[H.A.S.C. No. 111–146]

DEPARTMENT OF THE NAVY AND AIR FORCE COMBAT AVIATION PROGRAMS

JOINT HEARING

BEFORE THE

AIR AND LAND FORCES SUBCOMMITTEE

MEETING JOINTLY WITH

SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

HEARING HELD
MARCH 24, 2010

U.S. GOVERNMENT PRINTING OFFICE
57–033 WASHINGTON : 2010

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

AIR AND LAND FORCES SUBCOMMITTEE

ADAM SMITH, Washington, *Chairman*

JOHN SPRATT, South Carolina
SILVESTRE REYES, Texas
MIKE MCINTYRE, North Carolina
ROBERT A. BRADY, Pennsylvania
JIM COOPER, Tennessee
JIM MARSHALL, Georgia
JOE SESTAK, Pennsylvania
GABRIELLE GIFFORDS, Arizona
NIKI TSONGAS, Massachusetts
LARRY KISSELL, North Carolina
FRANK M. KRATOVIL, JR., Maryland
BOBBY BRIGHT, Alabama
WILLIAM L. OWENS, New York
DAN BOREN, Oklahoma

ROSCOE G. BARTLETT, Maryland
CATHY MCMORRIS RODGERS, Washington
MARY FALLIN, Oklahoma
DUNCAN HUNTER, California
JOHN C. FLEMING, Louisiana
MIKE COFFMAN, Colorado
W. TODD AKIN, Missouri
JEFF MILLER, Florida
JOE WILSON, South Carolina
FRANK A. LOBIONDO, New Jersey
ROB BISHOP, Utah
MICHAEL TURNER, Ohio
TODD RUSSELL PLATTS, Pennsylvania

JOHN SULLIVAN, *Professional Staff Member*
LYNN WILLIAMS, *Professional Staff Member*
SCOTT BOUSUM, *Staff Assistant*

SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

GENE TAYLOR, Mississippi, *Chairman*

SOLOMON P. ORTIZ, Texas
JAMES R. LANGEVIN, Rhode Island
RICK LARSEN, Washington
BRAD ELLSWORTH, Indiana
JOE COURTNEY, Connecticut
JOE SESTAK, Pennsylvania
GLENN NYE, Virginia
CHELLIE PINGREE, Maine

W. TODD AKIN, Missouri
ROB WITTMAN, Virginia
ROSCOE G. BARTLETT, Maryland
J. RANDY FORBES, Virginia
DUNCAN HUNTER, California
MIKE COFFMAN, Colorado
THOMAS J. ROONEY, Florida

HEATH BOPE, *Professional Staff Member*
JENNESS SIMLER, *Professional Staff Member*
ELIZABETH DRUMMOND, *Staff Assistant*

CONTENTS

CHRONOLOGICAL LIST OF HEARINGS

2010

WEDNESDAY, MARCH 24, 2010

DEPARTMENT OF THE NAVY AND AIR FORCE COMBAT AVIATION PROGRAMS

STATEMENTS PRESENTED BY MEMBERS OF CONGRESS

WITNESSES

APPENDIX

DEPARTMENT OF THE NAVY AND AIR FORCE COMBAT AVIATION PROGRAMS

HOUSE OF REPRESENTATIVES, COMMITTEE ON ARMED SERVICES, AIR AND LAND FORCES SUBCOMMITTEE, MEETING JOINTLY WITH SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE, *Washington, DC, Wednesday, March 24, 2010.*

The subcommittees met, pursuant to call, at 2:01 p.m., in room 2118, Rayburn House Office Building, Hon. Adam Smith (chairman of the Air and Land Forces Subcommittee) presiding.

OPENING STATEMENT OF HON. ADAM SMITH, A REPRESENTATIVE FROM WASHINGTON, CHAIRMAN, AIR AND LAND FORCES SUBCOMMITTEE

Mr. SMITH. Hearing will come to order.

Good afternoon. Welcome to the joint hearing for air, land and seapower forces. We, as I understand it, will have votes probably in the not-too-distant future which will interrupt us. We will try to get to do as many opening statements as possible before we have to head out for that purpose.

The subcommittees meet today to receive testimony on the Department of the Navy and the Department of the Air Force budget requests for combat aircraft for fiscal year 2011. And we have two panels of witnesses today. I will introduce them first and then we will have our opening statements from our chairs and ranking members, and then turn it over to our first panel for their opening statements.

We have the Honorable Ashton Carter, who is the Under Secretary of Defense for Acquisition, Technology and Logistics, Office of the Secretary of Defense (OSD).

We have the Honorable Christine Fox, Director of the Office of Cost Assessment and Program Evaluation (CAPE), also with OSD.

The Honorable J. Michael Gilmore, Director, Operational Test and Evaluation at OSD.

Mr. Michael Sullivan, Director of Acquisition and Sourcing for the Government Accountability Office.

That is the first panel.

On the second panel we will have the Honorable Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition.

Lieutenant General George Trautman, Deputy Commander of the Marine Corps for Aviation.

Rear Admiral Deke Philman, Director of the Air Warfare Division for the U.S. Navy.

Mr. David Van Buren, acting Assistant Secretary of the Air Force for Acquisition.

And last but not least, Lieutenant General Philip Breedlove, who is the Deputy Chief of Staff for Operations, Plans and Requirements.

As I mentioned, we have scheduled this hearing to give members the opportunity to address issues related to all combat aircraft programs of the Navy, Marine Corps and Air Force. We will be having another subcommittee hearing in late April to address mobility aircraft programs.

I have a complete statement. With unanimous consent I will ask that it be included in the record, and I will just briefly summarize.

This committee is very interested in this issue. This is arguably the biggest financial issue facing the Department of Defense (DOD) in the Armed Services Committee, with the price tag on the Joint Strike Fighter (JSF) going forward and the challenges that the program has faced.

And what we really want to learn today on the committee is what the force structure for combat aircraft is and what our plans are for meeting that force structure requirement. I am sure some members will also be curious about how we arrived at those requirement numbers year to year going forward.

And then the specifics of how we get there. There are a number of different air platforms or aircraft that are going to be factored into that, but obviously the big ticket item here is the F–35. Joint Strike is meant to replace a fair number of airframes within our force, and therefore how it is progressing plays a major role.

But there are other issues. How long can the F–15s and the F–16s last, in your estimation? How many more F–18s might we need to buy? And how does all of that combine to give us the force structure that we require for fighter aircraft?

We need to have a better understanding of that, and the main concern is the slippage in the cost overruns within Joint Strike. Joint Strike is considerably behind its original schedule and on pace to be considerably more expensive.

And my biggest concern at this point is not just that, though certainly that is a concern. That to a certain degree is the past. The future is what is our path forward. And in my study of this issue, it has not become clear to me that we have a clear path forward that we can confidently assert that we will meet. I am worried about whether or not this program will continue to slip to the right, it will get more expensive as we go.

We have laid out a new schedule. Again, it is not clear to this committee yet how it is that we have confidence in that schedule. As we know, our test aircraft have encountered a variety of different difficulties. I don't think we yet have a clear idea of this is what any one, A, B or C variant, is going to look like, this is what we are building, we know we can build it, and we are ready to get started. It is quite a ways out before we get to that point.

One of the aircraft, I believe, was scheduled to start production aircraft in 2012; the other two variants are going to be 2016. And with all of the testing problems that we have had, with all of the cost overrun problems that we have, our committee really needs to gain greater confidence that we have a plan going forward.

Certainly people will study what went wrong in the past, but for our purposes right now the most important thing is to know that we have restructured a schedule that we can confidently meet, so we are not sitting back here again next year going, "Here is the new plan."

To a certain degree, that is what happened between last year and this year. We procured a certain number of the aircraft in the fiscal year 2010 budget that after having done it through the authorization and appropriations process, DOD came back to us and said, "We don't really need that many, because we can't get there."

We would rather not keep having that happen every year. This is over $10 billion of our acquisition budget, the largest chunk we have, and we need to make sure that we are spending it wisely, because, as I am sure all of you are aware, we clearly and unequivocally have other needs as well.

As I said, I have a longer statement for the record that gets into some of these details that will be made available, but those are the main concerns that we hope to hear from our witnesses today and from the questioning period.

[The prepared statement of Mr. Smith can be found in the Appendix on page 49.]

Mr. SMITH. And with that—forgive me, I am not sure the protocol with two subcommittees here. Do I turn it over to Mr. Taylor or to Mr. Bartlett?

With that, I will turn it over to the chairman of the Seapower Subcommittee, Mr. Taylor.

STATEMENT OF HON. GENE TAYLOR, A REPRESENTATIVE FROM MISSISSIPPI, CHAIRMAN, SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

Mr. TAYLOR. Thank you, Mr. Chairman. And with your permission I would like to—and unanimous consent—I would like to enter my statement for the record.

Mr. SMITH. So ordered.

[The prepared statement of Mr. Taylor can be found in the Appendix on page 55.]

Mr. TAYLOR. Mr. Chairman, I thank you very much for calling this hearing. Like everyone in this room, we are told that the cost of this platform has gone up by 80 percent since 1996, that because the cost has gone up so much the anticipated buy has dropped by about 535 planes.

But what is particularly troubling is that, by some estimates, the cost of maintaining this aircraft will be 40 percent more than some of the legacy platforms that it is replacing. So I would hope that those three things could be addressed in today's hearing.

Like everyone else, I realize there is a need for the F–35. I would also remind our panel and everyone in this room that about the time we are buying the F–35, we will have the Ohio replacement coming on-line and at an estimated $7 billion per ship. The Social Security trust fund will no longer be collecting more than it spends. It will be spending more than it collects. The Medicare trust fund will be spending more than it collects.

There will be a lot of problems that our Nation will be facing, which means if we need the platform, as a Nation, and I think we do, we all have a huge responsibility to make it affordable.

So I thank you for calling this hearing.

Mr. SMITH. Thank you.

Mr. Bartlett.

STATEMENT OF HON. ROSCOE G. BARTLETT, A REPRESENTATIVE FROM MARYLAND, RANKING MEMBER, AIR AND LAND FORCES SUBCOMMITTEE

Mr. BARTLETT. Thank you, Mr. Chairman. I will keep my remarks brief, as we have got a busy schedule today with two panels of witnesses and both subcommittees in attendance.

I welcome all of our witnesses, and thank you for being here today.

This committee has been actively working to try to understand the risk the Department is taking in its combat aviation programs. I hope that this hearing will clarify some things for us because I have some real concerns about the force structure decisions that have been made.

After reviewing the report to Congress on the Combat Air Force restructuring plan, it appears to me that the recommendation to retire 250 fighters from the Air Force and the subsequent budget reductions were made before the Secretary of Defense announced he was terminating the F–22 production and before any of us learned of the years of delay now forecast in Joint Strike Fighter fielding.

So while the Air Force assumptions back in 2008 led to a conclusion that the short-term risk was manageable, the fact is today those assumptions are not reality.

Despite that, it appears the Air Force is going ahead with the plan.

I also share my colleagues' concern over the health of the Joint Strike Fighter program. This is an enormously expensive program that promises a great deal of capability, but I am, frankly, concerned that the cost growth will render it unaffordable in the long term.

In my 18 years in Congress I have seen program after program in which the cost grows, the production is reduced to fit inside a fixed budget, and the program ends in a spiral that leaves the services well short of their inventory requirements.

In attempting to manage the risk associated with the JSF program, all of the services appear to be looking for stopgap measures. However, to my knowledge, the engineering analysis needed to determine if service life extension programs (SLEP) on our existing fighter fleets are a reasonable course of action have not been completed yet, so we don't know what it will cost, how long it will take, or if the resultant service life is worth the investment.

To make matters worse, it has been very difficult to get programmatic details from the Office of the Secretary of Defense on the JSF program. That has generated not only a sense of frustration for the committee, but also has elevated our concerns about the true state of the program and validity of the proposed restructuring.

Some have said that the JSF program is too big to fail. I am not sure that is wholly accurate. But I do know this is a capability that is needed by our war-fighters and is overdue.

It is critical that we understand the risk in the JSF program in the context of the state of the legacy fighter fleets as we continue our work on the fiscal year 2011 Defense Authorization Act. I hope the witnesses before the committee today will help us do that.

Thank you, Mr. Chairman, for holding this hearing. I look forward to the discussion.

Mr. SMITH. Thank you, Mr. Bartlett.

Mr. Akin now, the ranking member on the Seapower Subcommittee.

STATEMENT OF HON. W. TODD AKIN, A REPRESENTATIVE FROM MISSOURI, RANKING MEMBER, SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

Mr. AKIN. Thank you, Mr. Chairman.

My sincere hope is that during our first panel we will be able to reach a common understanding on the progress being made to date on the Joint Strike Fighter program, any remaining schedule and affordability challenges, and the Department's plan for managing those risks.

I am particularly concerned about the unprecedented concurrency of testing and production, and am convinced that this is a bad idea.

At the same time, I believe it is just as important that we come to a common understanding of the big picture affordability and inventory risk of our Nation's strike fighters.

The Department has many competing priorities, including but certainly not limited to tactical aviation. Much like shipbuilding, we are seeing alarming force structure levels and increased demand on our equipment across the board. Although we may differ in terms of our recommendations for balancing Department of Defense's (DOD) investment against those many priorities, we should at least be able to come to agreement on the shortfalls and risks we are assuming as a result of our decisions.

Sadly, to date, the Department has been unable to articulate the shortfall it faces in Navy and Marine Corps strike fighters, let alone tactical aviation across all the services. Without consensus within DOD on the situation, we can hardly hope for a shared definition of the problem between the executive and legislative branches.

Let me show you what I mean.

On March 2008, the Department briefed the committee the Department of the Navy shortfall was 188 aircraft. That is March 2008. In March 2009, we are told the shortfall was 312. As if by magic, 2 months later, on May 2009, we are told the shortfall was only 146. At the beginning of February 2010, Secretary Gates testified the shortfall is only 100 aircraft. Toward the end of February the committee was told that the shortfall was 177. Five days later, my staff was told the shortfall of 100 was—shortfall was 100 aircraft. In testimony before the Senate Armed Services Committee (SASC) this month, Ms. Fox stated that 100 was an old number, and while she could not provide an estimate of the shortfall, it was under review.

Some change to these estimates could be expected as changes are made to the JSF program of record and the other fact-of-life issues arise. But based on this track record I think it is easy to see how we could become concerned that either the Department does not know how to handle the viability of the strike fighter inventory or the Department is changing the data to mask a problem.

In response to this uncertainty, the Congress has provided tools to the Department to create affordable options to improve the strike fighter inventory. Among these is the authority to enter into a multi-year contract on Super Hornets and Growlers that can save the taxpayers nearly $0.5 billion. Unfortunately, DOD has yet to take advantage of this tool, and time is running out.

Even if the DOD comes to its senses and proceeds with the multi-year, the Department of the Navy will still be several hundred planes short. I am baffled by the continued reluctance of senior DOD leadership to honestly address the shortfall.

My goal today is to achieve that mutual understanding of the problem. We could benefit greatly from the panels' views and updates on this issue. I do look forward to your testimony. The biggest single question I have is, if you and the many other people who have appeared as witnesses before this committee over the past two years would simply look us in the eye and say, "You guys are congressmen. You are the ones that make the decision about what kind of budget we have for defense, and given the amount of money you are giving us, this is our best bet as to how we balance things," I don't have a complaint.

But when all I get is year after year smoke and mirrors and people pretending like there is not a problem and people that pretend like they are answering a question and everybody in the room knows you are not answering questions, it makes us have a very, very low opinion of your ability to actually deal with what the situation is in a rational manner. I hope I make myself at least a little bit clear.

Thank you, Mr. Chairman.

Mr. SMITH. Thank you, Mr. Akin.

And we will begin with Dr. Carter.

STATEMENT OF HON. ASHTON B. CARTER, UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS

Secretary CARTER. Thank you, Mr. Chairman, distinguished members of the committee. I appreciate the opportunity to be here with you to discuss DOD's tactical aircraft programs.

I have a lengthy and detailed written statement. The Department has also provided you with responses to many questions you had in the letter of invitation to us, and we have also provided you with several independent reviews that importantly illuminated our department-wide review of the Joint Strike Fighter program, which is one topic I will be reporting on today.

So with your leave, in my oral statement I wanted to describe the basis for and the main ingredients of the restructuring of the Joint Strike Fighter program to put it on a more realistic basis.

Mr. Chairman, that is your path forward I will attempt to describe.

And I hope, Mr. Akin, it is a realistic one. But I will do my best to describe reality as we judge it to be.

And also I thought I would touch on the analytical foundation for the Department's decision not to pursue a second engine for the Joint Strike Fighter.

I would, of course, be pleased to answer questions on other topics with respect to the force structure requirements. I am pleased to talk about that as well. I just thought in view of the time that that might be better pursued with the Navy and Air Force panel which follows me, but again, I am happy to address that.

I am accompanied on this panel by Christine Fox, the Director of CAPE; Mike Gilmore, Director of Operational Test and Evaluation; and on the next panel by the service acquisition executives, Mr. Van Buren and Mr. Stackley. All four of those individuals participated in the internal reviews of JSF, which led to its restructuring, and they can all provide additional detail.

JSF is our largest, as has been noted, critically important program, and it is important for the three services that are going to be depending on this aircraft, our international partners and, of course, you to know whether after the recent restructuring it is now on a realistic and stable path to complete development and testing and eventually a full production to produce 2,443 aircraft for us, the Marines, the Air Force and the Navy, and 734 for international partners.

The easiest way to answer this question, I think, is to recount the sequence of events over the past several years. Again, full detail is provided in the written statement. But JSF's development began in 2001, and at that time the unit cost of a Joint Strike Fighter—there were 2,852 U.S. fighters planned at that time; now 2,443—was $50 million in 2002 dollars, which would be $59 million today.

In retrospect this estimate may have been unrealistically low, something we are trying to avoid in the future by requiring independent cost estimates early in the lifetime of a program, as is required by the Weapon System Acquisition Reform Act. But in any event, by 2007 the estimated cost had grown 36 percent—namely, to $69 million in 2002 dollars.

In late 2008—and this may go to a point you were making earlier, Mr. Bartlett—the first joint estimating team (JET) analysis was conducted—JET I. Ms. Fox will describe how this was done, but JET I found that JSF's costs were continuing to rise and that the development program was taking longer and therefore costing more than projected by the Joint Program Office and the contractor.

Secretary Gates at that time determined that the JET estimate was credible, and early in 2009 he accordingly added $476 million to the program—that is, for fiscal year 2010—to try to arrest this trend. By November of 2009, a few months ago, JET completed a second analysis—JET II—that became one of the foundations for the restructuring.

The JET II's results were substantially similar to those of JET I a year before—namely, the line at Fort Worth was still taking longer than planned to produce the initial JSF aircraft, and this was delaying flight testing and therefore the ramp-up to full rate production, and also costing more money, so that the unit cost of the aircraft, which had been $50 million in 2002 dollars, would now be as much as $95 million—that is, up to 90 percent cost growth.

So it was clear in November of last year that if we took the JET II estimate as credible, JSF would have a Nunn-McCurdy breach. Similar results from the JET over two consecutive years clearly indicated to the Department that we needed to take a more forceful management action this year than we had taken in light of the JET I estimate a year before.

At about this time also two additional reviews were conducted. The JET, by the way, as I indicated, was conducted by Ms. Fox's office. My office sponsored an independent manufacturing review team, which looked at the performance of the manufacturing process, and also something we called a joint assessment team, to look at the performance of the engine, the F135 engine.

All of these things came in together late last year, and we accordingly undertook department-wide reviews in November as though we were already in Nunn-McCurdy breach. This review continued through December and January, and the result was the restructuring announced by Secretary Gates in February.

And I realize, if I may say so, during this time we were conducting the review and before the President's budget was announced, that there was not information available here, and I recognize that some of the comments you made, that that was frustrating. We will attempt to do better in the future.

But that is what led up to the restructuring that Secretary Gates announced in February. And now let me describe the main features of that restructuring and the rationale for each.

First, the Department undertook several steps to stop the development and test program schedule from slipping yet further. There were three actions. One was the purchase of an additional aircraft to add to test. That is just the physics of getting through the test points faster, if you have more test assets.

So also secondly, the addition—or actually borrowing or loan of three developmental aircraft to—I am sorry, three operational test aircraft to developmental test—again, to hasten the process of completing developmental test.

And third, integration of—or, sorry, addition of another software integration line to ensure that the writing of mission system software would not become the factor that lengthened the development schedule after we tried to take care of the lengthening of the developmental flight test program.

With these three steps, the schedule slip that had been estimated by JET II to be 30 months of schedule slip was reduced to 13 months, a substantial, though not complete restoral of the original schedule.

Second feature of the restructuring was recognizing that the three steps I just described cost money. The Department decided to withhold $614 million of fee from the contractor, since it was not reasonable for the taxpayer to bear the entire burden of what is, after all, disappointing performance by the program.

I might add that the contractors have been part of this process from the beginning and have emphasized their commitment to better performance, and we are expecting that.

Third, the Department directed that the results of the independent manufacturing review team I described earlier regarding the ramp-up to full rate production be adopted, meaning that the Joint Strike Fighter program should plan for a somewhat later—that is 13 months—and somewhat flatter ramp to full rate production than had been planned. This step had the effect of reducing concurrency and the program.

For us, the Department determined that the JET II estimate, revised to take into account the changes I have already described, would be adopted as the program baseline for budgeting purposes throughout the future year's defense program and beyond—that is, that we would accept the independent cost estimate as the basis for the program.

And that is the basis, Mr. Chairman, for what we hope and believe is a realistic forecast. I will come back to that point in a moment. But as I have mentioned also, accepting that forecast implies a Nunn-McCurdy breach.

Fifth, the Department directed that the position of program executive officer for the Joint Strike Fighter program be elevated to three-star rank to give a fresh eye and vigorous management to the Joint Strike Fighter. And I am pleased that President Obama has nominated Vice Admiral Dave Venlet to this position.

These five steps, then, are the JSF restructuring in a nutshell. We believe that this restructuring puts JSF on a realistic path to restore its performance. Over the next few years we will be looking closely to the program to show progress against a reasonable set of specific objectives according to this overall plan.

We will be managing aggressively to see if we can improve the performance of the program relative to the JET II forecast, including the possibility of buying more than 43 aircraft in fiscal year 2011 and earlier transition to fixed price production contracts.

While, Mr. Chairman, the plan is realistic, this is still a challenging program entering its period of flight tests, and these are all forecasts—not weather forecasting, but it is program forecasting. Reality is going to get a vote.

At the same time no fundamental technological problems have surfaced in the reviews to date, nor have the capabilities of the aircraft changed.

In sum, in response to the JET and other estimates of the JSF program's performance and the impending Nunn-McCurdy breach, the Department has undertaken a fundamental restructuring of the program. We believe it is now on a stronger footing.

We now turn to the subject of whether two engines should be part of the Joint Strike Fighter program rather than one. The Department's decision not to support the second engine is a judgment informed by the analysis conducted by CAPE under Ms. Fox and which has been provided to the committee.

We weighed the very real upfront costs of preparing a second engine for competition, estimated at $2.9 billion, against the possible long-term savings produced in the out years from the competition assumed in the analysis. The analysis shows that under these assumptions the long-term savings calculated just balanced the large upfront investment.

However, the assumptions that need to be made to produce this break-even result are optimistic and in some cases unrealistic. For example, the analysis assumes that the second engine quickly follows upon the same learning curve as the first engine, that the additional learning will outweigh the fact that each manufacturer will build fewer engines and therefore proceed less far down the learning curve, and perhaps most importantly, that there will be true competition.

A more likely dynamic is a series of split or shared buys, since JSF will be procured by a diverse set of customers, many of whom are unable or unwilling to purchase from two engine manufacturers. We therefore concluded that the Department is unlikely to realize these long-term savings and that the $2.9 billion required to prepare the second engine for competition would be better spent on other critical military needs.

We also considered potential non-financial benefits of having a second engine for the F–35, but did not find them compelling. On this basis the Department is respectfully requesting that the Congress not direct pursuit of the second engine again this year.

Thank you, and I look forward to your questions.

[The prepared statement of Secretary Carter can be found in the Appendix on page 57.]

Mr. SMITH. Thank you very much, Mr. Carter.

Ms. Fox.

STATEMENT OF HON. CHRISTINE H. FOX, DIRECTOR OF COST ASSESSMENT AND PROGRAM EVALUATION, OFFICE OF THE SECRETARY OF DEFENSE

Ms. FOX. Thank you, Mr. Chairman and distinguished members of the committee. Thank you for the opportunity to appear before you today.

Dr. Carter's statement and our written testimonies provide you with the specific information about the Joint Strike Fighter independent review and the subsequent restructuring. Today I would like to quickly emphasize just a few key points.

First, CAPE conducts independent cost estimates for major weapon systems providing the Secretary and OSD leadership an estimate derived independently from the contractor and the program office. The Weapon Systems Acquisition Reform Act recently increased the responsibility and authority of CAPE in the conduct of these estimates. In the case of JSF, we went one step further and built a team of experts from the defense tactical aircraft community.

Specifically, the Joint Estimating Team, or JET, was composed of multifunctional government experts drawn from the Navy, Air Force and OSD staff. The members of the team provided technical expertise across the areas of air vehicle and mission systems engineering, testing and cost estimation. The JET conducted comprehensive onsite reviews with the prime contractor and each of the major subcontractors for the JSF program.

They then benchmarked this information against past programs to forecast the likely path of events going forward. As Dr. Carter just explained, the JET conducted two reviews; the first, JET I, conducted last year and was made available to the OSD leadership and the Congress. This past summer, the Deputy Secretary of Defense directed that the JET I be updated and the result of this update, JET II, were consistent with the findings of JET I and led the Secretary to significantly restructure the program as Dr. Carter has just described to you.

It is important to let you know that this restructuring in my view is completely aligned with the findings of the JET II and fully consistent with Congress' intent of using realistic cost estimates and schedule information to assess and structure a program. In particular, the JET worked because it is based on historical comparisons, allows more time for tests and allows for more test points than was in the original program allowing for more test discovery.

It is difficult to mathematically calculate the precise confidence levels associated with independent cost estimates prepared for major acquisition programs. Based on the rigor of the methods used in building CAPE estimates, the strong adherence to the collection and use of historical cost information and the review of the applied assumptions, we project that it is about equally likely that the JET estimate will prove too low or too high for execution of the restructured program as described.

Finally, I would like to discuss the analysis behind the Secretary's decision not to fund the alternate engine for JSF. We have provided you with more details on this, but quickly I wanted to let you know that we were able to conduct a business case analysis of the alternate engine and that analysis after accounting for all of the—costs to date suggests that we are at the break-even point in net present value terms.

Business case analysis included several optimistic assumptions. Dr. Carter has described some. Another is that the start of the competitive engine procurement would begin in 2014. CAPE was also able to estimate that DOD would have to invest approximately $2.9 billion to full fund the alternate engine on a more realistic schedule in light of the program restructuring to the point where it could participate in a competitive procurement that we now estimate would be in 2017.

We could not, however, quantify the intangible values of competition that are often cited. Based on the fact that the additional early costs to the program are known, but the intangible benefits of competition are speculative. The Secretary decided that we could not afford to invest the additional $2.9 billion. Thank you again for the opportunity to appear before you today.

[The prepared statement of Ms. Fox can be found in the Appendix on page 81.]

Mr. SMITH. Thank you. Mr. Gilmore.

STATEMENT OF DR. J. MICHAEL GILMORE, DIRECTOR, OPERATIONAL TEST AND EVALUATION, OFFICE OF THE SECRETARY OF DEFENSE

Dr. GILMORE. Chairman Smith, Chairman Taylor, members of the committee, my primary concern is that the Joint Strike Fighter Program be structured to conduct robust developmental testing so that we will be ready to do the operational testing which will confirm the combat capabilities of the aircraft in January 2015 and complete that testing in April 2016.

We don't want discovery of problems—significant problems to be postponed to operational testing because problems discovered that late will be more costly and more time-consuming to fix than if they are discovered early. The only way to assure that is to have a robust developmental test flight program. The changes to the program that Secretary Gates and Dr. Carter have directed are going to be key to assuring that that robust developmental flight test program occurs.

And the important changes that have been made are, of course, providing additional flight test aircraft or additional flight test aircraft, providing the resources in time needed to develop, deliver and test effective software because the mission system software is very complex and provides that combat capability in the aircraft.

I have to take into account realistically the inevitable discovery of problems during flight testing which means you have to have sufficient time to do the flight testing. And you have to provide the engineering and other resources needed to maintain an adequate pace of testing and the changes that have been directed to address all of those issues. So my concern is that the developmental flight test program be robust, the restructured program takes the steps necessary to do that. Thank you, and I look forward to your questions.

[The prepared statement of Dr. Gilmore can be found in the Appendix on page 89.]

Mr. SMITH. Thank you. Mr. Sullivan.

STATEMENT OF MICHAEL J. SULLIVAN, DIRECTOR OF ACQUISITION AND SOURCING, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Mr. SULLIVAN. Thank you, Mr. Chairman, Chairman Taylor, distinguished members of the committee. I am pleased to be here today to discuss the F–35 Joint Strike Fighter Program and our updated analysis to the competitive engine discussion.

In brief, Mr. Chairman, even given the strong actions taken by the Department to recently restructure the Joint Strike Fighter Program, it continues to struggle with increased costs, slow progress and risk of not being able to deliver expected capability and quantities of aircraft to the war fighter on time. It is also important, I think, to note that setbacks and costs and deliveries of the Joint Strike Fighter directly impact modernization plans and retirement schedules for our aging legacy aircraft that the fighter is slated to replace.

The recent restructuring increase program acquisition costs by $46 billion in then-year dollars compared to the program baseline approved in 2007, about $92 billion when compared to the original 2001 baseline. It also did the things that Dr. Carter went through which we think a lot of those things are very important to put—to actually putting the program on firm footing and having much more reasonable costs and schedule estimates at this point.

And another thing it did that we found important was it reduced near term procurement quantities by as much as 122 aircraft which, again, we think helps reduce the risk of buying aircraft that may not be through flight test at that time. That is through 2015. These actions should put the program on a firmer footing and they should establish more reasonable estimates for aircraft deliveries; however, there is still substantial overlap between development testing and production activities.

Slowed by manufacturing delays, late aircraft deliveries and low productivity, the flight test program has barely begun and only completed about 10 percent of its planned sorties through 2009. In addition, the program is relying on an extensive, but largely unproven network of ground test laboratories and simulation models to evaluate aircraft performance.

It is developing and integrating very large and complex software requirements and is still maturing some of the technologies that are essential to the cost savings, the program plans to get in the lifecycle due to logistical support requirements.

With the restructuring in place, the Department still plans to procure up to 307 aircraft at an estimated cost of $58.2 billion through 2015 before completing flight testing. We view that as very risky. These aircraft are currently being procured using cost reimbursable contracts, which I think the Chairman and the committee members understand that that indicates that there is a great deal of cost risk still in the aircraft due to many uncertainties the contract doesn't feel prepared to bid a fixed price. I believe Dr. Carter did address that, and I think that the Department now is trying to move much more quickly towards fixed price contracts. We are hoping that they can do that. That would be good.

Now, I will turn to the alternate engine discussion. As requested for this hearing, we have updated the analysis that we have done in the past for this committee to assess whether the changes to the Joint Strike Fighter Program that Dr. Carter just discussed have impacted the cost and benefits of sole source and competitive scenarios for acquisition and sustainment of the Joint Strike Fighter engine.

Our updated analysis indicates that given certain assumptions, competition may reasonably be expected to provide enough savings over the life of the engine to offset the investment in developing a second engine source. In a sole-source scenario, the engines will cost an estimated $62.5 billion in 2002 dollars over the remainder of the program. Additional costs are between $4.5 billion and $5.7 billion may be needed to maintain competition.

Some of that is the upfront investment that we have discussed to get the other contractor through development. I think that is somewhere between 1 and $2 billion and the rest of that is due to the increased overall costs—the recurring costs per engine that—and the learning curve losses that will take place if the competition goes forward. We ascertain that the costs—that all of that cost, the $4.5 to $5.7 billion could possibly be recouped if competition were to generate approximately 10 to 12½ percent savings over the life of the program.

Air Force data from past engine programs where competition was introduced into a sole source environment indicates that savings of that much or more have been achieved in the past; however, whether that happens on this program will ultimately depend on the final approach for competition, the number of aircraft eventually purchased, the ratio of engines awarded to each contractor and when the competition actually begins.

In addition to cost savings, most experts also agree that there are other benefits to competition that are not directly tied to savings such as improved contractor responsiveness, engine reliability and technical innovation. Currently, both the primary and second engine sources have experienced cost growth and delays. The F135 primary engine development cost is now estimated at approximately $7.3 billion, a 50 percent increase over the current budgeted estimate.

And the most recent unit costs for the conventional engine is now $17.7 million, which is 42 percent higher than the original estimate. Similarly, the unit cost for the short takeoff and vertical landing engine rose from $27.6 million to $33.4 million, a 21 percent increase. As planned, the F136 alternate engine development is about three years behind the F135 program. It also is facing cost and schedule challenges similar to the F135. Both programs have experienced about 21-months' delays for their initial release for flight testing.

Mr. Chairman, that concludes my prepared statement. I would be happy to entertain questions.

[The prepared statement of Mr. Sullivan can be found in the Appendix on page 108.]

Mr. SMITH. Thank you very much. A lot of ground to cover. A lot to ask about. Fortunately, there are a lot of members on the committee who are very informed of this program. So we will spread that around. But I will start by asking Dr. Carter and Ms. Fox about these cost estimates going forward.

And I realize as you quite accurately said, Dr. Carter, events will happen and we will have to adjust to them, but I want to get some greater idea for how much we have clarified the picture. I mean, going forward, there were a lot of different costs, but as I understand it, you are still looking at to try to estimate which are lifecycle estimates, lifecycle costs. There are various military construction pieces. There are issues with the—I am into Mr. Taylor's territory here, but with the C model, I think it is, if I have got that right, the one that takes off—the Navy version, what is going to do in terms of how we have to adjust aircraft carriers.

So different military construction pieces. And I understand that CAPE is still looking at some of this. Can you give us some idea of what you are done with, what you are still looking at in terms of what are sort of if you—it is a terrible phrase, but the anticipated surprises that you still haven't quite been able to calculate? Can you turn your mike back——

Secretary CARTER. Yes, Mr. Chairman. The CAPE estimate upon which we base the restructuring was of the development program, the ramp-up to production and initial production because that is the part—that is the phase that is immediately upon us.

Mr. SMITH. Right.

Secretary CARTER. And we had that estimate, and then we had another estimate from the program office and the contractor which was a—which showed less cost and a more accelerated schedule. The essence of accepting the JET estimate is in adopting it is recognizing what I certainly believe, and I know the Secretary does, that that is a more credible forecast for those three phases than was the program office's and the contractors'.

Which was a—which showed less cost and a more accelerated schedule.

The essence of accepting the JET estimate and adopting it is recognizing what I certainly believe, and I know the Secretary does, that that is a more credible forecast for those three phases than was the program office's and the contractor's.

Beyond that, when we get out beyond production to sustainment, that is, of course, many years in the future, so there isn't a managerial action that needed to be taken at this moment about that, but it is something we need to manage going forward—what are the costs of these airplanes going to be to operate them in the years in the future when they come? Not too early to take a look and begin to manage that.

And that is something we will be looking toward, going forward.

It doesn't affect our managerial decisions at the moment, but you are absolutely right, that is a phase out there in the future that will need to be costed also.

But we think we have our most realistic estimates of the development, ramp-up to production and production.

I will repeat what Ms. Fox said about these are so-called in the art that her office practices, a 50 percent estimate, meaning—and this isn't math, it is JET that there is in the judgment of the estimators a 50 percent chance that the cost will be greater than estimated and a 50 percent chance less.

That is why I talk about, it is not weather forecasting, but it is forecasting.

We are giving you our most realistic judgment, and we are trying to manage to that realistic—what was quite clear was that the path we were on was not realistic.

Mr. SMITH. Fair enough.

Dr. Gilmore, Mr. Sullivan, if I could have you deal with a couple different aspects of what is one of the central problems at this point, we are going to be procuring aircraft while we are still testing them. And there is always a delicate balance there.

I mean, ideally, you would like to have it tested and know exactly what you have got, and you are good to go. But the rapid pace of technology and the changes make that difficult with some of our new systems.

But I want to get a greater idea of the risks involved with that plan. Again, our hope is, I think, by 2016—I get my As, Bs and Cs, mixed up here, but two out of the three will be ready to go into production mode by 2016, or ready to be used at any rate, the other one in 2012.

At the same time, we are sort of testing as we go. How do you balance those risks, in terms of what—and it is hard to say, because you don't know exactly what you are going to figure out in the flight testing. On the other hand, we have been testing it for a little while and have some idea of what is going on.

Is it a good risk that is being taken here by saying that we are going to, in essence, bet on the come, we are going to start building this thing, and we are going to learn as we go and then make changes to it as we go?

What are the risks there? And how realistic do you think the approach that has been laid out?

Dr. GILMORE. While I would observe that we are really just at the beginning of a flight test program now——

Mr. SMITH. Right.

Dr. GILMORE [continuing]. In terms of, you know, total flight tests, we have flown in System Development and Demonstration (SDD) program, we have flown 37 flights out of over 5,700 that will be required. So we are at the beginning now.

With regard to how many aircraft will be delivered, once flight test has begun—and it has just now started—the program will be delivering more aircraft than almost any other aircraft program have been delivered, as—before flight testing is complete. That is just the situation that we are in.

Obviously, we will know more and more as we go along, and the rate of discovery, of knowledge, of accruing knowledge is going to increase rapidly under current plans. That is also consistent with past history.

So, I mean, there is concurrency in the program. The concurrency is greater than it has been in the past. But there—you know, the history of these programs is that there is concurrency.

Mr. SMITH. Right. That strikes me as a fairly big risk, as described, given how early we are in the testing portion, by comparison, to be making that big a production commitment.

Dr. GILMORE. Well, on the one hand, there is risk that you could run into structural problems and have to fix those, and that would—could potentially be time-consuming and costly to fix.

Now, so far, there is no indication of major structural problems, and they have completed a good deal of the ground testing of the structure, although that is not completely—that is not completed.

There is also risk that you could run into problems developing the mission systems software. However, if you run into those problems, a lot of those problems can be fixed not by changing the hardware, but by continuing to work on the problems fixing the software and then doing a new software release.

So a good deal of the risk in this program is associated with developing the mission system software. I mean, for example, the mission system software lines of code are 2.5 times in Joint Strike Fighter at the current estimate than they were in the F–22.

But you can fix those kinds of problems without major hardware changes in a number of instances. So that that counterbalances that risk.

Mr. SMITH. Mr. Sullivan, did you have anything to add on that?

Mr. SULLIVAN. Well, our perspective on that is, first of all, there is actually in the acquisition policies at the Department a kind of a rule that you shouldn't procure more than 10 percent of your total buy in Low Rate Initial Production (LRIP), which is what they are in now.

And you should try to get the fixed—you know, the fact that these are cost-plus contracts say a lot. If the Department can get this through a fixed price environment, that will settle a lot of this risk.

But, in addition to that, I think the risk moving forward is the—Dr. Gilmore alluded to the complexity of the software. And I think it is—there is a lot of risk left in that, because to get to the full-capability aircraft, which is Block III software, I am not sure how far along the program is in doing that. They haven't even established the lines of code for that.

So they have got an enormous effort in software. They haven't flown—I think that the development flight test program now has probably, basically, got a lot of safety-of-flight issues, and has not really started on the full performance envelope of the aircraft.

So there is risk something is going to happen.

Mr. SMITH. I am just going to ask one more question, and then turn it over my colleagues. And that is, you know, sort of the crux of the issue for us in the short term.

In 2010, we, in response, to your requests, you know, put in a certain number of production aircraft procurement. Shortly after we authorized and appropriated that, came back and said you only needed half of those.

How confident are you in the number that you are asking for us this year? Because on the surface of it, we are not confident at all. And that is a big chunk of our budget that we are putting to this. And we would hate to do that again, and then have, you know, the number change, six months after we did it.

What is different this year from last year on that issue?

Secretary CARTER. Is this to me?

Mr. SMITH. Yes, Dr. Carter, sir.

Secretary CARTER. We have slowed the ramp down, considerably, going forward. And that was one of the most important decisions we made in the restructuring. It was in recognition of some of the risk that has been adduced here, and we did try to reduce that risk, including the concurrency risk.

If I—we are trying to strike a balance here, Mr. Chairman, in the concurrency issue.

On the one hand, if you—if we tried to pull the ramp back, the ramp-up to production and steepen it unrealistically, we would have excessive concurrency and an excessive risk that we would discover in the course of flight testing things that had to be retrofitted and fixed and that would be expensive.

Against that, if we slip the ramp too much or flatten it more than we have already, you are adding cost, and adding schedule, unnecessarily.

So we are trying to fix that balance. We think we are in the sweet spot of that balancing, as best as we can ascertain it now. So we have slipped the ramp and flattened it. We are not recommending slipping it further and flattening it further, because that increases cost and delays the delivery of the aircraft to the services.

We are not recommending keeping the ramp, however, where it was before the review began, because that seemed—that not only seemed, our judgment was that that was unachievable.

If I may comment, also, on the fixed price. It is a very important point, and I am glad Mr. Sullivan raised it.

The willingness to go to fixed price is a measure of whether the contractor judges that the assembly line is stable and, therefore, the contractor is able to predict its performance well enough to offer a fixed price.

So that is an indicator—that is why we are using it, and I indicated that in my opening statement. We want to move to fixed price contracts as early as possible in LRIP. That asks the contractor to make a commitment to the stability of the line. The contractor has indicated a willingness to do that. That is a good deal for us——

Mr. SMITH. Right.

Secretary CARTER. A willingness, but they have not actually done it——

Mr. SMITH. Yet.

Secretary CARTER. Yes, we are in negotiations now.

Mr. SMITH. Okay. I do have to—if you have something really quick——

Secretary CARTER. Well, I just wanted, very quickly, to say that I think another issue in all this is the ability for them to deliver aircraft from—from the manufacturing facility now. That is not going well. And——

Mr. SMITH. Right.

Secretary CARTER [continuing]. And with flight testing, there is going to be more design changes. There is an awful lot of design change traffic hitting the floor now. So I think manufacturing this aircraft moving forward is going to be—that is another one of the risks on the program.

Mr. SMITH. Mr. Bartlett.

Mr. BARTLETT. Thank you very much, Mr. Chairman.

Mr. Sullivan, how long after we started the development of Engine 135 did we start the development of Engine 136?

Mr. SULLIVAN. Umm.

Mr. BARTLETT. I think—if my memory serves me right, it was 46 months. Is that correct?

Mr. SULLIVAN. Yes, I think, approximately, it is about a 3- to 4-year lag.

Mr. BARTLETT. Forty-six is the number I remember.

Mr. SULLIVAN. Yes.

Mr. BARTLETT. You said that the 136 was 1 year behind the 135, which means in fact, that its development is going better than the development of the 135.

Mr. SULLIVAN. Well, no, sir, I think I may have made a mistake, but I think it is three—I said it was three years behind. That is what I meant to say, anyway.

Mr. BARTLETT. It is my understanding that, in fact, the development of the 136 is proceeding faster than the development of 135. This 3 years behind 135 is because its development started 46 months, nearly 4 years behind. So it is, in reality, almost a year ahead of the development of the 135. Correct?

Mr. SULLIVAN. I guess, yes, if taking the—the three—I would have to look at that, but, yes, it could be, and we can take a look at that.

Mr. BARTLETT. If you say it is three years behind, that leads people to believe, gee, this is a lousy engine. They are even behind in development.

The fact is, they are, in fact, ahead in development by——

Mr. SULLIVAN. It was planned—yes, the program was planned to be three years behind so that it could—they could ramp into competition.

Dr. GILMORE. Congressman Bartlett, the information I have is that the development of the 136 is about 2 years behind the schedule that was planned in 2005, which placed—you know, the development of the engine did start, by design, 4 years later than the development of the 135, but the 136 is about 2 years behind the schedule that the contractor and the program office had laid out as recently as 2005.

Mr. BARTLETT. And how far behind is 135?

Dr. GILMORE. It is about the same amount behind.

Mr. BARTLETT. That much or more is my understanding.

Dr. GILMORE. Yes, it is about the same amount behind. They have had—both engines have had similar kinds of problems, the kinds of problems that should be expected when you are trying to develop and build a high-performance jet engine.*

Mr. BARTLETT. Dr. Carter, in both your written testimony and your oral testimony, you noted that analysis and cost estimates done in November of 2009 showed that the program would trigger a Nunn-McCurdy breach. How come we didn't know that then?

Secretary CARTER. We had received the JET report in November 2009. It was an estimate at that time. It was very different from what we had—our program office was telling us, which was the official baseline at that time.

It was then, around the turn of the year, that we completed our review of the JET estimate, and concluded that the JET estimate, and not the program office estimate, was the more realistic of the two.

It was January when the Secretary of Defense adopted the JET estimate as the projected way forward. And then he announced that in the budget in February. And I—the—and I have stated before that JSF was going to be a Nunn-McCurdy breach. It will be a matter of days before the official declaration goes.

But once we accepted the JET estimate, or adopted that, that meant that the program would be in Nunn-McCurdy breach, because the forecast of the program's progress made in the JET estimate suggested greater than 50 percent cost growth, which is the trigger for Nunn-McCurdy.

Mr. BARTLETT. Are there regulations, written or unwritten, in the building that precludes including us as a partner in those discussions?

Secretary CARTER. I would have to get back to you on the technicality of that. Certainly, in—as a general matter, no, we try promptly to keep this committee informed of important developments in programs that are in your purview.

[The information referred to can be found in the Appendix on page 201.]

As I said when I—earlier, because of the particular timing of the JET estimate and the Department's deliberations, which were in the December-January period leading up to the release of the

---

*The explanation of the scheduled delays provided by the DOT&E director is contrary to the information provided at a later date by the Air Force and F–35 Joint Program Office, shown in the Appendix on page 197.

President's budget, it wasn't until the President's budget was released that the—the JET estimate was—which was included in that budget—was available.

We did, however—it is my understanding that the JET estimate, even back in 2008, was made available to the committee.

Mr. BARTLETT. Thank you.

Your statement goes on to say that "Program management contractors and the Department need to surface, candidly and openly, issues with this program as they arise, so that Congress is aware of them and they can be addressed."

In the spirit of that statement, it would have been nice, I think, if we would have been a part of that two-month discussion between November and January. Would you agree?

Secretary CARTER. I promise that, going forward, we will be as open as we possibly can, and candid about the—what is going on in this program.

I firmly believe, as the acquisition executive, that you have got to create a climate in which people are willing to surface issues in programs. That is the only way you solve them.

And that is the only way we can do it—programs are, particularly at this particular inflection point in the transition from development to production, they are going to have issues. And if you don't create an environment in which those things are surfaced, you are never going to solve them.

