be defined), and to a memorandum of agreement between the Air Force and the prime contractors designed to motivate the prime contractors to achieve prices consistent with planned F-22 resources. This part of the JET plan focused on production affordability for attaining unit cost goals jointly agreed to by the F-22 government and contractor teams. A key aspect of this strategy was a plan to use industry and government investments to reduce unit costs. The same strategy had been successfully employed to drive down production costs on the C-17.

As a result of the Defense Acquisition Executive's review of the F-22 program in December 1998, the Acquisition Decision Memorandum signed by the Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L)) approved the go-ahead for production of the two-aircraft lot, and reiterated the importance of maintaining continued emphasis on executing the F-22 program within the congressional cost caps. The USD (AT&L) challenged the Air Force and its contractors to continue efforts to reduce costs. He also directed the Air Force to provide him quarterly briefings on

development and production cost status. The Department has used these special quarterly reviews to examine cost and schedule trends over shorter periods and to track program status to a higher degree of fidelity.

The Office of the Secretary of Defense (OSD) estimates of November 1998 and December 1999 included assessments of the effects of the PCRPs. Broadly, the estimates were prepared in two steps:

1. The recurring costs incurred to date on EMD units were used to forecast production costs. These "actual" costs reflect the degree of success, or lack thereof, of PCRPs that have been implemented to date.
2. A separate estimate of the savings to be expected from the still-unimplemented PCRPs was computed.

The final production estimate was the net of these.

All of the contractor, Air Force, and OSD estimators that looked into the effects of the PCRPs agree that they will have a significant effect on cost, and are well worth undertaking. These points are not at issue. There have been, and are, disagreements about the magnitude of the reductions that will be achieved by the PCRPs. These have centered on the savings that will be realized on PCRPs that have been defined, and the allowances that should be made for savings on PCRPs that have not yet been fully defined. The OSD staff generally favored lower realization rates and was not willing to take large reductions on the basis of PCRPs that had not yet been fully defined. There also have been disagreements about what the cost experience to date implies for the future, apart from the PCRPs. The key disagreements have had to do with how rapidly

the cost of purchased materials and subsystems will decline from the levels observed in EMD and on the first lot of Production Representative Test Vehicles.

The Department continues to employ the best oversight and insight tools available to it to ensure that the F-22 program will be accomplished for an acceptable cost and on an acceptable schedule.

The Department's senior leadership believes it has made a commitment to the Congress and the American taxpayer to achieve this objective.

Mr. SHAYS. Thank you, Dr. Schneiter.

Mrs. Druyun.

Mrs. DRUYUN. Thank you, sir.

I have prepared approximately 15 charts which I can get through fairly rapidly.

I thank the chairman and the members of the committee for the opportunity to appear at your hearing to discuss the F–22 program and the cost controls that we have in place to ensure we can deliver 339 aircraft within the cost caps established by the Congress in September 1997. If we could go to chart No. 3, which is entitled, Why Do We Need the F–22, if you look at the total threat to American air dominance, it includes advanced surface-to-air missiles, fighter aircraft and air-to-air missiles.

If you look at the capabilities of the F–15 today, it is unable to operate in an advanced surface-to-air missile environment. Clearly, the F–22 provides air dominance over the battlefield. It is optimized for the air-to-air environment. The F–22 also complements the Joint Strike Fighter, which will be optimized for ground attack. It's kind of what we refer to as the high-low mix.

If I could have the next chart and speak to where we are in terms of our production costs. Back in 1997, when we concluded the Joint Estimate Team, the JET effort, we implemented a number of initiatives within the program to ensure that we could control production costs. One of the key items that we implemented is called the target price commitment curve. And this was actually put on contract back in the 1997 timeframe.

And basically, this target price commitment curve established a set of price goals for the production representative test vehicles all the way through lot four. It started a learning curve and at the end of lot four, we would be on a learning curve that would ensure that we would be able to deliver 339 airplanes for the caps established by the Congress.

As part of this target price commitment curve, we are providing incentives up to $151 million to the contractors which will be awarded to those contractors that are making investments today and began making these investments back in the 1998 timeframe to basically bring down the cost, the actual cost, of producing this airplane.

The next chart lays out the production cost estimate. To develop the Air Force cost estimate for the F–22 we made use of the Air Force Cost Analysis Improvement Group process. The AFCAIG group chairman is responsible for management. This process was conducted under the auspices of the Air Force financial management organization, which is separate from the Air Force acquisition organization.

In using our AFCAIG process to develop a production cost estimate, we estimated the cost of production as part of this process of $40.8 billion. This estimate included approximately $10.2 billion for the production cost reduction plan and approximately $1 billion to cover risks associated with the production program.

Without the $1 billion cost risks, the cost estimate for production is $39.8 billion, which is at the congressional cap. That cap has since been reduced. It's been reduced because of the color of money that was used upon the six PRTV contracts, six PRTV aircraft

which are on contract. It was also reduced because of inflation adjustments. And that cap is roughly $37.6 billion.

In establishing the service cost position, I'm going to cover in the next chart our rationale as to why we settle on $39.8 billion. The service cost position budgets to $39.8 billion, which at the time was the production cost cap. We have a very high degree of confidence that the budget will be met within the FYDP. Matter of fact, the greatest uncertainty in the estimate is beyond the FYDP.

The AFCAIG's estimate clearly reinforces the program's effort to reduce and control production costs. The two production readiness contracts, one was awarded in 1998, the other was awarded in December 1999, which we tracked very carefully. The 1998 contract for two airplanes, this is our pre-production contract, the data indicates that it is actually costing less than what we had estimated. And this is good. This is the type of behavior we need to see in this program.

The same is also true for 1999. In fact, if you looked at our negotiated settlement position in 1998, the contractor projected losing approximately 2 percent. In other words, he wasn't going to make any profit. When I look at the cost reporting data that we get on that contract today, it shows the contractor is probably going to make a profit in the range of 6 percent. What that basically says is that he is continuing to bring down the cost of this program.

The same thing is also true of PRTV2, which we put on contract in December 1999. The cost reporting data is showing that the contractor has a potential for making more profit than what we originally estimated, which is also good, because he is really focusing in on bringing down the cost of these airplanes. And these are the types of indicators that we use to gauge how well we are doing in terms of tracking costs and turning our production cost reduction initiatives into reality.

The bottom line when you look at the service cost position of $39.8 billion is that this represents a reasonable risk to manage the program and incentivize cost savings to remain within the congressional cap. Clearly, we are managing risk just like industry manages risk. And I think that I have to stress to you that this is a continuing process. You can never take your eye off the goal post. And clearly, we are all focused on the goal post and examine these costs on a very, very regular basis.

My next chart, I really refer to what's going on, and it's called the lean revolution. The F–22 signed off to the lean enterprise process sponsored by both industry and Massachusetts Institute of Technology back in the mid-1990's timeframe. And just as the auto industry made a revolutionary leap from mass production to a lean production, F–22 is leading the way for revolutionary change in transforming the defense industrial base and in transforming that from one of mass production to one of lean production.

As you will recall, sir, back in the 1980's, our F–15 production lines produced approximately 130 to 135 aircraft per year. And the F–16, 180 a year. What we're looking at today is 36 airplanes a year when it gets into full rate production. And that really forces you to radically change the processes that were used in the past that have to be used today and in all future weapon systems to ensure that they are affordable.

This next chart is the same chart that I showed to you back in the December 7th, 1999 hearing. These are the summaries of the production cost reduction initiatives that we have been very aggressively working. I'm expecting the contractors proposal in next month. This chart will be outdated and from the data that I have seen, I can tell you that this continues to grow.

Looking at the next chart, which lays out the engine production cost reduction savings, once again, this is the same chart I showed to you, $4.1 billion, contractors proposal coming in next month I believe will also show that this is continuing to grow.

I have a couple of examples to use in the next several charts. This one example I have is of a what we call a producibility improvement example. It's called single pass drilling. And this is where we used to have a two step process for drilling, first, and there are a lot of holes in this airplane, obviously, for a lot of fasteners. Originally, the process was we used two separate drilling operations, one for drilling and then you'd go back and do the same hole and ream it out.

And this is one of the initiatives, many of the hundreds of initiatives that were identified by the contractor, by the workers on the floor. They actually brought, we call this the dreamer tool. We now have a one pass operation. We no longer have to use two separate tools. This effort was an investment of $841,000 by the contractor. And the payback is $41.1 million, basically a 49 to 1 payback.

My next example is another producibility improvement process. And this is something that we have been able to introduce into this airplane in the last 18 to 24 month period. And this is called the use of commercial parts. The example that you see here is an analog to digital conversion unit. It's obviously a board that we use in our flight management system. We did a commercial prototype with the TRW automotive side of industry.

And this is an example of where these savings are real. When we wrote PRTV contract one and two, these are the savings that we were able to extract by using commercial grade components, getting rid of military grade components like circuits, resistors, capacitors, those types of components.

And one, which is estimated to be in the range of, as you can see, over $1 million, we will consider that implemented once it is actually put on contract. But the other two are actually on contract and are part of our savings.

When I look at the example of what is to be lean, this is on the next chart, this is an example of a printed circuit board lean effort that the Sanders Corp. went through for just one component. Basically you use a video camera which allows them to film the entire process used to build a component.

And in this case, Sanders was able to use new labor standards. They really are more commercial like labor standards. And as you can see, in terms of parts travel, they went from 2.3 miles down to 320 feet, just tremendous examples of how you go and lean out a production line. This is on contract, and we're looking at about a $1.6 million savings.

My next example of lean, and I think this is an important one, what we basically see is a common machine part. This is done by a contractor in Texas. And we originally were on contract with firm

fixed price from Lockheed to this particular vendor. Lockheed went in there and worked with them to really begin to lean out their production line. The contractor came back in and basically reopened up his purchase order and gave money back to the contractor, because we saved money. This is on contract.