Mr. BARTLETT. Thank you, Mr. Chairman. I yield back.

Mr. SMITH. Thank you. For members' information, we have had, I think—how many—what, four votes, I think it is called, one 15-minute, three fives. We are going to get to Mr. Taylor, at least, before we go, push this up a little bit, and then we will have to take a break and come back.

Mr. Taylor.

Mr. TAYLOR. Thank you, Mr. Chairman.

And, Mr. Carter, I have been listening to your rational arguments on the dual sourcing for the engine. And you tell me that, because of the huge Research and Development (R&D) costs that, even if you get a second source in there, by the time you have bought all these engines, you end up with—I think the word you used was "a wash."

I am curious, since that is the way you have chosen to proceed, are you demanding that the vendor, the successful vendor, provide to the services a technical data package, that we would own the specifications to that engine?

The reason being is, if R&D is the reason that makes that second engine unaffordable, then you are only paying, in effect, for one case of R&D. But then you are in a position to take those specifications and see if a second vendor wants to build the engine that you have now blessed.

Have you—and we are doing that with some other things right—as we speak—in Navy shipbuilding. Have you pursued that line of thought at all?

And if not, tell me why.

Secretary CARTER. The—that particular approach to second-sourcing engines was tried once before in the case of the F/A–18 and was not successful.

Mr. TAYLOR. Walk me through it.

Secretary CARTER. Just to answer your specific question, we have not required the vendor of the F135 engine to produce the technical data package that would allow a build-to-print version of a competitive engine.

The competitive engine program that has been pursued has been an independent development of a second engine.

Mr. TAYLOR. Okay, I am with you, Dr. Carter, but I am just telling you, without the technical data package—we are paying for this research. From what I can tell, we are paying for everything in this research, as a Nation.

Then why should we not have the knowledge that is gained?

Why should someone have a monopoly on that knowledge for replacing that engine at some point, for fixing that engine at some point?

Wouldn't it be a wise acquisition tool for our Nation to own that technical data package?

Secretary CARTER. I will get back to you with a specific answer to that question. What I can tell you is this, regarding the R&D, two things. One is that, with respect to the R&D on the so-called second engine, the F136, that is a part of but not all of the cost to prepare that to compete.

[The information referred to can be found in the Appendix on page 201.]

Secretary CARTER. The other thing that I think may be useful to say at this point is that we do value competition in the military jet aircraft field and innovation in that field. And we have a number of programs to increase the fuel efficiency, the thrust-to-weight and other desirable features in the military aircraft engine area.

So the F135——

Mr. TAYLOR. So doesn't that—okay, so then you just talked yourself into a dual source. So which one is it?

Secretary CARTER. Not a dual source for the Joint Strike Fighter engine. I would like to have more than one, and we do have more than one competitor in the military aircraft field. I don't need to have two duplicative engines for the F–35 in order to have two parties in the military jet aircraft engine business.

I do want that, and some of our tech-base programs, in addition to developing technology, have that purpose.

On the question of the second engine for the F–35, I have the greatest respect for people who come to the opposite decision from the one we have come to. I know that many people with great expertise do, and I completely respect that point of view.

It is simply a matter of looking at up-front costs, which are very real, and assumed savings as a result of a competitive process that is much harder to have confidence would actually produce those savings.

And one just has to make a judgment between those two. We made a judgment that the large near-term costs, which displace other things we could spend our money on, are not—those costs are not outweighed.

But again, I respect people who come to the other view. We needed to make a judgment between those two cases, and this is the judgment that we have made.

Mr. TAYLOR. Okay, Mr. Carter, not to belabor this, because there are other people with good questions that—but I would like you, say, within the next two to three weeks, certainly well before markup of this bill, to visit with me and give me a good reason why we should not own that technical data package?

Thank you, Mr. Chairman.

Secretary CARTER. I will get back to you on that. I don't have a good reason, as I sit here now. I promise I will get back to you on that.

[The information referred to can be found in the Appendix on page 201.]

Mr. SMITH. Thank you, Mr. Taylor.

Mr. Wilson, we will try and get your five minutes in before we go over and vote. You are next in line. Mr. Akin had to go somewhere. We will get him as soon as we get back. Mr. Wilson?

And then, after him, we will go vote and come back.

Mr. WILSON. Thank you. Mr. Chairman.

And, Dr. Carter, last year, the F136 development maturation to competition was expected to be completed by 2014. This year there is a 3-year F136 schedule delay to 2017.

Why does the Department believe that the F136 development should take an additional 3 years?

Secretary CARTER. The analysis of the preparation of the F136 engine for competition was done by CAPE. So if I may ask Ms. Fox to answer that question?

Ms. FOX. Certainly. There are two fundamental factors that have caused us to look at moving the competition from 2014 to 2017. One has already been touched on, and that is that the 136 is behind their predicted schedule for development.

And the other is, frankly, the restructuring of the program overall. In order to get the engines in a place where they can compete, we need to have some directed buys. They need to be sufficiently mature in order to successfully compete. Given that we have slowed the ramp and moved the program out, we need planes to do that with.

And so it has just, by mostly the nature of the restructuring, pushed it out—plus, some of the delay in the 136, which we want to give them time to catch up. It is those two factors.

Mr. WILSON. Well, I thank both of you for being thoughtful on that issue.

And, Mr. Sullivan, you question, in your March report, whether the current plan for ramping up production of F–35s is prudent. Do you believe procuring fewer F–35s in fiscal year 2011 would decrease the program risk?

If so, what leads you to believe this?

Mr. SULLIVAN. I think we view it as any aircraft that you get out of the near term, fiscal year 2011, specifically, would reduce risk to the buyer. And we base that on a couple of things.

Number one, as we said earlier, the lack of development flight testing that has been done so far, so that there are still—there is a lot of unknowns about the design and about how the software is going to work and the hardware is going to work.

But in addition to that, we think it is prudent because, as I alluded to earlier, they are still having—the contractor is still having trouble learning how to build the aircraft. It is not coming down the learning curve real well.

So, in effect, there is, kind of, a backlog of aircraft, as we speak. I think, in fiscal year 2010—well, I think there is, like, 28 aircraft on order now, and this year, they are asking for another 43. You are beginning to get a backlog of aircraft on order that we are not sure they are going to be able to build within two years.

Mr. WILSON. And then, I do want you to have—the communities I represent, Beaufort, South Carolina, the Marine Corps Air Station; I represent communities adjacent to McEntire Joint Air Base, Eastover, South Carolina. And those communities are—are hopeful about F–35s.

And so any way that we can—I can be supportive, please let me know. The communities I represent enjoy the sound of freedom. So we would love to have them.

Secretary CARTER. Congressman, may I make a comment on the—in response to the last question?

Mr. WILSON. Yes.

Secretary CARTER. There are two kinds of risk here. And I really think we need to balance the two risks, at least. We are trying to do that.

One can reduce the risk of the kind that Mr. Sullivan is referring to by waiting until all the testing is done and then starting production. That reduces that risk, but it means that you don't get the airplanes until later and they cost more.

So one can't talk about only one kind of risk. There are two risks here that are being balanced. One is the risk associated with concurrency, which Mr. Sullivan is talking about, which is real, but one has to balance against that the risk of slipping the schedule and the ramp to the point where production is uneconomical and jets are delivered later than they otherwise could be.

That is the balancing that we are trying to do. So risk has several dimensions to it, and just reducing risk by slipping the program introduces yet another kind of risk.

We are trying to balance those two, and in the restructured program, have done our level best to strike that balance.

Mr. WILSON. And I just can't imagine all the different risk and the balancing you have to do. And—but thank you for expediting, however.

I understand the official restructuring acquisition decision memorandum has been recently approved, Dr. Carter. You mentioned that, if contractors can execute a development program and/or deliver aircraft at lower costs, you will work with Congress to procure additional aircraft.

What will be the incentives for the contractor and the government team to reach these milestones?

Secretary CARTER. It is in the interests of the contractor to get up that production learning curve, have confidence in the Department of Defense and in you, in the services, in the international partners in the ability to produce aircraft.

So it is very much in their interests to produce more than 43 aircraft in fiscal year 2011, if that is at all possible. We are trying to use that incentive to get better performance. And that is a commitment the contractor has made, and I would like to hold them to and enjoy the benefits of.

Mr. SMITH. On that note, we have to go. We will hopefully be back in 20 minutes to a half hour. There are four votes, so we are about out of time on the first vote, and then we have got the next three, so we should be able to maximize our time.

See you in a few.

[Recess.]

Mr. SMITH. If we could have everybody sort of re-find their seats. We are done now. Members should be drifting back in here shortly. Want to make sure we maximize our time. Thank you.

And in the spirit of maximizing our time, I will ask a couple of questions while we are waiting for some other members to get back. Mr. Akin will be first up when he returns.

Obviously the main focus of this hearing is the Joint Strike Fighter because of the large portion of our fleets that it is going to make up.

But could you talk a little bit about some of the other options in terms of how we get to the force structure that we are looking for at the various points, 5, 10, 15, 20 years out, and in particular what role existing aircraft—the F–18 and the F–15 and the F–16s—play in that, and how the slippage to the right of the JSF can affect that and how also determinations on things like what is the realistic life cycle for existing F–15s and F–16s. Are there ways to retrofit them to give them a longer life?

What sort of—are you playing around with those other pieces as well, and how do they fit into our long-term—well, short-term and long-term force structure demands?

And, Dr. Carter, I will let you go ahead and start us off on that.

Secretary CARTER. Thank you, Mr. Chairman. I will do that, and then probably ask Ms. Fox, if I may. And then the witnesses in the panel that come after us, I know, are prepared to discuss that also.

A couple of comments on that. One is that our principal effort is to restore affordability and schedule to the Joint Strike Fighter. That has been the burden of what we have been trying to do over the last few months because of the key role it plays in recapitalizing the Tactical Aircraft (TACAIR) fleet going forward.

And it is not just a matter of numbers, I guess is the second comment I would make, Mr. Chairman, it is the capabilities of the aircraft. The aircraft it is replacing are good aircraft also, but the Joint Strike Fighter has capabilities that the legacy aircraft don't, and obviously we want to have those capabilities as soon as possible.

With respect to life extension on legacy aircraft, I know that the acquisition executive is prepared to discuss that in detail.

Mr. SMITH. I will tell you what. Why don't we do this. I will follow up with him. We have had some other members join us. I want to make sure they get a chance to ask that.

You know, on those follow-up questions later, I am curious, you know, what is the threat that we are proposing to counter, the need for 22,000 or 2,200 or whatever is it in fighter aircraft and how that fits in with the Quadrennial Defense Review (QDR) and threats that we are worried about.

But I will go to Mr. Marshall now for five minutes and then Mr. LoBiondo after him.

Mr. MARSHALL. Well, I thank the chairman for his line of questioning that I stumbled in on. I do think it is important for us to hear, you know, with the recent changes that you have made on the ramp and flattening out the F–35, how that also changes other things. Obviously, force structure decisions were made with a different contemplated availability of the F–35 in mind.

I have got no parochial interest in this at all, into the F136 engine. It is almost—it is fascinating to me how this has evolved. If we get a new Secretary we are always subject to budget constraints, Secretary Carter, you mentioned just a minute ago, you know, which displaces other things. You know, the dollars involved in this displacing other things we can spend our money on.

But we get a new Secretary, a decision is made, comes as a surprise to us, given what we have heard from the Pentagon for years concerning the value of the competitive engine. Decision is made to cancel it. We fund it that year and request that Cost Analysis Improvement Group (CAIG) do a study. CAIG does a study, it comes back, we look at the study, we conclude that, okay, well, we should continue funding this thing. We just respectfully disagree.

After plunking a bunch more money into it, just sort of looking at the CAIG numbers, looked to us like both then-year and current-year dollars were either even or positive for the alternate engine. And then comes the veto threat over this, which just stunned all of us, frankly. It was pretty harsh rhetoric over something that we thought was a pretty close call, and it is sort of, because we had been funding it repeatedly, had gotten to the point where it was in the positive column.

So you all went back, and now CAPE does a study, I assume thinking sort of same people thinking about the same kind of objectives, et cetera, worried about the same kind of things, including the three or four things that you mentioned that make you uncomfortable with the projection that currently is available, and it looks like it is a wash, present dollars. I don't know what the then-year dollars look like. Maybe it is positive then-year dollars. We were only given present dollars.

And so the decision seems to rest on whether or not you buy all these attendant benefits and whether we will actually realize those attendant benefits. That is one thing.

Then the second thing is, are we willing to spend the money? Are we willing to say, Gosh, we will find money someplace else or we will just run a little red ink in order to avoid, as you put it, displacing other things that are priorities?

That puts us in a real awkward position. It seems to me that we are sort of where we have been for the last four or five years. Nothing has really changed. And consistently we have made this judgment that the alternate engine should be funded.

Now, I understand from the discussion earlier that the slippage in both programs have been about the same. I presume that means we are spending more money than we anticipated spending in the development of the 135 as well, both of those programs.

And I am just still at a loss to figure out why—I mean, I can understand that there is, you know, judgment back and forth called for, but I am at a loss to figure out why the Department would be threatening a veto over this.

Is that currently the Department's attitude about it?

Secretary CARTER. It is. And I think there are two things that make what is the—the analytical wash, which is—which you described and I think Ms. Fox has described—there are two other ingredients to the story that I think lie behind the Department's judgment that it is not advisable to proceed with the second engine.

The two other ingredients are—both of which you have mentioned—one is attendant benefits: Are there attendant, noneconomic, nonfinancial——

Mr. SMITH. If I could interrupt.

Mr. Sullivan, addressing the competition question, will we receive a payback that is valuable from competition, you are skeptical, considering whether or not that will occur.

Mr. Sullivan notes historically that paybacks in the range of 10 percent or 12 percent, which is what Mr. Sullivan identified in his opinion as being necessary in order to break even dollars-wise, that that historically has occurred.

You don't think so here?

Secretary CARTER. That is the other thing. Our judgment is that the assumptions that show that payback—historical, analytical—are very optimistic. And, therefore, if one accepts that, you have to compare very real, very certain upfront costs to hypothesized savings.

And I—we have not been able to substantiate those hypothesized savings.

Mr. SMITH. It is almost always the case that in trying to spend money on any future program, you have to predict benefits of—and whether it is economic payback, or, you know, improved security, et cetera. I mean, there are all kinds of projections that you make.

I don't see why these are really that different.

Secretary CARTER. Well, making an upfront investment to realize savings for the taxpayer in the long run is a very prudent. We do it all the time.

Investing real upfront money against a, to us, not analytically well-grounded expectation of future saving, that is where we have trouble making that particular—this investment.

Mr. SMITH. So it is the failure by CAIG to properly analyze this, to come up with the right balance——

Secretary CARTER. No, I think they have done the best analysis that can be done, which is kind of a—it takes learning—I don't want to get too technical about it, but it takes learning curves, the way the unit price is reduced with the strength of a buy——

Mr. SMITH. I am sorry. I am going to have to have you wrap this up fairly quickly. We are a little over time, and I want to get to the next questioner.

Secretary CARTER. I am sorry.

Mr. SMITH. But go ahead and complete your thoughts.

Secretary CARTER. My only point was I think it is the best kind of economics textbook, if I may say it, analysis that can be done. But that presumes a competition in the out-years, a certain competitive dynamic, that just doesn't look like it is realistically based.

Some of the customers will not, in fact, buy whatever engine is produced more cheaply in that particular year. They want one engine or the other engine.

So when one hypothesizes a free and open competition, we are concerned that it would actually be a series of directed buys.

Mr. SMITH. I am going to have to let Mr. Marshall get the last word here and then move on.

Jim, if you have got a word or two here?

Mr. MARSHALL. Well, I just don't see why CAIG and the bright folks that no doubt make up the group that did the original study wouldn't have been able to think through exactly those risks.

What has changed that all of a sudden somebody concludes, oh, we didn't think through—their thoughts concerning the value of competition are faulty because, as you have just described, that they couldn't have thought that through to start out with?

Mr. SMITH. And this will have to be continued, I am sorry, at a later point.

Mr. LoBiondo, and then I will get to Mr. Akin after him.

Go ahead.

Mr. LOBIONDO. Thank you very much, Mr. Chairman.

I kind of don't know where to begin to start. I don't know how other members feel—there aren't that many here. But I can't believe what I am hearing.

I mean, there have been slippages, there have been cost overruns, there have been all kinds of problems, and the—what we are being told is just "spend a little more money, take a little more time, don't worry about it, everything is okay."

I have been really on this fighter gap issue for some time now, and no one can explain how we are going to make this up.

You all have dug your heels in on this F–35, and I think this is going to come back in years to come and haunt us as a monumental mistake to look at what we are doing to our legacy fighters and the fighter gap issue—the bathtub issue.

There is no way anyone has been able to explain for years how you are going to make up this gap.

When these F–16s and F–15s are no longer able to fly and the F–35 still have problems because someone hasn't figured it out, you are going to have Air Guard units that are not going to have planes.

And, as someone pointed out earlier, all we are doing when we say what we need in terms of numbers is shrinking them down when someone points out that we have got a problem.

I don't—Mr. Chairman, I don't know how we get our arms around this.

Mr. Taylor, you talked about it earlier.

We have got serious, serious fiscal problems that are facing this country and we are billions and billions of dollars down the wrong track, because somebody made a decision that the F–35 was where we were going to put all our eggs into that basket.

And I am really angry about this. Hearing after hearing, it is the same thing—more time slippage, more money, more problems. "Just have a little more patience, Congress. We know more than you. Working with the vendors, working with the contractors. Don't worry. We are buying these things. We are doing it."

I will tell you. I hope somebody wakes up on this. I really do.

I apologize, because I—I had not intended to go this route. But I am listening to this, and there is only so much we can take.

Somebody has got to wake up and start giving us some answers.

If you are able to give us some answers on what you are doing to make up the bathtub issues and how substantively we are going to solve that problem, I would be quiet and be calm.

But I feel like a second grader, being patted on the head, saying, "Don't worry about. Everything is going to be okay. Just go back into the classroom and fold your hands. And everything will be fine."

I yield back.

Mr. TAYLOR. The chair thanks the gentleman from New Jersey.

The chair now recognizes the gentleman from Missouri, Mr. Akin.

Mr. AKIN. Thank you, Mr. Chairman.

As I mentioned when we started, I had been having a hard time trying to get some answers. I guess you are sensing, perhaps, some frustration on our committee. And to try to put—to give an overarching kind of sense of what is going on, is we feel like we are being given the mushroom treatment over here.

We are not included. There is not transparency. There is not visibility as to what the decisions are.

We talked about QDR this morning, and, as I said earlier, we live in the political world. We play with budgets, and we make decisions about how much the Department of Defense gets in their spending.

And if you are not getting enough money, we need to know about it. If we are going to give you this much money, and you say, "Okay, with this much money, here is what we can do to give you the least amount of risk," then you have got to tell us, "Yes, but we have left these gaps in here that are a problem."

And it is our job to go back and get more money for DOD, but we can't do that if we don't know what is going on.

And the transparency has been nonexistent. It is like it is transparent as a concrete wall.

Now, here is one that I—I have asked this question about 2½ years in a row now. I just keep trying it because I think maybe somebody can answer it. It is not on JSF, but it is related tightly.

First of all, what is the status of the DOD cost analysis on F–18 multi-year procurement, and will the Department meet the May 1st contract award deadline? That should be a yes or no.

Secretary CARTER. We are going to meet the May 1st deadline, if we possibly can. The only reason I add as we possibly can, sir, is that that is not entirely under our control. It is a matter of the interaction with the contractor.

It is an important discussion that we are having. We had some indication from the contractor of a willingness to make an offer that we would be interested in, and we are trying to wrap that up just as soon as we can, because we understand the deadline.

If I may comment on the mushroom issue, and to the congressman from New Jersey as well, I kind of felt the same way in November, that is, that we were seeing in the JET estimate a picture of the Joint Strike Fighter program so different from the one that had been portrayed by the joint program office and the contractor.

And that is the reason that the Secretary took the action he did. So I can very much relate to your anger about it and——

Mr. AKIN. The concern we had, sir, was that it wasn't just in one issue. It wasn't just Joint Strike Fighter. It has been across the board in a whole series of different areas.

So it is not like it is that one program. We know that there is certain problems with certain programs, understand that. But this has been a broader sense. The Quadrennial Defense Review is not just specifically that one plane. It is a whole series.

And how do you come to the decision of how many ships, how many this, how are you balancing that?

And that—that process is what I am talking about as being opaque. It is not just this one program, which also is that way.

So you are saying you are going to try to meet that deadline to the best of your—depending on negotiations with the contractor.

Secretary CARTER. Absolutely.

Mr. AKIN. Now, here is—next question: There is a memo we got from the Navy that says the shortfall is actually 177, but by—they think they can reduce it to 100 by several mitigation options. And then it says, "All options are on the table to manage."

So I asked a simple question before: Is one of the options if we don't have enough F–18s, that is the only thing we are flying off of aircraft carriers, is one of the options to buy some more of them?

It seems like you have got three options: One, you take old ones, fix them up; two, you just get by with what you have got, don't have as many airplanes on an aircraft carrier; or, three, you buy some new ones. That seems to me to be common sense.

Now, I asked that specific question, and I asked it three times, and never got an answer.

Are "all options are on the table," does that mean buying more F–18s is an option? Or is it not an option?

Secretary CARTER. Well, we are buying more F–18s.

Mr. AKIN. I mean beyond what is currently on record, the program of record. Because the program of record—this shortfall is after we buy the ones on record. It is still a shortfall.

Secretary CARTER. That is correct. Well, I want to be very clear. And then, of course, Mr. Stackley will be addressing this also.

The options that we are looking at now, and that we would then fund in fiscal year 2012 and beyond are ones designed to prolong the life of the existing fleet of F/A–18s until they can be replaced by Joint Strike Fighters.

Mr. AKIN. You say you are talking about rebuilding old planes?

Secretary CARTER. It is extending the life, the operational life, of the F/A–18s.

Mr. AKIN. But you are not considering buying some new ones instead of that?

Secretary CARTER. No, the options that are being considered that I think were in the—specifically referenced in the quote that you are discussing, are options for extending the service life of the F–35s—of the F–18s.

Ms. Fox will be conducting that analysis in the course of the year and I really ought to allow her to answer it.

Mr. AKIN. Okay. Well, I am about out of time, so I guess my concern is, we have taken a look at the cost per flight hour doing that, and, boy, is that an expensive alternative.

And I guess the question I have is why wouldn't you consider the alternative of buying a new one if it comes out to be a whole lot financially more desirable? But I have never had anybody say, "Well, we would consider that."

I mean, it is obviously logically something you could consider.

Secretary CARTER. Absolutely.

Mr. AKIN. You either fix up the old one, you go without, or you buy a new one. But why not consider buying the new one, because to fix up the old one is half the cost of the new one, and you get whatever it is—6,000 more hours on the sucker. So I don't understand that.

Here is one last question, if you will indulge me just a minute, Mr. Chairman: In the previous testimony, the committee has been told that the F/A–18 manufacturer submitted a proposal offering a 10 percent cost savings for multi-year procurement.

In fact, that is what Secretary Gates said—he had to have 10 percent, or he wouldn't be happy. I guess I would take any amount of money I could get, if we would get an improvement.

But, anyway, in your recent testimony to the Senate Armed Services Committee (SASC), you indicated that a 10 percent saving was simply not enough to meet a threshold of interest. But that a savings in the teens would actually be required for a multi-year procurement.

It appears to me that you are either trying to posture yourself to negotiate more savings from the manufacturer or you are arbitrarily setting requirements on the fly.

What is the basis for now requiring a savings that exceeds 10 percent? I would like to believe that this figure wasn't arbitrarily chosen, so I would like to see your analysis that supports this new figure and would allow you to justify walking away from nearly $0.5 billion of savings.

Do you understand—this is one that was kind of carefully written. Do you understand what we are saying?

Secretary CARTER. I do. And I can respond very directly to it. The Secretary said that 10 percent was the threshold of interest. I think that was the phrase I used. Obviously, we would like to get as much savings as we possibly can. That is something that is a matter of discussion and negotiation with the contractor and also, as we do our own independent assessment of what we should pay for the aircraft.

So we are trying to get the best deal for the taxpayer and the warfighter—the best deal. And——

Mr. AKIN. Now, when you are doing that negotiation, why wouldn't you, in that negotiation, say, "Hey, if we throw some more planes in, instead of fixing up the old ones, what kind of deal will you give us?" Why wouldn't you throw that part of the table too?

Secretary CARTER. Well, at the moment, we are discussing with them, very specifically, the planned buy of both E/F models and Growlers and trying to leverage the opportunity of—of placing a larger order, to see if it is possible that we can get a multi-year savings that would warrant taking the action of a multi-year.

And obviously I would like to get the best deal that we possibly can in that regard.

Mr. AKIN. I understand you are trying to get the best deal, but currently you have a program of record you are going to buy some planes, the contractor came and said, “Hey, we can do 10 percent to help you on this if you do a multi-year.”

Now, if you are really trying to get the best buy, have the shortfall, and you got a tremendously high cost to rebuild some planes, why wouldn’t you at least consider tossing out, “How about we increase the number of planes we are going to buy, what will you give us as a price?”

I mean, the Secretary has said: I like the 80 percent solutions instead of the real pricey, big ticket thing. Why don’t we use a little of that reasoning to say, if you got a plane at, whatever it is, $50 million, versus another one that is going to be, what do you think, $120 million, when you get done with F–35, and you don’t have the F–35 anyway at the time, and you do need some of them, now maybe you say, “Hey, we can’t afford to fill this gap because we don’t have enough money.” Hey, I can understand that as an answer, but I keep feeling like you are not being rational about the way you are approaching it. That is my sense of frustration.

Secretary CARTER. The analysis certainly compares life extension to recapitalization. You are right, that is logical. I think that has taken us to looking at different variants of life extension. And I don’t—that is analysis that is very straightforward to do and I think we can share entirely what the basis of that is as we go forward. And I think that——

Mr. SMITH [continuing]. And work on that.

Mr. AKIN. Thank you.

Thank you, Mr. Chairman.

Mr. SMITH. I just have one more question of this panel, and I will see if anyone else has anything, move on to the next one.

One thing on the alternate engine that we have not talked about is the May 2008 Defense Contract Management Agency Fighter Engine Industrial Capability Assessment that basically recommended the F136, sort of took Mr. Marshall’s and others’ side of that argument, if you will. We have asked for different opinions about different studies and it seems your Department has not commented on that one.

Are you aware of it? And if so, how do you refute it?

Secretary CARTER. I will need to get back to you on this. This is a DCMA analysis. I will get back to you on that.

[The information referred to can be found in the Appendix on page 201.]

Mr. SMITH. Okay. We will be sure and provide that for you, and would very much like your feedback on that particular study.

Does anyone else have anything for this panel?

Mr. Marshall.

Mr. MARSHALL. Try to be brief.

Do you think it is necessary that we maintain the industrial base in the sense that fighter engine production is different from other engine production?

Secretary CARTER. I would like to have—and I think the Department wants to have more than one participant in the military jet engine business. We have strong contenders now. We have ongoing procurements. We have technology base programs, R&D programs that are intended to advance the art in military jet engine technology. And all those activities support the industrial base and we do want an industrial——

Mr. MARSHALL. What would be helpful to me and, I think, the committee is if you could take the four reasons why you find the projection, you know, that there will be a wash to be unrealistic now, and do two things. Flesh them out a little bit more, they are very conclusory, and be very specific about why you will maintain, for example, an industrial base without the competitive engine.

And then if you could go back and specifically determine whether or not CAIG, when it originally considered all of this, took into account, in trying to make their 50–50 judgment, which is the same thing that CAPE does now, took into account the very things that you are now suggesting weigh against continuing with the alternate engine. That would be very helpful.

Ms. FOX. May I add to that, sir, in the estimate that we did in 2007 and the update we did make several optimistic assumptions. And Dr. Carter's referring to them is accurate. We do delineate them in our report and are clear about them in the current. And it does bring us to a——

Mr. MARSHALL. If I could, Ms. Fox, were you involved in that?

Ms. FOX. No, sir.

Mr. MARSHALL. So you are now saying that they were optimistic then.

Ms. FOX. Right.

Mr. MARSHALL. So you are saying that CAIG, at the time that it made these projections intentionally made optimistic——

Ms. FOX. No, sir, we didn't intentionally make optimistic assumptions. We tried to make——

Mr. SMITH. If I may—optimistic assumption is a matter of opinion at a certain point. I am sure when they put together the paper they didn't say, "And these assumptions are optimistic." I am sure when they put it together, when they did the study and all the studies that Mr. Marshall comes to, they did them based on what they thought was going to happen. I mean, your assessment now that it is not a good idea is a pessimistic assumption, if you want to put it that way. I mean those really are just sort of semantic words.

What would be helpful, and when we are talking about, for instance, the discussion about, you know, it is an optimistic assumption these cost savings are going to come forward, and we put forward and say, "Well, historically, if you have this sort of competition, a 10 to 12 percent savings is reasonable." That is not just sort of pulling it out of the air, that is going back and looking and seeing historically what have we learned. I mean, those are the assumptions you make. I mean, we—I think it would be obvious to anybody working on the Joint Strike Fighter that assumptions are far, far from guaranteed. We understand that. But to call them optimistic sort of—it really doesn't help us much unless you can say, "Well, gosh, you know, they say that historically you have saved 10 to 12 percent."

Well, look, we looked at 10 programs, and really only 7 of them, you know, 7 of them saved 5 percent, only 3 of them saved 10 to 12 percent. That is an actual data point, instead of just continually saying to us optimistic assumptions. That is, I believe, what Mr. Marshall and certainly what I am looking for.

Ms. FOX. A few comments, if I might.

First of all, the analysts that did the analysis in 2007 and updated it now are the ones that gave us all the list of assumptions they felt were, let me use the word "conservative," instead of optimistic. It is no attempt to be in any way disingenuous with the analysis. Analysis does have to make assumptions.

Mr. SMITH. Absolutely.

Ms. FOX. And in 2007 we were trying to put the best case forward for the alternate engine to inform the Secretary's decision, and so we did make conservative assumptions to elicit that. And when we updated the analysis we held those assumptions constant so we would be comparing apples and apples.

That is all I am trying to say.

Mr. SMITH. Okay.

Mr. MARSHALL. So back to 2007. Were you trying to prove a case or were you just trying to do a study?

Ms. FOX. We were trying to do a study, sir.

Mr. MARSHALL. So—and the same analysts. So you made your best judgment concerning these various issues. Certainly that group would have been aware of the issues that are now being specifically discussed. You made your best judgment, it was a frank, honest, not optimistic, not pessimistic judgment, and gave it to us. And based on that we decided to proceed.

So that is what we are struggling with right now, the suggestion that somehow that group did not accurately—well, two things. One, either that group somehow was faulty and it made overly optimistic assumptions. They would probably say, "No, we don't think we did, we thought we were right on the mark." Or things have changed. So that is what we are really struggling with here.

Mr. SMITH. If I could, I think we have beaten the horse sufficiently at this point. So I think I would like to move on to the next panel, unless there is something new and different that members want to raise that we have not raised with this panel.

Okay. Thank you very much.

And we will obviously from this, and I am sure you have been taking notes about some of the questions that we have had and get specific answers to them. And we know, I mean, this is a very difficult program. It is very expensive, big burden for all of us. Communication between your office and Congress would be important, and I would concur with Mr. Akin and some others who have said that that communication has been not what it could be to this point.

We all have to make tough decisions here. We just want to make sure that we are informed as much as possible so that we can, you know, hopefully come up with a plan that we can all agree on. So hopefully we will do a better job of that in the future.

I thank you for your testimony. We will move on to the second panel.

And I will give you a moment to switch out.

We have introduced this panel previously, but I will fire through it again quickly here just so that we know who we are dealing with. And the way I read these off will also be the order in which you will be asked to testify.

We have the Honorable Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition; Lieutenant General George Trautman, Deputy Commandant for the Marine Corps for Aviation; Rear Admiral Deke Philman, Director of the Air Warfare Division for the U.S. Navy; Mr. David Van Buren, who is the acting Assistant Secretary of the Air Force for Acquisition; and Lieutenant General Philip Breedlove, who is the Deputy Chief of Staff for Operations, Plans and Requirements, U.S. Air Force.

A lot has been said about this already, as you gentlemen no doubt heard. I would ask that—we have your statements. I will by unanimous consent submit them all for the record. We will have more votes coming up shortly, and I would hope that we could get done with this hearing before we do that.

So it is a very long, complicated way of saying try to be as brief as you can.

And with that, we will go with Mr. Stackley to get us started here.

STATEMENTS OF HON. SEAN J. STACKLEY, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT AND ACQUISITION; LT. GEN. GEORGE J. TRAUTMAN III, USMC, DEPUTY COMMANDANT OF THE MARINE CORPS FOR AVIATION; REAR ADM. DAVID L. PHILMAN, USN, DIRECTOR OF AIR WARFARE DIVISION FOR THE U.S. NAVY; DAVID M. VAN BUREN, ACTING ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION; AND LT. GEN. PHILIP M. BREEDLOVE, USAF, DEPUTY CHIEF OF STAFF FOR OPERATIONS, PLANS AND REQUIREMENTS, U.S. AIR FORCE

STATEMENT OF HON. SEAN J. STACKLEY

Secretary STACKLEY. Yes, sir.

Chairman Smith, Chairman Taylor, Representatives Bartlett and Akin, and distinguished members of the subcommittees, thank you for the opportunity to appear before you today to discuss Department of the Navy aviation procurement programs.

The Department of the Navy's fiscal year 2011 budget requests funding to procure 206 aircraft—103 fixed-wing, 100 rotary wing, and 3 UAVs.

Aviation programs represent the Department's greatest warfare investment, and this year program continues recent trends, which reflect an increase in our aviation procurement.

In formulating our investment strategy, we are mindful to balance cost, schedule, performance and risk to ensure the ability to meet the warfare—war-fighter's needs both today and for the future.

We are leveraging stable procurement in rotary-wing programs with continued procurement of the H–60, H–1 and MV–22. We are establishing strong technical foundation and putting in place the tools to control cost for the P–8A Maritime Patrol Aircraft, E–2D Advanced Hawkeye and the 53K Heavy Lift Helicopter programs.

We are investing in next-generation technologies and opportunities that come from unmanned aircraft systems.

And significantly, we are proceeding with E– and F–18 series production to include, as was discussed with the previous panel, pursuing multi-year procurement for the 124 aircraft in fiscal year 2010 through 2013, while completing development and ramping up procurement on the F–35 Joint Strike Fighter.

Our commitment to the JSF program is unequivocal. Now, within the framework of the restructured program, it is essential that we deliver the cost and schedule performance that matches our commitment to the program.

The Department has long recognized our ability to affordably meet our requirements relies upon our ability to manage the service life of our aviation fleet. As example, the P–3 sustainment. With Congress' help, we are able to ensure that that aging aircraft is able to meet our operational requirements while we await the arrival of the more capable P–8A aircraft.

And equally, similarly, the Department is aggressively managing service life of the legacy F/A–18A through D aircraft until its replacement by Joint Strike Fighter.

And to this end, we are initiating further steps to mitigate the impacts of delays associated with a restructured JSF program.

Again, we thank the subcommittees for this opportunity to discuss Navy and Marine Corps aviation programs and look forward to your questions.

[The joint prepared statement of Mr. Stackley, General Trautman, and Admiral Philman can be found in the Appendix on page 127.]

Mr. SMITH. Thank you.

General Trautman.

General TRAUTMAN. I have no opening verbal statement. I will just go with Mr. Stackley on this one, sir.

Thank you.

Mr. SMITH. Thank you.

Admiral Philman.

Admiral PHILMAN. Likewise, sir. I stand with Mr. Stackley's comments.

Mr. SMITH. Okay. Thanks very much. We will move on to the Air Force then and start with Mr. Van Buren.

STATEMENT OF DAVID M. VAN BUREN

Mr. VAN BUREN. Thank you, Mr. Chairman. I have a very short statement.

Good afternoon, Chairmen Smith and Taylor, Ranking Members Bartlett and Akin, and distinguished members of the committee. Lieutenant General Breedlove and I thank you for the opportunity to address the committee regarding the Air Force's current and future aviation requirements and capabilities.

Within acquisition, we are focused on our warfighting customers represented by General Breedlove. We are focused on what we buy and how we buy it. We are working very hard on the large-scale KC–X and F–35 programs, but also equally on the Intelligence, Surveillance, and Reconnaissance (ISR) platforms for today's fight such as Project Liberty and the MQ–9 Reaper.

We have much effort as well on modernizing our aging force. We have a robust acquisition improvement program with a key emphasis on affordability of what we buy and a cycle time reduction effort of how long it takes us to deliver to our warfighting customer.

We have made some gains, but we have much work to do. We have submitted a combined statement for the record. We look forward to answering your questions.

Thank you, Mr. Chairman.

[The joint prepared statement of Mr. Van Buren and General Breedlove can be found in the Appendix on page 173.]

Mr. SMITH. Thank you.

General Breedlove.

General BREEDLOVE. Mr. Chairman, thanks for the opportunity to be here today. I join Mr. Van Buren's remarks.

Mr. SMITH. Thank you.

Starting off, General Breedlove, with you and talking about the bomber programs. As you know, we canceled the next generation bomber program not long ago, and now we have restarted the process of figuring out what our next generation long-range strike platform is going to look like.

Two things about that. One, can you walk us through sort of what the plans are, and then explain how it is going to be different this time. It is, you know, the juxtaposition between canceling one year and then starting up a new process for developing it. The next does ask for a little bit of an explanation for why that decision was made.

Could you walk us through that?

General BREEDLOVE. Sir, I can, and I am happy to do that. The Secretary did cancel that program. We began immediately looking at what that would mean for our requirements, and the Secretary commissioned another group to study what those requirements would be, and that group is working vigorously across the Department with the help of the United States Air Force.

As far as our contributions to that and what this next program would look like, some things do not change much in the aggregate, and that is that the overall range, payload and stealth capability of the aircraft, some of that will remain fairly constant. But the program is being given a hard look. We are looking at it, sir, as you and I have talked about before, as a family of systems where the one platform for the bomber would only be one of the contributions to that family of systems.

It would be supported probably by a penetrating ISR, an electronic attack capability, a stand-off cruise missile capability, a prompt global strike capability, and those are across two different services, sir, so it would be a joint family of systems that would bring a capability to our Department and to our Nation to take care of whichever target set.

The original bomber was looked at more in the vein of being a single penetrating capability. We see that as a capability that one might need in certain less-dense target sets. In more-dense target sets, it may take the entire family of systems in order to accomplish the mission that we would need. And that, I think, will change the work from the first time when we were concentrating solely on one penetrating platform, and now how will we get to this capability across both naval and Air Force capabilities.

Mr. SMITH. Thank you.

And then my—the force structure question that I was asking the previous panel. As I understand it, that was adjusted, I think, this year from 2,200 down to 2,000. A couple of questions around that. One, why the downward adjustment? What is the threat that we are attempting to counter with that force structure? How did it change that allowed us to have 200 fewer aircraft?

And then talk to us a little bit about the F–15s and the F–16s, what their service life is going to be and what the variables are there? How confident are you that they will get to their service life? And if you aren't confident, what are our plans to sort of make up the difference? And is there a period in there, lastly, that we might have a shortfall, given where we are at with Joint Strike and with the service life of the F–15 and the F–16?

General BREEDLOVE. Yes, sir, I would be happy to address those. To begin with, the 200 delta is during the—after the recent release of the QDR and the supporting documents, the "Guidance to the Employment of Force," and in conversations with our OSD counterparts as they were developing those documents, the decision was taken that the Department should move from a low to medium or moderate threat from that, to a moderate threat.

In other words, the Department agreed to accept a little higher threat as we make these computations. And sir, that equals 200 aircraft in the modeling.

Sir, to look at the fighters that you were talking about, the F–16s and the F–15s. I would like to just touch first on a question that Mr. Bartlett, Congressman Bartlett asked, and that is: How do we know what we need? And I want—and I will start my discussion of the F–16s and F–15s by saying we have, sir, started to look at all of our platforms. The look at the A–10 is complete and we know what we have to do on the A–10. We know we have to reskin 233 of them.

The look at the F–16C, the air-to-air version, the hard fatigue-testing program is complete. And we know what we have to accomplish in the F–15C. The F–15E is our newest fighter, and we have not scheduled that full-scale testing for functional life yet. That will be a Program Objective Memorandum (POM) 12 initiative, but it is the newest fighter, and we are not nearly as far along into the period when we would need investigation.

The F–16, which is the workhorse of our fleet, of course, and has some of the oldest fighters associated with it, we are partially funded to look at that, and that look will begin next year in 2011. And we, as I said, we have partially funded that full-scale testing. And we will finish the funding of that full-scale testing in 2012. And this will provide us the data that we need structurally to look at those aircraft well before they are obsolescence lives.

Mr. Chairman, to address the F–15 and the F–16 question that you asked, we have made several efforts to look at what we need to do to move those fleets to the right, and in some cases to retire portions of those fleets and move other portions of the fleet to the right. We are electing to make major modifications to 176 of our F–15s. Those modifications range from avionics to new Active Electronically Scanned Array (AESA) radars, structural numbers in the longerons, which you know we had problems with several years back.

But for the F–15 fleet, 176 of them, we will invest fully to take them out to their full economic life. And that will buy them forward into the period where we will know much more about the JSF and how we make that time-out.

For the F–16 fleet, we kind of put them in two categories. We have the older models, the block 25s and 30s. We have looked at about 136 of those that we will elect to retire. The investment in those aircraft is too high in order to buy them forward. The remaining about 50 percent of that fleet, we are looking at a cost of about $500,000 to $800,000 apiece or a total cost of about $250 million for the whole fleet, to buy that fleet forward 5 years to cover the gaps that we are thinking may occur in that fleet. And that is primarily for lower skin repairs.

For the block 40s and the block 50s, our newer F–16s, those are the ones that will be looked the hardest at in this program which we initiated in this budget and will finish in the next budget to do the detailed fatigue testing, and we will know more about those aircraft when that is complete.

But what we already do know is that we need to invest in avionics and we are closing out this year the (CCIP), common configuration cockpit capability, which brings all of the block 40s and 50s up to one standard—a standard that will carry them well into 2020 or possibly beyond. And we are investing in that, and that program is ongoing now. In fact, all of the block 50s are done and we should finish the block 40s here in the next 2 years.

Mr. SMITH. Okay.

General BREEDLOVE. So we have addressed each one those platforms and looked at how we can move them right to lessen the gap or risk.

Mr. SMITH. Understood. That is very thorough, and I appreciate your answer.

I want to make sure I get to Mr. Taylor so I will turn it over to Mr. Taylor.

Mr. TAYLOR. Thank you, Mr. Chairman. I am going to keep this hopefully in my lane.

So Secretary Stackley, I thought I heard you say that you had plans to mitigate the effects of delaying the F–35. I was wondering if you could lay out some of the options that you have in mind and the time lines that would trigger those different options.

Secretary STACKLEY. Yes, sir. Let me break it down into a couple of categories. One is managing the fleet of aircraft; and then the other is extending the service life for the legacy aircraft.

In terms of managing the fleet, we look at several things that we have ongoing. One is we currently have in place what we refer to as TACAIR integration, Navy-Marine Corps, between respective services; squadrons both deployed on carriers and expeditionary, working the combined service to reduce the burden across the two, while separately working the pipeline of aircraft back stateside through depot training, et cetera.

So there is a TACAIR integration piece that is in place today that provides a baseline for what our requirements are. And then between the Marine Corps, which is referred to as a "bed-down plan" for Marine Corps TACAIR, and on the Navy side, the way the Navy introduces E and F squadrons to accelerate the introduction of E and F squadrons to replace F–18 legacy aircraft A- and C-type aircraft so that they can then go back into a depot pipeline for service life extension purposes.

So there is a fleet management piece, and then on the service life extension piece, we have a series of ongoing efforts for the F–18 that take it from what was originally a 6,000-hour aircraft, we have been able to extend its service life out to 8,000 hours through a number of sustainment efforts which, depending on what version of aircraft you are, that would define what your sustainment effort is.

This would include things like center barrel replacements which you may be familiar with. It is a significant upgrade to the early version F–18s that will get it out to the 8,000-hour timeframe. But as well, to go from 8,000 hours up to 8,600 hours, there is a series of inspections that are required where we know what the aircraft hot spots are that are of interest. And so an inspection regimen has been established to give us confidence in taking the aircraft from 8,000 out to 8,600 hours.

So in earlier discussion regarding what the TACAIR shortfall is for the Department of the Navy, the baseline hours that go with the most recent number that was described, 177, is that we will be able to get the legacy F–18 aircraft out to 8,600 hours service life.

The balance to get from—to drive down below 177 aircraft, that is where we need to go. The next step in terms of service life extension is to get it out to 10,000 hours. We have not started—the aircraft have not got to that point in their age and we have not started that SLEP program. That would be a 2012 issue in terms of starting to procure kits for inducting the aircraft into that service life extension program.

And this—this SLEP program basically buys an additional 4 to 5 years of service life on the legacy F–18 aircraft. What we have got to carefully determine is the extent of the SLEP. That effort is going on today to define the piece parts of the SLEP.

Mr. SMITH. Sorry, I need to interrupt for just one quick minute.

Secretary STACKLEY. Yes.

Mr. SMITH. Votes are on. We have got 15 minutes. We are going to use this full 15 minutes as much as possible to get to Mr. Taylor, Mr. Bartlett and Mr. Akin. And then it is going to be a good while before we can come back, and we will probably have to end the hearing at that point.

So we are going to enter the speed round here, so if we could get through all three of those folks, given our time constraints, that would be great.

Go ahead.

Secretary STACKLEY. Yes, sir.

The significant balance of service life extension is the foremost SLEP program, POM–12 issue with defining what it would contain today, that is everything from the technical details, starting to develop what I would call production-type of packages, and the cost estimates.

Then it is a matter of managing the throughput through the SLEP, and it is a significant matter of managing the throughputs through the SLEP so that we are not impacting the operational, the in-service aircraft by pulling too many aircraft out, but maintaining an efficient throughput at the depot.

And then there is a timing issue. When we talk about the strike fighter shortfall, it is really a period of time from start to finish. The numbers that you have quoted are the peak in about a 2017 timeframe. So what we would be doing is attacking that peak through the SLEP program.

Mr. TAYLOR. If the F–35, like so many other programs, takes longer than any of us wants, do you have a backup plan to continue buying F–18Es and Fs?

Secretary STACKLEY. We talked about the 124 aircraft that are in the program of record. That multi-year would be in fiscal year 2010 through 2013 multi-year. So those production lines would remain hot. The front end of the production line would remain hot until about the 2013–2014 timeframe.

Mr. TAYLOR. Okay. Lastly, to what extent—as you know, Mr. Bartlett and I are both adamant in that, if our Nation pays for some research, if our Nation pays to develop something, we ought to own those plans in case we ever need to buy parts for that engine, in case the supplier of that engine or whatever burns down, is destroyed by an act of God, act of man.