And more importantly, and this is what I refer to as really being revolutionary, the contractor was so excited with the processes that he has experience, he's put this across his whole business base that he does within the Department of Defense. These are examples of what has actually occurred.

I know a question that I am continually asked is, is all of this affordable. And the answer is yes. This is the same chart that I showed to you. The F–22 is fully funded in our budget as is the Joint Strike Fighter is also fully funded in our budget. Both of those programs are absolutely essential to the Air Force.

In conclusion, sir, I'd like to say that we clearly are managing our risk on this program. We believe that the service cost position of $39.8 billion represents a reasonable risk and that the processes are laid in place and clearly we track those processes. The F–22 is leading the way for transforming the defense industrial base from one of being that of mass production to lean production.

And I will look forward, sir, to answering your questions as we proceed through the rest of this hearing. Thank you.

[The prepared statement of Mrs. Druyun follows:]

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE COMMITTEE ON GOVERNMENT REFORM

SUBCOMMITTEE ON NATIONAL SECURITY, VETERANS AFFAIRS AND

INTERNATIONAL RELATIONS

UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: F-22 Program

STATEMENT OF: MRS. DARLEEN A. DRUYUN
Principal Deputy Assistant Secretary of the Air Force
For Acquisition and Management

June 15, 2000

Mr. Chairman and members of the Committee, thank you for this opportunity to appear before you to discuss the Air Force's F-22 program and the cost controls that we have in place. I personally review the F-22 program on a monthly basis and can assure you that the F-22 Government/Contractor team understands the desire and need for close control of F-22 costs. In addition to providing you with information on our anticipated production costs and the Production Cost Reduction Plans (PCRPs), I would also like to provide the committee with an update on the F-22's test program, avionics development, and progress towards meeting the CY2000 program criteria.

AEROSPACE SUPERIORITY

Control of the vertical battlespace has been, is, and will remain a major element of United States national security policy. DoD's *Joint Vision 2010* envisions the U.S. military dominating all aspects of a conflict—Full Spectrum Dominance. Control over what moves through air and space provides a fundamental benefit to joint forces. Full spectrum dominance depends on the inherent strengths of aerospace power: speed, range, flexibility, stealth, precision, lethality, global/theater situational awareness, and strategic perspective.

Air Dominance is key to the successful employment of military power. Protection of U.S. and allied joint forces is the number one priority--their protection requires the Air Force to quickly control the vertical battlespace. Air Dominance prevents our adversaries from using air and space to attack, maneuver, or perform reconnaissance that could interfere with the operations of our air attack, land, or surface forces. Air Dominance provides the freedom from attack, the freedom to maneuver, and the freedom to attack at a time and place of our choosing. While the US and our allies had Air Dominance during Operation Desert Storm, newer and more effective

weapon systems are emerging, our forces must be modernized to maintain the edge over our potential adversaries which we now enjoy.

Control of the 21st century air battle requires a combination of low observability, supercruise, integrated avionics, and high maneuverability to defeat the emerging fighter and surface-to-air missile threats. The F-22 combines all of these features into an affordable portion of the Air Force's modernization program. The F-22 and the complementary Joint Strike Fighter (JSF) provide the Air Force with a comprehensive and complementary modernization plan to exploit our nation's ability to control the vertical dimension well into the 21st Century. The F-22 will enable the United States to obtain Air Dominance--the total denial of the airspace to the enemy.

The multi-mission F-22 Raptor is a key element in the Air Force's modernization program and highest acquisition priority. The F-22 brings a revolutionary capability to the battlespace in replacing the aging F-15. In the hands of Air Force aviators, the F-22 will dominate the aerial arena of the 21st Century. We appreciate your concern, support, and funding for our efforts to modernize and sustain the world's most respected Aerospace Force.

US TACTICAL AIR FORCE MODERNIZATION

To maintain its viability, our Air Force needs to modernize as the threat evolves and to avoid technical obsolescence. The Air Force's ongoing time-phased modernization effort is based on developing the Air Force's core competencies and striking an affordable balance between readiness and modernization of the aerospace force. Within our total force modernization efforts, the tactical aviation modernization program envisions an evolution of the current F-15/F-16 high-low mix to a high-low mix of the F-22 and Joint Strike Fighter (JSF)

aircraft to provide the most combat capable, efficient, and lethal air forces possible. The proper mix of the high capability F-22 and the lower cost JSF provides the Air Force with the necessary combat aircraft to defeat the full spectrum of potential threats in the first decades of the 21st century at a minimum risk to the lives of our aviators. Within our strategy, the F-22 is the high capability force designed to destroy enemy aircraft and attack highly defended, high-value targets. The lower cost JSF, purchased in large numbers, will provide the bulk of the attack force once the air-to-air threat has been eliminated by the F-22. The low cost design of the JSF relies on the F-22 for air superiority.

F-22 PROGRAM

I am pleased to provide an update on the progress of the F-22 Air Dominance Fighter program. This update will include: recent challenges in the test program, progress in avionics development, assessment of the Calendar Year (CY) 2000 program criteria, and progress in production affordability initiatives. I will also highlight program successes thus far in 2000 and the challenges ahead as we prepare for the Low Rate Initial Production (LRIP) Defense Acquisition Board (DAB) review in December 2000.

The Fiscal Year (FY) 2000 Appropriations Act directed a delay in the LRIP decision while allowing the procurement of additional test aircraft for Follow-on Operation Test and Evaluation. This action preserved the overall F-22 development and production schedules while retaining the program affordability within the cost caps. In December 1999, the Under Secretary of Defense for Acquisition and Technology approved the award of a contract for six additional aircraft as Production Representative Test Vehicles (PRTVs). On 30 December, the Air Force, pursuant to the FY2000 Appropriation Law, awarded contracts for these aircraft as well as a long

lead contract for ten additional aircraft to be purchased following a successful LRIP decision. The PRTV aircraft will support tactics and training development at Nellis AFB as operational test assets. This acquisition strategy balances the risk associated with concurrent EMD and production and avoids significant program cost increases which would have resulted from a break in the manufacturing process.

At the December 2000 DAB, the F-22 team will demonstrate the technical performance of the F-22 weapon system through completion of critical test milestones and marked progress in meeting program affordability goals. The overarching program goals for this year are the completion of the program criteria, progression of integrated avionics development to the F-22 weapon system testing level, and the continuation of comprehensive program cost control initiatives.

ACCOMPLISHMENTS IN TESTING

CY2000 is the year of the F-22 test team. With the acceptance of four new Raptors, our flight test fleet will more than double in size to include a dedicated Block 2 flight loads test aircraft (aircraft capability of sustaining 100% of the F-22's predicted flight loads) and three avionics test aircraft. The program will also achieve significant performance milestones in sustained flight speed, altitude, and angle of attack. Finally by the end of CY2000, more than 25 percent of the total flight test program will be completed including the following program criteria:

- High Angle of Attack weapons bay testing
- First flights of aircraft 4003, 4004, 4005, and 4006
- Initiation of Radar Cross Section flight testing

- AIM-9 and AIM-120 missile separations
- Avionics Block 3.0 first flight; initiating testing of Block 3.0 unique functionality

First flight of 4003 was completed at the Lockheed Martin Marietta GA plant on 6 Mar 2000. The aircraft was delivered to the USAF Flight Test Center at Edwards AFB on 15 Mar 2000. Delivery of 4003 is significant because as the most heavily instrumented test aircraft, it will be used to clear the remaining flight test envelope, conduct weapons separations, and complete a majority of the remaining flight sciences testing. The contractor is currently completing the surface finishes on aircraft 4004 in preparation for a planned first flight in July. This aircraft will be the first avionics test aircraft. The remaining aircraft slated for a CY2000 delivery date is in final assembly.

In addition to the flight testing at Edwards AFB, the F-22 aircraft static and fatigue testing is also being conducted at the contractor's Marietta GA facility to determine the aircraft's strength and durability under simulated flight loads. During ultimate strength testing of the aircraft aileron, data from the adjacent flaperon indicated that a structural component had failed. An investigation revealed that the composite part had been subjected to a load in excess of its strength, leading to the failure. An inspection of the test aircraft revealed no similar failures and flight restrictions were put in place until the part could be redesigned/replaced. The contractor team used data from the static test to design and fabricate a titanium replacement part. Flaperons from the flight test and ground test aircraft were quickly repaired and testing resumed without a significant schedule impact.

More recently an issue was found in the aircraft's canopy. Small cracks initiating at the transparency bolt holes were found during an inspection of a high-time flight test canopy. Subsequent inspections of the remaining transparencies from flight and ground testing found

additional small cracks. The program suspended use of the cracked canopies in flight testing to determine the cause and growth rate of the cracks through a detailed investigation. The lack of available flight worthy canopies caused a delay in flight testing beginning on 9 May. This delay lasted until 5 June when test was resumed with an inspected canopy assembly. Additional replacement transparencies are being expedited and flight tests have resumed. The program made productive use of this down time to perform required aircraft maintenance and logistics tests while awaiting the delivery of new canopies.

In addition to aircraft ground testing, engine and aircraft subcomponent testing is also used to verify performance and durability. The amount of subcomponent testing and modeling completed easily makes the F-22 the most tested aircraft system ever developed by the Air Force (Figure 1). This includes more than 45,000 hours of wind tunnel testing, 12,000 plus hours of flight control simulation, over 10,000 hours of radar testing and more than 4,000 hours of signature testing.

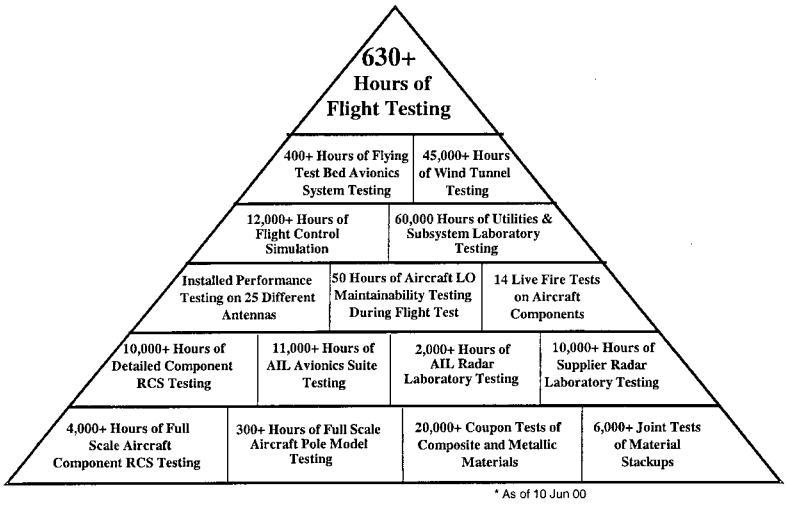

Figure 1. F-22 Testing to Date

In summary, F-22 government/contractor team continues to execute a remarkably successful test program.

AVIONICS DEVELOPMENT

Integrated avionics has been recognized as the critical technical challenge for the F-22. The combining of inputs from on and off-board sensors into a single comprehensive display, which is a first in any tactical aircraft, will provide the pilot with an unprecedented level of situational awareness and a key advantage in a tactical engagement. To meet this development challenge, the F-22 program plan employs a variety of ground and flight test hardware in order to incrementally achieve maturity on the integrated avionics software. While the current integrated

avionics program is technically challenging, the development team continues to meet all critical avionics software and hardware delivery milestones. The current software development schedule, commonly referred to as R-20, was established in February 1999. This plan provides a logical sequence of software development release for (from design through) flight testing on the FTB and F-22. While minor schedule adjustments to the R-20 plan have been made, no major milestones such as Block 3.0 and 3.1.0 software availability dates have been changed. An updated schedule, referred to as R-21, will be released in early-to-mid June. The R-21 schedule aligns avionics software delivery dates with aircraft need dates, maintaining the logical sequence of software development present in the R-20 plan.

The disciplined development approach for the F-22 avionics first uses the Avionics Integration Laboratory (AIL) located at Boeing in Seattle, Washington to verify software functionality and qualify the software release for flight. The AIL incorporates actual F-22 hardware in a ground test environment to determine software and hardware operability and compatibility. The software is tested next in the F-22 Flying Test Bed (FTB) – a modified Boeing, 757 incorporating an F-22 forward section housing an APG-77 radar and a roof mounted F-22 sensor wing - to verify in-flight performance prior to delivery to the test aircraft. A simulated F-22 cockpit is installed in the aft cabin of the 757 in order to evaluate the software with the actual controls and displays. The aft cabin has workstations for 30 software engineers and technicians who evaluate avionics, identify anomalies and, in some cases, even address anomalies in flight.

The current test status of the F-22 software is shown in Table 1.

Block 0 software is currently flying on the flight test aircraft today. This software provides the basic flight controls for the aircraft and is performing as projected.

Software Release	R20.1 Schedule	Flight Test Need Date	Status	Comments
Block 0 - Flying in 2 Test Aircraft • U&S / VMS			Delivered	Software Performing As Expected
Block 1.0 - Flying Test Bed only • CIP / Radar / Mission Avionics S/W			Delivered	Testing Completed
Block 1.1 - First Avionics software load for 4004 • Basic CNI	5/28/99	7/20/99 Power-On	Delivered	~900 KSLOCs Delivered 5/26/99
Block 1.2 - Update 4004 Flight OFP	12/4/99	12/4/99	Delivered	Delivered 12/3/99
Block 2.0 - Flying Test Bed Only (Risk Reduction Software Release) •Radar/CNI/EW Integration •Initial Sensor Fusion •Full Weapons Integration	8/1/99 Single CIP		Delivered	~1200 KSLOCs Single CIP Delivered 7/26/99
	10/22/99 Dual CIP		Delivered	Dual CIP Delivered 10/21/99
Block 3S - Flying Test Bed Only • "Sensor Physics"	6/12/00	6/12/00	Delivered	~1400 KSLOCs Delivered 6/12
Block 3.0 - Flying Test Bed • Full Sensor Fusion	8/31/00	8/31/00	On Schedule	On Schedule
Block 3.0 - Flight Test Aircraft • Full Sensor Fusion	10/30/00	1/01	Accelerating for first flight ~30 Nov 00	~1700 KSLOCs On schedule
Block 3.1 - Flight Test Aircraft • P3300	6/19/01	6/01	On Schedule	~1900 KSLOCs On schedule

Table 1. F-22 Avionics Milestones

Block 1 software, consisting of approximately 900K lines of code, represents approximately 45 percent of the total avionics software. Block 1 introduced radar and enhanced communications, navigation, and identification (CNI) capabilities to the test team. The initial release of Block 1.1 software was made to the production line May 26, 1999--seven weeks ahead of the first "power-on" testing of aircraft 4004. An enhanced version of the Block 1 software, version 1.2, was delivered to aircraft 4004 on time, in December 1999, in preparation for the planned first flight of the aircraft in July 2000.

Block 2 and Block 3S software, which were delivered on or ahead of schedule, are currently being tested in the FTB. These software blocks complete the radar, CNI and EW integration, and sensor tasking, all of which are key to the F-22's performance. This software

load will complete testing in the FTB in August 2000. Block 2/3S software consists of approximately 1.4 million lines of code representing approximately 94 percent of the total avionics software effort.

The Block 3.0 software, delivered on schedule and currently in AIL testing, provides the full sensor fusion and weapons integration for the F-22. This software block will consist of 1.7 million lines of code. Congressional direction prevents the awarding of an LRIP contract prior to first flight of the Block 3.0 software in an F-22. Our Team was able to accelerate this schedule by 140 days to accommodate this direction by Congress. First flight of this software is currently scheduled for November 2000 following initial testing in the FTB beginning in August.

Again, avionics is our key remaining technological challenge. The team has done a magnificent job in supporting critical FTB and aircraft need dates and maintaining critical program milestones. Continued diligent use of the disciplined, phased software development approach provides an unmatched level of software maturity at first flight while

optimizing both cost and schedule for avionics development. Performance over the past year clearly demonstrates the team is taking the necessary actions to protect critical avionics need dates in the development program and ensuring avionics testing proceeds on schedule.

ASSESSMENT OF THE CY2000 PROGRAM CRITERIA

In addition to the flight test criteria mentioned above, the program has a number of other criteria outlined in the 22 Dec 99 Acquisition Decision Memorandum to demonstrate the program's maturity to the DAB decision maker. These include:

- Complete first portion of engine Initial Service Release Qualification Test
- Complete air vehicle Final Production Readiness Review

- Complete EMD Aircraft 4008 fuselage, wing, and empennage mate
- Complete static structural testing
- Initiate fatigue life testing with the goal of completing 40% of first fatigue life
- Complete Critical Design Review for avionics Block 3.1 software

A 38-day strike by engineers and technicians at Boeing Aerospace Corporation impacted the schedules of many of these activities and increased the schedule pressure to complete them prior to the December DAB date. Since the conclusion of the strike on 20 March, the program has reviewed each of the milestones and determined that all can still be completed within CY2000 with appropriate mitigating management actions.

Completion of the DAB criteria is paced by the aircraft assembly process and avionics software development. As part of my monthly reviews of the program, I examine the progress towards meeting these criteria and personally believe that we will be able to complete them prior to the end of the year.

PROGRESS IN AFFORDABILITY INITIATIVES

Cost control is a critical focus with the F-22 team. The Air Force and F-22 contractors are committed to delivering the F-22 within the Congressionally-mandated cost caps. The Air Force and contractor team initiated cost reduction programs in both the development and production phases of the program in 1997 at the conclusion of the Joint Estimating Team (JET). These efforts have already achieved significant cost reductions, which have been documented in contract negotiations and the most recent cost estimates.

In December 1998 the Undersecretary of Defense for Acquisition and Technology approved an Air Force plan to accommodate the projected future development risks, estimated at

$667M, within the EMD cost cap—currently set at $20.5B. The Air Force plan involved a combination of development cost reduction initiatives, scrubbing development costs, application of existing management reserves, and deferral of non-essential combat capability. Since the approval of these initiatives, the Air Force program office and contractor teams continue to closely monitor the realization of cost risks as well as realization of savings initiatives. As of March 2000, $283M of the $667M in cost risks had been realized.

To develop the Air Force Cost estimate for the F-22, we made use of the Air Force Cost Analysis Improvement Group (AFCAIG) process. The AFCAIG chairman is the Deputy Assistant Secretary (Cost and Economics) who reports to the Assistant Secretary Financial Management and Comptroller. Thus, the process is conducted under the auspices of the Air Force Financial Management organization, which is separate from the Air Force Acquisition Management organization. The membership of the AFCAIG includes Headquarters Air Force management and experts from logistics, operations, planning, and acquisition. The AFCAIG chairman is also the Executive Director of the Air Force Cost Analysis Agency (AFCAA) whose personnel are experts in cost estimating and analysis. AFCAA reviewed and separately estimated the cost of major components of the F-22. A team of cost estimators from the F-22 program office and AFCAA reconciled their respective estimates to arrive at the Service Cost Position (SCP). This effort commenced in March 1999 and culminated in mid-November. Approximately 150 man months were expended to develop the Air Force Cost estimate.