To what extent are you insistent on—as you have done on the Littoral Combat Ship (LCS) program—that we own the technical data package to the engine to the F–35?

Secretary STACKLEY. Yes, sir. The same question that you had asked Dr. Carter and had an opportunity to discuss a little bit with him during a break—there are two pieces to the technical data package. I will call it the paper or the electrons that come with form, fit, and function, dimensions, characteristics of the engine—those are all deliverables associated with the engine development.

The part that I would say is proprietary—and we do owe you a formal response for the record—are processes that are unique in the case of the 130 engine and practices, techniques, and tooling that goes with those practices and processes for building that engine.

So while we would own a technical data package that would suggest build-to-print, the processes that go with that——

Mr. SMITH. But you will own the specs of what each part in that engine looks like; is that correct

Secretary STACKLEY. I will confirm that, but yes, sir.

Mr. SMITH. Okay.

Secretary STACKLEY. I will get back to you formally for the record.

[The information referred to can be found in the Appendix beginning on page 201.]

Mr. SMITH. Thank you.

Mr. Bartlett.

Mr. BARTLETT. A quick question. Would this be adequate for competitive bidding, or would you need more?

Secretary STACKLEY. That is the concern is it is one thing to have a build-to-print drawing, but the processing and the manufacturing processes and tooling that go with that——

Mr. BARTLETT. But different manufacturers use different processes and tooling. My question is: Is what we own adequate to get competitive bidding?

Secretary STACKLEY. I can't give you a confident answer today, sir. I need to come back to you formally for the record.

[The information referred to can be found in the Appendix on page 202.]

Mr. BARTLETT. We would appreciate that very much.

Do you know how much it will cost to do the service-life extension on these legacy aircraft? And have you included that in the budget

Secretary STACKLEY. Yes, sir.

Mr. BARTLETT. Just a simple—okay. If you have, that is fine.

Secretary STACKLEY. Oh, no, no, no. Yes, sir, meaning I understand your question.

Mr. BARTLETT. Okay.

Secretary STACKLEY. Service-life extension has many pieces to it. So the first part of service-life extension I am going to hit you with is the center-barrel replacement. That is late in the budget. There is north of a billion dollars for 421 aircraft we are already in process with.

The second part is planning for the more extensive SLEP program, which takes the aircraft from 8,600 to 10,000 hours. We are in that planning phase. That is a POM–12 issue for the Department of the Navy. And in POM–12, we will take a look at not just the numbers of the aircraft that we are going to drive through the SLEP but the extent of the SLEP for the different versions of the aircraft.

That gets you the airframe, as well, you want capability. So we also need to take a look at any upgrades that would be associated with an additional 5 years of service life for the F–18s.

Mr. BARTLETT. Thank you. What kind of confidence do you have that you will be able to achieve adequate service-life extension? Or is this the only option left to you now that the 22 has been cancelled and the 35 is late?

Secretary STACKLEY. Sir, I am going to tell you that we have significant confidence. Now, there is—I want to say—a business case that emerges as you go deeper and deeper into a SLEP program. In other words, as the aircraft get older, the sustainment cost increases. And when we look at the fleet of aircraft that are under consideration for SLEP, to attempt to do them all would not be a good—that is not an alternative that we would look at.

So we have taken the A through D aircraft, and we have shrunk the potential aircraft down to the 150 to 280 range that we would drive through a SLEP. And that is the range that we will be looking at in POM–12.

Mr. BARTLETT. One more quick question to which I just need a yes or a no answer. Looking at the deep strike heavy bomber, I note that the Chinese are able to take out a satellite. I note that we are able to take out a missile with a missile. This new airplane will fly lower than the satellite and slower than the missile.

It may be stealthy, sir, but it is still has a cross-sectional area. I am not sure that, in this new world that we are entering, that the juice is worth the squeezing in producing a new deep strike heavy bomber. I think that things may have changed.

Can you include us in your decision process as to how we decide what we are going to do in that area?

That is the only question I have. If the answer is yes, I am pleased. Thank you very much.

General TRAUTMAN. Yes, I think so. And that goes back to General Breedlove's discussion of the family assistance.

Mr. SMITH. Mr. Akin.

Mr. AKIN. I guess we have kind of maybe beat this dead horse and still haven't gotten, really, an answer. I had a chance to see those F–18s being taken apart with the cracks in the wings and cracks in other parts. And it looks like a pretty tedious process, and the numbers saying it is a pretty expensive process. And it just seemed to me like common sense that you have got to compare one thing with the other and trying to pay a tremendous amount of money to get, you know, less than 10 percent more hours on the airframe when you can get a whole new airframe.

And I guess my question is: Are you willing to do the cost analysis at least to compare those two alternatives? Right now, everything I have heard you say is, well, we are going to take a good look at taking the old ones and fixing them up. And compared to what? Well, compare it to—we are not going to say.

You know, are we going to compare it to something? Is it a comparison to just not do it at all? Or is it a comparison to buying a new one? I have never heard anybody say that yet.

Secretary STACKLEY. Yes, sir. Let me first describe—the SLEP program, under all circumstances, we have got to get the SLEP program up, running, and producing. We cannot—when you take a look at a shortfall number of 177 aircraft in a 2017 timeframe, you cannot buy new out of that shortfall.

In the economics of SLEP versus buying new, we look at—and we are doing the business-case analysis. We look at what it would cost to SLEP. And then there is a range of answers there depending on the material condition of the aircraft. So we have a bottom number, and we have an upper number. And we believe the answer is in between and it will vary by aircraft.

And when you take that number and you compare it to what it would cost to buy new, there is a factor there.

Mr. AKIN. So you will consider what it costs to buy new then when you do that analysis?

Secretary STACKLEY. I would tell you that our analysis—we have side-by-side with what a new F–18—the unit recurring fly-away cost is, and we can compare that versus what it costs to SLEP. The other factor that comes into play is what are we trying to resolve in terms of the shortfall. And it is a shortfall that extends from, you know, the peak of 2017 and it goes down towards zero in the 2023 timeframe.

So the SLEP program overlays that well. When we buy new, we are getting more hours, and we are getting those additional service hours in a period of time beyond when we have this shortfall. That is not a bad thing, but those extra dollars we pay for those extra hours are coming away from, potentially, for example, a JSF program which gives us the capability in that timeframe that we believe—the added capability that we believe we need.

Mr. AKIN. Of course, the SLEP is whatever it is—77 aircraft. The other hundred, you have still got the shortfall. So I mean, you could make a decision—I just haven't heard anybody say—I mean, if you are going to cost compare, you have got to compare something to something. And it seems to me, to compare—especially if you are negotiating a multi-year, if I were a camel trader, I would say, well, okay; you give me this percent, what happens if we throw a couple more aircraft in, you know, for the negotiation.

Just toss that out for your consideration.

Thank you, Mr. Chairman.

Mr. SMITH. Thank you very much.

We are out of time regrettably. I know members have more questions. There are some questions that we have prepared that we will submit to you and, for the record, we would like to reflect that. We appreciate any answers as quickly as you can get them to us.

And, obviously, we have a deep interest in this subject matter, and we will continue to work with all of you on resolving the issues that were raised.

Thank you. I appreciate your testimony and the questions from the members. And we are adjourned.

[Whereupon, at 4:54 p.m., the subcommittees were adjourned.]

APPENDIX

March 24, 2010

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

March 24, 2010

Statement of Chairman Adam Smith
Joint Hearing of the Air and Land Forces and Seapower and Expeditionary Forces Subcommittees
Department of the Navy and Air Force Combat Aviation Programs

March 24, 2010

"The hearing will come to order. The subcommittee meets today to receive testimony on the Department of the Navy and the Department of the Air Force budget requests for combat aircraft programs for fiscal year 2011.

"We welcome our witnesses for today. Panel one: The Honorable Ashton Carter, Under Secretary of Defense for Acquisition, Technology and Logistics, Office of the Secretary of Defense; The Honorable Christine H. Fox, Director of the Office of Cost Assessment and Program Evaluation, Office of the Secretary of Defense; The Honorable J. Michael Gilmore, Director, Operational Test and Evaluation, Office of the Secretary of Defense and Mr. Michael J. Sullivan, Director of Acquisition and Sourcing, Government Accountability Office.

"Panel two: The Honorable Sean Stackley, Assistant Secretary of the Navy for Research, Development and Acquisition; Lieutenant General George Trautman, Deputy Commandant of the Marine Corps for Aviation, Rear Admiral Deke Philman; Director of the Air Warfare Division for the U.S. Navy; Mr. David M. Van Buren, Acting Assistant Secretary of the Air Force for Acquisition and Lieutenant General Philip M. Breedlove, Deputy Chief of Staff for Operations, Plans and Requirements, U.S. Air Force.

"We have scheduled this hearing to give members the opportunity to address issues related to all combat aircraft programs of the Navy, Marine Corps and Air Force. There will be a subcommittee hearing in late April to address mobility aircraft programs.

"We have a number of issues to cover today, but my opening remarks will focus on the F-35. The F-35 is an incredibly complex program and there is no question significant technology and manufacturing capabilities have been demonstrated. The thousands of people working at the major contractors as well as the many suppliers and vendors deserve a great deal of credit for their achievements.

"But one cannot say that with the tens-of-billions-of-dollars invested to date, that the program is proceeding according to plan. There have been several master schedules and even more test flight schedules. The F-35 program is projected to field 14 test aircraft. Three production representative test aircraft have been delivered, resulting in only 16 of a planned 168 test flights being completed last fiscal year.

"All of the test aircraft are not projected for delivery until 2011 and the first Naval development variant aircraft will not be able to be used for catapult test launches as intended because of a structural design issue, unless it goes through a 2-3 month modification. Two thousand, four hundred and forty three U.S. Navy, Marine Corps and Air Force aircraft as well as

730 aircraft for 8 international partners are planned. No production aircraft have been delivered of the 58 production aircraft approved by Congress over the past 4 years.

"Two production aircraft are projected for delivery late this year, approximately 9 months later than projected. Funding for 550 production aircraft will be requested from Congress by the Department of Defense before initial operational test and evaluation is scheduled to be completed in 2016. Aircraft deliveries to date have come at a significant cost. This year's budget alone is $10.7 billion for research and development and procurement of 43 F-35 aircraft.

"The projected total program acquisition cost is currently estimated at well over $300 billion, a 55 percent increase over the original baseline estimate. The average projected F-35 procurement unit cost has increased 80 percent to $125 million per aircraft. In addition, the GAO has noted that engine cost growth and development delays are also contributing substantially to overall programs costs.

"The GAO, in its recent report noted, 'The F135 primary engine development effort…is now estimated to cost $7.3 billion, a 50 percent increase over the original contract award. This includes an $800 million contract cost overrun in 2008.' The total flight time logged on the F-35 baseline engine is approximately 250 hours -- far less than the 200,000 hours required to demonstrate engine maturity.

"Nine years into development, the F-35 remains a highly dynamic and unpredictable program. Secretary Gates, while visiting the F-35 production facility last August was quoted as saying, 'My impression is that most of the high-risk elements associated with this developmental program are largely behind us, and I felt a good deal of confidence on the part of the leadership here that the manufacturing process, that the supply chain, that the issues associated with all of these have been addressed or are being addressed.'

"Within two months of Secretary Gates' comments, three different Pentagon assessments concluded the F-35 faced significant cost growth and further delays, adding $46 billion in total acquisition costs and 2 ½ years to the 2007 approved program baseline.

"As part of the Pentagon assessments, a Manufacturing Review team determined that the production plan projecting increasing annual production was too aggressive and that large cost overruns were probable.

"Last month, Secretary Gates testified that even with the significantly restructured F-35 program, the service initial operational capability – or I-O-C dates remained unchanged. However, this month, two of the three services procuring the F-35, slipped their service I-O-C dates, with the AF slipping its projected initial operational capability date from 2013 to 2016.

"The Director of Operational Test and Evaluation December 2009 report states that, 'Continued production concurrent with the slow increase in flight testing over the next two years will commit DOD and Services to test, training, and deployment plans with substantial risk.'

"The GAO notes that the test program relies much more heavily than previous weapons systems on its modeling and simulation labs to verify aircraft and subsystem performance. The program plans to verify 83 percent of JSF capabilities in its ground labs, flying test bed, and desk studies – and only 17 percent through flight testing.

"Yet, only two of 35 models and simulations have been accredited and many of the remaining will not be accredited until late 2012 or 2013. It therefore remains to be seen whether, as Secretary Gates observed, that 'most of the high-risk elements associated with this developmental program are largely behind us.'

"The result of the Pentagon reviews is a restructured program that transfers some funding planned for procurement to development, adds one new test aircraft, and adds 13 months and $2.8 billion to complete the development schedule. Although the committee notes that the test aircraft assets added to the test program do not align with the test aircraft assets recommended by the Department's F-35 Joint Estimating Team.

"The restructured program reduces projected F-35 procurement over the next five years by 122 aircraft to a total of 362 aircraft. The level of research and development and procurement concurrency remaining, even with a restructured program, has been characterized as unprecedented.

"Under the current F-35 procurement plan, the Pentagon will be requesting congressional authorization for the highest annual rate of F-35 production to be achieved at any time during the program, one year before the full rate production decision is even made by the Department. The engine acquisition strategy continues to be a point of contention between the Pentagon and Congress.

"While competition is said by Pentagon officials to be a guiding principle for defense procurement, the Pentagon refuses to apply that principle to F-35 engine procurement. The Pentagon's engine acquisition strategy is to procure, through a sole source contract, several thousand F-35 engines over the next 25 years at a life cycle cost of well over $100 billion.

"Congress has maintained that a competitive engine development program would better ensure an affordable, reliable engine, and protect against the operational risk of having 95 percent of the entire U.S. fighter fleet dependent on one engine.

"The GAO has and continues to indicate that competition could be expected to yield enough savings to offset additional investments required to sustain a second engine source. The GAO also notes that prior studies indicate a number of non-financial benefits from competition, including better contractor performance, increased engine reliability, and improved contractor responsiveness.

"The Pentagon budgeted for and funded the F135 baseline engine and the F136 alternate engine through fiscal year 2006. Section 213 of Public Law 110-81 requires the Secretary of Defense to ensure the obligation and expenditure, from the amounts appropriated for the Joint Strike Fighter each year, of sufficient annual amounts for the continued development and procurement of two options for the propulsion system in order to ensure the development and competitive production of the F-35 propulsion system.

"The Pentagon has not complied with this statute and maintains that its business case does not justify an alternate engine program. Congress has funded the alternate engine for the last four years, but has only been able to fund the alternate engine at approximately 80 percent of the required level to maintain the F-35 Joint Program Office proposed schedule.

"The unwillingness of the Department to comply with statute, properly budget for the alternate engine program, and fully execute the alternate engine funds provided by the Congress for alternate engine, is unhelpful.

"Further, the failure of the Department to execute authorized and appropriated alternate engine funding is contrary to the commitment to the committee by the former Undersecretary for Acquisition, who testified that all funds authorized and appropriated for the alternate engine would be executed.

"The F-35 program office specified to Congress the need for $70 million in procurement funding, $35 million each, in the last two fiscal years, to properly execute the alternate engine program.

"Congress authorized and appropriated the $70 million, yet the Pentagon continues to fail to execute or reprogram the $70 million to research and development for the program.

"What the Pentagon does obligate for the alternate engine, it does so in an unpredictable and piecemeal manner, making the program extremely difficult to manage. Then when the Pentagon slips the out year schedule and increases the estimated costs to complete the alternate engine development, it infers the alternate engine program is at fault.

"While past F-35 program managers have provided congressionally requested information on annual funding levels required to support the engine, the current, acting program manager has declined to do so.

"Ultimately it is the responsibility of Congress to provide the funding for defense programs. We require the best information we can get to execute that responsibility.

"Further, misleading statements by senior Pentagon officials and congressional supporters of a sole-source contract for engine procurement make objective discussion of the F-35 engine issue difficult.

"Secretary Gates' Fiscal Year 2011 annual posture statement indicates that the F-35 alternate engine is 3-4 years behind the baseline F-35 engine. The F-35 alternate engine is 3-4 years behind the baseline engine primarily because that was the acquisition strategy for the alternate engine -- the development contract for the alternate engine was signed 46 months after the contract was signed for the baseline engine.

"Secretary Gates' statement also indicates many of the likely buyers of the F-35 are unable or unwilling to purchase from two engine manufacturers. This statement is not supported by the experience with the previous alternate engine, where eight countries have purchased from both engine manufacturers.

"In addition, the U.S. Navy purchased 359 of the Air Force alternate engines for its F-14 because of unsatisfactory performance with the F-14's baseline engine. Secretary of the Navy, John Lehman testified in 1984 that the Air Force alternate engine was 'a far a superior engine…at prices about 10 percent below the old engine that's in the F-14 now.' This would suggest that military services and countries buy engines for many different reasons, some of which are performance, price, contractor responsiveness, maintainability and durability.

"The head of public affairs for the Pentagon recently stated that, 'Revisionist history would suggest that the previous alternate engine competition resulted in some great savings to the taxpayer. I think the actual analysis shows that, if there was a benefit, it was negligible.'

The 2007 DOD engine study clearly indicated that engine competition caused a reversal in price trends for the baseline F-16 engine. It further is the case that after competition was introduced, engine reliability and maintainability improved significantly, and accidents due to engine problems, decreased significantly.

"We requested that the Pentagon provide further information on the public affairs statement. No information has been forthcoming. It has been stated in floor debate in the other body that the engine for the F-35 was competed and the alternate engine contractor 'simply wants another bite at the apple.' This is not supported by fact. There has never been a competition between the F135 and F136 engines for the F-35 aircraft.

"The Pentagon's current position on the alternate engine continues to be difficult to understand. When, during internal Department of Defense budget deliberations for the fiscal year 2006-2011 budget, the Navy did not fund its portion of the alternate engine development, the Office of the Secretary of Defense directed the funding and countered with, 'Without a second engine, future tactical aircraft inventory will be dependent on a single engine. Interchangeable, but different engines ensure that a single design problem won't simultaneously affect the bulk of the inventory. Funding the alternate engine also retains the industrial base.'

"A May 2008 study of Fighter Engine Industrial Capability by the Defense Contract Management Agency, completed at the request of the Assistant Secretary of the Air Force for Acquisition, recommended that the F-35 alternate engine be fully funded at the fiscal year 2006 planned program, i.e., to achieve production deliveries in fiscal year 2010 -- this fiscal year.

"Past F-35 program managers supported an alternate engine program. Former under Secretaries of Defense for Acquisition support the F-35 alternate engine program. The former Secretary of the Air Force and Chief of Staff of the Air Force both aggressively supported the F-35 alternate engine.

"The current Secretary of the Air Force says funding or not funding the alternate engine is, 'a close call.' Even if the most recent information cited by the Pentagon for the near-term cost of completing development and completing directed procurement of the alternate engine are correct, this cost represents less than 3 percent of the estimated life cycle cost of the F-35 engine.

"And again, the GAO projects that funding the alternate engine would be cost neutral over the program's life time. I can appreciate the position of Secretary Gates on the F-35 program. But we ask the Secretary consider our position on the alternate engine. The potential ramifications of this decision will play out over the next two - three decades.

"Not funding the alternate engine program will change the fighter engine industrial base that has been in place since World War II, making it a class of one company. Ninety-five percent of the total U.S. fighter force would dependent on a single-engine F-35 aircraft, dependent on one company. DOD needs to have an explicit strategy for the fighter engine industrial base. At the completion of development of the F-35 engine, the U.S. fighter industrial base will be without a major fighter engine development program for the first time in over 35 years.

"Secretary Gates will not likely be the Secretary of Defense for the 2-3 decades the F-35 is projected to be the mainstay of the U.S. fighter force. I may not be a member of Congress for two- three decades.

"But I don't believe it is the responsible course of action to not fund both F-35 engines, given what we know and don't know about the F-35 engine and where we are in the evolution of the test program -- with all of 250 flight test hours having been flown.

"Each of the F-35 engines has, to varying degrees, had development issues. These engines are being required to do what no other fighter engine has ever been expected to do. Technical challenges can be expected. However, it is important that when technical issues do develop that contractors respond in a timely way and they have their A teams addressing the issues. It has been demonstrated that competition is the only way to achieve that.

"All competitive programs require up-front investment to achieve the long term benefits that competition brings. In the case of the alternate engine, the up-front investment cost has been projected by the GAO to be recoverable over the life of the engine program. By funding the alternate engine, the Department has the opportunity to hedge against the operational risk of wide-spread fleet groundings due to engine problems, sustain the fighter engine industrial base, effect contractor responsiveness, and encourage technical innovation at no additional cost to the Department. The Department's engine acquisition strategy is inexplicable."

###

Statement of Chairman Gene Taylor
Joint Hearing of the Air and Land Forces and Seapower and Expeditionary Forces Subcommittees
Department of the Navy and Air Force Combat Aviation Programs

March 24, 2010

"I thank the gentleman for yielding and I would also like to thank him, and our ranking members, for holding this hearing on a critical topic. I'd also like to congratulate him on becoming the Chairman of the Air and Land Forces subcommittee, and I look forward to working with him on matters that affect both of our subcommittee's jurisdictions. I'd also like to welcome and thank our two panels of distinguished witnesses for taking time out of their very busy schedules and appearing before us to testify.

"Given the thorough opening remarks that the Chairman has made, which I also associate myself with, I'll be brief in my opening comments and will get right to the point. I am concerned about the lack of affordability of the JSF program and the effect that it will have on all the Services in meeting their tactical aircraft requirements.

"When this program began in 1996, the primary objective of the program stated in the Department's baseline document was to 'produce an affordable family of strike fighter aircraft that meets Air Force, Navy, Marine Corps and Royal Navy needs.' Since the 1996 baseline, the program has had two Nunn-McCurdy breaches; the unit cost of the aircraft has grown over 80 percent; the total quantity of planned aircraft purchases has decreased by 535 aircraft; and recent operational and risk assessments of the program highlight design and suitability issues that may prevent the aircraft from meeting Department needs.

"In a recent DOD manufacturing review of the JSF program, the report stated that 'affordability is no longer embraced as a core pillar.' In a recent assessment by the Assistant Commander for Research and Engineering at the Naval Air Systems Command, his report stated that 'affordability expectations are not materializing', 'cost increases will put Navy and Marine Corps force structure affordability at risk', and 'F-35B and F-35C operations and sustainment costs are estimated to be 40 percent higher than legacy aircraft costs.'

"Lastly, when Major General Moore, the current program manager, was recently asked during a briefing to committee staff to define 'affordable' as it relates to the JSF program, he stated that 'I define affordable as the lowest price I can negotiate with the contractor, but I don't have a specific cost goal in mind.'

"I think it can be safely stated that the JSF program began when only 'exquisite' weapons systems were envisioned to meet future requirements. Since the program began, many unpredictable and major events have happened which have put tremendous pressure on the economic security and stability of this country, and have caused many Americans to tighten their financial belts. I think it's time for the Department to realistically look itself in the mirror and make the hard choices, especially when other aircraft platforms are available at an affordable cost in meeting warfighter requirements.

"In remarks to the Army War College in April 2009, Secretary Gates stated that 'we need to shift away from the 99-percent exquisite, service-centric platforms, that are so costly and so complex that they take forever to build, and only then in very limited quantities. With the pace of technological and geopolitical change, and the range of possible contingencies, we must look more to the 80-percent solution, the solution that can be produced on time, on budget and in significant numbers. As Stalin once said, "Quantity has a quality all of its own."'

"I have witnessed over the years what the lack of affordability has done to our Navy's combatant fleet as it relates to obtaining a minimum of 313 ships, and it's not acceptable. In fact, the 313 goal post keeps moving further to the right year after year.

"This is happening now with the tactical aircraft inventory, and the cost growth and schedule slip of the JSF program is one of the main root causes. But at least for the Navy and Marine Corps, we have an opportunity to stop the slide during our watch and turn to another alternative.

"I've made a promise to the American people that to the maximum extent possible under my watch as Seapower Chairman, and with the help of my colleagues, the Navy's ship fleet will no longer be allowed to decrease according to Navy plans. I am now also making that promise as it relates to the Navy and Marine Corps tactical aircraft inventory.

"I look forward to the witness' testimony and again, thank them for being here and hope that they can adequately define what affordability means. With that, I yield back.

###

**HOLD UNTIL RELEASED BY THE
HOUSE COMMITTEE
ON ARMED SERVICES**

TESTIMONY OF

ASHTON B. CARTER

UNDER SECRETARY OF DEFENSE

(ACQUISITION, TECHNOLOGY & LOGISTICS)

BEFORE THE UNITED STATES HOUSE

COMMITTEE ON ARMED SERVICES

AIR AND LAND FORCES SUBCOMMITTEE

AND

SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

March 24, 2010

**HOLD UNTIL RELEASED BY THE
HOUSE COMMITTEE
ON ARMED SERVICES**

Mr. Chairmen and distinguished members of the Subcommittees, thank you for the opportunity to appear before you today to discuss the Department's aviation programs. My testimony today will provide background and rationale for the Department's Fiscal Year (FY) 2011 budget request for aviation programs. Specifically, I will provide answers to many of the questions addressed in your letter of March 11, 2010, which focused on the F-35 Lightning II Joint Strike Fighter (JSF) program. Some of the questions posed to the Department will require more time to answer, and we will provide those responses for the record as soon as possible. Ms. Fox, Director of Cost Assessment and Program Evaluation (CAPE), is with me today since her office conducts the independent cost estimates upon which these figures are based. Dr. Gilmore, Director of Operational Test & Evaluation (DOT&E), is also with me today since his office too is heavily involved with this program.

Aviation Programs

The Department's base budget request covers a number of aviation programs and supports what Secretary Gates has identified as a major institutional priority: rebalancing America's defense posture by emphasizing capabilities needed to prevail in current conflicts, while enhancing capabilities that may be needed in the future.

Rebalancing the Force – the Wars We Are In

The Department recognizes that America's ability to deal with threats for years to come will largely depend on our performance in the current conflicts. The FY 2011 budget request took a number of additional steps aimed at filling persistent shortfalls that have plagued recent military efforts, especially in Afghanistan.

Rotary-Wing Aircraft

To increase these capabilities, the FY 2011 budget request includes more than $9.6 billion for the acquisition of a variety of modern rotary-wing aircraft, including the creation of two additional Army combat aviation brigades by FY 2014.

Intelligence, Surveillance, and Reconnaissance (ISR)

The FY 2011 budget request continues efforts to increase ISR support for our fighting forces, including a substantial investment in unmanned aircraft systems. The ISR Task Force was formed in April 2008 to generate critical operational ISR capacity – primarily in Afghanistan and Iraq. Since then, the Department has worked to secure substantial funding to field and sustain ISR capabilities. In the FY 2011 budget, this includes:

• $2.2 billion for procurement of Predator-class aircraft to increase the Combat Air Patrols (CAPs) available to deployed forces from 37 to 65 by 2013.

• Doubling procurement of the MQ-9 Reaper over the next few years.

Electronic Warfare (EW)

The FY 2011 budget request supports the Quadrennial Defense Review's recommendation to improve EW capabilities for today's warfighters. The Navy procurement budget includes $1.1 billion in FY 2011 and $2.3 billion in FY 2012 for the addition of 36 EA-18G aircraft, with 12 procured in FY 2011 and 24 in FY 2012. These resources and capabilities will help fill an imminent EW shortfall that has been consistently highlighted by the combatant commanders as one of their highest priorities.

Rebalancing the Force – Preparing for the Future

In order to enhance capabilities that may be needed in the future, the FY 2011 budget includes $189 billion for total procurement, research, and development. For aviation programs, the base budget includes some $39.9 billion in aircraft procurement, with another $3.2 billion in the Overseas Contingency Operations (OCO) request. Total investment (procurement and research and development) for major tactical aircraft is $15.1 billion, and another $0.2 billion has been budgeted for the next-generation bomber. This investment reflects the fact that the United States needs a broad portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict, including conventional conflict with the technologically advanced military forces of other countries. To meet the potential threats to our military's ability to project power, deter aggression, and come to the aid of allies and partners in environments where access to our forces may be denied, this budget request includes substantial funds for conventional and strategic modernization.

Mobility and Tanker Aircraft

The FY 2011 budget continues to support development of a new aerial refueling tanker. The KC-X, the first phase of KC-135 recapitalization, will procure 179 commercial derivative tanker aircraft to replace roughly one-third of the current aerial refueling tanker fleet at an estimated cost of $35 billion. Contract award is expected in the summer of 2010 and procurement should begin in FY 2013. To support this long-range effort, $864 million has been requested for research into the next-generation tanker.

The FY 2011 budget ends production of the C-17, supports shutdown activities for production of new aircraft, and continues the modification of existing C-17s. With the completion of the program, the United States will have 223 of these aircraft, more than enough to meet current and projected requirements.

Tactical Aircraft

The FY 2011 budget funds programs to develop, procure, modernize, and maintain superior aircraft to guarantee continued air dominance over current and future battlefields. The Department's future tactical aircraft force will include a mix of legacy 4th generation aircraft and 5th generation strike fighter aircraft. The legacy tactical aircraft fleet, comprised of F/A-18, F-16, F-15, and A-10 aircraft, is budgeted for modernization, maintainability, and sustainability to ensure that the appropriate force structure is available to the Services. F/A-18E/F production has been extended an additional year to 2013 to provide risk mitigation for the Navy's carrier force structure. The F-22A aircraft is winding down production with the last of the 187 aircraft programmed buy scheduled to deliver in 2012. The F-22A modernization program is in year six of a 13-year plan, and consists of two major efforts: the common configuration program and a pre-planned product improvement program.

Your letter of invitation included a number of JSF-specific questions that are addressed later in this statement, and my testimony includes a detailed discussion of the JSF program. In terms of the Department's overall budget request, our FY 2011 base budget includes $10.7 billion for continued development of the F-35, and procurement of 42 aircraft. An additional JSF has been requested in the OCO budget. This budget request reflects a significant restructuring of the JSF development program to stabilize its schedule and cost. The Department has also adjusted F-35 procurement quantities based on revised projected orders from our foreign partners, realigned development and test schedules, and implementation of recommendations from independent reviews. This restructuring was directed by Secretary Gates late last year when these reviews indicated certain performance shortfalls in the program, including a Nunn-McCurdy breach.

Joint Strike Fighter

The Joint Strike Fighter is the Department of Defense's largest acquisition program, and its importance to our national security is immense. As Secretary Gates has said, "we cannot afford, as a nation, not to have this airplane." The JSF will form the backbone of U.S. air combat superiority for the next generation. It will replace the legacy tactical fighter fleets of the Air Force, Navy, and Marine Corps with a dominant, multi-role, fifth-generation aircraft, capable of projecting U.S. power and deterring potential adversaries. Furthermore, the JSF will have the capability to effectively perform missions across the full spectrum of combat operations. For our international partners who are participating in the program, the JSF will become a linchpin for future coalition operations and will help to close a crucial capability gap that will enhance the strength of our security alliances.

At the same time, Secretary Gates has insisted upon performance in acquisition programs, as has this Committee. The JSF program has fallen short on performance over the past several years. This is unacceptable to the taxpayer and to the warfighters of the U.S. Air Force, Navy, and Marine Corps, and to the international partners who also plan to deploy the JSF.

In his presentation of the President's FY11 defense budget, Secretary Gates described some of the steps he has taken to restructure the program, and, notably, to put it on a more realistic schedule and budget. These are important steps, and we will be giving the Committee more detail on them today. It has taken a couple of years for the JSF program to fall behind, and the Department will need to continue to aggressively manage the program over the coming critical years as it transitions from development and test into production. The Department will be looking to the program, as I know this Committee will, to show progress against a reasonable set of objectives according to a realistic overall plan defined in the restructuring. The emphasis must be on restoring a key aspect of this airplane when the JSF program was first launched over a decade ago: affordability.

The Department has conducted several reviews of the JSF program: two Joint Estimating Team (JET) reviews, an Independent Manufacturing Review Team (IMRT) review, and a F135 Joint Assessment Team (JAT) review. The Cost Assessment and Program Evaluation (CAPE) office led the JET I and II reviews. AT&L commissioned the IMRT and the JAT. All of these reviews have been provided to your staffs.

First, let me recount the events leading up to the JSF restructuring described by Secretary Gates in his budget statement. In October 2008, the JET I estimate projected that the System Development and Demonstration (SDD) phase of the program would take longer and cost more than both the JSF Joint Program Office (JPO) and the contractor were projecting. Based on the JET I estimate, Secretary Gates directed in October 2008 that $476M be added to the SDD program in FY10 to mitigate the schedule risk and cost growth forecast.

In July 2009, Deputy Secretary Lynn directed that a second JET estimate, JET II, be prepared by October 2009. The JET II estimate was substantially similar to the JET I estimate. It found that the factors noted in the JET I estimate in October 2008 had persisted for another year. These factors were driven by substantially higher contractor change traffic (that is, changes in design not resulting from changes in requirements or capability), which led to increased engineering and software staffing, extended manufacturing span times, and delayed delivery of aircraft to flight test. The overall effect of these factors, the JET II said, would be a 30-month slip in the completion of flight test relative to the JPO plan from the summer of 2009.

Additionally, the IMRT review identified a large number of conditions that would need to be satisfied in order for the production ramp-up to the higher Full Rate Production quantities be achieved. At about the same time, the JAT reviewed the substantial cost growth in the F135 JSF engine program and identified measures to arrest, and possibly reverse, that cost growth.

None of these reviews discovered fundamental technological or manufacturing problems with the JSF program, or any change in the aircraft's projected military capabilities. However, all of these inputs suggested that a Department-wide review of the JSF program was warranted. Further, it was clear back in November 2009 that if the JET II estimate was correct, the JSF program would have a critical Nunn-McCurdy breach.

The review, which began in November 2009, was therefore undertaken as though JSF was in Nunn-McCurdy breach. I will describe some of the findings of the review and the management steps taken to date as a result. They are organized according to their respective stages in the life of the program: development, initial production, and full-rate production.

JSF Development Program

The Department's leadership was presented in November with two different forecasts about how the JSF program would unfold in the next few years: one from the JPO and contractor, and another from the CAPE-led JET II. The JET II forecasted, among other things, a longer (by 30 months as measured to the end of developmental flight testing) and more expensive (by $3B over the FYDP) development phase than the JPO. As part of the budget process, Secretary Gates determined that the JET II estimate, suitably revised, was the more realistic forecast to use for budgeting purposes and directed that the program be restructured around the JET II forecast. The use of this independent cost estimate (JET II) is consistent with the Weapon Systems Acquisition Reform Act of 2009.

Secretary Gates also directed a fundamental restructuring of JSF, including several steps to partially restore the SDD schedule. First, he directed the procurement of an additional carrier version aircraft to be used for flight testing. This additional asset will help complete the required flight tests sooner and more efficiently. Second, he directed that three early production jets planned for operational test be loaned to developmental test, adding further assets to the flight test program. We are still working on the details of this loan of aircraft to ensure that it does not have an impact on operational test, as Dr. Gilmore will discuss. Third, Secretary Gates directed the addition of another software integration line to the program. This is intended to prevent the building of the mission systems software from becoming a limiting factor on the development schedule.

The JET II team estimates that these three steps, taken together, can restore 17 months to the development schedule; that is, reverse what would have been a forecasted 30-month delay in the completion of flight test to 13 months, meaning that it will complete in March 2015. This Revised JET II forecast, then, became the final basis for the Department's budget submission.

I would like to emphasize two things about this restructuring of the development program. First, adding aircraft, software engineering capability, and other resources to the development program to arrest the trend identified by the Revised JET II forecast costs money. It did not seem reasonable that the taxpayer should bear the entire cost of this failure of the program to meet expectations. That is why Secretary Gates decided to withhold $614M in fee from the Lockheed Martin SDD contract.

Second, while recovering 17 of the 30 months of projected development program timeline stretch is a constructive result of the JET process's look over the past two years of the JSF's performance, these are estimates, and reality will get a vote. The next two years will be critical ones for JSF, with delivery of test aircraft to Patuxent River and Edwards AFB, completion and analysis of hundreds of test flights, and commencement of flight training at Eglin AFB this year, and a number of key milestones in 2011, including:

- Initial Marine Short Take Off and Vertical Landing (STOVL) sea trials with Navy amphibious assault ship (LHD);
- Completion of initial land-based carrier catapult and arrested landing testing at Lakehurst, NJ and Patuxent River, MD.
- Release of Block 2 software to flight test;
- Completion of static structural testing of all three variants;
- Mission training initiated at Eglin AFB with Block 1 software;
- Delivery of all LRIP 2 (12 aircraft) and at least 13 of 17 LRIP 3 US and Partner aircraft.

The Department has challenged the contractor to improve upon the Revised JET II estimate, and they have accepted that challenge. The current program plan, as revised, stands up the first training squadron at Eglin AFB in 2011, and delivers operational aircraft to operational squadrons for the Marine Corps 2012, the Air Force in 2013, and the Navy in 2014.

One final note regards Initial Operating Capability (IOC). The IOCs are determined by the Services based on both the program's performance and how the Services define IOC. Each Service has a somewhat different definition, depending on what capabilities they intend to have at IOC, their operational test and training requirements, and the number of aircraft they require for IOC. Since the restructuring, the Services have specified these definitions.

At this time, based on the Revised JET II schedule for the end of developmental and operational test, and their definitions of IOC, the Services are projecting IOCs of 2012 for the Marine Corps, and 2016 for the Air Force and Navy.

JSF Initial Production

The Independent Manufacturing Review Team (IMRT) examined the transition from development to production. For JSF, there is a great deal of "concurrency," meaning that development activities like flight testing are still going when production begins. The IMRT identified a large number of conditions that would have to be satisfied in order for the planned production ramp to the higher Full Rate Production quantities be achieved, and recommended that the program adopt a somewhat flatter and smoother ramp. The JET II accepted this revised ramp and then moved it later in time in accordance with the delayed progress of the development program.

Secretary Gates decided to budget to the Revised JET II ramp, and the FY11 budget submission reflects this later, slower ramp up to full-rate production for JSF. As mentioned above, budgeting to this Revised JET II estimate is consonant with the WSARA. This approach has three consequences:

First, it lowers risk by reducing concurrency.

But second, the early aircraft will be more expensive, since fewer will be purchased initially. As typical for complex production programs, early units cost more. It takes time to optimize production processes and the distribution of work among many specialized subcontractors. As processes stabilize, unit costs will decrease significantly. In the short term; however, buying fewer units slows down the "learning" process. Furthermore, unit costs increase because fixed costs are spread over a smaller quantity and it is more difficult to obtain volume pricing. Specifically, the total quantity of aircraft we plan to purchase within the FYDP has decreased 24%. This, in turn, causes the average unit cost over the FYDP to increase 6% for the reasons just discussed.

Third, this is—again—an estimate. Obviously we would like the program to perform better than the Revised JET II estimate. That is why we are protecting the option to produce 48 aircraft, not 43, in FY11. This will be determined in negotiations with the contractor, which are ongoing. These negotiations include the transitioning of the LRIP contracts for JSF to fixed price at an earlier date. Obviously we think the taxpayer would want us to get more and cheaper aircraft than the JET II estimates.

The pattern here is the same as noted above for development: the Department is budgeting to the independent cost estimate, but challenging the contractor to do better than the estimate.

JSF Full-Rate Production and Nunn-McCurdy Breach

Finally, I would like to address full-rate production and the JSF program's breach of the critical Nunn-McCurdy threshold for unit cost.

After several years of low-rate initial production (LRIP), JSF will enter full-rate production and produce 2443 jets for the U.S. and 730 for international partners.

The JSF program has been approaching the Nunn-McCurdy threshold for several years. As the Department began reviewing the program in detail in November 2009, it became apparent that if the JET II estimate was right, the cost increases it was projecting, together with other factors, would cause the JSF program to breach the threshold.

This means that the average price of a JSF aircraft as estimated by the JET – the overall cost of the program averaged over all the years of production divided by the number of aircraft – would be more than 50% higher (in inflation-adjusted dollars) than it was projected to be back in 2001 when the program began. Specifically, in 2001, the average procurement unit cost for the JSF was estimated at $50M in base year 2002 dollars or $59M in base year 2010 dollars. This is now estimated to fall within a range of $79M to $95M in base year 2002 dollars or $93M to $112M in base year 2010 dollars. This is a 57% to 89% increase from the original baseline. This cost will be thoroughly re-assessed as part of the Nunn-McCurdy recertification process.

I expect that Air Force Secretary Donley will formally notify Congress of JSF's Nunn-McCurdy breach within days. The thorough review of a program required under the Nunn-McCurdy law will be a continuation of the process begun in November, when the JET II estimate indicated the shortcomings of the program over the past years.

There are a number of factors contributing to the cost growth estimate: larger-than-planned development costs driven by STOVL variant weight growth and longer forecasted development schedule; increase in labor and overhead rates; degradation of airframe commonality; lower production quantities; increases in commodity prices (particularly titanium); and major subcontractor cost growth.

The Way Forward

Clearly the JET II and other studies conducted over the past year indicate that the JSF program fell short of expectations and must be restored to affordability and a stable schedule.

Looking ahead to the coming years, several management measures will be critical, and Secretary Gates has elevated the position of the JSF Program Executive Officer to three-star rank to reflect a need for experienced, vigorous management. The JPO, with oversight from the Office of the Secretary of Defense, will need to take a number of critical steps in three areas:

1. The developmental test program and the lead-up to IOC.
2. The ramp-up to full-rate production; and
3. Addressing the Nunn-McCurdy cost growth.

In regard to the developmental test program and the lead up to IOC: First, as I noted earlier, it is important to provide the new test assets and software capabilities to the development program, as directed by Secretary Gates, so there will not be further delays in the completion of flight test. Second, the contractor must be held to account to meet or exceed a defined set of milestones connected to fee on the development contract. These negotiations are underway. Third, the program will need to deal promptly with issues that arise during flight testing—and experience shows there will be such issues.

In regard to the ramp up to full-rate production: the LRIP 4 contract covering FY11 should provide for pricing that meets or exceeds the JET II-based plan of 43 aircraft. These negotiations are also underway. LRIP contracts should transition to a fixed-price structure reflecting the need for the contractor to control costs and not simply pass them on to the Department. The Director of Defense Procurement and Acquisition Policy will be conducting a "should-cost" analysis to prepare for LRIP 5.

In regard to addressing Nunn-McCurdy cost growth: Affordability must be aggressively and relentlessly pursued by all three airframe contractors – Lockheed-Martin, Northrop Grumman, and BAE Systems – and the F135 engine prime, Pratt & Whitney. As part of our continuing "should cost" analysis, we will be looking at the cost structure of JSF in all its aspects – assembly, parts supplies, staffing, overheads and indirect costs, cash flows, contract structures, fees, and lifecycle costs.

More fundamentally, the program management, contractors, and the Department need to surface candidly and openly issues with this program as they arise, so that Congress is aware of them and they can be addressed. I pledge that we will keep this Committee fully and promptly informed of this program's progress. We will also keep our international partners fully and promptly informed. The program will benefit from the fresh eyes and experienced managerial hand of a three-star Program Executive Officer.

F136 Alternate Engine

The Department carefully deliberated whether to request funding for the F136 alternate engine in the JSF program as part of the President's FY 2011 budget. The Department has not funded an alternate engine for the JSF program since 2007 because it has been the Department's position that a second engine is unnecessary and too costly. Over the past year, as part of a thorough review of the overall JSF program, the Department took a fresh look to determine whether the second option had reached a point in funding and development that supported a different conclusion. An independent study, conducted by the CAPE, considered all aspects of this question and, in the end, concluded that the facts and analysis simply do not support the case for adding an alternate engine program. Accordingly, the FY 2011 President's Budget submission does not include funding for the JSF F136 alternate engine.

There are several aspects to the Department's rationale which support the above conclusion.

First, even after factoring in Congress' additional funding, the engine would still require a further investment of $2.9 billion to take it to competition in FY 2017; $2.5B over the next five years. Some have suggested that the additional investment necessary is much less; however, they are only looking at the cost to complete *development* of the second engine. The investment of $2.9B includes the costs to finish the development as well as conduct directed buys to prepare the second source for competitive procurement of JSF engines beginning in FY 2017, and to create the necessary logistics support to operate and sustain engines on deployed JSF aircraft. In short, $2.9B is the total additional cost required to take the alternate engine to competition.

Second, the additional costs are not offset by potential savings generated through competition. A recent update of the 2007 DoD business case for the JSF alternate engine, which accounts for the additional funding provided by Congress and more recent engine program actual cost performance, concludes that the second engine is at the break-even point in net present value. This analysis made several optimistic assumptions:

- It assumed that the competition would occur in 2014 rather than our current estimate of 2017. This allowed a direct comparison with the previous Congressionally-mandated analyses of the alternate engine from 2007.

- It assumed the second engine will proceed along a very accelerated learning curve. The assumption in the model is that the second engine developer will benefit from the learning of the lead engine developer even though it will produce fewer engines. Although this is possible, it is extremely difficult to achieve.

- The analysis assumed an efficient mix of engines in the competitive buy, a mix that is also unlikely to be achieved. Instead it is more likely that this competition will be a split or shared buy. JSF will be procured by a diverse set of customers, many of whom are unable or unwilling to purchase from two engine manufacturers. Split or shared buys, particularly those from only two production sources, do not historically produce the purely competitive behaviors assumed in the analyses.

Many proponents of a second engine cite the "Great Engine War" of the 1980s when the DoD purchased engines for Air Force F-15 and F-16 fighters from two manufacturers. While much has been made of this example, the facts tell a more nuanced and inconclusive story. The competition did appear to improve contractor responsiveness to Air Force needs. There were, however only minimal reductions in the acquisition unit price of the engines purchased for the F-15 and F-16 programs. Accordingly, it is difficult to cite this example to justify substantial savings due to competition.

Finally, the solution to understandable concern over the performance of the Pratt & Whitney program is *not* to spend yet more money to add a second engine. The answer is to get the first engine on track by conducting regular independent reviews of the engine development and by ensuring the contractor incentives are designed to achieve the performance necessary. All of these steps are underway. Further, the alternate engine program is three to four years behind in development compared to the current program. The addition of a second engine does not eliminate the need for the first engine, and there is no guarantee that a second engine program will not face the same challenges as the current effort.

For all these reasons, we are firm in our view that the interests of the taxpayers, our military, our partner nations, and the integrity of the JSF program are best served by not pursuing a second engine. We have reached a critical point in this debate where spending more money on a second engine for the JSF is unnecessary, wasteful, and simply diverts precious modernization funds from more pressing DoD priorities.

The military capability of JSF will ensure that this aircraft will be the backbone of U.S. combat air superiority for the next generation and, as I stated earlier, the technological capabilities of the aircraft are sound. The restructuring begun in November 2009 put the program on a more realistic footing. More detailed analysis of the JSF program and the alternate engine are provided in the responses to the Subcommittees' submitted questions enclosed with this testimony. I again thank the two Subcommittees for their time in allowing me to present the Department's positions on this important program.