We believe the resulting Air Force cost estimate, which was developed using the AFCAIG process, is a high quality cost estimate. The cost estimate is based on F-22 actuals to date and costs are projected using all relevant historical fighter aircraft (F-14, F-15, F-16, F-18, AV-8B).

The review of the EMD program concluded that despite the realization of cost risks since March 1998, the EMD program could be completed within the cost cap. This appraisal is consistent with the General Accounting Office (GAO) assessment in their Mar 2000 report titled "F-22 Aircraft – Development Cost Goal Achievable if Major Problems are Avoided". This report concluded "the Air Force has identified sufficient cost offsets to more than cover all identified cost increases and is aggressively managing the program."

Key to this positive evaluation has been aggressive leadership to control EMD costs and a very effective campaign to implement development cost reduction initiatives. In March 1999, I reported that the F-22 team hoped to achieve $80M in development cost reduction initiatives. To date the actual savings from these initiatives are $150M. The increase in development cost savings offset development cost risks as we complete EMD within the congressionally mandated cost cap.

In using our AFCAIG process to develop a production cost estimate, we estimated the cost of production at $40.8B. This estimate includes $10.2B for the Production Cost Reduction Plan (PCRP) and approximately $1.0B to cover risk associated with the production program and the PCRP. Without the $1.0B for risk, the cost estimate for production is $39.8B, which is at the congressional cap for production. Therefore the AFCAIG's recommended Air Force production cost position is to budget at the congressional cap of $39.8B (Since then adjusted to $37.6B for inflation).

Within the FYDP years there is a high degree of confidence the budget will be met. In fact, the recommended Air Force cost position includes approximately $540M to cover risk in these years (FY00 – FY05). Because there is little difference between the production estimate and the cap in the FYDP years and because there is higher estimating uncertainty in the outyears,

the AFCAIG did not recommend changing the current AF cost position from the congressional cap on production at this time.

Accepting this $39.8B production estimate means we are accepting some risk in the estimates beyond the FYDP years. Although we are accepting some risk beyond the FYDP, we believe it supports and reinforces our management efforts to reduce and control production costs.

The Air Force estimate includes most of the $20 billion in PCRP savings. The PCRPs include a variety of cost savings initiatives such as producibility improvements, process changes, adoption of new manufacturing techniques, and the implementation of Acquisition Reform principles. Both the airframe and engine contractors have programs to continue defining new cost savings opportunities. The dynamic set of cost savings plans are tracked by the Air Force and the contractors in established information systems that identify and measure savings potential and achievement. Air Force and contractors jointly manage the cost savings programs using defined tracking and measurement procedures. Our methodology is quite simple: confirm the required investments have been made, ensure scheduled milestones have been met, and revalidate the basis of estimate. Program cost savings status is also reviewed at periodic meetings between the Air Force and the contractor and briefed quarterly to the Under Secretary of Defense for Acquisition and Technology. The latest PCRP status is shown in Figures 2 and 3.

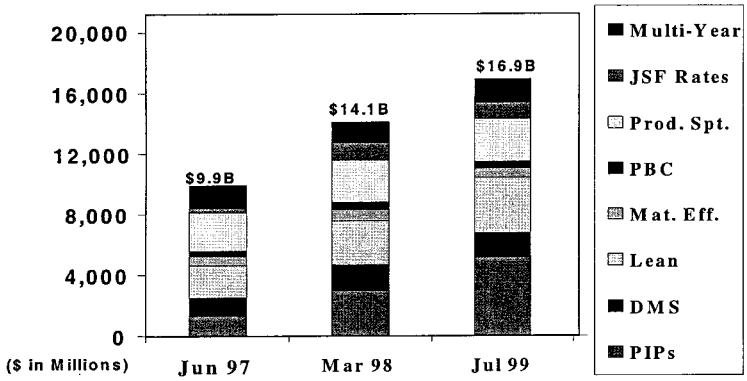

Figure 2. Air Frame Production Cost Reduction Plan Status

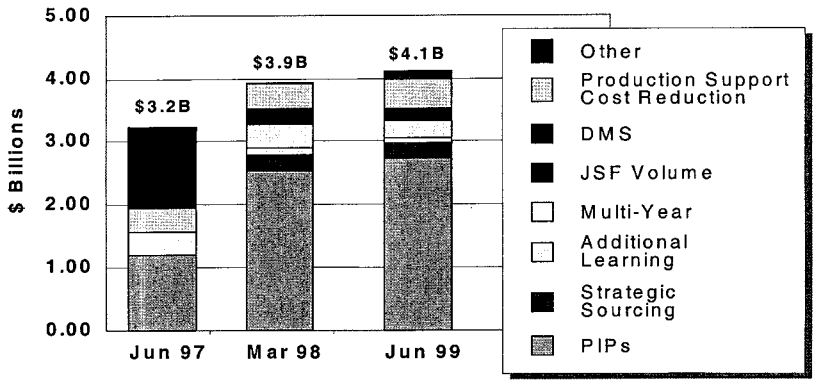

Figure 3. Engine Production Cost Reduction Plan Status

The definitions of the PCRPs categories are:

- Production Support Tailoring: This initiative achieves cost reductions by delaying the establishment of government depot capabilities until the F-22 system reaches maturity. These cost reduction benefits are obtained by integrating support into production at the Original Equipment Manufacturers (OEM's). This strategy will also ensure that the field problems and resolutions will be addressed early and corrections will be incorporated into production as well as fielded hardware. This initiative reduces spares, depot equipment Engineering Change Proposals, and updates to a redundant, expensive capability at the depot until the system matures. The F-22 has defined system maturity as 100,000 flight hours - projected to occur in FY 2008. When this milestone is reached the organic vs. contractor and/or partnerships best value decisions based on actual field values vs. predictions will be made.
- Performance Based Contracting (PBC): PBC flows down acquisition reform principles into subcontractor business arrangements. Examples include Modified Requirements Contracting, Partnership Analysis and Source Selection processes, selective use of financial incentives to motivate cost management, and effective use of Single Process Initiatives. Since the majority of F-22 work is done via subcontractors, significant acquisition reform savings can be achieved at this level.
- Material Efficiency: Utilization of improved and leveraged buying strategies and supplier alliances, such as team-wide and company-wide raw material and hardware procurements, are lowering the cost of raw material and purchased parts.
- Lean Manufacturing and Management: The application of Lean principles optimizes process flows, improves quality, and reduces cycle times and inventories. Lean

application utilizes the "Lean tool kit" developed by academia and industry to focus all involved personnel on the elimination of waste at three levels within the F22 Program - on the factory floor, above the factory floor (office and engineering improvements), and at the suppliers.

Lean training has and continues to encourage idea generation at all levels within the program. Suppliers are demonstrating a strong interest in integrating the Lean principles into their operations.

- Multi-year contracting (MYC): Permitting the acquisition of known requirements for more than one year allows the contractor to conduct production and capitalization planning in a more efficient manner, even though total funds required for subsequent lots are not available at the time of contract award. The F-22 currently plans to use two multi-year periods.
- Impact of the JSF on contractor business base: The increased business base at the prime site and at the suppliers due to the procurement of the JSF will yield savings to both programs through reductions in manufacturing and general and administrative overhead rates. Additionally, the commonality in parts and processes will offer savings to the program. The impacts of the JSF were not included in the Air Force's previous estimates.
- Diminishing Manufacturing Sources: As parts become candidates for redesign because components are no longer being produced, experience shows that the redesign has the potential for reducing recurring unit costs through the utilization of newer, improved technology. This potential for savings is highlighted by the electronics industry.

- Production Improvement Plans: Producibility enhancement projects are key to the long-term affordability of the F-22. PIPs require up-front investments to bring down the unit cost of the system. Examples of existing PIPs are:
    - Inlet Lip Change to Co-Cured Design
    - Machine Canted Frame
    - Wing Skin Clamshell Installation
    - Circular Manufacturing Process
    - Hollow Fan Blade
    - Exhaust Nozzle T-Duct Body Weldmen
    - Single Pass Drilling
    - Use of Commercial Parts for VMS AIM/ADIO and IVSC LDIMs

The Air Force assessment is that approximately one half of the airframe ($16.9B (TY$)) and engine ($4.1B) PCRPs can be considered mature and have been rolled into the production cost baseline. The remaining PCRPs are continuing to be worked and we anticipate that they will meet or exceed the total level of anticipated production cost savings. During the latest cost estimate, the Air Force evaluated the ability of the contractor to meet these savings projections. Table 2 provides our current assessment of the remaining PCRPs to be incorporated.

This analysis concluded that while a few initiatives have not achieved the projected level of savings and have been discontinued in favor of projects offering even greater savings potential, the team also has many examples where the actual savings have exceeded the initial projections. The F-22 has a dynamic production cost savings program and the team does terminate or redirect efforts if they fail to yield sufficient savings or the business case otherwise fails to develop. Overall this assessment concluded that the production cost reduction

	TY$M SCP	TY$M KTR
TRICO AIRFRAME PCRPs*		
PIP	$ 2,407	$ 2,740
Multiyear	$ 1,561	$ 1,540
LEAN	$ 1,350	$ 1,298
JSF	$ 1,050	$ 1,050
Other	$ 412	$ 413
DMS	$ 172	$ 294
SUBTOTAL SAVINGS	$ 6,953	$ 7,335
P&W ENGINE PCRPs		
PIP	$ 2,555	$ 2,723
Multiyear	$ 234	$ 273
Strategic Sourcing	$ 160	$ 251
JSF	$ 155	$ 196
SUBTOTAL SAVINGS	$ 3,104	$ 3,443
TOTAL PCRP SAVINGS (AIRFRAME & ENGINE)	$ 10,057	$ 10,778

* (Trico = Lockheed Martin and the Boeing Corporations)

Table 2. Remaining PCRPs to be incorporated.

initiatives are performing according to plan and will achieve the total level of savings anticipated.

Another technique we have implemented on the F-22 to incentivize cost reduction is the establishment of a target price curve (TPC). The TPC established a set of "stretch" price goals for the PRTV through Lot 4 buys, along with financial incentives for the contractors to make investments in cost reduction projects and earn a return on their investments. The TPC provides up to $151M in incentives to the contractors to reduce the average cost per unit during this

timeframe, and establishes an optimal starting point for affordable high-rate production of 36 aircraft per year in the future.

I conduct a monthly execution review to examine cost, performance, and schedule, and the Undersecretary of Defense for Acquisition and Technology holds a quarterly review as we proceed to the LRIP DAB in December 2000. In addition, all our information is available for oversight by the GAO and all responsible oversight agencies.

In the end, the most important performance measure is the final negotiated contract price. In this case, we have very encouraging results from the PRTV I and II contracts for aircraft and engines. In each case, we not only met the goals established for contract prices and agreed to firm fixed price contracts for these procurements, but our review of the contractor's actual cost performance shows that he is performing at a lower cost which is indicative of the lean thinking adopted by this program back in 1997. Our ability to reach these agreements relates directly to the contractor's confidence to deliver a product that meets the Air Force and DoD affordability objectives.

THE NET RESULT

The Air Force's tactical aviation modernization program is only a part of our overall efforts to build the world's most respected Aerospace Force. We are enhancing our expeditionary capabilities by balancing investments across our core competencies. Our focus is improving the Air Force's ability to project power rapidly, precisely, and globally. The Air Force's unique aerospace superiority, global attack, and precision engagement capability, supported by information superiority, rapid global mobility, and agile combat support, will produce a force capable of delivering decisive combat power whenever and wherever needed.

Not everyone agrees the F-22 team can meet the technical, cost, and schedule challenges ahead. However in 1999, the team had a clear yardstick by which to measure its performance and once again met every challenge. This year we take head-on the challenge of avionics development, demonstrated producibility, and continuing cost control. The F-22 team is committed and working hard to again succeed in meeting the challenge.

The F-22 program is on track to meet all cost and performance parameters including the cost caps. The program continues to meet or exceed all critical technical requirements. Senior Air Force and industry leaders are confident the F-22 program will meet its production cost targets and remain within its cost cap, provided program funding remains stable. The warfighter will receive the F-22's revolutionary capabilities on-time at an affordable cost, thus ensuring air dominance in future conflicts.

The American people expect the Air Force to dominate the sky. This is based in large part to the reality that there has not been any American service soldier killed by enemy aircraft in over 40 years. As long as the United States is able to dominate its enemies, the United States can achieve its objectives with minimal casualties. While some have said that the cost of current fighter modernization programs is too high, the cost of not having air dominance is unaffordable. The F-22's true value must be measured in American lives saved through dominance of the skies in future combat and also by conflicts prevented because other nations understand and fear our unmatched combat power. In order for the United States to maintain aerospace superiority in the next century we must field the F-22 and JSF.

Mr. SHAYS. Thank you very much.

Why don't I let Mr. Tierney ask questions, I'll go and vote, and then I'll come and ask questions. Because we want to be done before 1 o'clock, so I'll quickly vote. You have the gavel, Mr. Tierney.

Mr. TIERNEY. Good afternoon. I apologize for being out of the room for most of your testimony, because I had other duties. If I'm repetitive at all, I hope you'll bear with me.

I'm a little unclear as to what the Air Force production cost estimate actually is. I thought in your statement, as I read it, anyway, it said that the production cost estimate is $40.8 billion.

Mrs. DRUYUN. The official service cost position for production is $39.8 billion. As I explained, sir, while you were out, we put together what's called an, we used the Air Force cost analysis group to develop the service cost position. The group, in doing their analysis and developing an official cost estimate for this program, estimated the cost at $40.8 billion, which included $1 billion of risk in the out years, of risk that was unidentified.

Without that $1 billion for risk, the estimate is $39.8 billion.

Mr. TIERNEY. Can I interrupt you just a second? Can you tell me what that $1 billion in risk was for?

Mrs. DRUYUN. The $1 billion in risk is basically for the kind of unknowns that potentially might occur.

Mr. TIERNEY. And wouldn't generally, if you were going to do a project like this, wouldn't you try to keep that number at least somewhere at 10 percent or around there, the risk number?

Mrs. DRUYUN. I think clearly the philosophy that we are using and I think have used very successfully in managing this development program since the cost cap was put in place is to manage risk. And that is the philosophy that we have been using.

If I could give you an example, the EMD cost cap that was established by the Congress back in September 1997, the EMD cost cap is basically $18.9 billion. We're 85 percent through the completion of our development contract. We saw potential, as I testified last December, for cost increases. We have very aggressively worked what we call development cost reduction initiatives, which we have put in place.

And those development cost initiatives parallel what we are doing on the production side of the house. And those development cost reduction initiatives today still show that we are within the cap. They are working, they are paying off.

Mr. TIERNEY. Getting back to my point, you had $1 billion in there that you said was a risk factor, but there was no identifiable risk at the moment, it was just in there as sort of a precautionary measure?

Mrs. DRUYUN. It's basically tied beyond FYDP. Within the future 5-year defense plan, planning process that we go through, if I were to show you the service cost position, you would find that we have basically $540 million worth of risk built into that program for the first 5 years. Beyond that, when the service was developing its cost estimate, there is a potential, as there is in every program, for unknown, unknown risks, not well defined at this time.

What I learned a long time ago is that you need to basically focus in on managing that risk. And if you were to sign off to an additional billion dollars risk, my 31 years of experience has clearly

shown that it turns into reality, that it turns into a self-fulfilling prophecy. Because you take the pressure off the contractor.

And this is like trench warfare in terms of dealing with cost. You cannot and we will not take the pressure off the contractor. We have to change the way we do business within our defense industrial base if we are to survive. And that's why the initiatives that we have laid in place, which clearly focus in on lean, we're following the example set by the automotive industry where they basically reinvented themselves.

And that is the philosophy that we're using in managing this program. And as far as I'm concerned, that philosophy is working. It is working in development. As a matter of fact, if you would put that one chart up that shows my latest earned value data in my development program, what you would see from this particular chart, that blue line up there, is that my costs are doing better than what I had predicted at this point in the program. And my schedule is also doing better than what is predicted in this program.

And it takes just consistent, persistent dedication to keep everyone clearly focused on what the issues are and work their way through. I don't want an escape mechanism. I don't want an escape valve. And that is the philosophy of our Assistant Secretary of the Air Force as to how we manage these programs.

Mr. TIERNEY. Whose philosophy was it before when the billion dollar risk factor was put in?

Mr. KAMMERER. It was basically the Air Force cost analysis group, estimating group. They are people that work for me in the Air Force cost analysis community.

We have a chart on risk here that I'd just like to show you——

Mr. TIERNEY. So it was the same group that put that in there. And can you then tell me——

Mr. KAMMERER. It was the same group that put it in there——

Mr. TIERNEY. You were going to tell me what the basis was for them putting it in there. What were they figuring they were going to need that billion dollars for?

Mr. KAMMERER. Well, you have to understand the process that we go through. But it's a complex cost estimating answer, I'd be glad to explain it to you.

But what we do is, as we're estimating, every component of the airplane, we try to estimate what we think is the most that this component can go up to and what's the least it could be and what's the most likely cost. We put that in for every component at a very detailed level. And then we convolute those distributions into one distribution that shows what the distribution of cost looks like, from high to low.

Because you know, there is no point estimate really. Cost estimates should really be reflected as a range from here to there.

Mr. TIERNEY. So with the billion dollars in, is that the high range?

Mr. KAMMERER. The billion dollars would take you from the point of our point estimate, which we estimated at $39.6 billion, actually a little below the cap, and it would take us up to an area where we call our 50–50 estimate, 50 percent of a chance it would

be below that estimate or 50 percent of a chance of being above that.

Mr. TIERNEY. For the fudge factor.

Mr. KAMMERER. The chance of, if for example, we ended up at that $40.8 billion, the chance of getting from $39.6 billion, which we originally estimated, up to the $40.8 billion, is about 15 to 17 percent. So it's not a large thing. It's not as the GAO testified two-thirds that the estimate's going to be exceeded. There's a very small difference between that. I have a chart that shows that, and shows you the process.

This is part of our complex cost estimating business that we do.

Mr. TIERNEY. I guess what I'm trying to get at, at one point you thought it was necessary to put the billion dollars in, because there was some likelihood that you could go over on some of these components. Now you're telling me that you've readjusted because you no longer think you need the billion dollars.

Mr. KAMMERER. No, that's not what I'm telling you.

Mr. TIERNEY. OK, tell me again.

Mr. KAMMERER. What I'm telling you is that if we wanted the estimate to be at the 50–50 estimate, we would call it $40.8 billion.

Mr. TIERNEY. And that's what you did at one point.

Mr. KAMMERER. That's right. That's the estimating process. When our AFCAIG met, including the headquarters people from Air Force, of which I'm the chairman of that, we decided to leave the estimate at the cap because we did not want this to be a self-fulfilling prophecy. We did not want to give the contractors a chance at another billion dollars. We said, look, let's keep the estimate down at the cap, so that we put the pressure on the contractors and the pressure on ourselves to bring this in at what we originally said we were going to bring it in for.

Mr. TIERNEY. Thank you. I'm going to yield to Mr. Barr.

Have you voted yet?

Mr. BARR. Not yet.

Mr. TIERNEY. OK, then we're going to recess for a second until Mr. Shays gets back, and we're going to try to run down and vote.

Mr. BARR. Let me just ask you a quick question here. Mrs. Druyun, should we in the Congress have any reason to suspect the F–22 program will not be completed within the current EMD cost caps?