Enclosure 1

Responses provided March 24, 2010 to Hearing Questions in letter of invitation to Dr. Carter dated March 11, 2010

["For Official Use Only" and Company Propriety Responses deleted: question #5 (portions) and question #6 (portions)]

1. Joint Estimating Team (JET) II 2009

The Department's rationale for conducting JET II was to support the FY 2011-15 Program Budget review, as well as the Defense Acquisition Board (DAB) review of the Low Rate Initial Production (LRIP) Lot 4 award, at that time scheduled for the 1st quarter of FY 2010.

The results of JET II were provided to the Professional Staff Members (PSM) of all four Congressional Defense Committees on February 22, 2010. Additionally, backup documentation was provided to the Defense Committees on March 5, 2010.

Based on the findings of JET II, taken in conjunction with the prior findings from JET I, the Department revised the budget, schedule, and programmed buy for the JSF program over the FY 2011 - 2015 Future Years Defense Program. Additional detail concerning actions taken by the Department is included in the written testimony and the response to question #8 below.

2. Joint Assessment Team (JAT)

During an F-35 overview brief, presented to the Under Secretary of Defense for Acquisition, Technology and Logistics (USD AT&L) by the Joint Strike Fighter (JSF) Program Executive Officer (PEO), projected cost estimates for the F135 engine were significantly higher than estimated in the 2007 Selected Acquisition Report. USD AT&L chartered a JAT to analyze the issue and develop a plan to address F135 cost and affordability.

The JAT determined that the cost growth projections are to a significant degree reversible. There is good confidence that with investment in affordability and a commitment by the contractor, Pratt and Whitney (P&W) could realistically achieve their cost goals.

The results of the JAT were briefed to the PSMs of the four Defense Committees on February 22, 2010. The full briefing and backup information was provided to the Defense Committees on March 5, 2010.

3. Independent Manufacturing Review Team (IMRT)

USD AT&L documented the requirement for an IMRT in the April 8, 2009, Acquisition Decision Memorandum (ADM). The ADM resulted from the DAB reviewing the Low Rate Initial Production (LRIP) 2 full funding decision, and during the DAB review, the need to assess the program's ability to meet the full rate production quantities was discussed.

The IMRT made 20 time-phased recommendations which, they conclude, must be accomplished in order to achieve the ramp rates required to meet full rate production goals. They also proposed more achievable ramp rates which address some identified production program risks, yet fully exercise the production system.

Overall, the revised ramp provides a more realistic production profile and is the result of a combination of the movement of procurement funding to development to account for risk management, movement of planned partner aircraft procurements, a higher unit cost estimate, as well as Independent Manufacturing Review Team (IMRT) recommended limitations on the production rate.

The contractors remain committed to delivering production aircraft at costs in line with previous commitments and the Department intends to work with Congress to buy more aircraft if production performance frees up funding to do so.

The results of the IMRT were briefed to the PSMs of the four Defense Committees on February 22, 2010. Additionally, copies of the briefing charts and backup charts were provided to the Defense Committees on March 5, 2010.

4. Update on both the F135 and F136 engine development programs and evaluation of current and future risks to the F-35's cost, schedule and acquisition and operational performance based on the F-35 sole contractor engine development and procurement strategy.

Both the F135 and F136 have experienced technical issues nominally associated with advanced tactical engine development programs.

The F135 program is progressing well. Corrective changes for the 2007/2008 failures have been implemented. Deliveries of the LRIP engines are late but do not impact the production schedule due to aircraft production delays. The Conventional Take-Off and Landing (CTOL)/Carrier (CV) engine has achieved Initial Service Release (ISR), with the Short Take-Off and Vertical Landing (STOVL) engine projected for ISR in the 3d quarter of FY 2010. The F135 has completed over 13,000 of 14,730 planned ground test hours. Additionally, the F135 has completed over 120 flight hours on two CTOL aircraft and over 60 flight hours on two STOVL aircraft. On March 18, 2010, the 1st STOVL aircraft completed the initial vertical landing at Naval Air Station Patuxent River.

The F136 is 3-4 years behind the development of the F135, by design. The F136 development and ground test schedule has been adversely affected by a test engine failure in October 2009. The F136 team recently completed the root cause analysis and has resumed test activities. To date, three F136 System Development and Demonstration (SDD) ground test engines have been delivered. As of early February 2010, the F136 program had accumulated approximately 540 ground test hours.

The JSF program is structured to be supported by a sole-source engine supplier or a two source engine supplier. The current approved Acquisition Strategy accommodates both scenarios and the JSF program management team is structured to manage to both scenarios. Currently, the JSF program is developing the F136 engine, per FY 2010 appropriations. While there are risks in any development program, the Department does not believe that the JSF program carries any more risk due to the availability of a single source production engine. The Department also does not foresee any additional future risk due to a single source engine procurement strategy. The Department maintains two current tactical aircraft programs, the F-22A and F/A-18E/F, which utilize a single source engine provider. Both programs have enviable safety records and the Department is satisfied with the propulsion systems for both programs. Risks associated with propulsion systems have largely been mitigated over the past 20 years due to advancements in engine design, testing, and production. Engine systems are tested more thoroughly than in the past and have proven to be safer, with far greater reliability than past engine programs from the 1970's and 1980's.

5. **Original F135 SDD cost and schedule, changes to cost and schedule and reasons for those changes, and current cost, schedule, and performance risks.**

Major contributors to the P&W F135 SDD contract increase are shown below:

	SDD contract value *($B-TY)*
Contract Award (Oct 2001)	4.8
Contract Replan (modification definitized 2005) (New Scope)	5.8
[ ]	
Miscellaneous. Contract Modifications (New Scope)	6.0
[ ]	
SDD Program Reconstruction (2007-08)	5.9
[ ]	
OTB Contract (2008) (Overrun)	6.7
[ ]	

6. **Original F136 SDD cost and schedule, changes to cost and schedule and reasons for those changes, and current cost, schedule, and performance risks.**

August 2005 contract award, Period of Performance (PoP) through Sept 2013, contract price $2.5B.

Funding planned on the contract status is thru FY10 only and totals $2.1 B, with PoP thru Sept 2010. The F136 SDD contract cost and schedule have not changed.

[ ]

The primary cost and schedule risk is funding instability and the above mentioned technical risks that could also affect cost and schedule.

Past funding instability and FY09 funding shortfall did not allow for the execution of the program without significant milestone movement, change to program approach and additional funds. The F136 Fighter Engine Team (FET) and JPO agreed to a program restructure effort in early 2009 to align budgets and schedules. Another year of funding instability has caused FET to start working a replan of the engine development program which addresses: funding, development schedule risk, Arnold Engineering Development Center (AEDC) availability, flight test, and resolution of test issues.

7. **F-35 engine acquisition strategy risk assessment (In deciding in 2006 to cease development of the F-35 alternate engine, did the Department do an operational risk assessment of using a sole source engine supplier for a single engine fighter that was projected to ultimately comprise 95 percent of the fighter force structure?)**

The Department reviewed all aspects of the overall F-35 program, to include the propulsion system, in preparing the FY 2007 President's Budget. Each year the Department reviews all programs as part of a thorough and detailed budget review process. During that process, the Department prioritizes requirements based on potential benefit to the warfighters and value to the taxpayers. The Department reviewed the risks associated with a single source engine supplier for the F-35 program and determined that the risks were manageable.

8. **Your evaluation of cost, schedule and performance risk to the F-35 program.**

Over a period of weeks USD AT&L led a small team of senior principals (JSF Task Force) from the Services, Testers, and Estimators that met to fully understand the JET II estimate. The team also reviewed the program from the perspective of the program office and the contractors to understand difficulties encountered in meeting cost and schedule commitments. No technology or manufacturing show-stoppers were identified during reviews, and we did not de-scope performance requirements during this re-structure process. As a result of this review, a number of decisions were made to help reduce program risk.

- **Development Schedule:** To address the JET-projected additional 30 months of development:
  - Add a carrier variant aircraft to SDD,
  - Add a software integration line,
  - Borrow three LRIP aircraft for development flight test
  - Extend the development test program and move Milestone C (Full Rate Production) to April 2016, commensurate with completion of Initial Operational Test and Evaluation (IOT&E)
  - As a result of these actions JET II estimated additional development time is reduced from 30 months to 13 months
- **Development Funding:** Add $2.8B across FYDP to fully fund to the CAPE's estimate of this revised program including schedule mitigations above
- **Production:** Significantly reduced production profile to fund additional SDD requirements, account for increased costs due to Partner projected procurements sliding to the right, account for higher JET procurement estimates, and adjust to recognize IMRT recommendations.

The Department believes this restructured F-35 program provides a credible and realistic basis for going forward.

9. **Your views of the required tactical air force structure compared to the programmed tactical air force structure and whether you believe the programmed force structure meets requirements for the National Military Strategy.**

The Department's planned FY 2011 aviation force structure satisfies the demands of the national security strategy and emerging needs identified in the 2010 Quadrennial Defense Review. However, as the demands on the force evolve, the size and mix of aviation forces will change as well. Between FY 2011-2020, fighter/attack inventory levels will decline as the force becomes substantially more modern and capable. During this period the Services will retire fourth generation aircraft in favor of the fifth generation JSF, bringing stealth features and advanced sensing to the force. DOD will also greatly expand inventory of platforms capable of performing persistent Intelligence, Surveillance, Reconnaissance (ISR), and strike. The Services will manage the downward trend in fighter/attack inventories through the use of service-life extension programs, organizational structure changes and adjustments to concepts of operations to maintain the capabilities necessary to carry out a broad range of missions.

10. History of the direct competition for the F-22 and F-35 engines
a. Were the F119 and F120 competed, directly, to power the F-22?

Both engines were evaluated in both the YF-22 and YF-23 prototype aircraft during the Demonstration/Validation phase. On December 31, 1991, the Secretary of the Air Force announced that P&W was selected as the winner of the Advanced Tactical Fighter engine competition.

b. Were the F135 and F136 competed, directly, to power the F-35?

The F135 and F136 were not competed, directly, to power the F-35. In 1996 competitive contracts were awarded to Boeing and Lockheed Martin for the Concept Development phase of the program, with a single contractor selected [one for the F-35 engine and one for the airframe] for the Engineering and Manufacturing Development (EMD) phase in 2001. Both contractors selected a variant of the F-22 powered P&W F119 engine as their propulsion system [for the concept development phase]. Lockheed Martin was awarded the EMD/SDD [airframe] contract in 2001. P&W was awarded a noncompetitive EMD/SDD contract for the F135 propulsion system.

11. F-35 engine acquisition strategy, schedule, and changes since the start of the F-35 SDD program in 2001:

a. Was the acquisition strategy, SDD schedule established by the Department such that the F136 followed the F135 by 3-4 years?

Yes.

b. When was the SDD contract signed for the F135 engine?

The SDD contract for the F135 engine was signed in October 2001.

c. When was the SDD contract signed for the F136 engine?

The SDD contract for the F136 engine was signed in August 2005

d. Has any fighter engine ever been required to do what the F-35 engine is being required to do–power a lift fan for short takeoffs and vertical landings?

No prior fighter engine has had a requirement to power a lift fan for short takeoffs and vertical landings.

12. F135 and F136 engine development funding:

a. What was the SDD contract value and estimated conclusion date for each engine?

F135 SDD:
October 2001 contract award, PoP through April 2012, contract price $4.8B

Contract status $6.7B price (including Over Target Baseline adjustments), PoP through Sept 2013;

Projected cost and schedule impacts of Feb 2010 F-35 Program restructure are estimated by the office of the Cost Analysis and Program Evaluation (CAPE) and detailed in question 12.b.

F136 SDD:
August 2005 contract award, PoP through Sept 2013, contract price $2.5B

Funding planned on the contract is through FY10 only and totals $2.IB, with PoP thru Sept 2010.

b. What is the current estimated cost to complete, estimated completion date, and total cost for each engine's development?

Schedules: The current CAPE estimate of the completion date for the overall JSF aircraft development flight test program is in FY15, with some residual developmental tasks remaining to be accomplished in FY16 to support operational test and evaluation. The CAPE estimate forecasts that development of both engines would be completed within this timeframe. F136 engine development is in the early stages of ground test. It lags F135 engine development, which is in the early stages of flight testing, by 3-4 years. This development lag is a reflection of the engine acquisition strategy which was based on a leader-follower arrangement -- a contract for F135 engine development was awarded in October 2001; and F136 engine development was awarded in August 2005.

Cost Estimates: The current estimated annual development cost for each engine, from FY11 through FY15, is provided in the table below:

TYSB F135/F136 Engine Development	FY11	FY12	Fy13	Fy14	FY15	Total (FY11-15)
Sys Design & Devel (F135)	$0.2	$0.1	$0.1	$0.1	$0.0*	$0.5
Sys Design & Devel (F136)	$0.4	$0.3	$0.2	$0.1	$0.1	$1.2

*(*FY15 include minimal funds to continue residual development tasks; this estimate rounds to $0 at the reported scale.)*

At the time of the 2007 study, the F135 engine development costs were estimated at $6.4B (TY $), including sunk costs. The current estimate is $7.1 B (TY $), reflecting actual costs to date as well as adjustments resulting from the restructured JSF program. Total F136 engine development cost is currently estimated at $3.2B. This total has not changed substantially from the 2007 estimate; however, the phasing of F136 costs has been adjusted to be consistent with the restructured JSF program, and to reflect actual appropriations and expenditures since 2007. In the 2007 study, the CAIG estimated that the F135 would complete development in 2013, and the F136 would complete development in 2014.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 5: *Development & Demonstration (SDD)*	**R-1 ITEM NOMENCLATURE** PE 0604800F: *Joint Strike Fighter EMD*	**PROJECT** 653831: *Joint Strike Fighter*

Product Development ($ in Millions)

				FY 2010		FY 2011 Base		FY 2011 OCO		FY 2011 Total			
Cost Category Item	**Contract Method & Type**	**Performing Activity & Location**	**Total Prior Years Cost**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Cost To Complete**	**Total Cost**	**Target Value of Contract**
Lockheed Martin - SDD	C/CPAF	Lockheed Martin FL Worth, TX	23,060.300	2,431.167	Oct 2009	1,462.504	Oct 2010	0.000		1,462.504	2,607.330	29,861.302	27,481.288
Lockheed Martin - IDIQ D0022	SS/Various	Lockheed Martin FL Worth, TX	5.015	7.286	Oct 2009	2.677	Oct 2010	0.000		2.677	2.350	17.328	0.000
Lockheed Martin - IDIQ D0009	SS/Various	Lockheed Martin FL Worth, TX	19.733	7.000	Oct 2009	0.000		0.000		0.000	0.000	26.733	0.000
Lockheed Martin - BOA	SS/Various	Lockheed Martin FL Worth, TX	3.511	0.000		0.000		0.000		0.000	0.000	3.511	0.000
Pratt & Whitney - SDD	SS/CPAF	Pratt &Whitney Hartfored, CT	6,065.573	636.978	Oct 2009	211.828	Oct 2010	0.000		211.828	373.286	7,287.665	6,660.675
Pratt & Whitney - Close Out Contract C0132	SS/CPFF	Pratt &Whitney Hartfored, CT	1.364	0.000		0.000		0.000		0.000	0.000	1.364	0.000
Pratt & Whitney - CDP Close Out Contract C0050	SS/CPFF	Pratt &Whitney Hartfored, CT	2.211	0.000		0.000		0.000		0.000	0.000	2.211	0.000
Pratt & Whitney - BOA	SS/Various	Pratt &Whitney Hartfored, CT	35.983	0.000		0.000		0.000		0.000	0.000	35.983	0.000
Pratt & Whitney - IDIQ	SS/Various	Pratt &Whitney Hartfored, CT	10.862	0.000		0.000		0.000		0.000	0.000	10.862	0.000
General Electric - SDD	SS/CPAF	FET General Electric/ Rolls Royce: Cincinnati, OH	1,670.367	429.108	Oct 2009	0.000		0.000		0.000	0.000	2,099.475	1,716.386
General Electric - IDIQ D0009	SS/Various	FET	0.264	0.000		0.000		0.000		0.000	0.000	0.264	0.000

Note that the costs for the F135 development program are considerably higher than those for the F136. This reflects the fact that the F135 SDD effort includes development of the core, nozzle, and lift fan components of the JSF propulsion system. In contrast, the development cost for the F136 program, as well as the competition between suppliers, include only the core engine component of the JSF propulsion system.

c. **Why did the Department, in response to congressional inquiry regarding required funding for the F136 for FY09 and FY10, provide data on required advance procurement funds if the Department did not believe procurement was feasible in FY10 and FY11?**

In preparation for the FY09 budget (during 2008), the Department did believe that F136 procurement was technically and programmatically feasible. At that time, the F136 program was making developmental progress in line with the schedule to begin directed procurement of the F136 in LRIP 4 (FY10), with Advance Procurement funding required in FY09, per the approved JSF Acquisition Strategy. The Congressional inquiry for the FY10 budget was answered in 2009, prior to October 2009 when the F136 program experienced an engine failure on the single F136 SDD engine in test at the time. Determination of root cause analysis and finalization of an approved fix created a delay in F136 developmental testing making it very unlikely that the F136 will be ready for LRIP 4 production in FY10, or LRIP 5 production in FY11.

d. **What was the CAIG's estimated cost, by fiscal year, and completion date of the SDD program for each engine at the time the 2007 CAIG engine study was completed?**

See 12.b. above

e. **What is the current CAPE estimate of cost, by fiscal year, and completion date of the SDD program for each engine?**

See 12.b. above

13. **F135 and F136 industrial base studies:**

a. **What F135 and/or F136 industrial base studies have been completed by the Department or on behalf of the Department in the past five years of one-engine and two-engine programs; what were the findings and recommendations of those studies; and what actions were taken by the Department as a result of those studies?**

The OSD Cost Analysis Improvement Group (CAIG) and the Institute for Defense Analyses (IDA) completed Congressionally-directed studies in 2007. By direction, both studies examined industrial base implications as well as capability comparisons of a single engine and competitive engine program. Both studies were provided to the Committee in 2007. The Office of the Cost Analysis and Program Evaluation recently updated the CAIG report and this update was provided to the Chairmen and ranking minority members of the four Defense Committees; however, the industrial base section of the 2007 study was not updated. There are no studies completed by the Department or on behalf of the Department since 2007 that specifically assessed industrial base considerations of the F135 and/or F136 engines.

[This response does not reflect the fact that the Defense Contract Management Agency completed a fighter engine industrial base study dated May 2008. See pages 31 and 189.]

b. **Does the Department have a policy regarding the production of major F-35 engine components by non-U.S. private or government entities?**

All requests from U.S. industry for the manufacture of defense related articles outside the United States are submitted to the Directorate Defense Trade Controls, U.S. Department of State through the ITAR process. These requests are sent to the Defense Technology Security Administration (DTSA), U.S. Department of Defense for review and comment. The level and type of disclosure recommended by DTSA is based on U.S. National Disclosure Policy. For high performance jet engines, there are specific conditions on release of sensitive technology or capabilities.

c. Does the Department have a policy regarding the production of major F-35 engine components solely by non-U.S. private or government entities? If not, should it?

All requests from U.S. industry for the manufacture of defense related articles outside the United States are submitted to the Directorate Defense Trade Controls, U.S. Department of State through the ITAR process. These requests are sent to the Defense Technology Security Administration (DTSA), U.S. Department of Defense for review and comment. The level and type of disclosure recommended by DTSA is based on U.S. National Disclosure Policy. For high performance jet engines, there are specific conditions on release of sensitive technologies or capabilities.

14. SDD ground test and flight test hours for the F135 and F136 (Total hours, total ground test hours, total flight test hours; total hours on the production representative engine, total flight test hours on the production representative engine, total flight test hours on production representative engine in production representative aircraft in CY 2009).

The F135 SDD test program had three configurations; Initial Flight Release (IFR), Final Flight Release (FFR) and Initial Service Release (ISR). The F135 Production engines are configured to the ISR standard. The F135 has 13,223 ground test hours and 199.8 flight test hours as of 1 March. F135 flight test hours are in the IFR configuration. Roughly 723 ground test hours have been on engines in an ISR representative configuration. The F136 has approximately 638 hours total SDD ground test run time on all standards of engines in SDD. The F136 has approximately 135 hours total ground run time on SDD product standard engines.

15. Number of hours and estimated date when the F-35A, B, and C propulsion systems will be considered mature, based on DOD or F-35 Joint Program Office criteria.

The F-35 Propulsion Systems will be considered mature at 200,000 EFHs (Engine Flight Hours) total with a minimum of 50,000 EFHs per variant (this is documented in the specifications). This is predicted to occur in 2017 for the F135. The achievement date for the F136 would be dependent on F136 detailed way ahead.

16. History of F135 and F136 engine SDD test delays due to engine anomalies during testing, including for each instance, length of delay, cost impact to the program, weight growth impact, and specific engine anomaly experienced.

During the F135's first year of SDD testing, there were nine significant findings during engine testing. Eight of these resulted in some delay to other ground testing. The F135 had a total of six engines scheduled to test in that first year and accumulated approximately 1400 hours of testing. Having multiple test engines in the plan allowed the F135 to encounter failures and still accumulate test hours. During the F136's first year of testing, there were two engines that conducted tests and each of these experienced significant findings. The F136 SDD program has accumulated a total of approximately 638 test hours.

17. F110 alternate engine:

a. Why was an alternate engine required for Air Force (AF) in the mid-80s?

During the mid/late-70s, the P&W F100 engine was experiencing both durability and reliability issues. In addition, the Air Force felt that P&W was being unresponsive to Air Force concerns and requests regarding issues with the F100 engine. Finally, in 1979, two key subcontractors to P&W went on strike resulting in shortages of F100 engines and F-15s being delivered without engines.

b. How many years after F-15 aircraft IOC did AF officials determine that an alternate engine was required?

The Air Force declared Initial Operational Capability (IOC) for the F-15 in June 1976. In early 1979, the Air Force awarded a contract to General Electric (GE) for the development of the F101 Derivative Fighter Engine (which eventually became the F110 engine). No GE engine was delivered as part of a [USAF] production F-15 or spare.

[F110 GE engines were delivered as part of foreign military sales production F-15 aircraft and spares.]

c. What is the F-35A's current IOC?

The current documented IOC for the Air Force (F-35A) is 2013. The Services are currently reviewing their IOCs based on the re-structured JSF program. The IOCs are determined by the Services based on both the program's performance and how the Services define IOC. Each Service has a somewhat different definition, depending on what capabilities they intend to have at IOC, their operational test and training requirements, and the number of aircraft they require for IOC. At this time, based on the Revised JET II schedule for the end of developmental and operational test, and their definition of IOC, the Air Force is projecting IOC in 2016.

d. What happened to price trends for the F-16 engine after competition was introduced into engine procurement in 1986 and thereafter?

The OSD Cost Analysis Improvement Group (CAIG) examined price trends for the F-16 engine in its 2007 Congressionally-directed study (Ref: page 4, Figure I). The study concluded that "Even within fighter engine programs, historical experience shows that any costs and/or benefits arising from competition are highly unpredictable and also depend heavily on the strategic behavior of the companies involved."

e. What happened to F-16 engine reliability and maintainability after competition was introduced into engine procurement in 1986 and thereafter?

F-16 engine performance and reliability did improve, but there is no data to tie this to competition. A full answer to this question would require a detailed analysis of R&M data, accounting for changes due to Component Improvement Program (CIP), maintenance procedures, and requirements driven changes to the engine designs.

f. What happened to contractor responsiveness and technical innovation after competition was introduced into engine procurement in 1986 and thereafter?

Anecdotal evidence suggests the contractor's responsiveness improved following the competition. There is no data that competition drove any technical innovation.

g. Was the alternate engine designed for the Navy F-14?

The F-14 Tomcat program was initiated when the Navy variant of the Tactical Fighter Experimental (TFX), the F-111B powered by two P&W TF30 engines failed to achieve shipboard weight restriction and demonstrated significant fighter maneuverability issues. In May 1968, Congress stopped funding for the F-111B, allowing the Navy to pursue an aircraft tailored to naval requirements.

In July 1968, the Naval Air Systems Command (NAVAIR) issued a Request for Proposals (RFP) for the Naval Fighter Experimental (VFX), a tandem two-seat fighter with maximum speed of Mach 2.2 and a secondary close air support role. The winning design, the F-14A, was conceptually designed to be powered by two P&W F401-PW-400 engines. Developmental delays plagued the F401 program and initial F-14A production reused the TF30 engines from the F-111B, though the Navy planned on replacing them with the F401-PW-400 engines in a proposed F-14B variant as the F401 engines became available. The problems associated with the P&W F401 development proved to be too significant and the F401 engine never entered production leaving all F-14As manufactured to be delivered with TF30 engines. During the F-14A operational tenure, the TF30 engine was common to the USAF and Navy A-7 light attack aircraft as well as the USAF F-111A aircraft.

The F-14D aircraft variant design called for more powerful engines that would overcome aircraft deficiencies resulting from the TF30 power plant design flaws. The F-14D was powered by two F110-GE-400 engines with 28,200 lbs thrust each. This increased thrust for the F-14D allowed for military-powered catapult launch and otherwise improved overall performance and flying characteristics. The 110 engines allowed the F-14 aircrew to fly the aircraft throughout its performance envelope rather than with flight restrictions imposed by deficient engine performance capabilities as was the case in TF-30 powered variants.

The Navy built 37 "new" F-14D aircraft and remanufactured an additional 18 F-14A airframes to the F-14D configuration for a total of 55 F-14Ds. Additionally, 85 F-14B variants were equipped with the F110 engine, in lieu of the failed F401 engine, through remanufacture or conversion programs.

h. Why did the Navy procure the alternate engine?

The F-14 example is not viewed as an alternate engine case. Use of the TF30 was a workaround due to the immaturity of the intended engine.

18. Foreign Military Sales of F100 and F110 engines:

a. How many countries have procured either engine for their F-15 and F-16 aircraft inventories?

24 foreign countries have procured the F-16 and 5 foreign countries have procured the F-15. All of those countries procured either the F100 or F110 engine.

b. How many countries have procured both engines for their F-15 and F-16s?

4 of the 24 countries that have procured the F-16 have both types of engines. 2 of the 5 countries that have procured the F-15 have both types of engines.

19. F-35 International MOU

a. Why was an MOU signed by the Deputy Secretary of Defense in November 2006 with eight F-35 international partners committing the U.S. to produce both the F135 and F136 engines (2006 was also the first year the Department did not include F136 alternate engine funding in its budget request in the previous 10 years)?

The U.S. and the international partners signed the F-35 Production Sustainment and Follow-on Development (PSFD) Memorandum of Understanding (MOU) in 2006. The intent of the PSFD MOU was to establish a nine-nation arrangement for cooperatively producing, sustaining, and conducting follow-on development of the JSF. The inclusion of the F135 and F136 in the propulsion areas of the MOU is consistent with the F-35 Acquisition Strategy which states, "The Acquisition Strategy recognizes the possibility of two interchangeable propulsion systems, the Pratt and Whitney F135 and the General Electric Rolls Royce Fighter Engine Team F136, depending on availability of funding. Throughout this document, provisions are made for this two engine strategy. However, if development, procurement, or sustainment funding is not provided for the F136 program, the F-35 will precede with the strategy described, using a single F135 propulsion system".

b. Is that MOU still in force?

Yes, the MOU expires in 2051.

c. Have partner nations expressed concern that the DOD is attempting to terminate the F136 engine?

We have engaged in consultations with our partners on the Administration's decision not to include the F136 in its RDT&E funding requests. The partners, who understand that U.S. and others' participation is subject to the availability of funds for such purposes, may have further consultations with the Department on this matter.

d. How will prior-year contributions to the F136 development be credited to those nations that have provided funding if the engine is terminated?

The System Development and Demonstration MOU does not have provisions for crediting of contributions in such situations.

TESTIMONY OF

Christine H. Fox

Director, Cost Assessment and Program Evaluation

Office of the Secretary of Defense

Before the United States House

Committee on Armed Services

Air and Land Forces Subcommittee

And

Seapower and Expeditionary Forces Subcommittee

March 24, 2010

Mr. Chairman and distinguished members of the committees, thank you for the opportunity to appear before you to discuss the Department's fiscal year 2011 aviation programs—specifically, the analytical basis for restructuring the JSF program. The analysis has been led by analysts and managers in Cost Assessment and Program Evaluation, or CAPE. Today, I will try to give you a sense for how the analysis was conducted, its overall findings, and the implications for the program going forward.

CAPE conducts Independent Cost Estimates (ICE) for major weapons systems. Your Weapon System Acquisition Reform Act recently increased the responsibility and authority of our organization in the conduct of these independent cost estimates. CAPE's analytic reviews support Acquisition Reform – one of DoD's High Priority Performance Goals presented in the Analytic Perspectives volume of the President's FY 2011 Budget. Our work is building on the experience and expertise of the Cost Analysis Improvement Group, CAIG, who has been conducting these reviews since 1972. Independent Cost Estimates are conducted by using a combination of historical precedence, results of extensive site visits for all major components of the program, and the actual performance of that program to date. It is a careful, painstaking analysis that looks at all aspects of a program.

For JSF, we went one step further and built a team of experts from the defense tactical aircraft community. Specifically, the Joint Estimating Team or JET was composed of multifunctional government experts drawn from the Navy, Air Force, and OSD staffs. The members of the team provided technical expertise across the areas of air vehicle and mission systems engineering, testing, and cost estimation.

The JET conducted two reviews. The first, JET I, was conducted in 2008. The full cost of development in FY 2010 as predicted by JET I was submitted in the FY 2010 President's budget. To inform the 2011 program review and budget submission, the Deputy Secretary of Defense asked CAPE to lead an update of the original JET report last summer. This team, JET II, began its review in July 2009. Given that the aircraft is still in the early stages of flight testing, the group focused its efforts on examining the resources required by, and the planned schedule for completing, the System Development and Demonstration (SDD) phase of the program. Additionally, the team updated the previous JET estimates of JSF production, fielding, and support costs. Consistent with the methodologies used in independent cost estimation, the JET II conducted comprehensive on-site reviews with the prime contractor and each of the major subcontractors in the JSF program and then benchmarked this information against past programs. They used that combined information to forecast the likely path of events going forward.

It is difficult to mathematically calculate the precise confidence levels associated with independent cost estimates prepared for major acquisition programs. Based on the rigor of the methods used in building CAPE estimates, the strong adherence to the collection and use of historical cost information, and the review of applied assumptions, we project that it is about equally likely that the JET II estimate will prove too low or too high for execution of the restructured program as described.

The restructuring led by CAPE also considered results of the Independent Manufacturing Review Team, commissioned by Dr. Carter and discussed in his testimony. In summary, the Independent Manufacturing Review Team assessed that the rate of production of F-35s should be slower than originally planned, and that fewer aircraft should be acquired in the early years until specific manufacturing processes and management tools are put in place and demonstrated in the program. Like the JET estimate, the IMRT ramp is an estimate and we would like the contractor to exceed that ramp if possible.

Given the results of both JET I and JET II as well as the IMRT, we found it necessary to significantly restructure the program in the preparation of the FY 2011 President's Budget request. Specifically, we:

1. **Extended the development phase through completion of developmental testing to March 2015.**

This is a 13 month extension over the contractor's development schedule plans from Summer, 2009. We included the acquisition of one additional developmental carrier-based JSF test aircraft, allocated three additional production aircraft to the JSF development program to accelerate completion of developmental flight testing, and provided funding for an additional software development and testing line in the program. These actions are all necessary to achieve the new March 2015 date for completion of the development testing. The additional cost to this development phase of the program is $2.8B. The contractor will incur a portion of these additional costs as Dr. Carter described.

2. **Delayed an increase in the production ramp.**

In accordance with the IMRT recommendations, we reduced the planned procurement of JSFs by 122 aircraft in the FY 2011-15 Future Years Defense Program (FYDP). Given the additional time necessary for the development program, this reduction in aircraft procurement quantities in the FYDP reduces the number of aircraft delivered prior to completion of testing. The contractor team will be given the opportunity to exceed this prediction and produce more aircraft than planned in the restructured program based on demonstrated progress in implementing and maturing manufacturing processes, and a demonstrated ability to produce and deliver JSF aircraft to the government at lower cost.

3. **Will declare a critical Nunn-McCurdy breach.**

The program restructuring, based on the JET II cost estimate and the production rates recommended by the IMRT, will result in a critical Nunn-McCurdy breach of greater than fifty percent when measured from the original acquisition program baseline (APB) established for the JSF program in 2001. We have been preparing for this breach ever since the JET II results became available in October, 2009. The formal declaration of the breach to Congress is anticipated within days, and the Department plans to complete certification review of the restructured JSF program by June, 2010.

In 2001, at the time of Milestone B approval for the program, the JSF Average Procurement Unit Cost (APUC) was projected to be $50.2 million in constant, base-year 2002 dollars. This figure was based on a total anticipated US procurement of 2,852 JSF aircraft, including all three variants—for Air Force, Marine Corps, and Navy. The number of aircraft to be procured was revised in August, 2002 to 2,443. This revision was in response to plans for Navy/Marine Corps TACAIR integration. The latest JSF Acquisition Program Baseline (APB), dated March, 2007, projected an average procurement unit cost figure of $69.2 million (BY 2002 $).

We currently anticipate that the average procurement unit cost for the restructured JSF program in the FY 2011 President's Budget, based on a total planned US procurement of 2,443 JSFs, including all variants, will fall in the range of $80-$95 million (BY 2002 $). The Department is in the process of determining the specific unit cost figure to be included in the restructured JSF program baseline based on the Nunn-McCurdy review process that has already been initiated in DoD. The specific APUC figure will be determined based on review of the latest program plans and cost information for those aspects of the program that primarily affect the years beyond 2015—including requirements for full-rate production tooling, support equipment, sparing of critical subsystems, and the effects of high annual procurement and production rates on efficiencies and costs. The specific unit cost figure will be included in the final JSF Nunn-McCurdy certification package to be delivered to Congress in early June, 2010.

I would like to focus a minute on the perceptions of the JSF program that result from the restructuring. The projected delay in completion of the developmental flight test program should not be interpreted as a signal that the JSF program has insurmountable technical problems. The results of our reviews instead reflect the program's complexity and the risks remaining in its development activities.

We believe that the restructuring of the JSF program at this early stage is consistent with the goals of WSARA. The independent cost estimates and the results of the IMRT were taken very seriously and acted upon by Secretary Gates. The Department now has a realistic fiscal plan for this important tactical aircraft program.

Finally I would like to discuss the analysis behind the Department's decision not to fund an alternate engine for the JSF. CAPE has conducted several reviews of the costs and benefits of pursuing an alternate engine strategy, beginning in 2007.

Our 2007 study produced an extensive cost-benefit analysis of F136 alternative engine acquisition strategies. On the cost side, we found that the potential life-cycle cost savings were not compelling, and estimated that the alternate engine would cost an additional $1.2B in net present value. That said, we did suggest that pursuing a competitive F136 acquisition strategy may provide a hedge against potential technical problems in the baseline F135 engine. We also noted the potential benefit of motivating increased contractor responsiveness through competition.

In 2010 CAPE updated two key factors in the 2007 analysis: 1) the additional appropriations through FY 2010 that had been directed by Congress for development of the F136 alternative engine, which now represent 'sunk costs'; and, 2) the cost estimates for the primary and second engine System Design and Development (SDD) programs based on more recent actual cost information from both engine programs. The updated study did not include any other changes to the extensive list of assumptions used in the 2007 study, including the assumption that competition would begin in 2014. In particular, it does not fully reflect the recently restructured JSF program resourced in the FY 2011 President's Budget and the FY 2011-15 FYDP.

The updated results indicate that a competitive engine acquisition strategy becomes slightly more attractive than the 2007 study results indicated. This is because the costs of the SDD program for the second engine have become increasingly sunk with the additional directed congressional appropriations in FYs 2008-10 for the F136 development program. While the 2010 update is in fact more favorable to a competitive acquisition strategy than the 2007 analysis, the fundamental conclusion remains the same: the potential life-cycle cost savings from a competitive sourcing of engines for the JSF program do not provide a compelling business case. In net present value terms, the estimated costs of a competitive engine acquisition strategy are projected to be approximately equivalent to a sole-source scenario, or at the breakeven point, as a result of the additional sunk costs for the F136 development program during the last three years.

During the preparation of the FY 2011 President's Budget request, CAPE developed an estimate of the resources required to fully fund the F136 alternate engine program, consistent with the most recent restructuring of the JSF aircraft program. Based on the current stage of the F136 development and this restructuring, CAPE concluded that the competitive procurement of engines would now begin in 2017, three years later than the 2014 date assumed in prior analyses. This adjustment more appropriately reflects the programmatic and schedule changes incorporated into the restructured JSF aircraft development program, as well as the status of the alternative engine development program. It would provide necessary time to complete developmental qualification of the alternate engine. It would also provide a sufficient window for directed production buys to allow the second engine source to progress, with learning or cost improvement, to be positioned to compete more effectively with the primary engine source beginning in 2017.

We concluded that DoD would have to invest $2.9 billion (TY $) over the next six years to complete the development program for the alternate engine; to fund an engine "component improvement program" to maintain engine currency; to perform directed buys of engines from the primary and second sources to prepare for a competition; and to procure tooling, support equipment, and spares to enable DoD to conduct competitive procurement of JSF engines beginning in 2017. Based on the fact that the additional early costs to the program are known but the benefits of competition are speculative, the Secretary decided that we could not afford to invest the additional $2.9B.

The capabilities that the JSF will provide our forces are unique and this aircraft is a critical component of our force structure. The Department is committed to ensuring that the investments we make in this platform, and any other, represent the best use of the resources we steward. The considerations involved in choosing not to pursue an alternate engine strategy and to restructure the program were thoroughly and objectively analyzed. We believe that the strategy we have developed for the JSF is in the Nation's best interest. Thank you again for the opportunity to appear before you today.

FOR OFFICIAL USE ONLY
UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
JOINT SEAPOWER AND EXPEDITIONARY
FORCES AND AIR AND LAND FORCES
SUBCOMMITTEES

TESTIMONY OF

DR. J. MICHAEL GILMORE

DIRECTOR, OPERATIONAL TEST AND EVALUATION

OFFICE OF THE SECRETARY OF DEFENSE

BEFORE THE UNITED STATES HOUSE
ARMED SERVICES COMMITTEE

JOINT SEAPOWER AND EXPEDITIONARY FORCES
AND AIR AND LAND FORCES
SUBCOMMITTEES

March 24, 2010

FOR OFFICIAL USE ONLY
UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
JOINT SEAPOWER AND EXPEDITIONARY
FORCES AND AIR AND LAND FORCES
SUBCOMMITTEES

Joint Strike Fighter
Dr. J. Michael Gilmore
Director, Operational Test and Evaluation (DOT&E)
Office of the Secretary of Defense

Good morning Chairman Taylor, Chairman Smith, Congressman Akin, Congressman Bartlett, and distinguished Members of the Subcommittees. I am here at your request to discuss the Joint Strike Fighter (JSF) program.

In my view, the primary issues in the Joint Strike Fighter program have been late delivery of test aircraft and the failure to adjust to that reality by building and resourcing realistic system development and test plans, as well as plans for producing and delivering aircraft. These problems have increased concurrency between testing and production beyond what was originally expected and beyond historical precedent. The resultant delays relative to unrealistic plans and the associated increase in costs to complete development created the need to restructure the program, which is in progress. In my FY 2009 Annual Report, I assessed that completion of Initial Operational Test and Evaluation (IOT&E) of the most capable combat capability now formally planned (the so-called Block 3 aircraft) could occur in early to mid-2016, provided certain changes are made to specific aspects of the program. Key changes needed include providing sufficient flight test aircraft, providing the resources and time needed to develop, deliver, and test effective software, accounting realistically for the inevitable discovery of problems during flight testing, and providing the engineering and other resources needed to maintain an adequate pace of testing. I would like to review the status of these issues as I understand them today.

- Sufficient flight test aircraft. In the past fiscal year the program failed to meet the planned goals for testing, primarily due to the late delivery of test aircraft. As of today, three of the twelve previously planned flight test aircraft operate at one of the government test centers. Expectations at this time last year were that ten flight test aircraft would have begun productive flight test activity by now, with the final two following in the next 90 days. The program office now projects that all twelve of the previously planned developmental flight test aircraft will ferry to test centers by February, 2011. More test aircraft, generated from production lots, are needed to complete Block 3 development. I agree with the assessment of the Joint Estimating Team that two C-model aircraft, one A-model aircraft, and at least one B-model aircraft are needed in addition to the twelve previously planned developmental test aircraft to complete developmental testing in March 2015. Using production aircraft as developmental flight test assets, however, needs to be carefully managed to assure the original purposes for those aircraft, including operational test and evaluation, can still be met, either by returning the borrowed aircraft, or replacing them with other production aircraft.

- Software development and test. The delivery schedules for the remaining mission systems software Blocks 1, 2, and 3 have been extended by about one year compared to the plans existing in August 2008. The late delivery of test aircraft has, so far, masked the effect of delays in software development. Extending the use of the Cooperative Avionics Test Bed through the end of developmental testing was a good decision, as the test bed provides opportunities to discover problems with integration before software is loaded for use on an actual flight test aircraft. I understand the contractor has also proposed creating a new, additional software integration and test line. Although a lack of software integration and test resources was not identified previously as a problem by program management, the new test line will be very useful, provided the contractor has the manpower to operate it and simultaneously accomplish multiple integration activities. However, the reality is that flight test of the essential warfighting capabilities has yet to start. Mission systems flight test in F-35 aircraft begins when aircraft BF-4, the first of four previously planned mission systems test aircraft, ferries to a test center. This is currently planned to occur in May of this year. Only one of the remaining three previously planned mission systems test aircraft is expected to ferry before the end of 2010, with the final two delivering early in 2011. The initial mission systems testing will involve only very limited Block 1 capabilities. By mid-2011, flight test is planned to transition from Block 1 to Block 2 capabilities—this will be an important point where the program will deal with the realities of the performance of software providing the first significant combat capability. Throughout this testing, the program needs to assure software is released to flight test only when it is ready. The JSF program must also prepare to cope with the many software and mission systems integration problems that will be discovered during flight testing, as has been the case with all complex software-intensive programs of this kind.

- Realistic Schedules and Sufficient Resources. The program's ability to maintain an adequate pace of testing is dependent on how the government and contractors manage several aspects of the planned strategy for verifying the performance of the aircraft using flight testing and modeling.
  - Integration of multiple test venues. The fundamental test strategy is to integrate multiple test venues, including contractor labs and models, as well as the Cooperative Avionics Test Bed, using F-35 flight test as a "capstone" event. Effective orchestration of these venues and this build-up process is critical to assure efficient use of flight test sorties. We have yet to see how the process being put in place will cope with multiple events for three different variants operating at two flight test centers. Ultimately, those responsible for

issuing, or rescinding, flight clearances will need time and resources to examine the data and, if necessary, request and receive additional information. This has already been the case with the Short Takeoff/Vertical Landing (STOVL) aircraft testing being conducted at Patuxent River. The contractor predicted early last December that the first vertical landing test event would be achieved by the end of 2009. This event was achieved March 18, 2010; in 2008 it was projected to occur in July 2009. Restrictions on flight associated with vertical landings will likely persist for some time due to discoveries made during recent flight testing. The decision cycle for understanding flight test results and achieving flight clearance will be under considerable pressure in the coming months, and will require continual supervision in order to meet test goals.

- Accreditation of models. The testing strategy puts a high premium on accreditation of the labs and models that the program plans to use in the build-up to flight test. As of November 2009, about 40 percent of the currently-planned model accreditation activities are planned to complete in 2013 or thereafter. While this gives the program time to incorporate performance data from flight tests in the accreditation process, it also highlights the limited margin available if the models and labs cannot play the intended role of limiting flight test sorties to the amount currently planned. Flight test hours were reduced 26 percent in 2007 when modeling and simulation was assumed to be an acceptable substitute for flight testing. If those models cannot be accredited as planned, that assumption may not be realized, and flight test sorties will have to be added. I have recommended that an independent (of both the program office and contractor) review be conducted of the accreditation of the labs and models planned for use as test venues.

- Resources at the flight test centers. Adequacy of flight test center resources is also a concern. Adequate spare parts, trained personnel (including engineers), and training/mission rehearsal tools are essential to reaching the eventual pace of flight test events totaling over 140 per month. Early results in the area of spare parts usage and availability for the three aircraft now flying at Patuxent River are encouraging. However, managing adequate resources at two flight test centers after the remaining test aircraft are delivered requires considerable focus and early response as issues arise; again, this has been the case with other programs of this complexity. A high fidelity mission simulator located at or near the primary flight testing center, which I understand is being considered by the program office, will also be key to sustaining an adequate pace of testing.

- Margin for discoveries. While it is difficult to determine definitively what level of additional schedule is needed to account for issues yet to be identified, it is important to acknowledge that this is the reality of testing—we will discover problems and need to make adjustments. Engine performance in ground tests, deficiencies in the flight control surface actuators, and slow progress towards the first vertical landing are examples that have already occurred. A more recent example is the need to modify the keel beam of C-model test aircraft and change the design of the keel beam used in production aircraft. I understand the program is now including short periods of down-time in its revised test plans to modify test aircraft to incorporate pre-planned configuration updates. Combined with planning for a realistic number of refly and regression test sorties, these constitute the margin for discovery. I note that, while the planned flight testing refly and regression rates were recently increased, they remain below historical experience.

In my FY2009 Annual Report, I also stated that the mission capability of Low Rate Initial Production aircraft is unclear. The program has identified the aircraft flight envelope, as well as the functions that mission systems and the autonomic logistics systems should be capable of performing, that it hopes will be available when decisions are made to proceed with each lot of aircraft produced. However, it is not yet clear that the program's flight test plans provide reasonable assurance this performance will actually be demonstrated before each lot is delivered. Synchronization of testing with production deliveries is a key issue because during the past three years, delivery of production aircraft has been delayed up to nine months, while accomplishments in flight testing have been delayed two years. This synchronization is needed in order to plan for conducting all test and evaluation and will assist the Services as they make plans for fielding and supporting the early production aircraft. Planning in each case requires knowledge of the combat capability expected to be delivered to the government with each lot and variant of production aircraft.

I want to briefly highlight a system vulnerability issue included in my Annual Report. The program office is executing a comprehensive, robust, and fully funded Live Fire test plan. However, the program's removal of shutoff fuses for engine fueldraulics lines, coupled with the prior removal of dry bay fire extinguishers, has increased the likelihood of aircraft combat losses from ballistic threat induced fires. F-35 live fire testing to date has shown that threat impact into fuel tanks results in sustained fires. In addition, the F-35 will be more vulnerable to typical non-combat fires caused by fuel leaks and other system failures without the fire-suppression systems. At present, only the

Integrated Power Plant (IPP) bay has a fire suppression system. Though the configuration control process has approved the program office's request to remove these safety systems as an acceptable system trade to balance weight, cost, and risk, I remain concerned regarding the aircraft's vulnerability to threat-induced and safety-related fires.

In the remainder of this testimony, I will address the specific topics requested in my written invitation to speak at this hearing. I have already described what I consider to be the primary schedule and performance risks that existed in the JSF program and the steps taken by Dr. Carter to address those risks. The steps being taken to restructure the program reduce substantially --- but by no means eliminate --- the risk that key deficiencies in combat capability will be discovered during operational testing. The restructured program continues to have an unprecedented level of concurrency between production and testing. Along with the services, we recently received the program's latest version of its proposed new flight testing plans. In conjunction with developmental and operational test experts in the military Services, we will conduct an integrated test review to analyze the effects of the adjustments made in the revised plan relative to the program's prior plans, and assure those adjustments are consistent with the direction provided by Dr. Carter. Key issues we will examine include the following: the types of additional test aircraft to be used, as well as when and how long they will be used; whether the number of sorties to be flown by each test aircraft each month is consistent with historical experience and the availability of support assets (such as tankers) at flight test centers; whether sufficient contractor and government flight test engineers will be available at the test centers to support the planned pace of testing; whether projected deliveries of flight test aircraft are consistent with reasonable extrapolation of experience-to-date in assembling and delivering aircraft to test centers; whether developmental testing of the mission data load (the data loaded in the aircraft's mission computers describing key characteristics of both friendly and enemy aircraft, air-to-air weapons, and surface-to-air weapons) will be adequate to assure readiness for IOT&E; whether the high-fidelity mission simulation needed to conduct IOT&E (and which would be very useful during developmental testing) will be robust and accredited; whether adequate time and resources are allocated to train operational test pilots; and whether sufficient fully production-representative aircraft will be available to conduct IOT&E.

My understanding of the current status of three programmatic risks contained in my FY 2009 Annual Report that are not discussed above is as follows:

- STOVL Testing. As of March 18, 2010, developmental test aircraft BF-1 had completed 23 flights at Patuxent River and had conducted the first vertical landing. During these flights the test team discovered damage to the linkages for the aircraft's auxiliary air inlet doors after unanticipated stresses experienced during side-slip. This resulted in the imposition of operating limitations on flight test and production aircraft until changes to the linkages are made. The team also discovered greater than expected loads on the 3-bearing swivel duct doors, which allow the engine's nozzle to operate in STOVL mode. Subsequent testing revealed the doors have greater strength than predicted, and previously tested, permitting flight testing to continue. The test team continues to analyze the root cause of the increased loads. The contractor and test team are also working to determine how to instrument the STOVL aircraft's drive shaft (which connects the engine to the lift fan) to measure how it moves and deforms when the aircraft performs short take-offs and vertical landings. These measurements are needed to determine how the shaft must be re-designed to assure its durability. A new shaft is planned to be incorporated in production aircraft beginning with Lot 4. Additionally, the contractor and test team have determined that the STOVL clutch (which engages to transfer power from the engine to the lift fan through the drive shaft) heats excessively during conventional "up and away" flight. An overheated clutch could fail when engaged for vertical landing. Changes to both hardware and software will be needed to correct this problem; work began in February to define the needed changes. These discoveries highlight the challenges that will continue to be experienced in testing this complex set of aircraft.

- F135 engine fan trailing edge tip failure. The root cause of the failure experienced during previous testing of the F135 has been identified. The fan blade was incapable of withstanding the actual internal stresses experienced, which were greater than predicted. High-cycle fatigue testing of a new-design "clipped blade trailing edge" confirms the re-designed fan blade can withstand actual stresses. Initial service release engines are being retrofitted with the re-designed fan blade. Engines produced for use in aircraft after March 2010 will incorporate the re-designed fan blade.

- Inadequate Simulation Environment for Operational Testing. The verification simulation is a man-in-the-loop simulation planned for both developmental testing of integrated systems performance and operational testing of Block 2 and Block 3 capability. The contractor reduced the content of the simulation environment below that needed to conduct adequate operational testing—for example, numbers and types of both threat and friendly forces incorporated in the simulation are inadequate to support realistic operational testing. The operational test team has documented the specific changes needed. In response, the contractor and program office have begun to develop plans to improve the simulation. However, progress is very slow and I am concerned about readiness for testing. When accredited, this simulation, as was the case with a similar asset in the F-22 program, will be a key venue for integrated testing.

C-model Keel Beam. The carrier variant design requires a modification to a section of its keel beam to withstand the stress of carrier catapult launches. I first became aware of this issue January 20, 2010, after submitting my annual report to Congress. I received a briefing describing the details of the problem on February 12, 2010. That briefing was presented by members of the program office and Naval Air Systems Command. The airframe design process is both concurrent and iterative; initial designs and models are updated as test data become available. During this process, an error was made in assigning data to the Finite Element Model of the aircraft's structure in the area of the aircraft's keel. When the correct data were used, the Finite Element Models indicated loads experienced in a particular part of the aircraft's keel beam during catapult would exceed design limits by 37 percent, indicating the keel would likely fail during catapult. This deficiency must be corrected by modifying the structure of the existing test aircraft before carrier trials can be conducted; it must also be corrected in ground test articles used for static structural and durability testing. The first C-model production aircraft will be delivered in Lot 4 and will use a new-design keel beam. The impact to the overall test program is still to be determined; however, at least one C-model test aircraft will be unavailable for up to four months as it undergoes modification and repair. Previous schedules for conducting static and durability ground testing of the C-model aircraft have been extended about six months; that testing is now expected to complete in mid-2011. Effects on flight testing may be significant if more than one C-model test aircraft must be repaired to support carrier suitability testing. CF-3, the first mission systems carrier-variant aircraft, is the primary carrier trial aircraft and is scheduled to undergo the repair during its assembly before ferrying later this calendar year. Aircraft CF-1 is planned to receive the repair after first flight. CF-5, the developmental test aircraft added to production Lot 4, will receive the new design for the affected area of the keel. Flight sciences testing will begin on the C-model aircraft with delivery of CF-1 to Patuxent River later this calendar year (currently planned to occur in October 2010). Full scale static testing of the C-model is also currently scheduled to start in October 2010 and full scale durability testing in February 2012. Until the data from all these tests are analyzed and determined to be consistent with the predictions of the Finite Element Model, we will not know whether additional structural modifications to C-model aircraft will be necessary to achieve the combat capability currently required by the Navy.

Risk in the F-35 Program. The F-35 flight test plan originally spanned 65 months using 14 aircraft; it was reduced by the program office and the contractor in 2007 to a 52-month plan using 12 aircraft. The restructured plan directed by Dr. Carter allows 65 months to complete developmental flight testing and provides up to 16 aircraft to conduct that testing. Absent the additional four test aircraft, the Joint Estimating Team determined that completing developmental testing would require 82 months. The test plan schedule we just received from the program office for review allocates up to 65 months to complete developmental testing using up to four additional aircraft, but anticipates that testing might be completed more quickly---in about 57 months. The program office plan also appears to adopt more conservative assumptions than had been the case previously regarding the number of sorties each test aircraft will actually be able to fly and incorporates additional flight test hours. Thus, the revised plan appears to address many of the issues identified by the Joint Estimating Team. However, I still have the following concerns regarding the revised plan: availability of test aircraft for flight appears to be assumed to be about 80 percent, which is well above the 50 percent availability experienced in the F-22 program; the test aircraft being added are late-to-need and do not include sufficient numbers of C-models; although flight test hours have been added, the number of hours to be flown remains below the levels anticipated by the Joint Estimating Team; the plan for accrediting models does not explicitly incorporate independent review that I am recommending and remains aggressive and optimistic; and it remains unclear whether deficiencies in the verification simulation will be fully corrected.

B-Model and C-Model Shipboard Operations. The program office, in conjunction with the Services, tracks 47 individual issues for resolution towards successful B-model integration and STOVL operations from large-deck amphibious ships. Approximately one-half of these issues involve aircraft-ship integration, such as coping with main engine and integrated power pack exhaust. The remaining one-half deal with training and manpower issues, such as security protocols and acceptance of training devices. To resolve these issues, several ship changes are being considered, as are potential modifications to production aircraft such as re-directing the Integrated Power Pack exhaust to limit effects on takeoff surfaces on the amphibious ships. The issues being reviewed do not appear to prohibit the ability to conduct initial flight testing aboard an L-class ship, which is now planned to begin March 2011. The Navy has also begun analyzing the issues associated with operating C-model JSFs from its aircraft carriers. This planning is not as mature as that for use of the B-model aboard amphibious ships. Challenges to complete C-model integration include: sufficiency of the jet-blast deflectors, effects of engine exhaust on surfaces and personnel, and hangar space requirements.

Engines. Testing of the F135 engine is slightly less than two years behind the schedule planned as recently as 2005. The F135 has encountered a number of technical problems. In late 2007 and early 2008, for example, failures occurring in ground testing of the F135 in STOVL modes revealed the need for design and manufacturing changes of turbine blades. Currently, the program is pursuing design changes in the drive shaft and clutch assembly of the STOVL propulsion system. For all variants, the program is dealing with a phenomenon known as afterburner screech, unstable pressures created in the engine's afterburner section that will limit flight testing at high Mach number and altitude until resolved. F135 ground test hours now total 13,223 and flight test hours total over 200. Production of F135 engines is approximately one year behind the schedule planned in 2005.

The F136 "first engine to test" was delivered five months later than planned in the 2005 schedule. F136 ground test hours total 639. Three F136 engines in the most recent configuration are currently in test and have accumulated 135 hours of ground testing. Ground testing was recently restarted in January 2010 after testing in late 2009 revealed a failure in the combustor area, which necessitated modifications to a bearing and the combustor.

Increases in Aircraft Production. The Independent Manufacturing Review Team (IMRT) chartered by Dr. Carter provided a list of actions the contractor should undertake to prepare for award of the contract for production Lot 5. The IMRT recommended execution of a 20-item plan which, if followed, would greatly improve the quality and efficiency of aircraft production. The program office indicates it is executing this plan.

In conclusion, establishing realistic plans and adjusting to new realities revealed through flight test is essential as we move forward in the JSF program. Restructuring the test program and funding development consistent with the Joint Estimating Team's analysis are essential steps being taken now. In my view, the program needs to adjust continually to balance the pressure to complete testing on schedule and the need to demonstrate that the combat performance needed by the Navy, Marines, and Air Force has been achieved. The demonstrated performance of the aircraft should have the greatest influence on the decisions and adjustments that need to be made as the program progresses.

United States Government Accountability Office

GAO

Testimony
Before the Subcommittees on Air and Land Forces and Seapower and Expeditionary Forces, Committee on Armed Services, House of Representatives

For Release on Delivery
Expected at 2:00 p.m. EDT
Wednesday, March 24, 2010

JOINT STRIKE FIGHTER

Significant Challenges and Decisions Ahead

Statement of Michael Sullivan, Director
Acquisition and Sourcing Management

GAO
Accountability * Integrity * Reliability

GAO-10-478T

March 2010

GAO
Accountability·Integrity·Reliability

Highlights

Highlights of GAO-10-478T, a testimony before the Subcommittees on Air and Land Forces and Seapower and Expeditionary Forces, Committee on Armed Services, U.S. House of Representatives

JOINT STRIKE FIGHTER

Significant Challenges and Decisions Ahead

Why GAO Did This Study

The F-35 Lightning II, also known as the Joint Strike Fighter (JSF), is the Department of Defense's (DOD) most costly and ambitious aircraft acquisition, seeking to simultaneously develop and field three aircraft variants for the Air Force, Navy, Marine Corps, and eight international partners. The JSF is critical for recapitalizing tactical air forces and will require a long-term commitment to very large annual funding outlays. The current estimated investment is $323 billion to develop and procure 2,457 aircraft.

This statement draws substantively from GAO's March 19, 2010 report (GAO-10-382). That report discusses JSF costs and schedules, warfighter requirements, manufacturing performance, procurement rates, and development testing plans. This statement also provides an updated analysis of relative costs and benefits from a second (or alternate) engine program.

In previous years, we recommended, among other things, that DOD rethink plans to cut test resources, improve reliability of cost estimates, and reduce the number of aircraft procured before testing demonstrates their performance capabilities. In our March 2010 report, we recommended that DOD (1) make a new, comprehensive assessment of the program's costs and schedule and (2) reassess warfighter requirements. DOD concurred with both recommendations.

View GAO-10-478T or key components. For more information, contact Michael J. Sullivan at (202) 512-4841or sullivanm@gao.gov.

What GAO Found

The JSF program continues to struggle with increased costs and slowed progress—negative outcomes that were foreseeable as events have unfolded over several years. Total estimated acquisition costs have increased $46 billion and development extended 2 ½ more years, compared to the approved program baseline approved in 2007. Aircraft unit costs will likely exceed the thresholds established by the statutory provision referred to as Nunn McCurdy and may require DOD to recertify the need for the JSF to Congress. The program is at risk for not delivering aircraft quantities and capabilities on time. Dates for achieving initial operational capabilities may have to be extended or some requirements deferred to future upgrades. DOD leadership is taking some positive steps that should reduce risk and provide more realistic cost and schedule estimates. Officials increased time and funding for system development, added four aircraft to the flight test program, and reduced near-term procurement quantities. If effectively implemented, these actions should improve future program outcomes. Currently, however, manufacturing JSF test aircraft continues to take more time, money, and effort than budgeted, hampering the development flight test program. Slowed by late aircraft deliveries and low productivity, the flight test program only completed 10 percent of the sorties planned during 2009. Although restructuring actions should help, there is still substantial overlap of development, test, and production activities while DOD continues to invest in large quantities of production aircraft before variant designs are proven and performance verified. Under the current plan, DOD may procure as many as 307 aircraft at a total estimated cost of $58.2 billion before development flight testing is completed.

Our updated analysis on engine costs shows that, without competition, an estimated $62.5 billion (engine costs in the analysis are expressed in fiscal year 2002 dollars) will be needed over the remainder of the F135 primary engine effort to cover costs for completing system development, procuring 2,443 engines, production support, and sustainment. Additional investment of between $4.5 billion to $5.7 billion may be required should the department continue competition. Under certain assumptions, the additional costs of continuing the F136 alternate engine program could be recouped if competition were to generate approximately 10.1 to 12.6 percent savings over the life of the program. Air Force data on the first 4 years of competition for engines on the F-16 aircraft projected they would recoup at least that much. Actual savings will ultimately depend on factors such as the number of aircraft actually purchased, the ratio of engines awarded to each contractor, and when the competition begins. Competition may also provide non-quantifiable benefits with respect to better contractor responsiveness, technical innovation and improved operational readiness.

Mr. Chairmen and Members of the Subcommittees:

I am very pleased to be here today to discuss the F-35 Joint Strike Fighter (JSF) program. The JSF is the Department of Defense's (DOD) most costly and, arguably, its most complex and ambitious acquisition, seeking to simultaneously develop, produce, and field three aircraft variants for the Air Force, Navy, Marine Corps, and eight international partners. The JSF is critical to our nation's plans for recapitalizing the tactical air forces and will require a long-term commitment to very large annual funding outlays. The total expected U.S. investment is now more than $323 billion to develop and procure 2,457 aircraft.

GAO has issued annual reports on the JSF for the last 6 years. Our most recent report was issued last week and discussed relatively poor program cost and schedule outcomes and specific concerns about warfighter requirements, flight testing, manufacturing, and technical challenges as the program moves forward.[1] A recurring theme in our work has been concern about what we believe is undue concurrency of development, test, and production activities and the heightened risks it poses to achieving good cost, schedule, and performance outcomes. We have also raised concerns about the department continuing to buy large quantities of low rate production aircraft on cost reimbursement contracts far in advance of flight and ground testing to verify the design and operational performance. We are pleased that defense leadership has lately agreed with our concerns and those of other defense offices and task forces. The acquisition decision memorandum, dated February 24, 2010, directs numerous critical actions that we believe will, if effectively implemented, significantly improve program outcomes and provide more realistic projections of costs and schedule.

Today, I will discuss (1) JSF current cost and schedule estimates and the significant challenges ahead as DOD substantially restructures the acquisition program; and (2) our updated analysis of potential costs and savings from pursuing a competitive engine program. This statement draws primarily from our March 2010 report, updated to the extent possible with new budget data and a recently revised procurement profile directed by the Secretary of Defense. To conduct this work, we tracked and compared current cost and schedule estimates with those of prior

[1] GAO, *Joint Strike Fighter: Additional Costs and Delays Risk Not Meeting Warfighter Requirements on Time*, GAO-10-382 (Washington, D.C.: Mar. 19, 2010).

years, identified changes, and determined causes. We obtained program status reports, manufacturing data, and test planning documents. We conducted our own analyses of the information. We discussed results to date and future plans with DOD, JSF, and aircraft and engine contractor officials. We obtained information on the recent restructuring, including critical inputs from three independent defense teams established to review program execution, manufacturing capacity, and engine performance. For the engine cost analysis, we employed the same methodology first reported in 2007, now updated with current cost and program data.[2] We conducted this performance audit from May 2009 to March 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Significant Challenges Remain as DOD Restructures Program

Continuing cost increases and schedule delays culminated in the extensive restructuring of the JSF program recently announced. Restructuring is not complete and further cost growth and schedule extensions are likely. Manufacturing test aircraft continues to take more time, money, and effort than budgeted, contributing to substantial flight testing delays and raising questions about the ability to ramp up production as rapidly and steeply as planned. There is still substantial overlap of development, test, and production activities while DOD continues to push ahead and invest in large quantities of production aircraft before variant designs are proven and system performance verified.

Cost Increases and Schedule Delays Increase Risk of Not Meeting Warfighter Requirements on Time

The JSF program continues to struggle with increased costs and slowed progress—negative outcomes that were foreseeable as events have unfolded over several years. Total estimated acquisition costs have increased $46 billion and development extended 2 ½ years, compared to the program baseline approved in 2007. DOD is now taking some positive steps that, if effectively implemented, should improve future outcomes and provide more realistic cost and schedule estimates. Officials increased

[2] For a detailed discussion on our analytical approach and methodology, see our original testimony GAO, *Defense Acquisitions: Analysis of Costs for the Joint Strike Fighter Engine Program*, GAO-07-656T (Washington, D.C.: March 22, 2007).

time and funding for system development, added four aircraft to the flight test program, and reduced near-term procurement quantities by 122 aircraft. However, there is still substantial risk that the program will not deliver the expected number of aircraft and required capabilities on time. Dates for achieving initial operational capabilities may have to be extended or some requirements deferred to future upgrades. Also, aircraft unit costs will likely exceed the thresholds established by the statutory provision commonly referred to as Nunn-McCurdy[3] and require the department to certify the need for the JSF to Congress. Program setbacks in costs, deliveries, and performance directly impact modernization plans and retirement schedules of the legacy aircraft the JSF is slated to replace.

Table 1 summarizes changes in program cost, quantities, and schedules at key stages of acquisition. The 2004 replan estimates reflect a quantity reduction and a major restructuring of the program after integration efforts and design review identified significant weight problems. The 2007 data is the current approved acquisition baseline and the 2011 budget request reflects cost increases stemming from a major reassessment of the program by a joint team comprised of the Office of the Secretary of Defense (OSD), Air Force, and Navy representatives.

[3] 10 U.S.C. § 2433 establishes the requirement for DOD to prepare unit cost reports on major defense acquisition programs or designated major defense subprograms. If a program exceeds cost growth thresholds specified in the law, this is known as a Nunn-McCurdy breach. DOD is required to report breaches to Congress and, in certain circumstances, DOD must reassess the program and submit a certification to Congress in order to continue the program, in accordance with 10 U.S.C. § 2433a.

Table 1: Changes in Reported JSF Program Costs, Quantities, and Deliveries

	October 2001 (system development start)	December 2003 (2004 Replan)	March 2007 (Approved Baseline)	Fiscal Year 2011 Budget Request
Expected quantities				
Development quantities	14	14	15	14
Procurement quantities (U.S. only)	2,852	2,443	2,443	2,443
Total quantities	**2,866**	**2,457**	**2,458**	**2,457**
Cost estimates (then-year dollars in billions)				
Development	$34.4	$44.8	$44.8	$49.3
Procurement	196.6	199.8	231.7	273.3
Total program Acquisition(see note)	**$231.0**	**$244.6**	**$276.5**	**$322.6**
Unit cost estimates (then-year dollars in millions)				
Program acquisition	$81	$100	$113	$131
Average procurement	69	82	95	112
Estimated delivery dates				
First operational aircraft delivery	2008	2009	2010	2010
Initial operational capability	2010-2012	2012-2013	2012-2015	2012-2015

Source: GAO analysis of DOD data.

Note: Military construction costs, typically part of total program acquisition costs, are not included in this table. Construction cost estimates for the JSF program are incomplete and have been inconsistently portrayed at various stages.

Table 2 shows the extension of major milestone dates for completing key acquisition activities. The February 2010 restructure reflects the direction ordered by the Secretary in an acquisition decision memorandum issued on February 24 and revised on March 3. Completing system development and approving full-rate production is now expected in April 2016, about 2 ½ years later than planned in the acquisition program baseline approved in 2007.

Table 2: Changes in Major Milestones

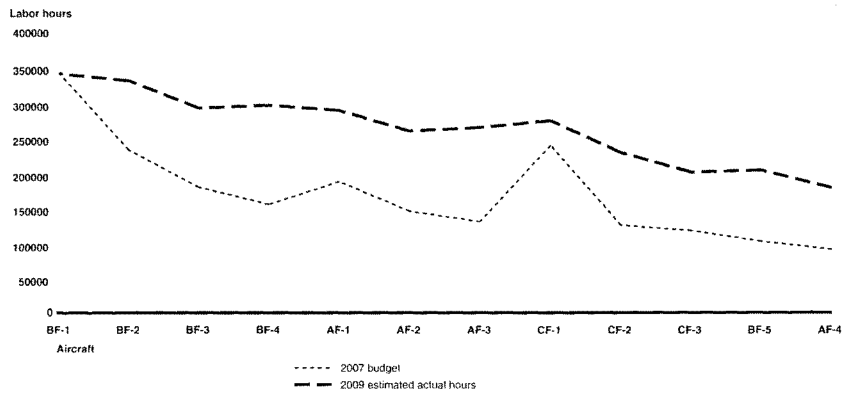
Major milestones	Program of record December 2007	Program of record December 2008	Restructure February 2010
Development testing complete	October 2012	October 2013	March 2015
Initial operational test and evaluation complete	October 2013	October 2014	January 2016
System development and demonstration phase complete	October 2013	October 2014	April 2016
Full-rate production decision	October 2013	October 2014	April 2016

Source: GAO analysis of DOD data.

Manufacturing and Engineering Challenges Continue to Slow Aircraft Deliveries and Put the Production Schedule at Risk

Manufacturing JSF test aircraft continues to take more time, money, and effort than budgeted. By December 2009, only 4 of 13 test aircraft had been delivered and total labor hours to build the aircraft had increased more than 50 percent above earlier estimates. Late deliveries hamper the development flight test program and affect work on production aircraft, even as plans proceed to significantly ramp up annual procurement rates. Some improvement is noted, but continuing manufacturing inefficiencies, parts problems, and engineering technical changes indicate that design and production processes may lack the maturity needed to efficiently produce aircraft at planned rates. An independent manufacturing review team determined that the planned production ramp rate was unachievable absent significant improvements. While the restructuring has reduced near-term procurement, annual aircraft quantities are still substantial. In addition, the program has procured several lots of low rate initial production (LRIP) aircraft using cost-reimbursement contracts, a contract type that places most of the cost risk on the government. Continued use of cost reimbursement contracts beyond initial LRIP quantities indicate that uncertainties in contract performance exist that do not permit costs to be estimated with sufficient accuracy for the contractor to assume the risk under a fixed price contract. Figure 1 compares labor hour estimates for test aircraft in 2007 and the revised manufacturing plan in 2009.

Figure 1: JSF Labor Hours for Manufacturing Test Aircraft



Source: GAO analysis of DOD data.

BF= Short take-off and vertical landing aircraft for the Marine Corps
AF= Conventional take-off and landing aircraft for the Air Force
CF= Carrier variant for the Navy

Little Progress in Development Testing While Program Continues to Face Technical Challenges

Although DOD's restructuring actions should help, there is still substantial overlap of development, test, and production activities while DOD continues to push ahead and invest in large quantities of production aircraft before variant designs are proven and system performance verified. Given the extended development time and reduced near-term procurement, DOD still intends to procure up to 307 aircraft at an estimated cost of $58.2 billion before completing development flight testing by mid fiscal year 2015 (see figure 2). At the same time, progress on flight testing is behind schedule—slowed by late aircraft deliveries and low productivity, the flight test program completed only 10 percent of the sorties planned during 2009, according to the Director of Operational Test and Evaluation. Other technical challenges include (1) relying on an extensive but largely unproven and unaccredited network of ground test laboratories and simulation models to evaluate system performance; (2) developing and integrating very large and complex software requirements; and (3) maturing several critical technologies essential to meet operational performance and logistical support requirements. Collectively, testing and technical challenges will likely add more costs and time to development, slowing delivery of capabilities to warfighters and hampering start up of pilot and maintainer training and initial operational testing.

Figure 2: JSF Procurement Investments and Progress of Flight Testing

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cumulative procurement (billions of dollars)	$0.9	$3.6	$7.1	$14.4	$23.6	$33.2	$45.2	$58.2	$72.4
Cumulative aircraft procured	2	14	28	58	101	146	217	307	420
Development flight testing									

Source: GAO analysis of DOD data.

Note: U.S. investments only.

Updated Analysis Shows that Competition Savings Still Has Potential to Outweigh Costs Depending on Acquisition Approach

The JSF program began with an acquisition strategy that called for a competitive engine development effort. In the fiscal year 2007 budget submission, DOD stopped requesting funding for the alternate engine (F136). At that time, DOD determined that the risks of a single point failure in a sole source environment were very low and did not justify the extra costs to maintain a second source. Each year since then, Congress has subsequently recommended funding for alternate engine development. We have previously testified on our assessment that, based on past defense competitions (including a fighter engine competition started in the 1980s between these same manufacturers) and making certain assumptions about relative quantities purchased from each, competition could reasonably be expected to yield enough savings across the JSF life cycle to offset the remaining investments required to sustain a second source.[4] Prior studies also indicate a number of nonfinancial benefits from competition, including better performance, increased reliability, and improved contractor responsiveness.

As noted in our prior testimonies, the acquisition strategy for the JSF engine must weigh expected costs against potential rewards—both

[4]GAO, *Joint Strike Fighter: Strong Risk Management Essential as Program Enters Most Challenging Phase*, GAO-09-711T (Washington, D.C.: May, 20, 2009) is our most recent testimony on engine issues.

quantifiable and non quantifiable. As a result, we have updated our prior studies conducted in 2007, and later updated in 2008, to assess whether changes in the JSF program have impacted the costs and benefits of the sole-source and competitive scenarios for acquisition and sustainment of the JSF engine. We updated our analysis to include (1) new estimates for Research, Development, Test, and Evaluation (RDT&E) and additional sunk costs, (2) a slower production ramp as a result of the recent program restructure, (3) increased engine unit recurring costs, and (4) updated production support costs. Based on schedule delays with the program, we moved the starting point of the procurement competition to fiscal year 2015, a 3-year slip from our past analysis. This adjustment aligns with the completion of the JSF development flight test program and would start the competition with the last low-rate initial production aircraft buy. We were not provided information that allowed us to update operations and support costs.

Our updated analysis, based largely on data provided by the JSF program office, found that, without competition, an estimated $62.5 billion[5] will be needed over the remainder of the F135 primary (current) engine to cover costs for completing system development, procuring 2,443 engines, production support, and sustainment. An additional investment of between $4.5 billion to $5.7 billion (depending on the competitive scenario) may be required should the department continue competition. Depending on assumptions, the additional costs of the alternate engine investment could be recouped if competition were to generate approximately 10.1 to 12.6 percent savings over the life of the program. Air Force data on the first 4 years of competition for engines on the F-16 aircraft projected they would recoup at least that much. Actual savings will ultimately depend on factors such as the number of aircraft actually purchased, the ratio of engines awarded to each contractor, and when the competition begins. Competition may also provide non-quantifiable benefits with respect to better contractor responsiveness, technical innovation and improved operational readiness. Recent engine cost concerns and past test failures are other factors that should be considered in deciding whether to continue the engine competition.

[5] To maintain consistency with our statements in prior years, all costs related to our engine cost analysis are expressed in base year 2002 dollars. Other engine costs in this statement are expressed in then year (inflated) dollars.

Costs of Sole Source Approach

Our updated analysis estimates the remaining costs for the Pratt & Whitney F135 engine is estimated to be $62.5 billion over the life of the program. This includes cost estimates for the completion of system development, procurement of engines, production support, and sustainment. Table 3 shows the costs remaining to acquire and support the Pratt & Whitney F135 engine on a sole-source basis in our updated analysis.

Table 3: Costs to Complete Pratt & Whitney F135 Engine Program (Fiscal year 2002 dollars in billions)

Cost element	Cost
System development and demonstration costs	$0.5
Total engine recurring flyaway costs	$24.7
Production support costs (including initial spares, training, manpower, and depot standup)	$5.7
Sustainment costs of fielded aircraft	$31.6
Total	**$62.5**

Source: JSF program office or other DOD data; GAO analysis.

Note: Based on 2,443 installed engines and spares.

In addition to development of the F135 engine design, Pratt & Whitney also has responsibility for the common components that will be designed and developed to go on all JSF aircraft, regardless of which contractor provides the engine core. This responsibility supports the JSF program level requirement that the engine be interchangeable—either engine can be used in any aircraft variant. In the event that Pratt &Whitney is made the sole-source engine provider, future configuration changes to the aircraft and common components could be optimized for the F135 engine.

Additional Costs of Competition

Our updated analysis estimated the additional costs under two competitive scenarios beginning in fiscal year 2015: one in which contractors are each awarded 50 percent of the total engine purchases (50/50 split) and one in which there is an annual 70/30 percent award split of total engine purchases to either contractor,. Without consideration of potential savings, the additional costs of competition total about $5.7 billion under the first scenario and about $4.5 billion under the second scenario. Table 4 shows the additional cost associated with competition under these two scenarios.

Table 4: Additional Costs for Competition in JSF Engine Program (Fiscal year 2002 dollars in billions)

Additional costs	50/50 Aircraft award split	70/30 Aircraft award split
System development and demonstration costs	$1.3	$1.3
Total engine recurring flyaway costs	$4.3	$3.1
Production support costs (including initial spares, training, manpower, and depot standup)	$0.1	$0.1
Sustainment costs of fielded aircraft[a]	N/A	N/A
Total	**$5.7**	**$4.5**

Source: JSF program office or other DOD data; GAO analysis.

Notes: Based on 2,443 installed engines and spares.

[a]No additional sustainment costs were considered because the number of aircraft and cost per flight hour would be the same under either scenario.

The disparity in costs between the two competitive scenarios reflects the loss of learning resulting from lower production volume that is accounted for in the projected recurring flyaway costs used to construct each estimate. The other costs include approximately $1.3 billion for remaining F136 development and $140 million in additional standup costs, which would be the same under either competitive scenario.

Level of Savings Needed to Recoup Additional Costs Varies Based on Assumptions

Competition may incentivize the contractors to achieve more aggressive production learning curves, produce more reliable engines that are less costly to maintain, and invest additional corporate money in technological improvements to remain competitive. However, it is important to consider that many of the additional investments associated with competition are often made earlier in the program's life cycle, while much of the expected savings do not accrue for decades. As such, we include a net present value calculation (time value of money) in the analysis that, once applied, provides for a better estimate of program rate of return. Our analysis indicates that recoupment of those initial investment costs would occur at somewhere between 10.1 and 12.6 percent, depending on the number of engines awarded to each contractor. A competitive scenario, where one contractor receives 70 percent of the annual procurement and the other receives 30 percent, reaches the breakeven point at 10.1 percent savings. A competitive scenario where both contactors receive 50 percent of the procurement reaches this point at 12.6 percent savings.

The government's ability to recoup the additional investments required to support competition depends largely on (1) the number of aircraft procured,[6] (2) the ratio that each contractor wins out of that total, and (3) the savings rate that competitive pressures drive. Another key variable is when the competition actually begins. In our analysis described above, we assume competition begins with the fiscal year 2015 buy which would be after the JSF system development flight test program is currently scheduled to be completed and would be the last low rate initial production order. We also ran an alternative scenario where competition did not begin until 2017, or 2 years later. Such a delay would increase the level of savings needed to recoup the additional investments. This was primarily due to the fact that savings from the competition began later in the life cycle and fewer engines from the total 2,443 procurement would be available for competition. Assuming competition starts in 2017, recoupment of the additional investment would occur at 11.3 to 14.1 percent savings depending on whether competitive buys are split either 70/30 or 50/50 between contractors. This range compares to the 10.1 to 12.6 percent range if the competition began in 2015.

Prior experience suggests it may be reasonable to expect savings of at least that much from a JSF engine competition. While we did not do an in-depth analysis of the competition, the "Great Engine War", may provide a good example of the potential savings achievable. The competition was between Pratt & Whitney and General Electric to supply military engines for the F-16 and other fighter aircraft programs. At that time, all engines for the F-14 and F-15 aircraft were being produced on a sole-source basis by Pratt & Whitney, which was criticized for increased procurement and maintenance costs, along with a general lack of responsiveness to government concerns about those programs. Beginning in 1983, the Air Force initiated a competition that resulted in significant cost savings in the program. For example, in the first 4 years of the competition, when comparing actual costs to the program's baseline estimate, results included

- Nearly 30 percent cumulative savings for acquisition costs,
- Roughly 16 percent cumulative savings for operations and support costs, and
- Total savings of about 21 percent in overall life cycle costs.

[6] In conducting our cost analysis of the alternate engine program, we presented the cost of only 2,443 U.S. aircraft currently expected for production.

It is difficult to estimate the costs that would have been incurred if there never were a competition. However, prior to the competition, there was an upward trend in the expected unit costs of the F-16 primary engine. When the alternate engine was introduced as a competitor, the upward trend stopped.

Multiple Studies and Analyses Show Additional Benefits from Competition

Competition for the JSF engines may provide benefits that do not result in immediate financial savings, but could result in reduced costs or other positive outcomes over time. Our prior work, along with studies by DOD and others, indicated there are a number of non financial benefits that may result from competition, including better performance, increased reliability, and improved contractor responsiveness. DOD and others have performed studies and have widespread concurrence as to these other benefits, including better engine performance, increased reliability, and improved contractor responsiveness. In fact, in 1998 and 2002, DOD program management advisory groups assessed the JSF alternate engine program and found the potential for significant benefits in these and other areas. While the benefits highlighted may be more difficult to quantify, they were strongly considered in earlier recommendations to continue the alternate engine program. These studies concluded that the program would

- Maintain the industrial base for fighter engine technology,
- Enhance readiness,
- Instill contractor incentives for better performance,
- Ensure an operational alternative if the current engine developed problems, and
- Enhance international participation.

In the OSD Cost Analysis Improvement Group's (now Cost Assessment and Program Evaluation) 2007 Joint Strike Fighter Alternate Engine Acquisition and Independent Cost Analyses Report, it also concluded that there are nonfinancial benefits to competition.

Another potential benefit from an alternate engine program cited by the program management advisory group studies is the hedge against a catastrophic risk that a single point, systemic failure in the engine design could substantially affect the fighter aircraft fleet. Though current data indicate that it is unlikely that engine problems would lead to fleet wide groundings in modern aircraft, having two engine sources for the single-engine JSF further reduces this risk as it is less likely that such a problem would occur to both engine types at the same time. Because the JSF is expected to be the primary fighter aircraft in the U.S. inventory, and Pratt & Whitney is also the sole-source provider of F119 engines for the F-22A aircraft, DOD is faced with the potential scenario where most of the fleet could be dependent on similar engine cores, produced by the same contractor in a sole-source environment.

JSF Engine Costs and Flight Test Progress Have Not Met Expectations

Both the F135 and F136 have experienced cost growth and delays. The F135 primary engine development effort—a separate contract from the airframe development effort—is now estimated to cost about $7.3 billion, about a 50 percent increase over the original contract award. This includes an $800 million contract cost overrun in 2008. Engine development cost increases primarily resulted from higher costs for labor and materials, supplier problems, and the rework needed to correct deficiencies with an engine blade during redesign. Engine redesigns and test problems caused slips in engine deliveries, according to program officials. Officials note that these late engine deliveries have not yet critically affected the delivery of test aircraft because airframe production lagged even further behind. However, the prime contractor has been forced to perform out-of-station engine installations and other workarounds as a result of engine issues. As of January 2010, 17 of 18 F135 development flight test engines have been delivered, seven of which have flown. However, the initial service release date for the short take-off and vertical landing (STOVL) variant has slipped from 2007 plans about 21 months until the third quarter 2010.

Engine procurement unit costs are higher than earlier budget estimates. For example, the negotiated unit cost (2009 buy) for the conventional take-off and landing variant is now $17.7 million—42 percent higher than the program's budget estimate of $12.5 million. Similarly, the unit cost for the STOVL engine (including lift fan and related parts) rose from $27.6 million, to $33.4 million, a 21 percent increase. JSF program officials cite several reasons for the higher than budgeted unit costs, including configuration changes and quantity reductions. Based on recent data provided by the program office, the average unit costs projected through the end of procurement has increased by 45 to 55 percent since 2006, depending on the variant.

As planned, the F136 second engine development is about 3 years behind F135 engine development. While the time lag and funding instability make precise assessments more difficult, the second engine contractor is also facing cost and schedule challenges. Through fiscal year 2010, the government has invested about $2.9 billion in developing the second engine and DOD cost analysts estimate that about $1.6 billion more would be needed to complete F136 development in 2016. F136 contractor officials told us that funding stability, engine affordability, and testing issues are key concerns for the program to go forward. According to the F136 contractor, it believes system development could be completed earlier by 2014, with less funding. While the F136 engine has not yet been flown, it has experienced delays. For example, its initial release for flight testing for the short take-off and vertical landing variant has slipped by about 21 months to late 2011.

Concluding Remarks

The JSF is DOD's largest and most complex acquisition program and the linchpin of the United States and its allies' long-term plans to modernize tactical air forces. It will require exceptional levels of funding for a sustained period through 2035, competing against other defense and nondefense priorities for the federal discretionary dollar. The Department has recently taken some positive steps that, if effectively implemented, should improve outcomes and provide more realistic, executable program. However, the program will still be challenged to meet cost and schedule targets. To date, the Department does not have a full, comprehensive cost estimate for completing the program. Credible costs and schedules estimates are critical because they allow DOD management to make sound trade-off decisions against competing demands and allow Congress to perform oversight and hold DOD accountable. Because the JSF is expected to eventually make up most of the tactical aircraft fleet, the services should have a high degree of confidence in their ability to meet their initial operational capability requirements and to acquire JSFs in quantity so that DOD can plan its overall tactical aircraft force structure strategy. However, the Department has not yet defined reasonable expectations for achieving initial operational capabilities for each of the services given the recent restructuring. While the Department has lowered cost risk by reducing near term procurement quantities, there is still substantial overlap of development, test, and production activities now stretching into 2016. Constant program changes and turbulence have made it difficult to accurately and confidently measure program progress in maturing the aircraft system. Tying annual investments more directly to demonstrated progress in developing, testing, and manufacturing aircraft may be a prudent fiscal measure for ensuring government funds are invested wisely.

In previous years, we recommended, among other things, that DOD rethink plans to cut test resources, improve reliability and completeness of cost estimates, and reduce the annual number of aircraft procured before testing demonstrates their performance capabilities. In our March 2010

JSF report, we recommended that DOD (1) make a new, comprehensive and independent assessment of the costs and schedule to complete the program, including military construction, other JSF-related expenses, and life cycle costs; and (2) reassess warfighter requirements and, if necessary, defer some capabilities to future increments. The department concurred with both recommendations. We also included a matter for congressional consideration regarding development of a system maturity matrix as a tool for measuring progress and evaluating annual budget requests.

A decision whether to continue the alternate engine program will likely have long term implications for the JSF program, industrial base, and fleet readiness. Expected costs must be weighed against potential benefits, both quantifiable and unquantifiable. Last year, Congress enacted legislation to help improve weapons acquisition outcomes. The legislation, referred to as the Weapon Systems Acquisition Reform Act of 2009, included a provision requiring DOD to ensure that the acquisition strategy for each major defense acquisition program includes measures to ensure competition, or the option of competition, throughout the life of the program. The long-term impact on the industrial base is likely to be high given the size of the JSF program, international participation, and the expected supplier base. Depending on the assumptions made, a competitive environment could yield enough financial savings over the life of the program to offset the immediate cost of investing in competition. Specifically, key assumptions include the number of aircraft purchased, the ratio of engines each contractor wins, and savings competitive pressures drive. The timing of when a competition occurs will also have a direct bearing on the amount of savings that is needed to recoup the additional costs of competition. Competition could also provide many intangible benefits that do not result in immediate financial savings but could result in reduced costs or other positive outcomes over time. It is important that DOD and Congress reach an agreement on the best path forward.

Mr. Chairman, this completes my prepared statement. I would be pleased to respond to any questions you or other Members of the Committee may have.

For further information on this statement, please contact Michael Sullivan at (202) 512-4841 or sullivanm@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals making key contributions to this statement are Bruce Fairbairn, Matt Lea, Kris Keener, Ridge Bowman, Charlie Shivers, Charles W. Perdue, and Greg Campbell.

GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site (www.gao.gov). Each weekday afternoon, GAO posts on its Web site newly released reports, testimony, and correspondence. To have GAO e-mail you a list of newly posted products, go to www.gao.gov and select "E-mail Updates."

Order by Phone

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's Web site, http://www.gao.gov/ordering.htm.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: www.gao.gov/fraudnet/fraudnet.htm
E-mail: fraudnet@gao.gov
Automated answering system: (800) 424-5454 or (202) 512-7470

Congressional Relations

Ralph Dawn, Managing Director, dawnr@gao.gov, (202) 512-4400
U.S. Government Accountability Office, 441 G Street NW, Room 7125
Washington, DC 20548

Public Affairs

Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, DC 20548

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
SEAPOWER AND EXPEDITIONARY FORCES AND
AIR AND LAND FORCES SUBCOMMITTEES

STATEMENT OF

THE HONORABLE SEAN J. STACKLEY
ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISITION)

AND

LIEUTENANT GENERAL GEORGE J. TRAUTMAN III, USMC
DEPUTY COMMANDANT FOR AVIATION

AND

REAR ADMIRAL DAVID L. PHILMAN, USN
DIRECTOR OF AIR WARFARE

BEFORE THE

SEAPOWER AND EXPEDITIONARY FORCES
AND
AIR AND LAND FORCES
SUBCOMMITTEES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY'S AVIATION PROCUREMENT PROGRAM

MARCH 24, 2010

NOT FOR PUBLICATION UNTIL RELEASED BY
HOUSE ARMED SERVICES COMMITTEE
SEAPOWER AND EXPEDITIONARY FORCES AND
AIR AND LAND FORCES SUBCOMMITTEES

NAVAL AVIATION PROGRAMS OVERVIEW

The Fiscal Year 2011 President's Budget implements a recapitalization strategy for new capabilities and initiatives, reduced operating costs, and sustainment of legacy fleet aircraft that are performing magnificently in current operations. We are always aware that our decisions on programmatics, budgeting and procurement have a direct impact on the young men and women we send overseas to fight and win our nation's wars, and providing the proper weapons systems for those warfighters is a charge we take very seriously.

We continue to work with industry in seeking ways to reduce costs in production contracting strategies on the F/A-18E/F, the H-1, the F-35B and F-35C, the MH-60R/S and the MV-22B. The Department of the Navy (DoN) continues the development and low rate procurement of the F-35B and C models, E-2D Advanced Hawkeye, CH-53K Heavy Lift Replacement, unmanned aircraft systems and new strike weapons capabilities. In total, with our Fiscal Year 2011 funding, Navy and Marine Corps aviation will procure 103 tactical and fixed-wing aircraft, 100 rotary-wing aircraft and three MQ-8 Vertical Takeoff and landing Unmanned Aerial Vehicles (VTUAVs) for a total of 206 aircraft.

TACTICAL AIRCRAFT/TACTICAL AIRCRAFT SYSTEMS

F-35 Joint Strike Fighter (JSF)

The DoN is committed to both the STOVL and CV variants of the JSF as they are essential to our long-term Naval and Marine Corps Aviation strategy and the nations security. The Fiscal Year 2011 President's Budget requests $1.4 billion in RDT&E and $4.5 billion in Aircraft Procurement, Navy (APN) for 20 JSF aircraft (13 F-35B and seven F-35C) and associated aircraft hardware and spares. These resource requirements reflect the F-35 program's restructure recently approved by the Secretary of Defense.

The commonality designed into the joint F-35 program will minimize operating costs of Navy and Marine Corps tactical aircraft, and allow enhanced interoperability with our sister service, the United States Air Force (USAF) and the eight partner nations participating in the development of this aircraft. The F-35 aircraft will provide combatant commanders greater flexibility across the range of military operations. A true fifth-generation aircraft, the JSF will enhance precision strike capability through unprecedented stealth, range, sensor fusion, radar performance, combat identification and electronic attack capabilities as compared to legacy platforms. It is important to stress that after the extensive review that led to the recent F-35 program restructure, no fundamental technology or manufacturing problems were discovered, nor were there any changes to F-35 performance requirements. It will also add sophisticated electronic warfare capabilities, as compared to the legacy platforms to be replaced, and will tie together disparate units scattered across the battlefield, in real time. All F-35 variants are projected to meet their respective Key Performance Parameters (KPPs).

The F-35B Short Takeoff Vertical Landing (STOVL) variant combines the multi-role versatility and strike fighter capability of the legacy F/A-18 with the basing flexibility of the AV-8B and the potential for electronic warfare dominance of the EA-6B. The Marine Corps intends to leverage the F-35B's sophisticated sensor suite and the very low observable (VLO) fifth-generation strike fighter capabilities, particularly in the area of data collection and information dissemination, to support the Marine Air Ground Task Force (MAGTF) well beyond the abilities of today's MAGTF expeditionary attack, strike and electronic warfare assets. Having these capabilities in one aircraft will provide the joint force commander and the MAGTF commander unprecedented strategic and operational agility. The F-35C carrier variant (CV) complements the F/A-18E/F Block II and EA-18G in providing survivable, long-range strike capability and persistence in an access denied environment. The F-35B and F-35C will provide the Expeditionary Strike Group and Carrier Strike Group commanders a survivable, "day-one" strike capability in a denied access environment with the tactical agility and strategic flexibility to counter a broad spectrum of threats and win in operational scenarios that cannot be addressed by current legacy aircraft.