Mrs. DRUYUN. No, sir. Our official position within the Air Force is that this program will be completed, as we see it today, within the cost caps established by the Congress. When you look at the production cost reduction initiatives that we have laid in place, we have, and I would invite you, sir, next time you're in Marietta, GA, to go look at the electronic data base that contains all of the data on every single one of these initiatives.

And it tracks it through from PRTV1 until the Lot 12, and every single one of those initiatives is laid out. It explains what the initiative is, who the owner of the initiative is. It is updated, as I understand it, every 2 weeks. And we use that as the basis to continually understand where we are in the process.

The other thing I have to emphasize, it's a journey. It's called continuous improvement. The contractors, particularly at the subcontractor, the vendor level, are actively engaged in this. And on

a daily basis, as they go through performing their work, as they find better ways of building a part, for example, that data rises up. It is carefully examined, and if it looks like it is something that is doable, it is either, it is laid in either as something that is implemented. And if it's implemented, it means it's actually on contract. It's actually in our baseline today.

Many of these initiatives today have been implemented on PRTV1 and PRTV2, which are on contract. And as I said to you earlier, we get cost data, even those with firm fixed price contracts, we get cost data to track what is actually happening. And what is actually happening are things like, it's taking fewer final assembly hours to put these airplanes together. So the data is clearly showing that the contractor, as we see it today, is clearly exceeding the goals that we set out for him in terms of cost reduction for these first two PRTV contracts.

And that's the philosophy that we are using as we go through and manage this program.

Mr. BARR. Thank you, Mrs. Druyun.

Thank you, Mr. Chairman.

Mr. SHAYS. Does the gentleman have other questions?

Mr. BARR. I'd better go vote.

Mr. SHAYS. Any question you want to ask that you want me to listen to?

Mr. BARR. I was glad you were here for that one. Thank you.

Mr. SHAYS. OK.

I'd like to just kind of anchor onto something and then go from there. This is from the statement of the draft report of the GAO. And both of you have that at your desks, so you can look at it there. These are numbers, I think, that you both should be pretty familiar with.

Dr. Schneiter, do you have a copy?

Mr. SCHNEITER. If it's the tables, I think we do.

Mrs. DRUYUN. We are sharing a copy.

Mr. SHAYS. OK, thank you.

Just so I can anchor down here, with the Air Force, I look at the Air Force estimate at $51 billion, and that includes, am I correct, the already implemented, which doesn't mean all the savings have occurred, but we're looking out at the future cost anyway. But the part that's been implemented, that $51 billion figure represents the $10.2 subtraction of the implemented, which is the chart on page 6 of—it's in the report. There are two reports. Maybe you could just rip out those two pages, because that's what I'm making reference to.

I have table two, production cost estimates for the F–22, and table one, status of contractors production costs.

Mr. KAMMERER. In each one of those numbers, Mr. Chairman, the $51 billion does include implemented PCRPs. However, it does not include all of the $10.2 billion. Those $10.2 billion were——

Mr. SHAYS. How much does it include of it?

Mr. KAMMERER. It includes, and I'll have to give you a rough estimate of this, because we don't have an exact estimate, but our rough estimate is between $6 billion and $7 billion.

Mr. SHAYS. Of the $10.2 billion?

Mr. KAMMERER. Yes. And the reason it doesn't include it all is because as we did our estimate, we evaluated what should be in and what should be out.

Mr. SHAYS. Let me back up, then, let me go to the status of the contractors production cost reduction plan.

Mr. KAMMERER. OK.

Mr. SHAYS. I'd like to hear both your opinion of that chart, Mr. Schneiter, and then Mrs. Druyun or Mr. Kammerer. Dr. Schneiter, what does this chart say to you, this table, rather? This is the one with the reasons for reductions implemented, to be implemented.

Mrs. DRUYUN. If I could answer that, Congressman Shays, this is a contractor chart. This is how the contractor has captured his estimates of where he is in terms of these production cost reduction plans, where they have been implemented or where they remain to be implemented.

We do have a common definition of what we mean by implemented, and I know that was a question you asked earlier. And what we mean by implemented is, I either have a firm fixed price proposal in hand that recognizes the impact of those cost reductions, or the contractor has basically reduced the standard number of hours allocated to a specific task which would correspond to the reductions that he would be signing up to, or the reduction has been negotiated in a forward pricing rate agreement. These are negotiated for all of our major contractors at their particular plants.

Or the reduction has been negotiated with a subcontractor or vendor. Or finally, the impact of the reduction has been reflected in a current contract price, either with the prime or with its suppliers. That's what we call implemented. If it doesn't fall within those categories, then it's in the to be implemented column.

Mr. SHAYS. So this doesn't represent your—you don't accept $10.2 billion, then?

Mrs. DRUYUN. No. This is the contractors number. Our service cost position had a different number.

Mr. SHAYS. What is that number?

Mr. KAMMERER. Well, as I mentioned to you, sir, our best estimate of that number, because we started from a baseline, and we had to estimate how much was in there, but our best estimate of that number is between $6 billion and $7 billion.

Mr. SHAYS. If we are between $6 billion and $7 billion, well, then how much to be implemented? Where do you estimate that number to be?

Mr. KAMMERER. We estimate that number to be $10.2 billion.

Mr. SHAYS. OK. How do you get to $21 billion?

Mr. KAMMERER. The $21 billion is the number of $16.9 billion from the contractor for airframe avionics, Lockheed, and the $4 billion added to that to get $21 billion is from the engine contractor.

Mr. SHAYS. But given your numbers, that doesn't jive.

Mr. KAMMERER. That's right.

Mr. SHAYS. So?

Mr. KAMMERER. So we had a different baseline that we started from than the contractors.

Mr. SHAYS. What was their baseline?

Mr. KAMMERER. What was their baseline?

Mr. SHAYS. Yes.

Mr. KAMMERER. I do not know what their baseline was. I know that whatever they started at, they predicted that they could get $21 billion. We could supply that for the record.

I'm here basically to defend our Air Force estimate.

Mr. SHAYS. OK, let me just say this to you. I understand we're not going to answer some questions and this is a work in process. But I want to have some confidence that we're not just guessing, and that you're not just bringing everything under to be under the cap. And we have no way to evaluate. How do we evaluate? Trust me? It's like me standing up and saying, trust me, I'm a politician. It just doesn't work.

And frankly, saying trust you, you're in charge of this program, I can't do it that way.

Mr. KAMMERER. My point is that the important number to start at is the number that the GAO showed in their table two. Because these PCRPs have been rolled into the estimate, we're saying that $51 billion is what that would be without implementing those that have yet to be implemented. And then we say, take the $10.2 billion off of that, and that's where we get down to our $40.8 billion estimate.

In other words, everybody starts from the same baseline, the OSD people started from the baseline, saying there is a certain amount of these PRCPs in their baseline also.

Mr. SHAYS. Dr. Schneiter, I'm getting an uncomfort. My uncomfort level is that basically, we have different baselines. We have a disagreement within the family that you weren't able to work out, evidently. And I don't know if either of you are right. Tell me, I don't know what is the first question I want to ask. I would like you to sort out the disagreement you appear to have with the Air Force.

Mr. SCHNEITER. Let me comment. First of all, the OSD estimate is an independent estimate. We work very closely with the Air Force. Our cost estimators are in, I think, close to daily contact with them. And we do that to make sure we have a common data base, and that we have the same information to go on.

Once that's done, however, we make an independent estimate; it's our job to do that. And it may be done using different methodology from that of the Air Force. If we did the same thing they did, it wouldn't really be independent.

When we do that, the fact that we do that is part of the reason that Mr. Li and others have difficulty comparing the two, because they're done in a different way. So it's very hard to make such a detailed comparison.

But the chart that was table 2 of the GAO testimony tells the story roughly as it exists at this point. And that is that the OSD estimate, setting aside the cost reduction initiatives still to be accomplished, or implemented, is somewhat higher than the Air Force estimate. If you look at that table, it's about $3.7 billion. And that's due to different assumptions that are made in terms of how we extrapolate from the data that we have collected on actual costs.

We have a little bit of data at this point from the EMD and the PRTVs. What we have to do now is go way out, a decade, estimating from that. We have different approaches to doing that and dif-

ferent assumptions. And that results in that top-line difference, the $54.7 billion and the $51 billion. And that already takes account of the implemented cost-reduction initiatives.

The second row is the difference in assumptions in terms of what will be realized from the cost-reduction initiatives that haven't yet been implemented. And that shows up here as about $4 billion. And that basically is a judgment call between the Air Force and the OSD cost estimators. And we tend to be less optimistic than they.

Those two things combined result in the $7.8 billion difference that you see there.

Mr. SHAYS. The last thing I would want to suggest is that as an independent organization that you would conform your numbers to the Air Force. But the fact is that you did it independently and you came up with a different number. You had the same basic facts and you came up with a different number based on different assumptions.

So how am I to interpret that from your standpoint?

Mr. SCHNEITER. I'll tell you how we interpret it. We interpret it that there is certainly some risk associated with meeting the numbers that are in the budget currently and expected in the out years.

But also, we strongly want to encourage the Air Force actions in the program to meet what they say they think they can meet. And we won't know until we get successive contracts actually negotiated how that's going. If those negotiated contracts continue down the line that Mrs. Druyun showed during her testimony, then we would in fact end up at the Air Force estimate. It's too early at this point to say.

Mr. SHAYS. I had a friend who said, I may not be right, but I'm never in doubt. You come across as being very convinced that you're right. You have a strong sense that you don't have much doubt about your numbers.

But how do you respond to the Secretary's office coming up with $7.8 billion more in costs than you do?