Four System Development and Demonstration (SDD) jets (AF-1, BF-1, BF-2, and BF-3) are now in flight testing, while AA-1 has completed its flight testing requirements and awaits a live fire test at the Naval Air Warfare Center, China Lake. CF-1 is in the run station with an In-Service Release engine. CF-2 has recently left the production line and is going through system checkout. BF-4 is currently in ground tests in Fort Worth and is expected to ferry to Naval Air Station (NAS) Patuxent River on May 7, 2010. The remaining SDD jets and ground test articles, plus Low Rate Initial Production (LRIP) I, LRIP II, and LRIP III aircraft, are in various stages of production. With regard to the flight test program, the initial Conventional Takeoff and Landing (CTOL) aircraft (AA-1) has demonstrated outstanding performance with 91 sorties (~126 flight hours) flown through January 2010.

BF-1, the first STOVL flight test jet, has flown more than 30 sorties, in preparation to its first vertical landing (VL). It has demonstrated smooth and positive flight characteristics during transitions from conventional flight to slow speed flight and accomplished the first STOVL transition to a vertical landing (VL) flight on the 18th of March 2010. BF-2 has ferried to NAS Patuxent River and has completed 16 sorties with more than 28 hours of accumulated test time. BF-3 was ferried to NAS Patuxent River in February 2010 and completed its initial three test sorties and BF-4's first flight is anticipated to occur within the next 60 days. We have been pleased that the initial STOVL/F-35B test aircraft that have arrived at NAS Patuxent River have required little postflight work, as this demonstrates that the prime contractor is continuing to mature its production line

The F-35B structural testing that has been completed will enable expansion to the full STOVL envelope – though we have had recent challenges with the STOVL door operations we continue to fly as we investigate and make any required modifications. F-35C Full Scale Drop Test was started on March 4 at Vought Aircraft Test Laboratory in Dallas, TX. The mission systems testing completed to date has provided us additional confidence in F-35 integrated sensor functionality – and we plan to continue to further mature this fifth-generation integrated sensor performance during the next 12 months. Additionally, we have recently cleared BF-2 to utilize its on-aircraft speech recognition capability for flight test, which, when completed, promises to enhance warfighting capability and reduce pilot workload. The signature testing completed to date has built confidence in the VLO performance as we await the first full signature jet to demonstrate overall operational mission effectiveness.

The DoN has taken special interest in the F-35 air/ship integration. Initial ship suitability testing has been completed and our computational fluid dynamic models are being validated to ensure the effects of F-35 propulsion systems on LH and CVN-class ships and ship systems are well understood and addressed. To date, there are no known air-ship integration issues which we cannot overcome; future test events will refine our integration efforts and validate our initial analysis. With respect to logistic support for test and deployment, dedicated aircraft/ship variant teams are in place, all known logistical risks have mitigation plans, and the test and operational use of our Autonomic Logistics & Global Sustainment (ALGS) systems will continue to shape and mature our global sustainment implementation plans with our eight partner countries.

The Initial Operational Capability (IOC) is determined by the Service based on both the program's performance and how the Service defines IOC. For the Marine Corps F-35B, IOC is defined as a squadron of ten aircraft able to execute the full range of TACAIR directed mission sets and to deploy on F-35B-compatible ships and to austere expeditionary sites. The Marine Corps plans to IOC with an Operational Requirements Document (ORD) compliant Block 2B aircraft. For the Navy F-35C, IOC is defined as a squadron of ten ORD compliant Block 3 aircraft that are ready to deploy and have completed IOT&E. With the recent program restructuring, IOC is projected to be 2012 for the F-35B and 2016 for the F-35C.

The F135 propulsion system has begun the transition from development to production with the delivery of the first three LRIP 1 engines. Six additional production engines are in assembly and deliveries will ramp up to three engines per month by the third quarter of 2010. Notwithstanding this significant progress, we continue to focus on engine cost. The Office of the Secretary of Defense recently chartered a Joint Assessment Team (JAT) to investigate F135 cost and cost objectives. The JAT assessed that the F135 engine cost goals are achievable with the proper investment in cost reduction initiatives. The focus in the coming year will be to ensure the engine manufacturer and the government implement the necessary efforts to achieve the cost goals. The current LRIP 4 engine proposal shows that the engine manufacturer has begun to reduce cost in alignment with the JAT assessments and recommendations.

F/A-18 Hornet

TACAIR is made up of 1180 total aircraft, of which 88 percent are Navy and Marine Corps Hornets (20 Navy squadrons totaling 400 Super Hornets; 17 Navy and 13 Marine squadrons totaling 635 legacy A-D Hornets). Super Hornets and legacy Hornets have conducted over 130,000 combat missions in support of Operations IRAQI FREEDOM (OIF) and ENDURING FREEDOM (OEF) since September 11, 2001. While deployed both ashore and at sea aboard our aircraft carriers, F/A-18s have brought significant numbers of precision ordnance and laser-guided munitions to the fight, and have employed numerous rounds of 20mm ammunition supporting forces during strafing runs. These aircraft continue to provide vital overwatch and direct support to our troops on the ground in Iraq and Afghanistan.

F/A-18 A/B/C/D (Legacy) Hornet

The Fiscal Year 2011 President's Budget request is $258.0 million in APN for the continuation of the systems upgrade programs for the F/A-18 platform. As the F/A-18 program transitions to the F/A-18E/F and JSF, today's inventory of 635 F/A-18A/B/C/Ds will continue to comprise more than half of the Navy's strike fighter inventory until 2013. In order to maintain a tactical advantage, we will procure and install advanced systems (Joint Helmet-Mounted Cueing Systems (JHMCS), Multi-Function Information Distribution System (MIDS) and Advance Tactical Forward Looking Infra-Red) (ATFLIR)/LITENING) on selected F/A-18A/B/C/D aircraft. The requested funds will support the APG-73 radar obsolescence management program and procure APG-79 radars in order to replace APG-73 radars in early Block II Super Hornets, each a vital piece of the TACAIR mission for the near future.

These funds will also procure and install centerbarrel modifications, which will be a major contributor to extending the service life of the F/A-18 C/D fleet from 6,000 to 8,000 hours and beyond. The Service Life Management Program (SLMP) continues to monitor and improve the health of the legacy F/A-18A-D fleet through analyses of TACAIR inventories and the service life of each airframe.

The Marine Corps will upgrade 56 Lot 7-9 F/A-18As and 30 Lot 10/11 F/A-18Cs to a Lot 21 avionics capability with digital communications, a tactical data link, JHMCS, MIDS and LITENING. The Marine Corps will also upgrade 72 F/A-18D models' APG-73 radars with the Expand 4/5 upgrade, providing an enhanced Synthetic Aperture Radar (SAR) capability. The Marine Corps anticipates these upgrades will enhance the current capabilities of these aircraft with the digital communications, tactical data link and Advanced Tactical Airborne Reconnaissance Systems (ATARS) required for them to remain viable and relevant. The Marines expect the F/A-18(A++/C/D) to remain in the active inventory until Fiscal Year 2022 and in the reserve inventory until Fiscal Year 2023.

The Marines are also employing the LITENING targeting pod on F/A-18A+/C/D aircraft in expeditionary operations including OEF. When combined with data link hardware, the LITENING pod provides real-time video to ground forces through Remotely Operated Video Enhanced Receiver (ROVER) and Video Scout ground workstations.

F/A-18 E/F Super Hornet

The Fiscal Year 2011 President's Budget requests $1.8 billion in APN-1 for 22 F/A-18 E/F Block II aircraft. The F/A-18E/F continues to transition into the fleet, improving the survivability and strike capability of the carrier air wing. The Super Hornet provides a 40 percent increase in combat radius, 50 percent increase in endurance and 25 percent increase in weapons payload over the legacy Hornets. The program will complete procurement of the 515 budgeted aircraft in 2013. Production line shutdown will begin in Fiscal Year 2013 with the final shutdown occurring in Fiscal Year 2015.

The APG-79 Active Electronically Scanned Array (AESA) radar system was installed in all production F/A-18E/Fs and EA-18Gs beginning with Lot 30, and a retrofit program is modifying

135 Lot 26-29 Block IIs with APG-79 radars. All 458 Block II Super Hornets will be AESA equipped, providing the Super Hornet a significant increase in detection range, lethality and survivability over the legacy Hornets. AESA squadrons have been successfully deploying since 2008 and are highly valued by Fleet Commanders.

The Super Hornet uses an incremental development approach to incorporate new technologies and capabilities – the JHMCS, ATFLIR (with shared real-time video), Shared Reconnaissance Pod System (SHARP) and MIDS data-link. The F/A-18E/F Fiscal Year 2011 Budget request also includes $84.4 million in APN to implement commonality, maintain capabilities and improve reliability and structural safety. The Navy continues to explore the possibility of a multiyear procurement for 124 F/A-18E/F and EA-18G series aircraft (Fiscal Years 2010-2013) with the Secretary of Defense.

AV-8B Harrier

The Fiscal Year 2011 Budget requests $22.9 million in RDT&E funds to continue development of the AV-8B Readiness Management Plan (RMP), Digital Improved Triple Ejector Racks (DITER), and Engine Life Management Plan (ELMP) to include continued Accelerated Simulated Mission Endurance Testing (ASMET). The DITER effort will increase the digital weapons carriage capability of the Harrier and thereby support combat operations more effectively. The Fiscal Year 2011 Budget also requests $19.4 million procurement funds for ELMP upgrades and the RMP, which addresses aircraft obsolescence and deficiency issues associated with sustaining the Marine Corps' AV-8B fleet.

Today's Harrier - equipped with precision weapons, LITENING targeting pods with a video downlink to ROVER ground stations, and digitally-aided Close Air Support (CAS) (Marine Tactical System (MTS) protocol) - has proven to be an invaluable asset for the MAGTF and joint commander across the spectrum of operations. The AV-8B program continues to address attrition recovery and other inventory sustainment efforts to mitigate significant legacy inventory shortfalls and obsolescence issues. The AV-8B continues to be deployed heavily in support of OEF and for other emerging operational contingencies; each Marine Expeditionary Unit (MEU) that sails does so with embarked AV-8Bs. In 2009 the Harrier ended a highly successful six-year rotation in Iraq; we then transitioned the aircraft to Afghanistan. There the AV-8B is supporting ground forces with its precision weapons, 25-millimeter cannon and sophisticated sensor suite. The Harrier has a proven combat record, and its weaponry and basing flexibility have been invaluable as we deploy it into the fight from the decks of L-class ship as well as ashore in the austere Afghanistan environment. Planned capability upgrades, obsolescence mitigation and readiness initiatives will ensure the AV-8B remains relevant, healthy and sustained through at least 2022.

Although the LITENING targeting pod is managed by the AV-8B program office, the pod is carried on all three USMC TACAIR platforms. Building on its extensive and proven combat record, the Air Force and Marine Corps are upgrading the LITENING pod to the G4 (fourth generation) standard to support engaged Marine Corps, joint and coalition warfighters. The Fiscal Year 2011 Budget requests $72.1 million in procurement funding for USMC expeditionary LITENING targeting pod upgrades, which include enhanced Forward Looking Infra-red (FLIR) and charge-coupled device (CCD) optics, a Laser Target Imaging Processor (LTIP), a more powerful video downlink transmitter, and improved ground moving target and air-to-air target tracking systems.

TACAIR Inventory Management

In 2009, we estimated the DoN Strike Fighter Shortfall (SFS) to be 146 aircraft. With the changes in the Fiscal Year 2011 President's Budget, the Strike Fighter Shortfall analysis was updated and the peak DoN Shortfall rose from 146 to 177 aircraft - primarily due to the F-35 delivery ramp reduction of 55 aircraft and removing the assumption of aircraft reaching 10,000 flight hours. Today, with the application of our management strategies and levers, the peak can be managed to about 100 aircraft in 2018.

We are closely managing the flight hours and fatigue life of our tactical aircraft. Since 2004, we have provided guidance and actions to optimize aircraft utilization rates while maximizing training and operational opportunities. The F/A-18A-D Inventory Management Forecasting Tool is used to project the combined effects of TACAIR transition plans, retirements, attrition and pipeline requirements on the total F/A-18A-D aircraft inventory. The model is updated with the most recent data and forecasts the strike fighter inventory compared to the existing requirements. Critical model variables include JSF deliveries, force structure, usage rates, life limits, depot turnaround time, Fatigue Life Expended (FLE), catapult launches and arrested landings, and field landings.

Faced with an increased Shortfall, the DoN has continued to identify further opportunities to reduce its impact. The Marine Corps has modified it's F-35 transition plan by transitioning some Hornet squadrons earlier and leveraging the service life remaining in the AV-8B fleet. Management "levers" have been identified: accelerating the transition of five legacy F/A-18C squadrons to F/A-18 E/F; transitioning two additional F/A-18 C squadrons to F/A-18E/F using the remaining attrition F/A-18E/F reserve aircraft; reducing the Navy Unit Deployment Program (UDP) and USMC Expeditionary F/A-18A+/C/D squadrons from twelve to ten aircraft per squadron. Some of these measures are dependent on reduced demand in Global Force Management (GFM) requirements.

We are continuing to perform High Flight Hour (HFH) inspections to extend the service life limits of F/A-18A-D aircraft from 8,000 to 8,600 flight hours. Analysis revealed that extensive areas of the legacy F/A-18 airframe require Service Life Extension Program (SLEP) inspections and modifications in order to reach the service life goals of 10,000 hours. The F/A-18A-D SLEP engineering development program will complete in 2012. Together these efforts can extend the F/A-18 A-D service life and reduce the impact of the Strike Fighter Shortfall.

The 146 USMC AV-8B aircraft (in seven squadrons) currently are not challenged by FLE as are the DoN's F/A-18 aircraft. However, continued investment in engine sustainment, in avionics and in managing airframe component obsolescence are critical to ensuring these aircraft remain viable contributors to the TACAIR transition. Continued investment in Program Related Engineering (PRE)/Program Related Logistics (PRL) in the Operations and Maintenance, Navy (OMN) is critical for sustaining the combat relevancy of the DoN's legacy platforms through the TACAIR transition.

The DoN long term Shortfall reduction strategies will be addressed in the Fiscal Year 2012 President's Budget development. Currently, items under review are the F/A-18A-D SLEP and opportunities for optimizing depot turn around times. We will continue to explore other mitigation alternatives. Applying the mitigation levers available to us and considering long term strategies such as SLEP, the DoN believes the Strike Fighter Shortfall is manageable.

Airborne Electronic Attack (AEA) / EA-18G Growler

The Fiscal Year 2011 President's Budget request is $22.0 million in RDT&E,N for correction of deficiencies and $1.0 billion in APN for 12 full rate production (FRP) EA-18G aircraft. The program completed operational evaluation in May 2009. The Fleet Replacement Squadron (FRS) has achieved Ready for Training (RFT) and the first deployable EA-18G squadron achieved Safe for Flight in September 2009. Initial Operating Capability (IOC) was achieved in September 2009 and a favorable FRP decision was obtained in November 2009.

The EA-18G began replacing carrier-based Navy EA-6B aircraft in 2009 and is currently programmed to continue these transitions through 2014. A total of 34 aircraft have been procured to date. As directed by the Quadrennial Defense Review (QDR), the Navy will procure an additional 26 EA-18G aircraft across the FYDP to increase joint force capacity to conduct expeditionary electronic attack, increasing the program of record to 114. These additional aircraft will be utilized to fill the Navy's four expeditionary electronic attack squadrons currently using the legacy EA-6B Prowler.

The Navy is completing an Analysis of Alternatives (AoA) to determine the best path forward for the Next Generation Jammer (NGJ). The NGJ will replace the ALQ-99 pods currently flown on the EA-18G and EA-6Bs and will provide the Office of the Secretary of Defense (OSD) and the Services an opportunity to introduce a comprehensive electronic attack capability to the EA-18G as well as all variants of the F-35 JSF.

Airborne Electronic Attack (AEA) / EA-6B Prowler

The Fiscal Year 2011 President's Budget request includes $24.3 million in RDT&E,N for electronic warfare counter response, $33.8 million in APN for common AEA systems and $29.9 million in APN for all EA-6B series aircraft. Currently there are 92 EA-6Bs in the DoN to support 61 operational aircraft in 14 active component squadrons and one reserve component squadron. This includes 76 Navy and Marine Corps ICAP II aircraft and 16 Navy Improved Capability (ICAP) III aircraft. The replacement of Navy EA-6B aircraft with EA-18G was expected to be completed in 2012; however, the Navy now plans to complete its EA-6B program of record in 2014.

The Marine Corps currently has 20 operational EA-6B ICAP II aircraft in four VMAQ squadrons. Overseas Contingency Operations (OCO) funds were used to purchase 16 ICAP III modification kits and installations. The transition to the ICAP III aircraft began in March 2010 and is planned to complete in 2013. As the Navy transitions ICAP III squadrons to EA-18G, those aircraft will be transferred to the Marine Corps. Once the transition is complete, the

Marine Corps will have 32 ICAP III to support its EA-6B program of record through 2019. Aircrew training for the DoN will be conducted at VAQ-129 through 2014. Once the Navy has completed its transition from the EA-6B, the Marine Corps may be required to establish a Fleet Replenishment Squadron (FRS) to support its program of record.

Marine Prowlers have been employing the LITENING targeting pod in expeditionary operations including OEF. When combined with data link hardware, the LITENING pod provides real-time video to ground forces through ROVER workstations. Additionally, the Collaborative On-line Reconnaissance Provider/Operationally Responsive Attack Link (CORP/ORAL) Joint Combat Technology Demonstration (JCTD) is demonstrating the concept of networked, on-demand Intelligence, Surveillance and Reconnaissance (ISR) and electronic warfare from manned and unmanned platforms utilizing the link capabilities in LITENING pods.

E-2D Advanced Hawkeye (AHE)

The E-2D AHE replaces the current E-2C Hawkeye aircraft. E-2D will be a critical enabler of transformational ISR capability and one of the pillars of theater air and missile defense. Its radar will provide enhanced detection and surveillance capability in overland, littoral and open ocean environments.

The Fiscal Year 2011 President's Budget requests $171.1 million in RDT&E,N for continuation of SDD and $937.8 million in APN for four LRIP III aircraft and advanced procurement for Fiscal Year 2012 LRIP IV aircraft.

A Milestone C decision was achieved in the third quarter of 2009 and a contract awarded for two LRIP I aircraft. In Fiscal Year 2010 Congress appropriated $742.1 million APN for three LRIP II aircraft and advanced procurement for Fiscal Year 2011 LRIP III aircraft.

T-6B Joint Primary Aircraft Training System (JPATS)

The T-6 is the primary flight training aircraft for Navy and Marine Corps pilots and Naval Flight Officers(NFO), replacing the T-34C. The current requirement is for 315 aircraft, of which 161 aircraft have been procured and 60 aircraft delivered to date. Of those 60 aircraft, six are the newer T-6B aircraft which is the upgraded avionics variant of the T-6A. The Fiscal Year 2011 President's Budget request includes $266.1 million to procure 38 aircraft under a USAF contract. The JPATS program delivered the first two T-6B aircraft to the Navy in August 2009. The program is on track for T-6B IOC in April 2010 at NAS Whiting Field, FL. Funding requested in the President's Budget will also support the critical sustainment of the TH-57, the training helicopter for Navy and Marine Corps helicopter pilots, and of the T-45, the Navy's training jet for future jet pilots and Naval Flight Officers.

ATTACK/SURVEILLANCE AIRCRAFT

P-8A Poseidon

The future of the Navy's maritime patrol force includes plans for sustainment, modernization, and re-capitalization of the force. The P-8A Poseidon is the replacement aircraft for the P-3C Orion. The Fiscal Year 2011 President's Budget requests $929.2 million in RDT&E, N for development and $1.991 billion in APN for procurement of seven P-8 Poseidon aircraft. Fiscal Year 2011 development funding will support the continued development of the P-8A and associated testing. Fiscal Year 2011 funds support the procurement of the seven LRIP P-8A aircraft which are scheduled to begin delivery in January 2013 and advanced procurement for the subsequent LRIP. The program is on track for IOC in late 2013 when the first squadron will have transitioned and be ready to deploy forward in support of the combatant commander. The P-8A program is meeting all cost, schedule and performance parameters in accordance with the Acquisition Program Baseline (APB).

The program completed the Interim Program Review in April 2009 and awarded the Advanced Acquisition Contract for LRIP advanced procurement. The first five test articles (three flight test aircraft and two ground test articles) are on schedule for delivery. Boeing has completed fabricating the first five of eight test aircraft. The remaining three flight test aircraft will commence fabrication this year. The first test flight using T-1, the airworthiness test aircraft, occurred on October 15, 2009, in Seattle, WA. After an initial period of flight testing T-1 completed its last phase of Installation and Check-out for the aircraft instrumentation system. The program is currently undergoing ground testing in preparation for resuming flight tests in March 2010.

P-3C Orion

In Fiscal Year 2011, $228.0 million is requested to sustain the P-3C until transition to the P-8A Multi-mission Maritime Aircraft. More than half of this amount ($153.5 million) is for wing modifications, which will allow airframe sustainment to support the CNO's P-3 Fleet Response Plan, as well as supporting EP-3E requirements, which are executed within the P-3 Airframe Sustainment Program. The P-3 is being sustained to keep the aircraft a viable warfighter until it is replaced by P-8. Results of the P-3 Service Life Assessment Program (SLAP) revealed the need for an aggressive approach to P-3 airframe sustainment. The aircraft is well beyond planned fatigue life of 7,500 hours for critical components, with an average airframe usage of 16,000 hours.

In December 2007, ongoing refinement of the model used to calculate wing stress indicated that the lower aft wing surface (Zone 5) of the P-3 aircraft had fatigue beyond standards for acceptable risk resulting in the grounding of 39 P-3 aircraft. As of January 15, 2010 a total of 49 aircraft have been grounded for Zone 5 fatigue. As of March 5, there had been 14 Zone-5 modifications completed and the aircraft returned to the fleet; there were 32 Zone-5 aircraft in work. Current mission aircraft availability is 65. Key elements of the sustainment approach are strict management of requirements and flight hour use, special structural inspections to keep the aircraft safely flying, and increased use of simulators to satisfy training requirements. In Fiscal

Year 2011, a systems sustainment and modernization budget of $74.5 million is requested to continue to address a multitude of mission essential efforts to replace obsolete components, integrate open architecture technology, and leverage commonality.

The Navy will continue to closely manage the service life of the P-3C as the Maritime Patrol Reconnaissance Aviation forces transition to the P-8A Poseidon. Until force levels recover, allocations of aircraft must be balanced to meet mission and minimum training while preserving remaining P-3 service life. Currently, P-3Cs are meeting Combatant Commander allocations for deployed aircraft.

EP-3 Aries Replacement/Sustainment

The EP-3E continues to be a high demand ISR asset in current OCO. In Fiscal Year 2011, the President's Budget request is $90.3 million in APN to address EP-3E Signals Intelligence (SIGINT) and communications obsolescence. This APN request supports the LRIP buy for communications intelligence (COMINT) modifications necessary to pace the evolving threat. The EP-3E program continues to modify aircraft with multi-intelligence capability to meet emergent classified requirements. Modifications are necessary to keep the platform viable until the replacement platform can be fielded.

Navy removed funding for EP-X in PR-11 and terminated the program, based on the high cost in the Program Objective Memorandum (POM) Fiscal Year 2010 acquisition strategy. Navy and OSD realize the critical capability gaps that exist with legacy systems/sensors, which led to OSD direction to conduct an Analysis of Alternatives (AoA) for this future airborne ISR capability. AoA results are due in April 2010 in order to inform POM-12 decisions on how this necessary and comprehensive ISR capability can be met using either a single material solution or multiple solutions (system of systems). Navy will develop an achievable acquisition strategy to procure known and affordable technology to satisfy future requirements.

As stated in the Administration's proposed FY11 budget, "Once the Department completes its review, the most efficient and cost effective program for replacing the current surveillance aircraft, the EP-3, can be selected." In the interim, Navy will continue to replace obsolete equipment with mission-critical sensor improvements on board the EP-3 to support US and coalition forces currently engaged in OCO. As a result, the current EP-3 fleet will be capable of performing its mission beyond 2020 while the replacement capability is developed and fielded.

MH-60R and MH-60S

The Fiscal Year 2011 President's Budget requests $1.059 billion for 24 MH-60R aircraft including advanced procurement for 24 Fiscal Year 2012 aircraft, and $55.8 million in RDT&E, N for continued replacement of the Light Airborne Multi-Purpose System (LAMPS) MK III SH-60B and carrier-based SH-60F helicopters with the MH-60R. The $55.8 million is to continue development of the Ku-band data link, automatic radar periscope detection and discrimination (ARPDD) program, which is a fleet-driven capability upgrade to the APS-147 Radar, and Mode V interrogation capability in its identification friend-or-foe (IFF) system. The MH-60R is used in both anti-submarine warfare (ASW) with its dipping sonar, sonobuoys and torpedoes and in the surface warfare (SUW) role with its electronics surveillance measures system, multimode radar with inverse synthetic aperture radar (ISAR), FLIR system and Hellfire missiles. It has demonstrated three to seven times the capability in the ASW role and significant increases in its SUW capability over legacy systems. The MH-60R program is post-milestone III, having received approval for FRP in 2006. The first operational squadron, HSM-71, returned from a successful deployment in Carrier Strike Group aboard the USS JOHN C STENNIS (CVN 74) in July 2009. There are currently three operational Carrier Air Wing Squadrons and two fleet replacement squadrons operating the MH-60R. Two additional operational squadrons will transition or standup by the end of Fiscal Year 2011.

The Fiscal Year 2011 President's Budget requests $548.7 million in APN for 18 MH-60S aircraft including advanced procurement for 18 Fiscal Year 2012 aircraft and $38.9 million in RDT&E, N funds for the MH-60S to continue development of the Organic Airborne Mine Countermeasures (OAMCM) (Block II) and the Armed Helicopter (Block III) missions. The MH-60S is the Navy's primary combat support helicopter designed to support Carrier and Expeditionary Strike Groups. It will replace four legacy platforms with one H-60 variant. The basic MH-60S reached IOC and FRP in 2002. Armed helicopter configuration reached IOC in June 2007 and OAMCM is scheduled to reach IOC in Fiscal Year 2011. HSC-8 completed its first carrier deployment with Carrier Strike Group aboard the USS JOHN C STENNIS (CVN 74) from January to July 2009. HSC-9 operated eight helicopters, including six aircraft in the armed helicopter configuration which includes the Multi-spectral Targeting System (MTS) FLIR, Link-16, self defense equipment, two 50 caliber crew-served weapons and eight Hellfire missiles.

The Army and Navy are executing a joint platform multiyear contract that includes both the MH-60R and MH-60S airframes along with the Army's UH-60M. The Navy is also executing a multiyear contract for integration of mission systems into the MH-60R.

LIGHT ATTACK AND UTILITY AIRCRAFT

UH-1Y Venom/AH-1Z Viper

The H-1 Upgrades Program is replacing the Marine Corps' UH-1N and AH-1W helicopters with state-of-the-art UH-1Y and AH-1Z aircraft. The legacy aircraft have proven enormously effective over decades of heavy use, and as these aircraft reach the end of their service lives we look forward to expanding utility and attack helicopter capabilities. The new Yankee and Zulu aircraft are fielded with integrated glass cockpits, world-class sensors and advanced helmet-mounted sight and display systems. The future growth plan includes a digitally-aided Close Air Support (CAS) system designed to tie these airframes, their sensors and their weapons systems together with ground combat forces and fixed-wing aircraft. Low-cost weapons systems currently in development, such as the Advanced Precision Kill Weapon System II (APKWS II), will provide lethality while reducing collateral damage.

The Fiscal Year 2011 Budget requests $60 million in RDT&E, N for continued product improvements and $827 million in APN for 31 H-1 Upgrades aircraft (18 UH-1Y, 10 baseline AH-1Z and three AH-1Z OCO aircraft). The program is a key modernization effort designed to resolve existing safety deficiencies, enhance operational effectiveness, and extend the service life of both aircraft. Additionally, the 84 percent commonality between the AH-1Z and UH-1Y will significantly reduce lifecycle costs and logistical footprint, while increasing the maintainability and deployability of both aircraft. The program will provide the Marine Corps with 123 UH-1Y and 226 AH-1Z helicopter models through a combination of remanufacturing and new production. This represents an increase of 69 aircraft above the previous inventory objective of 280 aircraft. The revised objective was driven by the need to increase our active-duty Marine Light Attack Helicopter squadrons (HMLAs) from six to nine as part of the Marine Corps' directed increase in force structure and manning. This increase in active-duty HMLA squadrons started in Fiscal Year 2009 and will conclude with the stand-up of HMLA-567 in Fiscal Year 2011.

The UH-1Y Venom aircraft achieved IOC in August 2008 and FRP in September 2008. The UH-1Y program was given priority status in order to replace the under-powered UH-1N fleet as quickly as possible. AH-1Z testing and LRIP continues, with an operational evaluation (OT-II3C) starting later this month. The AH-1Z Viper's FRP decision is scheduled for the first quarter of Fiscal Year 2011. 58 AH-1Zs will be built new to support the increased inventory objective, which exceeds the quantity of existing AH-1W airframes available for remanufacture. As of March 2, 2010, a total of 33 aircraft (25 UH-1Ys and eight AH-1Zs) have been delivered to the Fleet Marine Force, and an additional 36 aircraft are on contract and in production. To date, all Fiscal Year 2009 and 2010 aircraft deliveries have been 30 days or more ahead of contract date and the program has not shown any significant impacts from the summer 2009 labor strike at Bell Helicopter.

In 2009, the Marine Corps successfully executed the first UH-1Y shipboard deployment, with three UH-1Ys deployed with the 13th MEU. During this deployment, those three aircraft flew over 600 flight hours and posted mission capable rates in excess of 76 percent, while supporting a variety of maritime special-purpose force missions to include the rescue of Captain Phillips of the Maersk Alabama from the Somali pirates.

The second UH-1Y deployment, with nine of these aircraft deployed into combat in Afghanistan, began in November 2009. In the first three months of that second deployment, HMLA-367 posted UH-1Y mission capable rates in excess of 77 percent while flying an average of 40 flight hours per aircraft per month. This is more than twice the planned utilization rate of 18.9 hours per aircraft per month. In just three months those aircraft lifted over 800 passengers and 15,000 pounds of cargo and responded to more than 650 calls from ground forces for assault support and offensive air support. The crews flying these new aircraft have not missed a single assigned launch to date and played a critical role in providing troop and cargo transport, command and control, aerial and armed reconnaissance, armed escort, and close air support during Operation COBRA'S ANGER in the Now Zad valley of Helmand Province.

ASSAULT SUPPORT AIRCRAFT

CH-46E Sea Knight

The FY 2011 Budget requests $17.7 million for CH-46 sustainment targeted at replacing worn equipment and aircraft components that will ensure the health and viability of the airframe as we progress through the transition to the MV-22B Osprey. Our medium lift evolution to the MV-22B is progressing on schedule, with 50 percent of our medium lift fleet having begun or successfully completed the transition. The CH-46E continues to perform well and is prepared to maintain operational relevance through its projected retirement in 2018.

V-22B Osprey

The Fiscal Year 2011 President's Budget request includes $2.7 billion for procurement of 35 V-22s and for continued development of follow-on block upgrades. Fiscal Year 2011 is the fourth year of the V-22 multiyear procurement contract. Our multiyear procurement strategy supports a continued cost reduction and affordability trend, provides a stable basis for industry, and best supports the needs of the warfighter. The Fiscal Year 2011 appropriations will fully fund Lot 15 and procure long-lead items for Lot 16 under the V-22 multiyear contract. Over the past 12 months, Bell-Boeing has continued to consistently perform better than required on production contracts, delivering aircraft on or ahead of schedule. The USMC continues to field and transition aircraft on time.

The MV-22B Osprey is now combat tested and forward deployed supporting combat operations and responding to contingencies around the world. As our premier medium lift assault support platform, the Osprey brings unprecedented range, speed and survivability to the warfighter, in a platform that far exceeds the capabilities of the CH-46E it is replacing. The MV-22B has been continuously supporting our Marines, in combat and in contingencies, since October 2007. During three consecutive squadron deployments in support of Operation IRAQI FREEDOM (OIF) (FY08-09) Osprey squadrons logged over 9,000 flight hours, carried over 40,000 passengers, and lifted over two million pounds of cargo while flying every mission profile assigned by the Multi-National Force-West Commander. The MV-22B also completed its first shipboard deployment as part of a Marine Expeditionary Unit (MEU) last November, capping its six-month deployment by flying 510 nautical miles from USS BATAAN (LHD-5) to Camp Bastion, Afghanistan. The shipboard squadron conducted a relief in place with another squadron to begin support of OEF.

The Osprey continues to redefine the speed and range at which the MAGTF commander can influence his operational area. The second MV-22B shipboard deployment is currently underway supporting humanitarian relief efforts in Haiti and follow-on presence in the U.S. Central Command area of operations. The CV-22 program has conducted multiple SOCOM deployments, including a successful trans-Atlantic operational deployment in support of operations in Africa and at locations in CENTCOM.

As we continue to explore the tremendous capabilities of tilt-rotor aircraft, we are learning valuable lessons with respect to readiness and operating costs. As of December 2009, the V-22 had exceeded 70,000 total flight hours. More flight hours have been flown on this aircraft in the last two years than in the previous 18 years combined. Like other types of aircraft in the early operational phase of their lifecycles, the MV-22 has experienced lower-than-desired reliability of some components and therefore higher operations and support costs. Despite our readiness challenges, the MV-22 squadron in Afghanistan continues to meet mission tasking through hard work and aggressive sparing. We are meeting mission, but only at supply, maintenance, and operating costs that are inconsistent with our expeditionary nature and cost conscious culture.

Fleet wide, our Block B combat deployable aircraft averaged approximately 60 percent mission capable (MC) in Continental United States (CONUS) for 2009. With focused logistical support provided to our deployed aircraft, however, we average nearly seven of ten aircraft available on a daily basis in Afghanistan. This compares favorably with the 71.6 percent availability over 18 months of operations in Iraq, and 71.0 percent availability for aircraft in the 22nd MEU. With the cooperation and support of our industry partners, we are tackling these issues head on, with aggressive logistics and support plans that will increase the durability and availability of the parts needed to raise reliability and concurrently lower operating costs of this aircraft.

V-22 capability is being increased and fielded over time via a block upgrade acquisition strategy. MV-22B Block A aircraft are now used predominantly in training squadrons. 61 MV-22B Block B aircraft have been fielded with our operational squadrons and more will continue to be delivered under the current MYP. MV-22B Block C aircraft will provide additional mission enhancements, primarily in the areas of environmental control systems upgrades, weather radar, and mission systems improvements. The targeted delivery for Block C aircraft is Lot 14, in Fiscal Year 2012.

CH-53K Heavy Lift Replacement Program

In Fiscal Year 2011 the President's Budget requests $577 million RDT&E,N to continue SDD of the CH-53K. In the past year, the CH-53K program closed out its Preliminary Design Review (PDR), has begun producing long-lead items in preparation for building test articles under the SDD contract, and is scheduled to conduct Critical Design Review (CDR) in July 2010. In Fiscal Year 2011, the program transitions to assembly of the static and fatigue test articles and of the Ground Test Vehicle and continues developmental test activities.

During FY 2009, the program encountered a schedule delay (and associated growth to program cost due to the delay), driven primarily by an overly aggressive initial program schedule. It is important to note that these delays were not driven by technical issues, and the program remains on a sound technical footing as it enters CDR later this year. Additionally, the program has corrected the planning issues that caused those delays and is now maintaining cost and schedule performance. This program is not in danger of breaching Nunn-McCurdy thresholds. The requested funds will permit an orderly restructuring of the program leading to IOC in FY 2018.

The new build CH-53K will replace the current legacy fleet of CH-53D and CH-53E helicopters with an aircraft that provides the performance necessary to support our future warfighting requirements. The CH-53D Sea Stallion and CH-53E Super Stallion provide unparalleled combat heavy lift to the MAGTF and are among the Marine Corps most-stressed aviation communities. CH-53s, providing vital lift of heavy equipment, supplies and troops, are currently deployed in Afghanistan, the Horn of Africa and Haiti, and are flying with MEU. Since ramping up operations in Afghanistan in May 2009, these aircraft have flown nearly 11,000 hours, carried more than 62,000 passengers, and moved over 10 million pounds of cargo in support of coalition forces in Afghanistan and the Horn of Africa, while flying well above their programmed rates in austere, expeditionary conditions.

To keep these platforms viable until the CH-53K enters service, the Fiscal Year 2011 Budget requests $62.1 million for both near and mid-term enhancements, including the Force XXI Battle Command Brigade and Below, Integrated Mechanical Diagnostic System, T-64 Engine Reliability Improvement Program kits and Directed Infrared Countermeasures. While these aircraft are achieving unprecedented operational milestones, they are nearing the end of their service life; the CH-53E is approaching 30 years of service and the CH-53D has been operational for almost 40 years.

Ultimately, these aircraft will be incapable of supporting the Marine Corps' future warfighting concepts and will be replaced by the CH-53K. The new-build CH-53K will fulfill land and sea based heavy-lift requirements not resident in any of today's platforms, and contribute directly to the increased agility, lethality, and presence of joint task forces and MAGTF. The CH-53K will transport 27,000 pounds of external cargo out to a range of 110 nautical miles, nearly tripling the CH-53E's lift capability under similar environmental conditions while fitting under the same shipboard footprint. The CH-53K will also provide unparalleled lift capability under high altitude, hot weather conditions similar to those found in Afghanistan, thereby greatly expanding the commander's operational reach.

Maintainability and reliability enhancements of the CH-53K will decrease recurring operating costs significantly, and will improve aircraft efficiency and operational effectiveness over the current CH-53E. Additionally, survivability and force protection enhancements will increase protection dramatically, for both aircrew and passengers, thereby broadening the depth and breadth of heavy lift operational support to the Joint Task Force (JTF) and MAGTF commander. Expeditionary heavy-lift capabilities will continue to be critical to successful land- and sea-based operations in future anti-access, area-denial environments, enabling seabasing and the joint operating concepts of force application and focused logistics.

EXECUTIVE SUPPORT AIRCRAFT

VH-71 / VXX Presidential Helicopter Replacement Aircraft

The Fiscal Year 2011 President's Budget includes $94.7 million for the settlement of the VH-71 termination, and $65.1 million for continuing efforts on VXX, the follow-on program for presidential helicopters.

Receipt of the VH-71 termination proposal is anticipated late in Fiscal Year 2010 with negotiations and the anticipated settlement expected in Fiscal Year 2011. The Navy is currently working closely with DCMA in a complex effort to disposition all the assets acquired as part of the VH-71 Program cancellation. The majority of VH-71 specific tooling has been sold back to

Agusta-Westland in Europe. The process to disposition non-aviation related assets is well underway in the United States, and is beginning in Europe. The Navy has begun preliminary negotiations with various operators of the EH-101 and other Federal entities concerning disposition of VH-71 aircraft and parts.

VXX activity will include continuing effort that began in Fiscal Year 2010, specifically the Analysis of Alternatives (AoA), capability based assessments, CONOPS development, trade study analysis, specification development, system concept development and threat analysis leading to a successful Milestone A decision. Following Milestone A and beginning the Technology Development Phase, remaining Fiscal Year 2011 activities will focus on the proposed material solutions, specifically, reducing technology risk by determining and maturing the appropriate set of technologies and demonstrating technology on prototypes.

The VXX AoA will address all feasible options with a holistic assessment of requirements, capabilities, cost drivers, schedule implications, and risks. The requirement for a replacement Presidential Helicopter was validated by the Joint Requirements Oversight Council; however, the details and specifications on how the requirement will be safely and affordably met have not been finalized. As a first step in the process to determine how best to satisfy the need to transport the President, data will be analyzed and matured by the government study team into executable alternatives. This AoA process is underway and will support the development of an acquisition strategy, at which time cost/capability trades will be made.

VH-3D/VH-60N Executive Helicopters Series

The Fiscal Year 2011 Budget requests an investment of $43.4 million to continue programs that will ensure the aging legacy Presidential fleet remains viable until its replacement is fielded. Ongoing efforts include the Cockpit Upgrade Program (CUP) for the VH-60N and Communications Suite Upgrade (CSU), Structural Enhancement Program (SEP), and Obsolescence Management Program (OMP) for both the VH-3D and VH-60N. Current service life extension analyses for both VH-3 and VH-60 fleets are underway with results expected in early FY 2011. The Trainer Conversion Program will start in Fiscal Year 2011 and will reduce training usage significantly on our VH-3D and VH-60N national assets. Future investments in the legacy fleet will be required to ensure continued safe and reliable executive transportation until the replacement aircraft is fielded.

WEAPONS

Joint Standoff Weapon (JSOW)

The Fiscal Year 2011 President's Budget requests $12.6 million for continued JSOW-C-1 developmental activity and $131.1 million for production for 333 All-Up Rounds. While these much needed procurements will help meet the fleet's weapons loadout requirements, JSOW continues to remain below approved non-nuclear ordnance requirements. Development of the JSOW-C-1 variant adds a moving maritime target capability to the highly successful baseline JSOW-C, and adds a data link and guidance software improvements. The combat-proven JSOW family of weapons procurement continues on cost and schedule.

Small Diameter Bomb II (SDB II)

The Fiscal Year 2011 President's Budget requests $44.1 million of RDT&E for the continued development of this joint DoN/Department of the Air Force program. SDB II provides an adverse weather, day or night standoff capability against mobile, moving, and fixed targets, and enables target prosecution while minimizing collateral damage. SDB II is of special interest to the DoN, as it will be integrated into the internal carriage of both the Navy (F-35C) and Marine Corps (F-35B) variants of the JSF. SDB II acquisition consists of a competitive development risk reduction phase between two industry teams, with a down-select at Milestone B planned for the second quarter Fiscal Year 2010.

Direct Attack Moving Target Capability (DAMTC)

The Fiscal Year 2011 President's Budget requests $21.7 million for the completion of production acceptance testing and an initial order of 700 weapons. DAMTC was originally initiated as a Fiscal Year 2007 Rapid Deployment Capability in response to an urgent requirement identified by the combatant commander overseeing operations in Iraq and Afghanistan. DAMTC improves the warfighter's ability to attack and strike moving targets by leveraging highly successful dual-mode systems.

Advanced Anti-Radiation Guided Missile (AARGM)

The Fiscal Year 2011 President's Budget requests $7.8 million for the follow-on development and test program and $54 million for production. The AARGM development program transforms the legacy High-speed Anti-Radiation Missile (HARM) into an affordable, lethal, and flexible time-sensitive strike weapon system. AARGM adds multi-spectral targeting capability with supersonic fly-out to destroy sophisticated enemy air defenses and expand upon the traditional anti-radiation missile target set. The program began its formal test program in Fiscal Year 2007 and was approved for LRIP in Fiscal Year 2008. Independent operational test and evaluation (IOT&E) is scheduled to begin in the third quarter of Fiscal Year 2010, with IOC on the F/A-18C Hornet in 2011.

Advanced Precision Kill Weapon System II (APKWS II)

The Fiscal Year 2011 President's Budget requests $8.8 million of PAN,MC for procurement of 600 APKWS II Precision Guidance Kits. The DoN assumed program authority for the APKWS II on September 30, 2008. Congress appropriated funding and approved a DoN above-threshold reprogramming (ATR) request in Fiscal Year 2008 to complete APKWS II SDD. Integrated test completed in January 2010. Milestone-C is scheduled for the end of second quarter Fiscal Year 2010. IOC is planned for the second quarter of Fiscal Year 2011. APKWS II will provide an unprecedented precision guidance capability to our current unguided (and thus less accurate) rockets, improving accuracy and minimizing collateral damage. The program is on schedule and on budget to meet the needs of our warfighters in today's theaters of operations.

Joint Air-to-Ground Missile (JAGM)

The Fiscal Year 2011 President's Budget requests $100.8 million of RDT&E to support the continued development of this critical weapons program. JAGM will become the next-generation precision-guided missile launched from Navy and Marine Corps fixed-wing, rotary-wing, and unmanned platforms. The DoN, in conjunction with the United States Army (Executive Service), received formal approval to proceed with the development of the JAGM in January 2008. JAGM is the first weapons program to be developed under the new competition and prototyping strategy, intended to improve program success rates and reduce costs. In September 2008, fixed price incentive contracts were awarded to two industry teams. During a 27-month technology development phase, these two competing contractors will carry their design through a system-level preliminary design review phase and will conduct ground launches of their prototype missiles.

Hellfire Weapon System

The Fiscal Year 2011 President's Budget requests $109.5 million, including $66.0 million of OCO funding, for 1,219 Hellfire all-up-round weapons. Hellfire procurements are a mix of thermobaric, blast/fragmentation, and anti-armor warheads, to provide maximum operational flexibility to our warfighters. This procurement quantity will bring the inventory total to approximately 50 percent of the requirement, and will increase our training assets. While the DoN develops the JAGM, we request continued support for legacy Hellfire weapons. Hellfire continues to be a priority weapon for current military operations as it enables our warfighters to attack targets in the caves of Afghanistan as well as to prosecute military operations in urban environments.

Sidewinder Air-to-Air Missile (AIM-9X)

The Fiscal Year 2011 President's Budget requests $0.9 million for RDT&E efforts and $55.2 million for production of a combined 155 all-up-rounds and captive air training missiles and missile-related hardware. The joint Navy/Air Force AIM-9X Sidewinder missile is the newest in the Sidewinder family. The Sidewinder is the only short-range infrared air-to-air missile integrated on USN/USAF strike-fighter aircraft. This fifth-generation weapon incorporates high off-boresight acquisition capability and increased seeker sensitivity through an imaging infrared focal plane array seeker with advanced guidance processing. It also uses an advanced thrust vectoring capability to achieve superior maneuverability and to increase probability of intercept of adversary aircraft.

Advanced Medium-Range Air-to-Air Missile (AMRAAM) (AIM-120)

The Fiscal Year 2011 President's Budget requests $2.6 million for continuing RDT&E efforts and $155.6 million for production of 101 all-up-rounds and captive air training missiles with associated missile-related hardware. AMRAAM is a joint Navy/Air Force missile that counters existing aircraft and cruise missile threats. It uses advanced electronic attack capabilities at both high and low altitudes, and can engage from beyond visual range as well as within visual range. AMRAAM provides an air-to-air first look, first shot, first kill capability, while working within a networked environment in support of the Navy's Theater Air and Missile Defense Mission Area.

Tactical Tomahawk BLK IV Cruise Missile

The Fiscal Year 2011 President's Budget requests $300.2 million for an additional 196 BLK IV weapons and associated support. The Navy supports strongly the continued procurement of this combat-proven, deep-attack weapon in order to meet ship-fill loadouts and combat requirements.

Theater Mission Planning Center (TMPC)

The Fiscal Year 2011 President's Budget requests $10.6 million RDT&E and $88.7 million OPN for continued TMPC development and support. The TMPC is the mission planning segment of the Tomahawk Weapon System. TMPC develops and distributes missions for the Tomahawk Missile; provides strike planning, execution, coordination, control and reporting; and enables Maritime Component Commanders the capability to plan or to modify conventional Tomahawk Land-Attack Missile (TLAM) missions. Under the umbrella of the Tomahawk Command and Control System (TC2S), TMPC has evolved into five scalable configurations deployed at 125 sites, to include, Cruise Missile Support Activities; Tomahawk Strike Mission Planning Cells; Carrier Strike Groups, Command and Control Nodes and Labs/ Training Classrooms. TC2S Version 4.2 was released in March 2009 and has aligned Navy Tomahawk Strike and Mission Planning with existing decision-maker operational processes and support tools. Fiscal Year 2011 resources will continue the development of TC2S Versions 4.3 and 5.0 to improve joint interoperability and system usability.

UNMANNED AVIATION

RQ-4 Broad Area Maritime Surveillance (BAMS) UAS

The Fiscal Year 2011 President's Budget requests $529.3 million RDT&E,N to continue SDD of the BAMS UAS and $42.2 million MILCON to begin construction of Test and Evaluation facilities at NAS Patuxent River. The Milestone B decision for the BAMS UAS program was achieved on April 18, 2008. The program is on schedule and conducted the Systems Requirement Review (SRR) in January 2009, SFR in June 2009, Integrated Baseline Review in July 2009, and the Preliminary Design Review (PDR) in February 2010. The BAMS UAS program will meet the Navy requirement for a persistent ISR capability as well as providing a communication relay capability. The BAMS UAS is a larger Group-5 system which will be a force multiplier for the Fleet Commander, enhancing situational awareness of the battle-space and shortening the sensor-to-shooter kill chain. BAMS UAS will work as an adjunct to the new P-8A Multi-mission Aircraft (MMA) to provide a more affordable, effective and supportable maritime ISR option than current ISR aircraft provide. The Navy also procured two USAF Global Hawk (Block 10) UASs in Fiscal Year 2003, for demonstration purposes and to perform risk reduction activities for the BAMS UAS Program, known as the BAMS-Demonstrator (BAMS-D) program. One of the two BAMS-D UASs has been deployed to the CENTCOM theater of operations for over a year.

MQ-8 Vertical Takeoff and landing Unmanned Aerial Vehicle (VTUAV)

The Fiscal Year 2011 President's Budget requests $10.7 million RDT&E to continue development of the MQ-8, commonly referred to as the Fire Scout UAS and $51.0 million APN for the production of three Fire Scout MQ-8B aircraft and for initial spares. The MQ-8 Fire Scout is an autonomous vertical takeoff and landing tactical UAV (VTUAV) designed to operate from all air-capable ships, carry modular mission payloads, and operate using the Tactical Control System and Line-Of-Sight Tactical Common Data Link. The Fire Scout UAS is a medium-to-large sized Group 4 system that will provide day/night real time ISR and targeting as well as communication relay and battlefield management capabilities to support core Littoral Combat Ship (LCS) mission areas of Anti Submarine Warfare (ASW), Mine Interdiction Warfare (MIW) and Anti Surface Warfare (ASUW) for the Naval forces. The Fiscal Year 2011 RDT&E Budget request included funding to continue integrating a maritime search radar system that will significantly increase surveillance capability of the MQ-8B and support Littoral Combat System (LCS) developmental testing. While in developmental testing, the MQ-8B system is continuing a Military Utility Assessment on the USS MCINERNEY (FFG-8) in order to evolve fleet concepts for operation of the system. Deploying this system on the USS MCINERNEY has documented lessons learned that will provide valuable insight into continued development and will reduce LCS developmental and operational test risks. However, the program may not be able to complete all operational test objectives prior to the end of the USS MCINERNEY deployment. The Navy is investigating additional ship schedules to complete OPEVAL and conduct follow-on operational testing. The Fire Scout program will also continue to support integration and testing as a mission module on LCS. The Navy continues to cooperate with the Coast Guard for their ship-based UAS planning.

Unmanned Combat Air System (UCAS)

The Fiscal Year 2011 President's Budget requests $266.4 million RDT&E for the continuation of the Navy Unmanned Combat Aircraft System (NUCAS) efforts to research a large, Group 5, carrier-suitable, long range, low observable, penetrating, persistent, unmanned aircraft system capability to conduct ISR/strike missions in denied access environments. The NUCAS efforts consist of continuation of the UCAS carrier suitability demonstration (UCAS-D), acquisition planning and associated technology development. The UCAS-D effort will mature technologies associated with unmanned carrier-suitability, including launch, recovery, and carrier controlled airspace integration, to the technology readiness levels required for a potential follow-on acquisition program. The demonstration will include catapult launch and arrested landings aboard an aircraft carrier. Additionally, the program will demonstrate autonomous aerial refueling using the same unmanned systems from the carrier suitability demonstration. The demonstrations will be complete in Fiscal Year 2013, though we expect needing additional technology maturation. Northrop Grumman, prime contractor for the UCAS carrier suitability demonstration, is on track to achieve first flight in Fiscal Year 2010.

Small Tactical Unmanned Aircraft System (STUAS)

The Fiscal Year 2011 President's Budget requests $38.9 million in RDT&E ($12.7 million Navy, $26.2 million Marine Corps) and $35.3 million in procurement ($9.0 million APN and $26.3

million PMC) for the STUAS program that will address Marine Corps and Navy ISR capability shortfalls identified in the OCO and currently supported by service contracts. The Group 3 UAS will provide persistent, ship- and land-based ISR support for tactical level maneuver decisions and unit level force defense/force protection. The Milestone B decision to enter engineering and manufacturing development (EMD) is scheduled for the next quarter. STUAS is currently in source selection for a contract award to coincide with the Milestone B decision. An interim Commercial Off the Shelf (COTS) solution referred to as STUAS Lite, is budgeted in Fiscal Year 2011 with $5.4 million in RDT&E and $14.4 million in APN. Fiscal Year 2011 PMC is planned to procure STUAS systems as an early operational capability.

Marine Corps Tactical UAS (MCTUAS)

The Fiscal Year 2011 President's Budget requests $0.9 million RDT&E and $18.1 million in baseline APN, as well as $8 million in an OCO request for continued product improvement, upgrades, and retrofits. MCTUAS is the same system as the Army's RQ-7B Shadow UAS, and is a Group 3 system procured as an interim replacement for the RQ-2B Pioneer UAS until a suitable Group 4 UAS can be fielded in Fiscal Year 2016. The transition to the RQ-7B Shadow began in Fiscal Year 2007 and the Marine Corps procured its thirteenth and final system in Fiscal Year 2010. The Shadow UAS provides rapid fielding of a capability that meets urgent Marine Corps operational requirements and brings immediate interoperability and commonality between Army and Marine Corps unmanned aircraft units operating side-by-side in Afghanistan.

SUMMARY

Since 2001, the Navy and Marine Corps have been fighting shoulder to shoulder overseas, supporting an extremely high operational tempo in two theaters and in numerous contingencies while growing our force, introducing new aircraft and systems, and looking beyond the current fight to how we will shape the naval aviation structure of the future.

The Fiscal Year 2011 President's Budget reflects the Navy-Marine Corps team's solutions to the challenges we face together. The DoN's aviation programs balance sustaining fielded capabilities, as they are employed in the OCO and continued forward presence worldwide, and a substantive recapitalization effort that will deliver significantly better capabilities to the warfighter. The naval aviation team continues to work aggressively to identify efficiencies in the development, testing, procurement and sustainment of aviation platforms, components, and weapons systems in order to provide the proper tools to the fleet. USD/AT&L Dr. Carter recently testified that: "I support, as does the Secretary, the initiatives the Congress directed when it unanimously passed the Weapon Systems Acquisition Reform Act (WSARA) of 2009. Acquisition Reform is one of DoD's High Priority Performance Goals presented in the Analytic Perspectives volume of the President's Fiscal Year 2011 Budget. The Department is moving out to implement these initiatives." Our recapitalization and efficiency initiatives here are part of and consistent with WSARA implementation and DoD's Acquisition Reform goal.

We thank you again for the opportunity to testify today regarding the DoN's aviation procurement programs and look forward to your questions.

ADDENDUM: FOCUSED PROGRAMS AND TOPICS OF DISCUSSION REQUESTED FROM THE DEPARTMENT OF THE NAVY (DON) BY THE AIR AND LAND FORCES AND SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTES FOR MARCH 24, 2010 HEARING ON AVIATION PROGRAMS

1. A discussion of the validated 1,240 aircraft strike-fighter force structure DoN inventory requirement and the projected peak inventory shortfall of -263 aircraft in Fiscal Year 2017.

The 1,240 aircraft strike-fighter force is the projected DoN inventory needed to support the anticipated operational demand in the 2024 timeframe.

The estimated DoN inventory requirement of 820 aircraft supports 40 active duty Strike Fighter Squadrons (440 Strike Fighter Aircraft) and two reserve squadrons (20 aircraft). Additionally, the inventory will need to support aviator training, flight test, attrition reserve and the depot pipeline. The inventory projection is estimated based on historical averages and assumes 100 percent squadron entitlement (no productive ratio reductions) and does not account for potential future efficiencies gained from TACAIR Integration (TAI). Both services remain committed to TAI.

The Marine Corps TACAIR requirement to meet operational demands and commitments is 420 F-35B JSFs in 21 active and three reserve squadrons. Since 2001, this requirement has been consistently stated, documented and periodically verified for relevancy. A total of 282 aircraft will be assigned to operational squadrons, 60 aircraft for training use, six aircraft for test and evaluation, and the reminder for pipeline maintenance and attrition replacement. The inventory projection is based on detailed projected and historical operational analysis, optimization of the JSF multi-mission capabilities, complete legacy TACAIR replacement by the F-35B, and expected improvements in reliability, maintainability and survivability.

The latest Fiscal Year 2011 President's Budget DoN inventory shortfall is 177 aircraft toward the end of the decade. This can be reduced to about 100 aircraft by application of several mitigation options including some SLEP. Optimization of FRC throughput is being studied as an additional mitigation method. All options are on the table to manage the shortfall and projections will continue to evolve as analysis is updated.

2. A discussion of the DON's plan to reduce DON Unit Deployment Packages (UDPs) and Expeditionary squadrons from 12 to 10 primary mission assigned aircraft; accelerating the scheduled transitions of five Navy F/A-18C squadrons and transitioning two additional Navy F/A-18A/C squadrons into available F/A-18E/F aircraft utilizing designated F/A-18E/F attrition reserve aircraft; decreasing the Navy "productive ratio" for carrier aircraft wings from 90% resourced to 87% resourced; and, a discussion of the operational risk incurred by implementing the

aforementioned initiatives as it relates to meeting the National Military Strategy and Combatant Commander operational requirement.

The DoN remains committed to the JSF program. The timely delivery of the F-35B STOVL and F-35C carrier variant remains critical to our future strike fighter capacity. The DoN has the necessary tactical aircraft capacity in the near term to support our nation's strategic demands. However, ongoing assessments forecast a potential decrease in our strike fighter capacity during JSF transition, unless further mitigation measures are implemented. In addition to management initiatives currently in place, we plan on addressing this potential capacity decrease through additional aggressive and precise management strategies.

The Department's TACAIR Inventory management initiatives are targeted at preserving the service life of our existing legacy strike fighter aircraft (F/A-18A-D). The Navy will reduce the number of aircraft available in our squadrons during non-deployed phases to the minimum required. DoN expeditionary squadrons and those supporting the Unit Deployment Program (UDP) will be reduced from 12 aircraft to 10 aircraft per squadron on an as-required basis. The Navy is accelerating the transition of five legacy F/A-18C squadrons to F/A-18 E/F Super Hornets. The Navy will also transition two additional F/A-18C squadrons using F/A-18E/F attrition aircraft. The use of attrition aircraft expends the service life of the F/A-18E/F aircraft earlier than programmed. These measures reduce the operational demand on legacy F/A-18s, making more aircraft available for induction into life extension events. The DoN is also evaluating depot level efficiency to maximize throughput and return legacy strike fighter aircraft to the Fleet. Collectively, these measures will extend the service life of the legacy aircraft and make the projected shortfall manageable.

The management initiatives being implemented prudently balance operational risks and requirements today, while seeking to fulfill future projected capacity and capability requirements.

3. A discussion of the service life assessment program being conducted to evaluate the feasibility of extending the service life of the F/A-18E/F to 9,000 flight hours and a description of the funding currently contained in the fiscal year 2011-2015 future years defense plan for such program.

The F/A-18E/F Service Life Assessment Program (SLAP) is a three phased program which commenced in 2008 and will last through 2015. One of the F/A-18E/F SLAP goals is to define the necessary inspections and modifications required, if any, to achieve 9,000 flight hours. Other goals relate to increasing total landings, arrested landings and catapults beyond currently defined life limits. Phase A is currently underway and is developing methodologies to be used and assessing airframe, flight controls and subsystems. Phases B and C will continue those assessments along with landing gear and multiple fleet teardowns.

The F/A-18E/F SLAP is incorporating lessons learned from the F/A-18A-D analysis, which was started sooner in its life cycle than F/A-18A-D and encompasses the entire weapon system vice just the airframe was the case for the F/A-18A-D SLAP. The F/A-18E/F SLAP also has the advantage of having a 3rd lifetime test cycles completed on multiple test articles providing detailed information on high fatigue areas early in the program.

Furthermore, the SLMP philosophy has been applied to the F/A-18E/F fleet much sooner in its lifecycle than the F/A-18A-D, which will optimize FLE, flight hours and total landings so that they all converge at the same time, which should align aircraft service life with fleet requirements.

The Fiscal Year 2011 President's Budget includes a request for $97.2 million RDT&E (Fiscal Years 2011-2015) to support the F/A-18E/F SLAP study requirement.

4. An update on the three phases of legacy F/A-18A-D airframe, major subsystems and avionics service-life assessment and extension programs, and a discussions regarding the estimated costs, implementation risks and likelihood, schedule and depot capability in executing these programs.

The F/A-18 A-D SLAP is now complete and has revealed that extensions are possible with inspections and modifications. Based upon those results, SLEP planning has begun. The 3 phased SLEP is underway as follows:

SLEP Phase A is complete. It identified the critical safety of flight locations that needed immediate inspection and identified notional repair concepts to enable Rough Order of Magnitude (ROM) cost estimates.

SLEP Phase B is currently in work with Naval Air Systems Command (NAVAIR) and Boeing. It is categorizing parts by criticality, developing tracking algorithms to define recurring inspection intervals, conducting vertical tail failsafe solutions and upgrading analytical tools necessary for the NAVAIR and Boeing engineers to design repairs. It is currently 57 percent complete and is estimated to conclude in November 2010.

SLEP Phase C is in planning. It will finalize all work remaining from Phase B and develop modifications and any new inspections required. Estimated contract award date is late 2010.

The DoN is developing a Fiscal Year 2012 President's Budget request that will include SLEP requirements. The technical risk in developing modification kits to achieve the

10,000 flight hour goal is assessed as low. The current planning schedule has modifications beginning in 2012. Current assessments have determined that the Fleet Readiness Centers (FRC) have the capacity to execute the required number of HFH inspections and SLEP modifications. Material availability and engineering disposition turn around times influence depot efficiencies.

5. A discussion on the health of the F/A-18A-F, EA-18G and AV-8B fleets.

The F/A-18 fleet continues to meet operational needs in the current conflicts. DoN Hornets have consistently met full mission capable goals and operational commitments. NAVAIR uses a Health of Naval Aviation (HONA) database to store and track the actual utilization data of all the F/A-18s. Current data shows that for the F/A-18A-D aircraft the average age is 19.0 yrs. The average age of the F/A-18E/F is five years. The EA-18G has just recently achieved IOC.

The F/A-18A-Ds have flown approximately 70 percent of the total flight hours available at the 8,600 hour limit and approximately 60 percent of the fleet is over 6,000 flight hours with approximately 1.8 percent over 8,000 flight hours. SLEP of a portion of these aircraft will be required to meet operational commitments out to 2023.

The F/A-18 E/Fs have flown approximately 28 percent of the total flight hours available at the 6,000 hour limit and this will not be adequate to meet operational commitments out to 2035. The EA-18G have flown approximately 4 percent of the total flight hours available at the 7,500 hour limit and are currently able to meet commitments.

The AV-8B Fleet continues to meet its operational commitments with simultaneous support to three Marine Expeditionary Units (MEUs) and OEF. The Harrier does not measure airframe hours; the AV-8B tracks Fatique Life Expended (FLE). As of March 2010 the highest FLE aircraft is 46.2 percent of available expenditure, with a fleet-wide average of 26.3 percent expenditure.

6. A discussion regarding the recent F/A-18E/F and EA-18G programs of record modifications and an update regarding the on-going discussions with the aircraft manufacturer regarding Multi-Year Procurement contract certifications and negotiations.

In August 2009, the Department submitted a report to Congress stating that the Department believed the preferred option was to procure the remaining 89 F/A-18E/F and EA-18G aircraft through a single-year acquisition strategy. The Department also stated that if the requirement for the program of record for either the F/A-18E/F or EA-18G should change, the Department would re-evaluate the benefit of a multiyear procurement strategy.

On December 18, 2009 the Fiscal Year 2010 NDAA added nine additional F/A-18E/F aircraft to the Department's request as follows: 17 F/A-18E, one F/A-18F and 22 EA-18Gs.

On December 24, Resource Management Decision (RMD) 700 added 26 EA-18G aircraft in Fiscal Year 2012 and 2013 to the program of record (POR) for the Expeditionary Forces and shifted F/A-18E/F aircraft procurement to Fiscal Year 2013. These activities extended the production of the F/A-18E/F and EA-18G production line to 2013 and increased the total procurement to 124.

On February 26, 2010, the Secretary of Defense notified Congress of the Department's intent to explore the possibility of a multiyear acquisition strategy of the F/A-18 series aircraft for the Fiscal Years 2010-2013 procurements, citing Section 128 of the Fiscal Year 2010 NDAA and the Department of Defense Appropriations Act, 2010. The letter stated that due to the increase of budgeted aircraft from 89 to 124 and a viable offer recently received from the prime contractor, the Department needs additional time to evaluate the potential multiyear procurement. If a multiyear procurement is deemed to be worth pursuing, the Department will work with Congress to determine the best path forward.

Discussions continue with the prime manufacturer, Boeing, in regard to the F/A-18 multiyear. The Director, Cost Analysis and Program Evaluation (CAPE) is currently conducting a cost analysis, as required by Title 10, Section 2306b. The purpose of this cost analysis is to determine the actual savings that can be achieved by pursuing a multiyear over a single year contracting strategy for the same number of aircraft. Once complete, the Secretary of Defense will then evaluate the proposed multiyear against the requirements of Section 2306b and governing statutes and regulations. If appropriate, the Secretary of Defense will certify that all the multiyear requirements have been met and notify Congress by 1 May, 2010, per the Fiscal Year 2010 NDAA.

7. A discussion of current and future capabilities inherent in the F/A-18E/F that do not meet future Combatant Commander operational requirements for strike-fighter aircraft.

The F/A-18E/F is a highly capable aircraft designed to meet and defeat today's threats with growth potential for the future. The Super Hornet will be a complementary platform on the Nation's carrier decks with the F-35C into the 2030s. The F/A-18E/F will meet current and projected requirements with planned investments in the Fiscal Year 2011-2015 FYDP.

Processes have been established whereby all requirements from the Combatant Commanders are incorporated into tasking via the Director of Air Warfare (N88). These requirements are incorporated into the aircraft through budgeted, funded efforts.

8. A discussion of changes to the Marine Corps bed-down plan for the Joint Strike Fighter that have occurred since the release of the Fiscal Year 2010 President's Budget Request.

The Marine Corps bed-down has had only minor changes since the Fiscal Year 2010 President's Budget. Due to the earlier procurement of the F-35B as compared to the F-35C, the Marine Corps training, test, and first operational squadrons remains unchanged. The decrease in total procurement from Fiscal Year 2011 through 2015 necessary to support the Secretary of Defense JSF program restructure initiatives slowed the transition of 50 percent of the squadrons an average of one year. As a result, the transition of our legacy squadrons was re-ordered to retain TACAIR operational capabilities and meet Marine Corps operational commitments, while retaining the most capable F/A-18s for our enduring commitment to TAI.

9. DON perspectives on the proposed termination of the JSF F136 engine program, including how such termination may affect procurement, life-cycle costs, operational risks mitigation and logistics strategy footprint and execution.

The DoN, and the DoD as a whole, maintain that the benefits of an F-35 alternate engine program do not outweigh the significant costs/investment to develop, procure, and maintain two JSF engines. Even after factoring in Congress' Fiscal Year 2009-2010 funding additions, the alternate engine still requires $2.5 billion more over the next five years. While we acknowledge there may be some general benefits, the likelihood that the DoD would ever recoup the necessary investment to be offset by the potential savings generated via competition is highly unlikely. Technically, the F136 development is at least four years behind the F135. Logistically, two types of engines would also require establishing separate depot repair lines at significant cost. Our current operational logistics footprint is limited in space available for lift and storage. Supporting two engines in expeditionary environments, onboard aircraft carriers, and amphibious ships would require duplicative spares lines; duplicative support equipment and training, and an increase in shipping containers in already constrained shipboard storage spaces. Two separate engine power modules will cause additional costs in our operations and maintenance accounts. Regardless of the decision on an alternate engine, it would limit the DoN's capability to meet operational demands due to the complexity of the logistics required to support two different engines.

10. A discussion of 1) how many aircraft engine types and models the DON currently operates, maintains and sustains and the logistical strategy employed by the DON to support all aircraft operations, 2) a representative comparison of how many aircraft engine types and models were aboard aircraft carriers during Operation Desert Storm, and 3) how many aircraft engine types and models are

projected to be aboard aircraft carriers in 2035, assuming only the F135 engine F-35 aircraft.

1) Aircraft Engine Types/Logistics Strategy: The DON operates 24 active engine type-model-series. The logistics strategy employed by the Department is informed by the system engineering process traced back to the requirements (as documented in the ORD, CDD, or CPD) to determine the best overall support concept. Factors influencing the logistics support concept are Title 10 core law; total ownership cost; reliability and maintainability requirements; and user's requirements for the mission.

2) Desert Storm Experience: Up to eight different type/model/series engines were aboard aircraft carriers during Operation Desert Storm.

3) Aircraft Engine Type (Current/CY35): Currently there are six different type-model-series engines aboard the aircraft carrier. In 2035, four different type/model/ series engines are projected to be aboard CVNs: F135 (JSF); F414 (F/A-18E/F and EA-18G); T56 (E2D); and T700 (H-60).

A numerical engine count does not provide the full context for this discussion. The JSF engine is the largest tactical fighter engine in size and overall logistics footprint in the history of the Department of Defense. In comparison, the F135 engine is approximate twice the size of the Super Hornet F414 engine. While the performance of the F135 engine brings significant performance gains and warfighting advantage, it presents significant challenges logistically across all of the Services – but no more so than to the Navy and Marine Corps who operate in already constrained spaces aboard L-Class and CVN ships.

If one were to visualize the JSF F135 core engine module container it would closely approximate an eighteen foot long pipe and weigh 9,000 lbs. In comparison, the F/A-18E/F F414 engine is approximately 13 feet long and weighs only 4,600 pounds in its container. Secondly, the F-35 Joint Program Office and the F135 engine prime contractor have completed engine spares modeling. The model indicates that the Department will need to deploy with eight of the very large F135 power modules during a wartime six-month deployment per CVN. The eight power modules equates to sixty-two pallets of pre-staged ammunition. Recognizing power modules are just one of the key critical engines spares we must accommodate, it becomes more problematic with two engines.

We accept that the F136 alternate engine would be interchangeable on our platforms – but several engine components are not interchangeable. Supporting two engines would require: unique spares; unique support equipment; unique/additional training; and a larger range of spare modules without decreasing the number of spares per engine. Because of the size, weight and height of critical engine spares, it is not feasible to store all JSF engine spares in legacy store rooms or stack them as is done for legacy systems. This causes us to plan work-arounds in hangar deck spaces normally reserved to store and maintain tactical aircraft. Further, the footprint limits below-deck maneuverability and lift capacities aboard our ships. Adding an alternate engine makes the shipboard logistics even more challenging as it is not a one-for-one exchange. Logistics sparing in this case will require us to bring aboard more spares to support two engine configurations versus just one.

The Department of Navy plans further study and analysis on this topic to provide the best possible range of options to the combatant commander.

11. A discussion of the underway replenishment capability for the F-35B/C engine in supporting F-35 operations aboard L-class and CVN-class ship operations.

JSF Power Modules, at approximately 9,000 lbs the heaviest component of F-35B/C engines, exceed the rated load capacity of the STREAM Unrep system currently installed in NIMITZ-class aircraft carriers. FORD-class carriers will be delivered with a new underway replenishment system (Heavy Unrep) capable of receiving loads up to 12,000 lbs at conventional ship separation and sea conditions. Logistics support options for sparing JSF engine components in NIMITZ-class carriers, including future installation of the Heavy Unrep system, are being studied. For the L-class the interim solution for JSF Power Modules is delivery via Vertical Replenishment using MEU organic CH-53 E/K aircraft or MV-22. The long term solution for USMC Air Combat Element heavy Unrep requirements is still to be determined by Naval Sea Systems Command (NAVSEA) and NAVAIR for amphibious shipping.

12. A discussion of the post-production F110 re-engining program for the F-14 fighter aircraft as it related to mitigating risks regarding operational reliability, maintainability, contractor responsiveness and sustainability for the TF30 engine.

The F-14 Tomcat program was initiated as the Navy's variant of the Tactical Fighter Experimental (TFX) when the F-111B powered by TF30 engines, failed to achieve shipboard weight restriction and demonstrated significant "fighter' maneuverability issues. In May 1968 Congress stopped funding for the F-111B, allowing the Navy to pursue an answer tailored to naval requirements.

In July 1968, NAVAIR issued a Request for Proposals (RFP) for the Naval Fighter Experimental (VFX), a tandem two-seat fighter. The winning Grumman design, the F-14A, was conceptually designed to be powered by F401-PW-400 engines.

Developmental delays plagued the F401 development and the initial F-14A production reused the TF30 engines from the F-111B; the Navy planned to replace them with the F401-PW-400 engines in a proposed F-14B variant as the F401 engines became available. The problems associated with the F401 development proved to be too significant and the F401 engine never entered production leaving all F-14As with TF30 engines. During the F-14A operational tenure, the TF30 engine was common to the USAF and Navy A-7 light attack aircraft as well as the USAF F-111A aircraft. There were not any unusual sustainability or maintainability issues with the TF30.. As installed in the F-14, the TF30 engine proved to be deficient in both power produced and reliability. Significant operational problems involving "blade creep" and subsequent turbine failures, with resultant aircraft mishaps, were addressed by engine design changes which added additional weight to the TF30 engine. The contractor was responsive to investigating and correcting TF30 engine performance problems but the basic TF30 engine design was not suited to the F-14 platform. Secretary of the Navy John Lehman testified to Congress that the F-14/TF30 combination was "probably the worst engine/airframe mismatch we have had in years" and said that the TF30 was "a terrible engine" with F-14 accidents attributed to engine failures accounting for 28 percent of overall losses. TF30 engines were prone to compressor stalls, which could easily result in loss of aircraft control due to the wide engine spacing, causing severe yaw oscillations and leading to an unrecoverable flat spin.

The F-14D aircraft variant design called for more powerful engines to overcome aircraft deficiencies resulting from the TF30 design flaws. The F-14D was powered by two F110-GE-400 engines with 28,200 lbs thrust each. This increased thrust for the "D" Tomcat allowed for no-afterburner catapult launches off the carriers and otherwise improved overall performance and flying characteristics. The F110 engines allowed the F-14 aircrew to fly the aircraft throughout its performance envelope rather than flight restrictions imposed by deficient engine performance capabilities as was the case in TF-30 powered variants. The installation of the new F110 engines required only minor redesign changes to the aft fuselage and engine exhaust area.

The Navy procured 37 new F-14D aircraft from Grumman and remanufactured an additional 18 F-14A airframes to the F-14D configuration for a total of 55 F-14Ds. Additionally, 85 F-14B variants were equipped with the F110 engine, in lieu of the failed F401 engine, through remanufacture or conversion programs.

13. A discussion regarding the 40 percent increase regarding the estimated total ownership costs and affordability analysis conducted by Naval Air Systems Command in October, 2009 for the F-35B and F-35C as it relates to the legacy F/A-18A-D and AV-8B costs.

The department is on the front end of reviewing JSF total ownership costs and assumptions. The NAVAIR cost team brief on total ownership costs is a pre-decisional brief. These types of briefs are developed to inform leadership of ongoing technical analyses and provide options and consequences as we work to deliver affordable programs. In a program such as the JSF, these analyses are constantly evolving. The brief is an internal working document and provides points for discussion in support of achieving successful and affordable fielding of all variants of the JSF.

The operating and support costs in the working document are not definitive and are subject to variance based on potential courses of action. The Navy Department is fully coordinated with Office of the Secretary of Defense (OSD), the USAF and the Joint Program Office (JPO) in executing this critical program.

14. A discussion regarding all issues, associated risks, feasibility, costs and schedule of integrating the F-35B and F-35C aircraft onto L-class and CVN-class ships for forward deployed operations, and what date changes to L-class ships will be made to support the forward deployability of the Marine Corps' planned Fiscal Year 2012 IOC date for F-35B.

Several "Cornerstone" modifications have been identified and planned for the L class ships to be compatible with F-35B operations to include: Special Access Program Facility (SAPF) spaces, Autonomic Logistics Information System (ALIS) infrastructure, and Deployable Mission Rehearsal Trainer (DMRT). Many of the alterations for the L-class F-35B integration are similar to the CVN F-35C alterations. Environmental Effects modifications due to the jet engine STOVL mode of operational and the Integrated Power Pack exhaust plumes require further analysis and testing to validate modifications to the L-class ships.

The shipboard environment affected by these two components are being fully evaluated through engineering analysis which will be verified using land based testing, and shipboard Developmental Testing (DT), which is scheduled to occur during second quarter Fiscal Year 2011. The test results will be used to finalize the L-class ship alterations required for F-35B integration and may include the relocation of ancillary systems, material changes, and shielding.

Those changes will be incorporated during the Fiscal Year 2012 Continuous Maintenance Availability period onto an L-class ship, currently scheduled to be LHD-1, the Wasp. The remaining L-class fleet will be modified to match the transition from AV-8B to F-35B to ensure operational commitments are met, specifically forward deployed MEUs.

Several separate ship alterations have been identified as requirements to integrate F-35C into NIMITZ- and FORD-class aircraft carriers. Aircraft Electrical Servicing Station (AESS) modifications, Ready Room and Aircraft Intermediate Maintenance Department (AIMD) upgrades, and ALIS and DMRT installations continue to mature, and are programmed for installation to meet F-35C IOC. The cost and schedule to incorporate the additional shipalts, which include Lithium-Ion Battery storage and Below Decks sound attenuation, will be delivered with CVN- 78, and addressed in future budget submittals for NIMITZ-class carriers.

One shipalt still in development concerns Flight Deck Jet Blast Deflectors (JBD). The Navy expects aircraft carrier JBDs will require some level of modification to accommodate F-35C heat plume concentration on the JBD. The Navy is currently collecting data from F-35 test aircraft to characterize the heat plume and signature of the JSF F-135 engine. The concentration of F-35C jet exhaust heat and plume differs from that of an FA-18E/F in physical location on the JBD, effects more JBD area, and may have a higher total integrated heat load. The goal of current analysis is to define the heat transfer to the Flight Deck and JBD components, determine the JBD system response, and develop a solution to mitigate the heat imparted by F-35C while retaining compatibility with the FA-18E/F. The solution must also ensure the mission of the JBD to protect the Flight Deck environment. These modifications will be incorporated aboard NIMITZ-class aircraft carriers during previously-scheduled availabilities. Modifications to CVN 78 will be accomplished during construction where possible, after finalization of a JBD system solution.

Several preliminary tests measuring the heat plume characteristics have been completed, funded by the F-35 Joint Program Office. Most recently, an angle plate test was conducted and the test results are being analyzed. Upon completion of this analysis, an F-35C will conduct high-power engine tests against a modified land-based CVN JBD. The cost and schedule to modify the test JBD will be dependent on the results of the ongoing analyses.

15. A discussion regarding the analysis and probability of when the F-35B and F-35C are scheduled to declare Initial Operation Capability as it relates to the restructured System Design and Demonstration (SDD) program delay of 13 months.

With the recent program restructuring approved by the Secretary of Defense, the IOC is projected to be 2012 for the F-35B and 2016 for the F-35C. The actions taken by the Secretary of Defense include procuring an additional F-35C aircraft to be used for flight testing, loaning three early production aircraft to developmental test and directing the addition of another software integration line to the program. These three steps, taken together, establish a viable program and continue to support the Marine Corps' December 2012 IOC.

The IOC is determined by the service based on both the program's performance and how the services define IOC. Each service has a somewhat different IOC depending on what capabilities they intend to have at IOC, their operational and testing requirements, and the number of aircraft they require for IOC.

For the Marine Corps F-35B, IOC is defined as a squadron of ten aircraft able to execute the full range of TACAIR directed mission sets and to deploy on F-35B-compatible ships and to austere expeditionary sites. The Marine Corps plans to IOC with an Operational Requirements Document (ORD) compliant Block IIB aircraft.

For the Navy F-35C, IOC is defined as a squadron of ten ORD compliant Block 3 aircraft that are ready to deploy and have completed IOT&E.

16. Discussion of the known risks and issues specifically related to the DON regarding the development, fielding and deployment of the Autonomic Logistics Information Systems for sustaining the F-35 as it relates to maintenance and logistics operations.

F-35 Autonomic Logistics Global Sustainment is built concurrently with the aircraft and the ALIS is being used to support flight test operations today. As with any new system, there has been a learning curve associated with the new logistics support system and the new users; however, as maintainers continue to tax and use the system, improvements and efficiencies can be identified. The early operational use of ALIS with the developmental test program at Patuxent River will function as risk mitigation for OT&E and for operational fielding. Currently there are no known risks that do not have mitigation plans in-place. We will continue to address any issues that may arise as development continues, as is done for any complex developmental effort, and as plans for test and deployment mature.

17. Discussion of F-35C design issues regarding the aircraft splice (i.e. keel); aircraft in-flight airspeed acceleration requirements as it relates to key performance parameters; abrupt wing stall; aircraft, engine and integrated power package operations and performance limitations in hot external environments; anti-surface warfare capabilities; main and nose gear tire limits as it relates to takeoff and landing speeds of the aircraft; predicted portable memory device download times and low-observable material repair and restoration as it relates to required sortie generation rates.

Many of the issues listed in the question are routine developmental issues that are discovered and answered during any SDD. The F-35 SDD is no exception and we will likely uncover additional issues that we will need to address. To-date, no technical issues have been discovered which we cannot overcome. F-35 is currently meeting all Key Performance Parameters (KPPs).

F-35C aircraft keel: a slight negative static margin and negative fatigue margin was discovered during the normal strength analysis review. A fix has been developed for those SDD aircraft that would be impacted by a restriction. CF-5 and all subsequent F-35C aircraft will have a production representative fix installed during manufacture.

Abrupt wing stall: program early wind tunnel testing has investigated this phenomenon, though results remain inconclusive. As a mitigation strategy, a transonic spoiler was installed as a flight test unique configuration for F-35C SDD aircraft. Flight testing will confirm the need for a spoiler and if it can be safely removed, will be removed from the production configuration.

Engine and IPP environments: The F-35C IPP exhausts up and does not impact the landing surface. Modeling has not led to any design changes; however, OT&E will fully investigate any affects of exhaust impact on the upper surface relative to wind conditions.

Anti-surface warfare capabilities: ASuW capabilities are currently estimated from modeling efforts. Capabilities will be analyzed with SDD specified ASuW weapons and tested in IOT&E. The Department is currently planning to initiate an ASuW AoA to inform the long-term plans for F-35 and other critical surface, sub-surface and joint launch platforms.

Main Landing Gear (MLG) and Nose Landing Gear (NLG) tires: Based on modeling, there appears to be some challenges with F-35C landing gear tires under very taxing conditions, such as heavy weight, high altitude, and hot temperatures. As flight testing continues, these models will be verified and possible solutions or restrictions will be investigated.

Download times: Currently, download times are a challenge; however, corrections and potential future updates have been identified.

Low Observable (LO) repair and restoration: LO material lessons learned from previous programs have been incorporated into the F-35 design. Modeling to date shows that we are better than legacy aircraft, yet there is a continued effort to improve.

18. An update on the UH-1Y/AH-1Z development and procurement programs and past issues regarding production line efficiencies and capabilities.

The UH-1Y aircraft achieved initial operational capability in August 2008 and full rate production in September 2008. The UH-1Y program was given priority status in order to replace the under-powered UH-1N fleet as quickly as possible. AH-1Z testing and low rate production continues, with an operational evaluation (OT-II3C) starting later this month. The AH-1Z full rate production decision is scheduled for the first quarter of Fiscal Year 2011. 58 AH-1Zs will be built new to support the increased inventory objective, which exceeds the quantity of existing AH-1W airframes available for remanufacture. As of 2 March 2010, a total of 33 aircraft (25 UH-1Ys and eight AH-1Zs) have been delivered to the Fleet Marine Force, and an additional 36 aircraft are on contract and in production. Since April 2008, all helicopter deliveries have been on or

ahead of schedule. To date, all Fiscal Year 2009 and 2010 aircraft deliveries have been 56 days or more ahead of contract date and th
e program has not shown any significant impacts from the summer 2009 labor strike at Bell Helicopter. The most recent government assessment has determined that Bell helicopter has the current capacity to produce 32 H-1 upgrades aircraft per year. Plans are in place to increase this capacity to 36 aircraft per year in the near future.

19. An update on V-22 procurement program and contractor performance; and performance of the MV-22 during Operation Iraqi and Enduring Freedom.

The Fiscal Year 2011 President's Budget request includes $2.7 billion for procurement of 35 V-22s and for continued development of follow-on block upgrades. Fiscal Year 2011 is the fourth year of the V-22 multiyear procurement contract. Our multiyear procurement strategy supports a continued cost reduction and affordability trend, provides a stable basis for industry, and best supports the needs of the warfighter. The Fiscal Year 2011 appropriations will fully fund Lot 15 and procure long-lead items for Lot 16 under the V-22 multiyear contract. Over the past 12 months, Bell-Boeing has continued to consistently perform better than requiredon production, delivering aircraft on or ahead of schedule. The USMC continues to field and transition aircraft on time.

The MV-22B Osprey is now combat-tested and forward-deployed supporting combat operations and responding to contingencies around the world. As our premier medium lift assault support platform, the Osprey brings unprecedented range, speed and survivability to the warfighter, in a platform that far exceeds the capabilities of the CH-46E it is replacing. The MV-22B has been continuously supporting our Marines, in combat and in contingencies, since October 2007. During three consecutive squadron deployments in support of OIF (Fiscal Year 2008-2009) Osprey squadrons logged over 9,000 flight hours, carried over 40,000 passengers, and lifted over two million pounds of cargo while flying every mission profile assigned by the Multi-National Force-West Commander. The MV-22B also completed its first shipboard deployment as part of a MEU last November, capping its six-month deployment by flying 510 nautical miles from USS BATAAN (LHD-5) to Camp Bastion, Afghanistan. The shipboard squadron conducted a relief in place with another squadron to begin support of OEF.

The Osprey continues to redefine the speed and range at which the MAGTF commander can influence his operational area. The second MV-22B shipboard deployment is currently underway supporting humanitarian relief efforts in Haiti and follow-on presence in the U.S. Central Command (CENTCOM) area of operations. The CV-22 program has conducted multiple SOCOM deployments, including a successful trans-Atlantic operational deployment in support of operations in Africa and at locations in CENTCOM.

20. An update on the efforts related to the V-22 program related to the redesign, qualification, manufacturing and fielding of more reliable parts and subsystems and how it relates to planned goals for reducing current operations and maintenance costs.

As we continue to explore the tremendous capabilities of tilt-rotor aircraft, we are learning valuable lessons with respect to readiness and operating costs. As of December 2009, the V-22 had exceeded 70,000 total flight hours. More flight hours have been flown on this aircraft in the last two years than in the previous 18 years combined. Like other types of aircraft in the early operational phase of their lifecycles, the MV-22 has experienced lower-than-desired reliability of some components and therefore higher operations and support costs. Despite our readiness challenges, the MV-22 squadron in Afghanistan continues to meet mission tasking through hard work and aggressive sparing. We are meeting mission, but only at supply, maintenance, and operating costs that are inconsistent with our expeditionary nature and frugal culture.

Fleet wide, our Block B combat deployable aircraft averaged approximately 60 percent MC in Continental United States (CONUS) for 2009. With focused logistical support provided to our deployed aircraft, however, we average approximately seven of ten aircraft available on a daily basis in Afghanistan. This compares favorably with the 72 percent availability over 18 months of operations in Iraq and 71 percent availability for aircraft in the 22nd MEU. With the cooperation and support of our industry partners, we are tackling these issues head on, with aggressive logistics and support plans that will increase the durability and availability of the parts needed to raise reliability and concurrently lower operating costs of this aircraft. The Government-industry team has a coordinated strategy to address these issues which is spiral in nature and will provide incremental improvements over time. The team is executing this strategy, having improved many aspects of maintainability, component reliability, and overall affordability. With the commitment of funds in January 2010, we are now accelerating the incorporation of these improvements onto fleet aircraft. Successful component modification and improved maintenance and diligent supply support practices are intended to reduce component removals and increase component availability. While simultaneously maintaining an emphasis on its hard-won production excellence and these initial readiness advances, government and industry partners are engaged in the next iteration which aims to raise parts production capacity to meet demonstrated demand while designating additional candidates for potential redesign and retrofit.

21. Update on the VH-71 liability and termination negotiations as it relates to estimated costs and disposition of SDD and Increment I aircraft assets, and the $100 million appropriated for VH-71 "technology capture".

The Fiscal Year 2011 President's Budget includes $94.7 million for the settlement of the VH-71 termination and $65.1 million for continuing efforts on VXX, the follow-on program for presidential helicopters. We expect receipt of the VH-71 termination proposal late in fiscal year 2010 with negotiations and the anticipated settlement expected in Fiscal Year 2011. The Navy is currently working closely with DCMA in a complex effort to disposition all the assets acquired as part of the VH-71 Program cancellation. The majority of VH-71 specific tooling has been sold back to Agusta-Westland in Europe. The process to disposition non-aviation related assets is well underway in the United States, and is beginning in Europe. The Navy has begun preliminary negotiations with various operators of the EH-101 and other Federal entities concerning disposition of VH-71 aircraft and parts.

22. An update on the VH-(XX) analysis of alternatives and planned acquisition strategy in regards to requirements, costs and schedule.

The VXX Analysis of Alternatives (AoA) will address all feasible options with an assessment of requirements, capabilities, cost drivers, schedule implications, and risks. The requirement for a replacement Presidential Helicopter was validated by the Joint Requirements Oversight Council; however, the details and specifications on how the requirement will be safely and affordably met have not been finalized. As a first step in the process to determine how best to satisfy the need to transport the President, data will be analyzed and matured by the government study team into executable alternatives. This AoA process is underway and will support the development of an acquisition strategy, at which time cost/capability trades will be made. The AoA will also support CONOPS development, trade study analysis, specification development, system concept development and threat analysis leading to a successful Milestone A decision. Following Milestone A and beginning the Technology Development Phase, remaining Fiscal Year 2011 activities will focus on the proposed material solutions, specifically, reducing technology risk, determining and maturing the appropriate set of technologies .

23. An update on the health and sustainment initiatives pertaining to the service-life extension of the VH-3 and VH-60 rotorcraft fleets.

The Fiscal Year 2011 President's Budget requests an investment of $43.4 million to continue programs that will ensure the aging legacy presidential fleet remains viable until its replacement is fielded. Ongoing efforts include the Cockpit Upgrade Program (CUP) for the VH-60N and Communications Suite Upgrade (CSU), Structural Enhancement Program (SEP), and Obsolescence Management Program (OMP) for both the VH-3D and VH-60N. The Trainer Conversion Program will start in Fiscal Year 2011 and will reduce training usage significantly on our VH-3D and VH-60N national assets. Future investments in the legacy fleet will be required to ensure continued safe and reliable executive transportation until the replacement aircraft is fielded.

24. An update on the CH-53K program and whether the program is meeting cost, schedule and performance goals.

The CH-53K program continues to execute an event driven schedule based on a solid technical foundation utilizing proven and mature technologies. In 2009, the Program Manager submitted a Program Deviation Report stating the program would not achieve the remainder of its APB milestones and would require additional RDT&E in order to complete development due to the associated schedule delays. There were a number of parallel issues contributing to this delay including late contract award, slower than planned government and industry staffing, alignment of the systems engineering process, delays in subcontracting and design maturation. The program has corrected all of the above issues and was recognized by an OSD Program Support Review as exhibiting sound technical and management approaches, good communication between government and industry, comprehensive risk management, and regularly conducting integrated design reviews. It is important to note that these delays were not driven by technical issue, and the program remains on a sound technical footing as it enters CDR later this year. In parallel, the program has been producing long lead items in preparation for the building of key test vehicles over the next year. The CH-53K has received the necessary funding to complete development of this critical aircraft and is now maintaining cost and schedule performance based on funding to support an IOC of Fiscal Year 2018.

25. An update on the P-8 program and whether the program is meeting current cost, schedule and performance goals.

The P-8 program is meeting all cost benchmarks, schedule milestones and performance thresholds in accordance with the APB.

The program has entered the flight test phase and has three flight test aircraft in or preparing for various aspects of ground and flight testing. In addition, a static test aircraft has been developing the flight envelope to support flight testing while a fatigue test article has been built and is being prepared to enter fatigue testing in late Fiscal Year 2011. Three additional flight test articles (production representative) are on contract and will be delivered beginning in early Fiscal Year 2011 to support Initial Operational Test and Evaluation (IOT&E) planned for February 2012.

The P-8 is making final preparations for Milestone C (planned for June 2010) and for the award of a production contract for the first LRIP lot of six P-8's. The program is on track to have developed, tested and delivered aircraft to meet the planned IOC target in the 2013 on time.

P-8 will bring improvements to on-station performance when compared to the legacy P-3 in Anti-submarine and Anti-surface Warfare and will have significantly better operational availability and will reap the benefits of training in high fidelity simulators. The program has been well managed and is frequently used as an example of how to control costs while delivering critical performance on schedule.

26. An update the service life extension and Zone 5 repair programs of the P-3/EP-3 and a discussion on current fleet availability to meet Combatant Commander operational requirements.