Mrs. DRUYUN. I think Dr. Schneiter has done a very good job of describing what some of those fundamental differences are. When you go back to that GAO chart, table two, when you go back to the GAO chart, there obviously are big differences with respect to the issue of not implemented PCRP savings.

And I guess I would like to go back to my chart four and remind you what we set in place in 1997 and where we are today with respect to what we set in place in 1997.

Mr. SHAYS. That chart doesn't have any numbers to it.

Mrs. DRUYUN. No, but I can certainly——

Mr. SHAYS. It's basically meaningless to me without numbers.

Mrs. DRUYUN. I can certainly fill that in for you. When we set out our numbers back in 1997 for PRTV, what is now PRTV1, PRTV2, and we're getting ready now to receive the lot 1 proposal, the fact remains for PRTV1 and I'm looking at, I believe it's an average flyaway cost of about $310 million a copy, this is part of our learning curve and this is basically what we have laid out here as a learning curve that we need to achieve to ensure we can deliver airplanes at the $39.8 billion cap.

So we put that on contract 3 years later, and as you can see from what I'm basically showing you, what we put on contract, our data today, PRTV2 is about 25 percent complete. When we put that on contract, we basically thought the contractor would make no profit, as I said earlier. Today our cost reporting data which I get on this contract shows that we expect he will make some profit upwards to the range of about 6 percent.

We put PRTV2 on contract back in December 1999, approximately 6 months ago. And our cost reporting data shows that the actuals that we are seeing on that contract today are better than what we had expected.

And so, this is how we build confidence. We laid this out 3 years ago. The first two efforts that are on contract are firm fixed price. And we were able to put on contract and establish a learning curve and we're coming down that learning curve. The lot 1 proposal is due next month, and I expect in December when we have finally negotiated that effort and we're ready to put it on contract, which will be our low rate initial production, I am very confident——

Mr. SHAYS. Can I ask, how is this responsive to my question, though? I'm hearing you, but I don't understand how it responds to my question.

Mrs. DRUYUN. Our confidence, my confidence, comes from the fact that we brought PRTV1 and PRTV2 in on the Air Force estimate, and in on the target prices that we established 3 years ago. We also have a very extensive electronic data base that tracks every one of the production cost reduction initiatives. And we are able to status exactly where we are, whether they have been implemented and to continue to track them through.

And that is the philosophy that we use in this program. We identify it when it goes on contract. We track it and we continue to update our cost estimate to ensure that it is going to yield the savings that we basically feel are necessary to keep this program within the ceiling price established by the Congress.

Mr. SHAYS. In 1997, you came in with $13 billion potential cost overruns. In 1999, you had $16 billion, and now we're looking at $21 billion. The trend line is up. Why shouldn't I not conclude that we're losing ground?

Mrs. DRUYUN. These are cost reduction initiatives.

Mr. SHAYS. Right. But there's a reason why you need to do cost reduction initiatives.

Mrs. DRUYUN. It's called continuous improvement.

Mr. SHAYS. No. You are making these improvements because you have overrun costs. Let me just make sure we're not playing a game here. I want you to find ways to save money. But don't come and tell me that the program is going to cost more and more and more and then you have to make cost reductions and that's a sign that we're making progress. That's idiotic.

Mrs. DRUYUN. Sir, if you were to go back to the original ceiling that was established in law, you would find that there have been a number of adjustments to that ceiling. One of them is for inflation. Inflation that's used in preparing our budget estimates continues to decrease. That's why that cost cap is basically decreased.

Mr. SHAYS. The cost cap is decreased?

Mrs. DRUYUN. Well, the cost cap originally was $43.4 billion for production.

Mr. SHAYS. For the same number of planes?

Mrs. DRUYUN. Yes, sir. And today that cost cap, with 333 airplanes, remember 6 were funded in EMD, so we shifted it to EMD per congressional direction. That cost cap was——

Mr. SHAYS. We didn't shift costs to the outer years so they don't show up?

Mrs. DRUYUN. No, sir. Absolutely not.

Mr. SHAYS. OK. So your response to me is that you're happy that we've brought the cap from $43 billion to $39.8, is that your point?

Mrs. DRUYUN. No, sir.

Mr. SHAYS. I want to make sure ultimately I get my question answered. You have a keen way of making sure I know what you want me to know. And I have never not allowed a witness not to have that opportunity.

But what I do want to know is, we were looking at costs of $13 billion in 1997, cost reductions to $16 billion to $21 billion. Are you saying of the $21 billion, $3 billion of it or $4 billion of it was to get the cap lower?

Mrs. DRUYUN. No, sir. It is to ensure that we stay within the cap.

Mr. SHAYS. And the reason why we have to make these cost reductions is the program is becoming more expensive than we anticipated. Therefore we had to make these cost reductions.

Mrs. DRUYUN. No, I would not characterize it as the program becoming more expensive. Part of the phenomena that we see here is called inflation.

Mr. SHAYS. No, the $21 billion, then let's just deal with the $21 billion. That $21 billion is a description of what?

Mrs. DRUYUN. The $21 billion is a description of the cost reduction initiatives that the contractor has identified today and is actively pursuing——

Mr. SHAYS. In order to stay within the caps, correct?

Mrs. DRUYUN. In order to stay within the caps or come below the caps.

Mr. SHAYS. OK, fair enough. Let's find the areas where we agree and then we'll find the areas we disagree.

But the bottom line is that the program was looking more expensive and we had to find more ways to cut costs to stay within the caps. I believe that the Air Force should be congratulated anywhere we can make cost reductions. And the contractor. And I want you to rejoice in those areas.

Given that I'm not an opponent of this program, though I will become on if I find that ultimately we are underestimating costs that we can trip our way into a big program and then later on, when someone else is taking your place, they'll say, well, I didn't make those estimates and they were wrong, and a lot of good that will do the country.

I'm even willing, and I was going to say this in the beginning, I'm even willing to say this program should be, we should have this program if it costs $45 billion. In other words, I'm open to that view. Because I think it is an important program.

But what I'm not open to is some kind of sense that we have this cap that we're going to stay under. What it looks like on the out-

side looking in is that the Air Force wants this program so much that it is going to find every way to tell the committee that they're going to meet the cap, and yet even within DOD, we have the Secretary's office saying, you know, we may not meet the cap.

And so I think you can understand from my position that I could come to that conclusion. I want you to tell me how you're proud of this program and all the cost savings that you're going to make and I don't belittle that. But I wanted an answer to the question. And the question was, when we first were looking at this program, we didn't expect that we had to make these $13 billion worth of costs, or maybe we thought we had to make some of it. Then it looked to $16 billion, another $3 billion, and now we're looking at another $5 billion in just 1 year.

And the $16 billion to $21 billion I don't think is related to our reducing the cap, it's to stay within the cap. Isn't that correct?

Mrs. DRUYUN. No, sir. The reasons why the cost reduction increases continue to, that we've identified, continue to increase, so that we can stay within the cap, and the cap continues to come down. The cap today is $37.6 billion.

Mr. SHAYS. Now, isn't the $39 billion to $37 billion in part because we're going to do six less planes?

Mrs. DRUYUN. Yes, but——

Mr. SHAYS. OK, wait, let me just interrupt you a second. When I see that happen, then I begin to doubt other things you're saying. I mean, that's unfair. We're making less planes, so obviously the costs are going to come down. Right?

Mrs. DRUYUN. Yes, however, if I can answer the rest of the question, part of that is inflation. $600 million of that is inflation. That's the part that I have to continue to offset. The inflation rate that basically is used is in the neighborhood of about 1.1 percent.

Mr. SHAYS. Well, let me ask you this.

Mrs. DRUYUN. The real inflation that we see in this program is about 3 percent. When you look at the cost of people——

Mr. SHAYS. I'll try to follow you here, and we're going to finish in 10 minutes. What I'm trying to logically follow is that when you mention inflation, then I will make an assumption that we're going to have to even make more than $21 billion of savings?

Mrs. DRUYUN. If inflation continues to come down, the indices that we use——

Mr. SHAYS. Down or up?

Mrs. DRUYUN. If inflation indices continue to go down, I obviously will be forced to work even harder to find offsets because in reality——

Mr. SHAYS. Is that realistic? I mean, I just want us to be realistic?

Mrs. DRUYUN. Is it realistic? Well, as far as I'm concerned, it's reality that we have to deal with.

Mr. SHAYS. No, no, but reality may not be realistic. In other words, your ability to deal with that may not be realistic. Reality may just, I mean, why wouldn't we make an assumption right now that the program, over the course of it is, we're going to have this much inflation and this is what it's going to cost us?

Mrs. DRUYUN. But the inflation, sir, if you look back in the history of how inflation is done over the last 20 years, you would find

it goes up and down. What we have seen for the last several years is that the inflation number has been going down. And remember, we're estimating through 2011.

Mr. SHAYS. Let me just take that point. I thought you were telling me inflation was going up and that you had to make further cost reductions.

Mrs. DRUYUN. No, no. The inflation factor that I have to use in doing our cost estimate has been going down. It's gone like from 1.5 percent down to about 1.2 percent.

Mr. SHAYS. When you say you have to, in other words, that's what you're required in law to do?

Mrs. DRUYUN. Yes, those are the rates that are set that we use.

Mr. SHAYS. Right. I'm asking a different question. I'm asking a logical question that the rates you have to use may be different than reality.

Mrs. DRUYUN. Yes, they are.

Mr. SHAYS. And what is really bothering the hell out of me is that when I'm talking about inflation, you want to talk about the inflation rate that you have to meet. I want to just talk about inflation. Inflation costs go up. And I want to know, I just even want to know if the $39 billion is a real, $39.8 billion, is or was a realistic number. And I just want to know that. And that's the question I asked you.

So is it logical that costs are going to keep going up every year? And the answer would logically be yes, right?

Mrs. DRUYUN. Sir, let me just answer it this way. The $39.8 billion estimate, which is our official service cost position that we have put together, I believe is realistic today. Now, will that be realistic if inflation were to go down to a half a percent and I still had to continue, contractors still continue paying in the neighborhood of 3 percent when you get into the out years? There's a point in time when it does become next to impossible to be able to offset it.

Mr. SHAYS. Who sets that inflation rate?

Mrs. DRUYUN. That inflation rate is basically set by the Office of Management and Budget.

Mr. SHAYS. And that's the so-called allowable inflation rate that you were given?

Mrs. DRUYUN. Yes.

Mr. SHAYS. As opposed to the reality of what inflation really is?

Mrs. DRUYUN. Yes, that's correct. And the problem is in the area, it's not materiel cost. The problem is in the area of people cost. There's a very short market of people out there. There's a shortage of people and contractors are paying higher rates than 1 percent.

Mr. SHAYS. I understand that. I understand that you have inflation on people and you have increased costs for fuel. You have a lot of reasons why the costs may go up. And if the costs went up to $45 billion, there could be very logical reasons why the costs could.

The question is, is it logical, and that's what I'm trying to see, is it logical that we will be able to stay under the caps. You are giving us a story that we'll be able to stay under the caps. But even as we have this dialog, I get less comfortable that you'll be able to.

Mrs. DRUYUN. With the current cap that was established, that we have today which is $37.6 billion, it translates close to what was the $39.8 billion. The $39.8 billion, as you recall, went down because of inflation and the rest was because airplanes were moved into the development side rather than the production side. Today, we believe that's a realistic cap and that we can live within it and deliver 339 airplanes.

But the big challenge in the future is obviously for us inflation.

Mr. SHAYS. What I would like you to ask you to do is be able to give us a more accurate number. I'd like to understand your base. I'd like to understand, Dr. Schneiter, your base. And then we'll convene in a month. Let me ask you, how long will it take us to come back and do this? I would like to nail down what numbers you use as your base, Dr. Schneiter, what numbers you use as your base.

And I'd also like to understand what numbers of the $21 billion, I'd like to know what numbers you use and what numbers you use as already being implemented. Meaning, the very helpful, Mrs. Druyun, your helpful explanation of your number of firm fixed prices and your contract prices and so on, what is implemented and what is to be implemented. And I'd also like if we could have numbers on this.

I don't think we're going to resolve all my questions, but what we'll do is we'll come back in a month's time and we'll try to sort it out. And I'm not asking, Dr. Schneiter and Mrs. Druyun, that you all conform your numbers, because you both are going to give us different assumptions. So that's not what I'm asking. But I'm interested in knowing that.

And I would love to just ask you, would you just respond, Mrs. Druyun, to the GAO's concern that you're not giving the cost estimates in your reports to the Secretary? Is that something that I should be concerned about or not?

Mr. SCHNEITER. I can comment on that. I think OSD has been well informed in terms of the status of these. As I indicated earlier, at the working level, we certainly do that on an almost daily basis. What gets reported in the quarterly meetings to Dr. Gansler depends in large part on what's changed since the last report. I think we probably have not focused on these much in the last couple of meetings, because really nothing had changed from what we saw before.

Mr. SHAYS. Is it an unfair request for me to ask you that these be done on a quarterly basis? Then it becomes a more public document, correct?

Mr. SCHNEITER. I don't think it becomes a more public document. Those are internal reports to Dr. Gansler.

Mr. SHAYS. Well, it becomes a document, I would ask you to do that. It becomes a document that more information is in one document that we can then turn to, and it helps us do evaluation. Is there any reason not to expect that, Mrs. Druyun?

Mrs. DRUYUN. There is no reason why we cannot officially give a report to Dr. Gansler. But I would also like to supply for the record, sir, all of the meetings that have occurred between the OSD staff and the Air Force staff looking at these production cost initiatives. I don't think the GAO has quite captured the amount of ex-

change and the amount of examination that has gone on and continues to go on, literally on a monthly basis.

Mr. SHAYS. I think that you would agree that when they come in from the outside, though, it's a little harder to track a daily conversation on what transpires, and it's helpful to have periodic reports that they can then have, you know, grab onto. And I would think that's something that obviously this committee would be interested in as well.

Mrs. DRUYUN. Certainly.

Mr. SHAYS. Let me do this. Let me—I'm not adjourning this hearing, we will conclude it, and we will call another hearing, working it out with your schedules in a month or so, give or take, where we can go over these numbers in more depth. And I would just say that our committee will try to write a specific request of the things that would be helpful so there will be no misunderstanding. And we'll try to get that to you in the next few days.

Mr. KAMMERER. Just one point that I want to add, Mr. Chairman. If you take a look at the numbers with the implemented——

Mr. SHAYS. Which one am I looking at?

Mr. KAMMERER. That's table two of the GAO report on page 10. If you take a look at the numbers at the top line there, between $54.7 billion and $51 billion, the difference of $3.7 billion on a base of $54.7 billion or $51 billion is a very, is well within cost estimating differences. In other words, that's a 7 percent difference. And that is a number between us and the OSD that is well within cost estimating uncertainty. You cannot do much better than that.

Mr. SHAYS. Right. It would just be interesting to know where your differences are.

Mr. KAMMERER. I can explain pretty much where the differences are. I'll plan to do that the next time we testify.

Mr. SHAYS. We're not going to do it in the next 3 minutes.

But is the confidence level, this is something that counsel is asking me, what should be the confidence level; 7 percent, 10 percent, 5 percent?

Mr. KAMMERER. Well, if you're within plus or minus 10 percent, usually cost estimators say if you're within plus or minus 10 percent, that's a pretty good number.

Mr. SHAYS. So if this project costs us $44 billion in the end, versus $39 billion or $40 billion, then——

Mr. KAMMERER. Yes, sir. Now, there are some good reasons why estimates should vary more than that. For example, if we were both in agreement on the production cost reduction programs [PRCPs], if that was within 7 percent, then that whole estimate would be within 7 percent.

Mr. SHAYS. Mr. Kammerer, I am more comfortable with your comment, believe it or not, than you may realize, because that's more reality for me. But what that says is that the $39 billion figure, it puts it in some perspective. And it does put, Mrs. Druyun, your extraordinary confidence that you're within this cap, it gives me a different perspective as well.

I've never known us though, I've never known us to usually underestimate costs, though. That's what makes me concerned.

Mr. Tierney, what we're going to do is we're going to come back, because we have to vacate this room at 1, and we're going to have

a hearing in about a month to go over the numbers in more detail. We'll invite your staff to also help us in the letter drafting.

Is there any comment that any of you want to make before we get on our way?

Mrs. DRUYUN. We look forward to having a follow-on session. I would suggest perhaps if we had a pre-session with your staff, it could be very helpful to understand the differences in baselines.

Mr. SHAYS. I think we'll need to do that, yes, I agree.

Thank you very much. Let me ask you, have there not been communications with my staff on these issues? Your people have sat down with our people, right? This would not be the first time?

Mrs. DRUYUN. No, we have sat down before. But I think we know what your issues are, I think we can really zero in on them.

Mr. SHAYS. I just wanted the record to not make an indication that part of the problem is that we haven't been sitting down with each other. So I just want to make sure of that. We're happy to do that, and I think it's a good suggestion.

I thank all of you for coming, and we'll be back.

[Whereupon, at 12:55, the hearing was recessed, to reconvene at the call of the Chair.]

[The prepared statement of Hon. Helen Chenoweth-Hage follows:]

Statement of Congressman Helen Chenoweth-Hage
Subcommittee on National Security, Veterans Affairs and International Affairs
Committee on Government Reform and Oversight
B372 Rayburn House Office Building
June 15, 2000

Thank you, Mr. Chairman. I appreciate the committee for holding this hearing concerning "*F-22 Cost Controls: Will Production Cost Savings Materialize?*" Today, I look forward to hearing more from our panel of witnesses about the financial impact of the production cost reduction plans and the feasibility of staying within the production cost estimates.

Mr. Chairman, what I have found *most* disturbing about the whole production process with respect to the F-22 is the continual lowering of production targets while the cost has generally continued to grow.. It is simply amazing to me that we have *reduced* production goals from 750 in 1991 to 333 today, while development cost now *exceeds* sixty billion dollars!

These are disturbing facts, Mr. Chairman, and, we cannot avoid them. That is why the aggressive implementation of production cost reduction plans are so important to the survival of this program. However, at the same time, we must confirm that these production cost reduction plans will actually achieve their stated objectives. It has seemed to be extremely hard to determine exactly how much will actually be saved. The Air Force estimates $40.8 billion and the Office of the Secretary of the Air Force estimates $48.6 billion.

Mr. Chairman, I understand that the way these figures were arrived at used different calculations and accounting methods. However, a eight billion dollar differential is extreme. It brings to mind the old joke of, "A billion here, a billion there, and pretty soon we're talking about real money." Mr. Chairman, we have to find a solution to this problem.

I have been a supporter of the F-22 in the past and I firmly believe that we do need to progress toward obtaining a replacement fighter for the F-15. There's also *much more* that we should be doing. We have never developed a plane that can adequately replace the A-10, a plane that was so successfully used during the Gulf War that some troops renamed it from the Warthog to the Queen of the Gulf. We have never acquired an adequate substitute in the proper numbers for the B-52, a plane that is now older than the parents of some of its pilots. And yet, Mr. Chairman, no matter how much we wish to obtain replacement aircraft, we face genuine budgetary limits.

Mr. Chairman, I look forward to hearing the analysis of both our panels today. I believe that their answers will provide the critical analysis that we require to make calculated cost-benefit decisions with regard to future procurement of the F-22. Again, Mr. Chairman, I want to than both you and the Committee for holding this hearing and look forward to receiving the answers we all desire.

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