P-3C Zone 5 wing fatigue has resulted in the grounding of 49 aircraft from December 2007 to September 2009, with more expected. Fatigue analysis will continue and there continues to be a moderate risk of future P-3C groundings. Based on projected depot output, it is expected that P-3C mission aircraft will return to pre December 2007 grounding levels no earlier than second quarter Fiscal Year 2012. The Navy received significant congressional support from Global War on Terror (GWOT) 08, GWOT 09 and OCO 10 supplementals totaling $395 million for P-3C wing repairs to keep these critical aircraft flying. These funds have been utilized to purchase Zone 5 kits, Outer Wing Assembly kits and conduct installations which have been critical for P-3C sustainment and recovery. In Fiscal Year 2011, $228.0 million is requested to sustain the P-3C until transition to the P-8A Poseidon. More than half of this amount ($153.5 million) is for wing modifications, which will allow airframe sustainment to support the CNO's P-3 Fleet Response Plan, as well as supporting EP-3E requirements, which are executed within the P-3 Airframe Sustainment Program. As of March 05 2010, 14 P-3C aircraft have been returned to the fleet with 32 aircraft in work for Zone 5 repairs. Current mission aircraft availability is 65. The Navy will continue to closely manage the service life of the P-3C as the Maritime Patrol Reconnaissance Aviation forces transition to the P-8A Poseidon. Until force levels recover, allocations of aircraft must be balanced to meet mission and minimum training while preserving remaining P-3 service life. Currently P-3Cs are meeting combatant commander allocations for deployed aircraft.

27. An update on the Navy Unmanned Combat Air System Update (NUCAS) program and whether the program is meeting current cost, schedule, risk and performance goals.

Developmental work on the Navy UCAS Demonstration (UCAS-D) continues. This critical risk mitigation effort to land an unmanned, low observable relevant aircraft on an aircraft carrier (CVN) by 2013 is an essential step toward meeting future Navy warfighting needs. Though the contractor is late to their 2012 estimate, the government program office expects to be complete in 2013. Surrogate shipboard landing tests are proceeding as planned, with several events successfully completed in 2009 and early 2010. Low speed taxi testing has commenced. The program is on track to meet all technical performance parameters. The UCAS-D Government/Industry team is conducting a bottom-up review of the program to refine schedule and cost of the remaining portion of the program. The 2011 funding request is adequate.

28. An update on the Broad Area Maritime Surveillance program and whether the program is meeting current cost, schedule, risk and performance goals.

The BAMS UAS is currently meeting its cost, schedule, and performance parameters as defined by the program's APB. Currently, no risks or issues exist that would place any BAMS UAS APB parameter in jeopardy. The BAMS UAS program will meet the Navy requirement for a persistent ISR capability as well as providing a communication relay capability. The BAMS UAS is a larger Group-5 system which will be a force multiplier for the Fleet Commander, enhancing situational awareness of the battle-space and shortening the sensor-to-shooter kill chain. The BAMS UAS will work as an adjunct to the new P-8A Multi-mission Aircraft (MMA) as part of the Navy's Maritime Patrol and Reconnaissance Force (MPRF) to provide a more affordable, effective and supportable maritime ISR option than current ISR aircraft provide. The BAMS UAS leverages a variety of Department of Defense (DoD) investments including the RQ-4B Global Hawk air vehicle and engine, along with sensor payloads from numerous DoD platforms. The program is also pursuing synergy opportunities with both the Navy's MPRF and the Air Force Global Hawk. The BAMS UAS program conducted a PDR in February 2010 and in the past year, also successfully held System Requirements Review (SRR), System Functional Review (SFR) and the Integrated Baseline Review (IBR). The program is progressing well and is on-track to meet a fiscal year 2016 IOC.

29. An update on the E2D Advanced Hawkeye program and whether the program is meeting current cost, schedule, risk and performance goals.

The Advanced Hawkeye system entered the Production and Deployment Phase following a successful Milestone C review in May 2009. LRIP Lot 1 for two aircraft was awarded in June 2009. LRIP Lot 2 for two aircraft was awarded in January 2010. The program is on track to deliver three pilot production aircraft in 2010. Program cost remains stable.

The E-2D AN/APY-9 radar system continues to perform well as Developmental Testing nears the 70 percent complete mark and remains on track for Operational Evaluation (OPEVAL) in the first quarter of Fiscal Year 2012. All key performance parameters, including detection range are exceeding expectations. The E-2D has successfully demonstrated its integral role in the Navy's NIFC-CA architecture. Weapon System Specification Verification is on track to complete in 2010 and the program will conduct Operational Assessment #2 in late summer of 2010 to support DAB approval for LRIP 3 and 4 early 2011. The program continues to manage risk, and currently, has no high risk issues.

30. A summary of all Class A, B and C aviation-related safety issues, including recent mishaps, trends, and analysis occurring within the past year.

Recent Mishaps:

15 March 2010: (Fallon, NV) 2-F/A-18E, Mishap – one Class "A"; one "TBD"
11 Mar 2010: (Beaufort, SC) F/A-18D, Mishap - Class "A"
18 Feb 2010: (W.Virginia) MH-60S crashed in remote area during training mission.
23 Jan 2009: (New Orleans, LA) T-34C crashed into water.
29 Oct 2009: (California) AH-1W crashed into water after midair collision.
28 Oct 2009: (Corpus Christi, TX) T-34C did not return from VFR training flight.
26 Oct 2009: (Afghanistan) AH-1 and UH-1 crashed in open desert.

Class A Flight mishaps over the past 10 years show a downward trend while the Class B and C mishap rate trends show a slight increase. An analysis of mishaps over the last 12 months shows that human error accounts for the highest percentage of the causal factors in Class A and B mishaps while material failures account for most causal factors in Class C mishaps. To date the FY 10 mishap rates for Class A, B, and C are ahead of FY 09 and the 10 year averages.

Naval Aviation continues to focus on decreasing human error in mishaps. This includes the introduction of Human Factors Analysis and Classification System (HFACS) as a tool for investigating, reporting and analyzing mishaps to determine the best human error mitigation strategies. Additionally, the Navy is revitalizing Operational Risk Management (ORM) and in particular Time-Critical Risk Management (TCRM). In Naval Aviation this will help improve Crew Resource Management (CRM) and decision making skills of aviators. It also has applicability to all sailors both on and off duty. Finally, in collaboration with the other Services and other Government agencies we are analyzing fatigue as an aeromedical contributor to mishaps and determining the best methods for fatigue alleviation and control.

Class "A" Mishaps

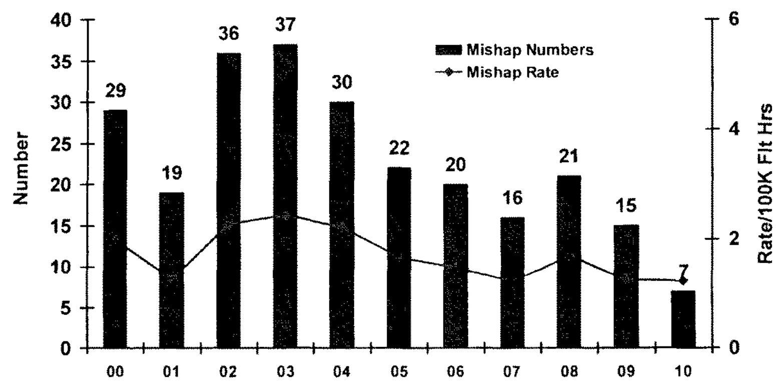
Aviation Class "A" Summary:

- Human error accounts for the largest percentage (83%) of involved factors for Aviation Class A Flight Mishaps
- FY00-09 mishap rates show a decreasing trend.

Department of the Navy (DoN) Class A Flight Mishaps FY09 through 17 March 2010

FY 2009 – 17 MAR 2010 AVIATION CLASS A FLIGHT MISHAPS		
INVOLVED FACTOR	# EVENTS	PERCENT
AIRCREW FACTOR	8	67%
MATERIAL MALFUNCTION	6	50%
MAINTENANCE PERSONNEL	2	17%
SUPERVISORY PERSONNEL	8	67%
FACILITIES PERSONNEL	1	8%
HUMAN ERROR	10	83%
UNDETERMINED	0	0%
UNDER INVESTIGATION	10	
ALL EVENTS	22	
FACTORS STILL UNDER INVESTIGATION NOT INCLUDED IN %. MISHAPS OFTEN INVOLVE MULTIPLE CAUSAL FACTORS.		

CLASS A FLIGHT MISHAPS



	17 Mar 10	17 Mar 09
CLASS A MISHAPS/MISHAP RATE FY COMPARISON:	7 / 1.23	7 / 1.31
FY09 MISHAPS/MISHAP RATE:	15 / 1.26	
10-YEAR AVERAGE (FY00-09) MISHAPS/MISHAP RATE:	24.5 / 1.77	

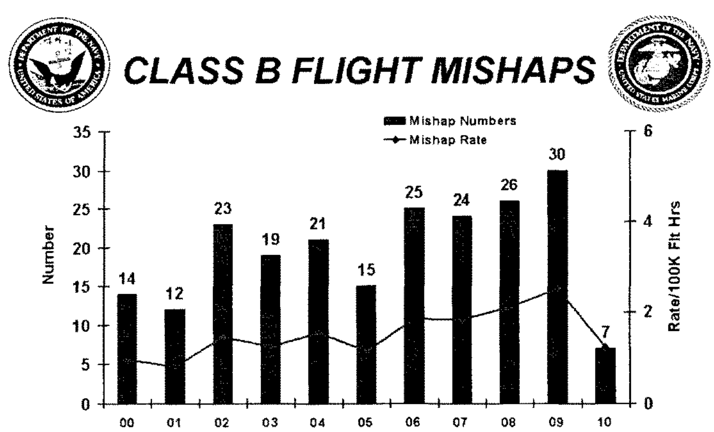
Class "B" Mishaps

Aviation Class "B" Summary:

- Human error accounts for the largest percentage (91%) of involved factors for Aviation Class B Flight Mishaps.
- Fiscal Year 2000-2009 mishap rates show a general increasing trend.

Department of the Navy (DoN) Class A Flight Mishaps FY09 through 17 March 2010

FY 2009 – 17 MAR 2010 AVIATION CLASS B FLIGHT MISHAPS		
INVOLVED FACTOR	# EVENTS	PERCENT
AIRCREW FACTOR	13	62%
MATERIAL MALFUNCTION	11	52%
MAINTENANCE PERSONNEL	3	14%
SUPERVISORY PERSONNEL	10	48%
FACILITIES PERSONNEL	0	0%
HUMAN ERROR	19	91%
UNDETERMINED	0	0%
UNDER INVESTIGATION	16	
ALL EVENTS	37	
FACTORS STILL UNDER INVESTIGATION NOT INCLUDED IN %. MISHAPS OFTEN INVOLVE MULTIPLE CAUSAL FACTORS.		



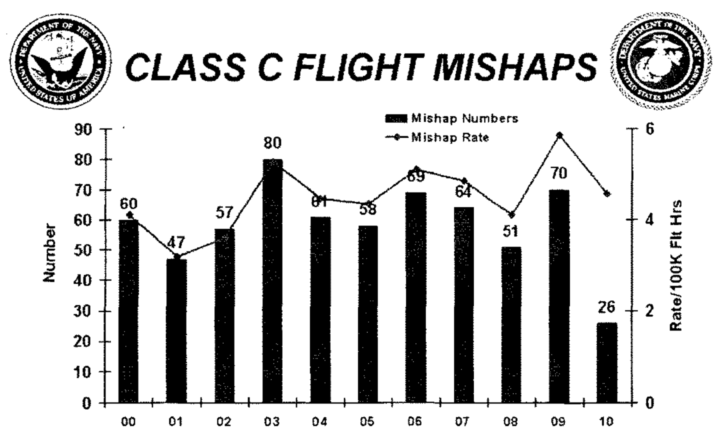
	17 Mar 10	17 Mar 09
CLASS B MISHAPS/MISHAP RATE FY COMPARISON:	7 / 1.23	10 / 1.86
FY09 MISHAPS/MISHAP RATE:	30 / 2.51	
10-YEAR AVERAGE (FY00-09) MISHAPS/MISHAP RATE:	20.9 / 1.51	

Class "C" Mishaps

Aviation Class "C" Summary:

- Material Malfunction accounts for the largest percentage (68 percent) of involved factors for Aviation Class C Flight Mishaps. Human error accounts for 43 percent of involved factors for Aviation Class "C" Flight Mishaps.
- Excluding two spikes in mishap rates in FY03 and FY09, the Aviation Class C Flight mishap rate has been fairly constant over the past 10 years.

FY 2009 – 17 MAR 2010 AVIATION CLASS C FLIGHT MISHAPS		
INVOLVED FACTOR	# EVENTS	PERCENT
AIRCREW FACTOR	11	25%
MATERIAL MALFUNCTION	30	68%
MAINTENANCE PERSONNEL	7	16%
SUPERVISORY PERSONNEL	7	16%
FACILITIES PERSONNEL	0	0%
HUMAN ERROR	19	43%
UNDETERMINED	1	2%
UNDER INVESTIGATION	52	
ALL EVENTS	96	
FACTORS STILL UNDER INVESTIGATION NOT INCLUDED IN %. MISHAPS OFTEN INVOLVE MULTIPLE CAUSAL FACTORS.		



	17 Mar 10	17 Mar 09
CLASS C MISHAPS/MISHAP RATE FY COMPARISON:	26 / 4.58	25 / 4.66
FY09 MISHAPS/MISHAP RATE:	70 / 5.87	
10-YEAR AVERAGE (FY00-09) MISHAPS/MISHAP RATE:	61.7 / 4.47	

31. An update on A-12 litigation.

The dispute over the 1991 termination for default of the A-12 program has been in litigation since June 1991. On appeal for the third time, on June 2, 2009 the Court of Appeals for the Federal Circuit affirmed the May 2007 judgment of the Court of Federal Claims that the Navy had properly terminated the contract for default. Plaintiffs/appellants, Boeing and General Dynamics, sought a rehearing before the full Court of Appeals, but their requests were denied on November 24, 2009. Both contractors have said they intend to ask the Supreme Court to review the case. Their petitions for a writ of certiorari are now due March 24, 2010. The Government will then have the opportunity to file its response to the petitions. The Supreme Court is expected to decide by the early fall whether it will review this case.

32. A list of all DON program funding shortfalls that are currently in the fiscal year 2011 through 2015 future years defense plan, as submitted, that would not permit full program scope execution as currently planned.

The Chief of Naval Operations (CNO) and Commandant of the Marine Corps (CMC) have each separately submitted an unfunded priority list. We have had no major changes to our programs since the Fiscal Year 2011 President's Budget request was submitted. However, we are aware that potential rate increases across the industry may influence programs, as well as economic order fluctuations that may influence costs independent of program performance. Program funding issues will be addressed in the Selected Acquisition Reports (SARs).

NOT FOR PUBLICATION UNTIL RELEASE BY THE
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON AIR AND LAND FORCES
SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES
U.S. HOUSE OF REPRESENTATIVES

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE HOUSE ARMED SERVICES COMMITTEE

AIR AND LAND FORCES SUBCOMMITTEE
AND
SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

March 24, 2010

SUBJECT: USAF Aviation Programs

COMBINED STATEMENT OF:

Mr. David M. Van Buren, (acting) Assistant Secretary of the Air Force for Acquisition (SAF/AQ)

Lieutenant General Phillip M. Breedlove, Air Force Deputy Chief Of Staff for Air, Space and Information Operations, Plans and Requirements (AF/A3/5)

NOT FOR PUBLICATION UNTIL RELEASE BY THE
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON AIR AND LAND FORCES
SUBCOMMITTEE ON SEAPOWER AND EXPEDITIONARY FORCES
U.S. HOUSE OF REPRESENTATIVES

I. Introduction

Chairmen Smith and Taylor, Ranking Members Bartlett and Akin, and distinguished members of the committee. Thank you for the opportunity to address this committee regarding some of your Air Force's aviation programs.

The Secretary of Defense, in the recent 2010 Quadrennial Defense Review, set four objectives to guide our current actions and future Planning: prevail in today's wars, prevent and deter conflict, prepare to defeat adversaries and succeed in a wide range of contingencies, and preserve and enhance the all-volunteer force. Your Air Force is vectoring to meet these objectives, balancing risk appropriately, and preparing to prevent, prevail, and preserve well into our Nation's future.

II. Contributions of our Air Force

Today, your Air Force flies and fights in air, space, and cyberspace--globally and reliably--as a valued member of our Joint and coalition teams. More than 40,000 Airmen are deployed, with 30,000 in and around Afghanistan and Iraq, as we unwaveringly do whatever it takes to prevail in today's wars. Airmen, soldiers, sailors, and marines who cross outside the wire do so with the asymmetric advantage of armed overwatch, globally integrated intelligence, surveillance, and reconnaissance, combat search and rescue, and aero-medical evacuation. In Afghanistan alone, last year your Air Force flew 26,474 close air support sorties, a 39 percent increase over 2008. Our joint force in the Central Command area of responsibility is sustained by around-the-clock rapid global mobility operations that included, in 2009, 52,905 airlift sorties delivering 264,839 short tons of cargo, over 32 million pounds of airdropped cargo, and 1.3 million passengers. Additionally, sometimes overlooked is the fact that approximately 43 percent of our total force is daily engaged in out-of-theater support to Combatant Commander operations; a remarkable contribution enabled by past investments in technology and infrastructure that allow your Air Force to project global vigilance, reach, and power while minimizing vulnerability.

On the home front, since September 11th, 2001, your Air Force has flown over 57,391 total sorties under Operation NOBLE EAGLE, including 41,219 fighter sorties, 11,507 tanker sorties, and 1,850 early warning sorties. As a testament to the total force, the Air National Guard has flown more than 70 percent of these sorties and currently operates 16 of 18 Air Sovereignty Alert sites.

While we fight today, your Air Force is also scanning an increasingly complex security horizon so that we can help deter, and if necessary, defeat a variety of potential adversaries in a wide range of contingency operations. As successors of the great strategic thinker General Curtis LeMay, and stewards of two-thirds of the Nation's nuclear deterrence triad, we continue to strengthen our nuclear enterprise. Furthermore, our initial investments in a family of long-range strike capabilities mark our commitment to sustaining power projection capabilities well into the future. Finally, your Air Force is extremely proud that there have been no fatal air attacks on American ground forces in almost 57 years. Such air supremacy is not coincidental, and the F-35 will be central to your Air Force's continued ownership of the air domain.

This committee asked that we address some specific aviation programs and issues, each vital to your Air Force's sustained excellence and our National Military Strategy, including: the Joint Strike Fighter, the CV-22, Personnel Recovery, future fighter aircraft shortfalls, the health of the fighter and bomber aircraft fleets, safety, and the Joint Air-to-Surface Stand-off Missile.

III. Joint Strike Fighter (JSF) Alternate Engine Program

Your Air Force's position regarding the Joint Strike Fighter alternate engine program is that a second engine is unnecessary, too costly, and risks diverting resources from production. The FY11 Presidential Budget does not request funding for the development and procurement of the F136 alternate engine. The Air Force and Navy continue to execute the funding appropriated by Congress in the previous budgets to continue the F136 program.

The Office of the Secretary of Defense for Cost Assessment and Program Evaluation (CAPE) estimated that the Department of Defense will have to fund approximately $2.9 billion to take the F136 engine to competition in FY17, including development, directed buys, and the necessary logistics support. Continued funding for the F136 engine carries cost penalties to both the F135 and F136 engines in the form of reduced production line learning curves and inefficient economic order quantities. The department has concluded that maintaining a single engine supplier provides the best balance of cost and risk. We believe the risks associated with a single source engine supplier are manageable due to improvements in engine technology and do not outweigh the investment required to fund a competitive alternate engine.

IV. CV-22

Air Force special operations capabilities play a vital role in support of U.S. Special Operations Command and geographic combatant commanders. As the Department of Defense increasingly develops irregular warfare capabilities, the Air Force is investing in special operations airlift like the CV-22 Osprey.

In FY11, the Air Force CV-22 Osprey program will receive the 13th CV-22 of a 50 aircraft program of record, declaring Full Operational Capability in FY16. Air Force Special Operations Command (AFSOC) declared the CV-22's Initial Operational Capability in March 2009 and stood up the third CV-22 operating base at Cannon AFB, NM. AFSOC's CV-22s have self-deployed overseas to Africa, Central America, and most recently Iraq. They are currently enroute for another operational deployment.

The CV-22 has encountered challenges with its high operational tempo and small fleet size. This coupled with lower priority versus combat operations on spare parts has resulted in lower availability rates. The FY11 President's Budget added $126.2 million through the FYDP, for initial spares and support equipment. The Joint CV-22 Program

Office along with the cooperation and support of industry partners are aggressively working to increase the reliability and availability of the CV-22 platform.

V. Personnel Recovery

Today your Air Force is meeting the Secretary of Defense's 60 minute goal for combat aero-medical evacuations 98 percent of the time, and we continue to strive for perfection in this endeavor. This responsive casualty stabilization and extraction capability is making the "Golden Hour" a reality for our wounded joint warriors. We have several programs that comprise our combat search and rescue capability, including HH-60s, HC-130s, and Guardian Angels.

The President's Budget Request for FY11 seeks funding for six HH-60G Operational Loss Replacement aircraft (including 3 from OCO funding). These aircraft will continue to restore the legacy HH-60G fleet to the 112 aircraft program of record. The Air Force will procure the current in-production variant, UH-60M, and modify them with CSAR mission equipment. Additional funding would be used to accelerate fielding of loss replacement aircraft.

Your Air Force is currently working with the Office of the Secretary of Defense and Joint Staff to finalize the requirements and Acquisition strategy for a full fleet recapitalization of the legacy HH-60G fleet. FY 11 budget request contains initial funding for this program with aircraft procurement expected to begin in FY12. In the case of H-60 Recapitalization, additional funding will not accelerate initial programs deliveries, but could be applied later in the program to increase per-year quantities to replace the aging HH-60G.

The HC-130 is on schedule to recapitalize the current fleet of 37 airplanes with C-130J model aircraft. The first two aircraft will be delivered to the FTU in September 2011, with an additional 2 aircraft being delivered in 2012. We are currently working with OSD to right size our fixed-wing capability.

Under the Guardian Angel program, your Air Force is developing mission critical equipment that increase our joint forces combat rescue operational capability to respond in adverse conditions and environments. This equipment includes technical rescue kits, Search Sonar, collapsed structure/confined space extrication kits, and advanced parachute delivery systems.

VI. Fighter Aircraft Shortfalls

We constantly assess the Combat Air Force structure in relation to the dynamic security environment and the evolving needs of our joint force. At this time, your Air Force does foresee a fighter inventory shortfall when we compare force structure to Combatant Commander plans and requirements.

In April 2008 the Air Force informed Congress of a projected fighter gap of over 800 aircraft in 2024. Since that testimony, three key fighter force structure assumptions have changed. First, during the FY10 budget cycle the Air Force elected to accept increased short to mid-term war fighting risk and a subsequent smaller fighter force in exchange for modernization. Second, the Air Force F-35 procurement rate used for planning was increased from 48 to 80 per year. Third, the approach to fighter service life computations was refined. The combination of these changes significantly reduced the fighter gap.

Numerous internal and external assessments of the future security environment, including the 2010 Quadrennial Defense Review, have determined our current fighter force plans will fulfill Combatant Commander requirements with a moderate amount of risk.

Your Air Force intends to manage the risk assumed by a fighter shortfall, in part, by accelerating the planned retirement of our oldest 257 fighter aircraft, upon completion of the required reports to Congress later this year. This retirement will free resources to recapitalize the remaining legacy fighter fleet, providing a bridge until the F-35 and F-22 fighter force is fully capable. Finally, the A-10 and F-16 fleets are currently postured to absorb modest F-35 program delays.

The future balancing of our fighter fleet must now be viewed through the FY11 President's Budget and planned adjustments to the F-35 investment and procurement profile. These necessary modifications unfortunately reduce near-term procurement, shifts resources into research and development, and delay the fielding of this essential aircraft. We are working closely with the F-35 Joint Program Office and our service partners to fully understand the impact on fielding the capability we require to meet Combatant Commander needs.

VII. Health of Fighter Force

The average age of all Combat Air Force aircraft is 21.7 years. In August of this year, your Air Force will have been engaged in combat operations for over 21 continuous years. The assessment of our aircraft's longevity is complicated by the fact that we are currently flying the oldest Air Force fleet in our history and are using them longer and more frequently than was envisioned during their design. This presents considerable challenges in a difficult fiscal environment. In response, we have conducted an extensive investigation into the service life of our fighter aircraft. This is an ongoing effort and will be informed by detailed fatigue testing of our A-10, F-15 and F-16 fighters to better understand the life-limiting factors of these aircraft, the feasibility of extending their service life and the economic and operational sense of doing so. The work to date has reinforced our need to recapitalize our aging fleet using a combination of the acquisition of next-generation systems and modernization of selected legacy platforms.

A10

The A-10 provides our Joint Force Commanders lethal, precise, persistent, and responsive firepower for CAS and combat search and rescue. It has performed superbly in Operations DESERT STORM, ALLIED FORCE (OAF), OEF and OIF.

However, the age of the A-10 and high operations tempo have taken a toll on the fleet. The A-10 fleet's aircraft availability rating for FY10 is 52 percent.

Your Air Force plans to retain the venerable A-10 fleet beyond 2030, based on the proper care, investment, and fleet management recommendations of a 2006 Fleet Viability Board. In FY09 the A-10 fleet began a robust depot-level modification schedule that runs through the FYDP. This year we will begin installing new wings that have "thick-skin" center wing panels on 233 A-10s--nearly two-thirds of the fleet; and we will soon begin a program to improve the fuselage structure. Your Air Force is also modernizing 347 of our A-10 fleet to the "C" configuration, anticipating completion by April of FY11. This upgrade includes precision engagement modifications that integrate targeting pods and digital data links into the aircraft avionics, enabling use of GPS-aided munitions such as the Joint Direct Attack Munitions and Wind Corrected Munitions Dispenser; integrates a digital data link and advanced targeting pods with video downlink; replaces monochrome cockpit displays with color multi-function displays; installs new pilot throttle and stick controls; adds a moving map capability and a mass-memory upgrade; and doubles current DC power. Additionally, we have integrated beyond line of sight radios into the A-10 for faster communication with ground units, forward controllers, and command and control (C2) centers. Together, these modifications will allow the A-10 to continue its record of close air support excellence over the next two decades.

F-15 C/D

The F-15 C/D is an air superiority fighter with an average age of over 25 years. We project the F-15C/D fleet is viable until 2025-2030, and will consider the airframe's service life extension requirements following full-scale fatigue testing scheduled to begin this summer and conclude in FY14. Your Air Force is managing the fleet through scheduled field / depot inspections under an individual aircraft tracking program. For FY10, the F-15C/D's aircraft availability is 65 percent.

We continue to modernize our long-term F-15 fleet with Active Electronically Scanned Array radars, infrared search and track capabilities, and a more capable aircraft mission computer to boost and extend the air superiority capabilities of this aircraft. We expect these efforts to successfully enable the 176 F-15C/D "Long Term Fleet" to operate safely and effectively through at least 2025, as determined by the full-scale fatigue test.

Additionally, in FY10 the USAF reduced F-15C/D force structure by 132 permanently assigned aircraft, and retired 112 aircraft to the Aerospace Maintenance and Regeneration Group at Davis-Monthan AFB in Arizona. This leaves 199 permanently assigned aircraft (250 total active inventory) for FY11 and beyond.

F-15E

The F-15E fleet, with an average age of over 16 years, continues to provide support for on-going operations in Afghanistan and Iraq. Like the A-10, the F-15E performed superbly in operations DESERT STORM, OAF, OEF, OIF, and continues to be heavily tasked for operations in Afghanistan. In 2009, F-15Es delivered 54% of the 2000lb JDAMs and 29% of the 500lb JDAMs employed in that area of operations. The FY10 aircraft availability rate for the F-15E is 59 percent.

Your Air Force has been working hard to improve the F-15E's ability to rapidly engage and destroy time sensitive targets by adding secure radios and data links for faster communications with ground units and forward controllers; by integrating the latest precision weapons that not only hit a target accurately but are designed to reduce collateral damage; by adding a helmet mounted cueing system that will reduce the F-15E's time to engage a target by up to 80%; and by adding a state-of-the-art, Active Electronically Scanned Array (AESA), radar system that not only addresses sustainment issues with the current system but will give the F-15E advanced capabilities to identify and engage targets, and share information with other aircraft. Your Air Force plans for the F-15E to be an integral part of the Nation's force through at least 2035.

F-16

Our multi-role F-16 comprises the majority of the fighter fleet. There has been a 3.6% drop in the F-16 fleet's aircraft availability since FY05. Drivers contributing to this decline are the Falcon STAR (all blocks) structural integrity program, 341 bulkhead repair/replacement (block 40/50), engine inlet RAM (all blocks), lower wing skin cracking (blocks 25/30/32), and aft cockpit corrosion for the two seat aircraft. We expect these drivers to continue to impact aircraft availability through FY15. The F-16's FY10 aircraft availability is 67 percent.

Extensive flight hours and more stressing mission profiles resulted in the need for significant structural modifications to the F-16. This upgrade program, scheduled to complete in FY13, replaces known life-limited structural components, and will maintain the original design airframe life of 8,000 flight hours. Wing pylon rib corrosion, a known problem with the F-16 aircraft, is an issue we monitor closely through inspections every 800 hours. This corrosion can prevent the F-16s from carrying pylon mounted external fuel tanks which limits their effective combat range. In partnership with industry, the Air Force has recently developed and certified an effective repair allowing repair of affected aircraft at the unit in a single day instead of requiring a lengthy wing overhaul at the depot.

In other inspections, maintainers have found bulkhead cracks in approximately 68 percent (271 of 397) of our Block 40/42 F-16 aircraft. 170 aircraft have been repaired and 49 aircraft have had the bulkheads replaced with 13 more in progress. An additional 145 aircraft continue to fly with increased inspection requirements to measure crack growth. We will continue to monitor this situation closely. Similar to the F-15, the Air Force will start conducting a full-scale durability test for the F-16 in FY11 to help establish the maximum service life and more effectively manage structural health of the fleet.

The Common Configuration Implementation Program (CCIP) is a top F-16 priority and will enable the maintenance of a single operational flight program configuration on the Block 40/42/50/52 F-16s. The Block 50/52 modification is complete and the Block 40/42 modification will be complete this year. It combines several modifications including a new mission computer, color displays, air-to-air interrogator (Block 50/52 only), Link-16, and Joint Helmet Mounted Cueing System. The F-16 is expected to be a capable element of the fighter force well into 2024.

Fifth Generation Fighters

Fifth generation fighters like the F-22A and the F-35 are key elements of our Nation's defense and ability for deterrence. As long as hostile nations recognize that U.S. airpower can strike their vital centers with impunity, all other U.S. Government efforts are enhanced, which reduces the need for military confrontation. This is the timeless paradox of deterrence; the best way to avoid war is to demonstrate to your enemies, and potential enemies, that you have the ability, the will, and the resolve to defeat them.

Both the F-22A and the F-35 represent our latest generation of fighter aircraft. We need both aircraft to maintain the margin of superiority we have come to depend upon, the margin that has granted our forces in the air and on the ground freedom to maneuver and to attack. The F-22A and F-35 each possess unique, complementary, and essential capabilities that together provide the synergistic effects required to maintain that margin of superiority across the spectrum of conflict. The Office of the Secretary of Defense-led 2006 Quadrennial Defense Review Joint Air Dominance study underscored that our Nation has a critical requirement to recapitalize TACAIR forces. Legacy 4th generation aircraft simply cannot survive to operate and achieve the effects necessary to win in an integrated, anti-access environment.

F-22A Future Capabilities & Modifications

The F-22A Raptor is your Air Force's primary air superiority fighter, providing unmatched capabilities for air supremacy and homeland defense for the Joint team. The multi-role F-22A's combination of speed, stealth, maneuverability and integrated avionics gives this remarkable aircraft the ability to gain access to, and survive in, high threat environments. Its ability to find, fix, track, and target enemy air- and surface-based threats ensures air dominance and freedom of maneuver for all Joint forces.

Similar to every other aircraft in the U.S. inventory, there is a plan to regularly incorporate upgrades into the F-22A to ensure the Raptor remains the world's most dominant fighter in the decades to come. The F-22A modernization program consists of two major efforts that, together, will ensure every Raptor maintains its maximum combat capability: the Common Configuration program and a pre-planned product improvement (P3I) program (Increments 2 and 3). We are currently in year six of the planned 13-year program.

As of 26 February 2010, your Air Force has accepted 155 F-22A aircraft out of a programmed delivery of 187. We will continue to upgrade the F-22A fleet under the JROC-approved Increment 3 upgrade designed to enhance both air-to-air and precision ground attack capability. Raptors from the production line today are wired to accept Increment 3.1, which, among other hardware changes, upgrades the APG-77 AESA radar to enable synthetic aperture radar ground mapping capability, provides the ability to self-target JDAMs using on-board sensors, and allows F-22As to carry and employ eight Small Diameter Bombs (SDB). Your Air Force will begin to field Increment 3.1 in FY11.

Responding to current threat assessments, the next upgrade will be Increment 3.2 "Accelerated, with completes development in FY13. 3.2 "Accelerated" is a software-only upgrade and provides significant additional Electronic Protection, Link 16 improvements, and a better Combat Identification capability. In the future, F-22As will receive the Increment 3.2 full upgrade, which features MADL, improved SDB employment capability, improved targeting using multi-ship geo-location, additional Electronic protection and Combat ID, automatic ground collision avoidance system (Auto GCAS) and the capability to employ our enhanced air-to-air weapons (AIM-120D and AIM-9X). Increment 3.2 should begin to field in FY16. The current F-22A modernization plan will result in 34 Block 20 aircraft used for test and training, 63 Block 30s, 87 Block 35s, and two Edwards AFB-test coded aircraft.

F-22A Procurement Plans

The F-22A production program is currently delivering Lot 8 aircraft ahead of scheduled contract delivery dates at a rate of about two per month. Lot 8 Raptors are the second lot of the three-year multiyear procurement contract awarded in the summer of 2007. The Air Force completed F-22A deliveries to Elmendorf AFB, Alaska and we are currently underway with deliveries to two squadrons at Holloman AFB, New Mexico with expected completion in January 2011.

When the plant delivers the last Lot 10 aircraft in 2012, we will have completed the program of 187 Raptors. The average unit cost for the 60 aircraft in the multiyear procurement was $142.6M. The Lot 10 unit flyaway cost is estimated at $153.2M. $10.6M higher than under the multiyear procurement due to higher material costs for a much smaller lot buy, loss of the multiyear procurement savings in parts and labor, and inflation.

F-35

The F-35 program will develop and deploy a family of highly capable, affordable, fifth generation strike fighter aircraft to meet the operational needs of the Air Force, Navy, Marine Corps, and Allies with optimum commonality to minimize life cycle costs. The F-35 was designed from the bottom-up to be our premier surface-to-air missile killer and is uniquely equipped for this mission with cutting edge processing power, synthetic aperture radar integration techniques, and advanced target recognition. The F-35 also provides "leap ahead" capabilities in its resistance to jamming, maintainability, and logistic support. The F-35 is currently in the 9th year of a 14 year Engineering and Manufacturing Development (EMD) phase.

The F-35 is projected to meet all Key Performance Parameters (KPP) and as of 17 December 2009, AA-1 completed its 91st and final test flight. The second F-35A, AF-1, completed its first flight test on 14 November 2009. The first system development and demonstration (SDD) Short Take-Off and Vertical Landing (STOVL) aircraft, BF-1, successfully completed several flights leading toward the program's first vertical landing, which occurred on 18 March 2010. The second SDD STOVL aircraft, BF-2, had its first flight in February 2009. As of March 2010, 16 of 19 SDD aircraft have been produced, including 6 ground test aircraft and 10 flight test aircraft. In addition, the F135 CTOL engine reached Initial Service Release on 5 March 2010, and the first F135 production engine was delivered to the government on 29 January 2010. The Cooperative Avionics Test Bed (CAT-B) continues to provide unprecedented risk reduction at this stage in a major weapon system not seen in any legacy program. The F-35 program was restructured and funded to be consistent with the most recent independent estimates, removing $2.3B from procurement and adding $1.4B to RDT&E across the FYDP. In addition, CTOL quantities were reduced by 67 across the FYDP. The FY11President's Budget provided funding for 22 CTOL, 13 STOVL and 7 CV aircraft, as well as 1 OCO CTOL aircraft.

VIII. Health of Bomber Force

The B-1, B-2 and B-52 remain engaged in today's fight while retaining an ability to meet future challenges. Air Force bombers have been on rotating deployments to Southwest Asia since September 11th. The bomber aircraft inventory is 162 and averaged at 33.7 years old. Your Air Force continues its commitment to future long-range strike capabilities as part of a comprehensive, phased plan to modernize and sustain our bomber force. We will continue planned legacy bomber sustainment and modernization to increase the capabilities of the fleet.

B-1

The B-1 is fighting in Afghanistan by providing long-range persistent airpower in direct support of NATO, US and Afghan troops. The B-1 provides real-time intelligence, surveillance and reconnaissance with full-motion video, enhanced situational awareness, and a demonstrable over watch presence. B-1s added SNIPER Advanced Targeting Pod capability in summer 2009 to provide aircrews with positive identification capability and the ability to share video with ground forces. The AF developed this capability on an accelerated 18-month timeline in response to a CENTCOM tasking. Other B-1 modernization programs include the Fully Integrated Data Link (FIDL), Radar Reliability and Maintainability Improvement Program and the Inertial Navigation System & Gyro Stabilization System.

B-1 aircraft availability rates remained relatively level for FY02-FY07 with a drop in FY08 and FY09 primarily driven by modernization efforts. To mitigate manpower shortages and reduced maintenance experience levels, B-1 bases have been augmented by a contract field team which will continue through April 2011. Manning authorizations have been approved but manning will continue to affect the B-1's aircraft availability rating into the distant future while personnel are trained and gain experience. Your Air Force continues to modernize and support its bomber fleet with over $5.5B planned over the FYDP in modernization and sustainment investments. The B-1, B-2 and B-52 bombers each have programs to ensure their viability into the future.

The B-1B Lancer has maintained an unflagging deployed presence since September 11, 2001 in support of Operations ENDURING FREEDOM and IRAQI FREEDOM. During that time, the B-1 fleet and its crews have flown more than 6,900 missions and amassed more than 70,000 combat hours. In Operation ENDURING FREEDOM alone, the B-1 has employed nearly 40 percent of all munitions while flying only 5 percent of all sorties.

Given the B-1's critical contributions to today's fight and its corresponding high operations tempo, your Air Force places great emphasis on sustaining the B-1 fleet. B-1 sustainment efforts address several issues which, if left unchecked, could critically limit aircraft availability and leave a gap in our power projection capability. Although these modifications represent a significant investment, they are critical to supporting our deployed combat forces by ensuring continued B-1 availability.

Your Air Force's primary B-1 modernization effort is the Fully Integrated Data Link, or FIDL. FIDL gives aircrew enhanced situational awareness and combat effectiveness by incorporating Link-16 data link and Joint Range Extension Beyond Line-of-Sight capabilities. FIDL also provides the backbone infrastructure for a substantial upgrade to the existing cockpit including modern multi-function color displays that provide aircrew with a new level of fused data.

Your Air Force continues to develop the highly successful Laptop Controlled Targeting Pod, or LCTP, modification for the B-1. Initiated in 2007 in response to a CENTAF Urgent Need Request and operational since 2008, LCTP provides the B-1 with targeting pod capabilities via the Sniper Advanced Targeting Pod, or ATP. The B-1 combined with the Sniper ATP delivers an unprecedented level of payload precision to the fight. Efforts continue to outfit the entire B-1 fleet for Sniper operations and provide a Moving Target Kill capability via employment of laser-guided weapons.

B-2

The B-2 is a part of supporting US Pacific Command's Continuous Bomber Presence to assure allies and support US interests in the Pacific. The B-2 is undergoing a Radar Modernization Program and will attain FOC in FY13. The Defensive Management System will provide improved capability for the B-2 to penetrate modern threat environments. B-2 aircraft availability rates have improved steadily since FY05; however, they are projected to remain below target due to upgrade and modernization programs. Obsolescence in avionics and diminishing manufacturing sources continue to cause supportability issues.

The B-2 Spirit Advanced Technology Bomber provides a lethal combination of range, payload, and stealth, and remains the world's sole long-range, low observable bomber. It is the only platform capable of delivering 80 independently targeted 500-lb

Joint Direct Attack Munitions (GBU-38). While B-2 availability has steadily increased over the past five years, in part due to enhancements in low observable maintenance such as the highly successful Alternate High Frequency Material program, it faces increasing pressures to upgrade avionics originally designed over twenty years ago. The Extremely High Frequency Satellite Communications and Computer Upgrade Program (EHF SATCOM and Computer Upgrade) has three increments. Increment 1 upgrades the Spirit's flight management computers as an enabler for future avionics efforts. Increment 2 integrates the Family of Beyond-line-of-sight Terminals (FAB-T) along with a low observable antenna to provide secure, survivable strategic communication, and Increment 3 connects the B-2 into the Global Information Grid. Increment 1 of EHF SATCOM and Computer Upgrade is in Engineering and Manufacturing Development and on track to begin procurement in FY-2011 for fleet installations beginning at the end of FY-2013. The Department is also investing in the B-2's Defensive Management System to ensure continued survivability. This will allow the B-2 to continue operations in more advanced threat environments while decreasing the maintenance required operating the system.

We will also replace the B-2's original radar antenna, upgrade selected radar avionics and change the radar operating frequency as part of the Radar Modernization Program (RMP). We signed the Low Rate Initial Production (LRIP) contract for the first six production radar kits in December 2008 and contracted the second and final full-rate buy for the remaining seven ship sets in November 2009. Also, we bought seven radar ship sets during development and are installing in fleet aircraft to round out the twenty aircraft B-2 fleet. The developmental units will be retrofitted to the final production configuration. This program successfully achieved required assets available (RAA) on 15 March 2010. Thanks in large part to Congressional support, the RMP acquisition strategy was modified to include life-of-type component buys to avoid diminishing manufacturing source issues during the production run.

B-52

The B-52 amplifies the consistent message of long-range US airpower in a theater like USPACOM where distances drive decisions. Equipped with advanced targeting pods, the B-52s can also provide real-time ISR with full-motion video, enhanced situational awareness, a demonstrable over watch presence and precision joint fires in support of CDRUSPACOM objectives.

The B-52 fleet's aircraft availability rates remained relatively level until FY08. Reduction in aircraft availability due to an increase in PDM induction was driven by a 2008 NDAA decision. The bow wave is expected into FY10, but the mitigation efforts in place should achieve improvements by the end of FY10. Additional factors affecting the fleet include fleet repairs and new capability modernization, including Advanced Weapons Integration and Advanced Targeting Pod, Combat Network Communications Technology, Extremely High Frequency Satellite Communications (SATCOM), and the Strategic Radar Replacement.

The B-52 Stratofortress is our nation's oldest frontline long-range strategic bomber with the last airframe entering service in 1962. Your Air Force has invested in modernization programs to keep the platform viable and operationally relevant. Major B-52 modernizations include the Combat Network Communications Technology (CONECT), EHF SATCOM, Strategic Radar Replacement (SR2), and the 1760 Internal Weapons Bay Upgrade programs. CONECT provides an integrated communication and mission management system with machine to machine datalink interfaces for weapons delivery. The digital infrastructure provided in CONECT is the backbone for EHF SATCOM and SR2. The EHF SATCOM program integrates the FAB-T providing assured, survivable two-way strategic command and control communications. The SR2 program, starting in FY10, integrates modern non-developmental radar to address systemic sustainment issues, replacing the legacy APN-166 radar. Finally, the 1760 Internal Weapons Bay Upgrade provides internal J-series weapons capability through modification of Common Strategic Rotary Launchers and an upgrade of stores management and offensive avionics software. Updated with modern technology the B-52 will be capable of delivering the full complement of jointly developed weapons and will continue into the 21st century as an important element of our nation's defenses.

Long Range Strike (LRS)

The FY11 Presidential Budget began funding for technology industrial base sustainment in anticipation of a future long range strike (LRS) platform program. This effort develops and demonstrates LRS technologies and concepts in support of Air Force Global Strike and Global Persistent Attack Concepts of Operations. This effort will provide capability improvements in the areas of strike responsiveness, survivability, lethality, connectivity, and affordability. The Quadrennial Defense Review-directed LRS study will help inform and shape the requirements for LRS.

The FY11 Presidential Budget adds $199 million in FY11 and $1.7 billion over the FYDP for LRS. FY11 investments will reduce technology risk, preserve critical technology industrial base skills and refine requirements for a future long range strike platform. Investment areas of interest include advanced sensors, electronic warfare and countermeasures, survivability, manufacturing readiness, net-ready communications, open systems and multi-level security architectures, mission management, weapon effectiveness and survivability, and combat identification.

XI. Aviation Safety

The Air Force experienced the safest year in Air Force history in FY09 with a .80 rate per 100,000 hours, and only 17 Class A Mishaps (accidents involving more than $1 million dollars, destroyed aircraft, loss of life or permanent total disability). So far in FY 10, we have experienced an even better rate than last year's record safety rates with a .56 rate per 100,000 hours as of 15 March 10. There are no mishap trends or other "significant aviation-related safety issues" from those fleets impacting their ability to execute the National Military Strategy. The Air Force continues to pursue lessons learned and conducts thorough investigations making sure any and all critical safety information is delivered across the Air Force and to sister services, to ensure we continue to have a safe and effective fighting force.

XII. Joint Air-to-Surface Stand-off Missile (JASSM)

The JASSM is the Nation's only stealthy, conventional, precision, launch-and-leave, stand-off missile capable of being launched from fighter and bomber aircraft. The JASSM achieved an operational capability on B-52, B-1, F-16 and B-2 and puts an adversary's center-of-gravity targets at risk even if protected by next-generation air defense systems.

The Air Force postponed the JASSM FY09 production contract due to unsatisfactory flight tests of the Lot 5 JASSM production missiles. Of the 10 flight tests, we considered six to be complete successes. To address issues discovered during the JASSM test program to date, we paused FY09 missile production in order to incorporate reliability improvements and conducted Lot 7 reliability tests which achieved 15 for 16 successful hits. The FY11 President's Budget requests funds for the procurement of 171 missiles to include the first order of the Extended Range variant.

X. Conclusion

Your Air Force and its outstanding Airmen remain focused on the mission--the continued security of our great Nation. We are convinced that a balanced force structure will enable us to extend our Nation's supremacy in the air domain, and--along with our joint partners--prevail today and tomorrow. USD/AT&L Ash Carter recently testified that: "I support, as does the Secretary, the initiatives the Congress directed when it unanimously passed the Weapon Systems Acquisition Reform Act (WSARA) of 2009.Acquisition Reform is one of DoD's High Priority Performance Goals presented in the Analytic Perspectives volume of the President's FY 2011 Budget. The Department is moving out to implement these initiatives." The Air Force actions described above are part of and consistent with WSARA implementation and DoD's Acquisition Reform goal. We thank this committee for your shared commitment and for this opportunity to meet with you today.

DOCUMENTS SUBMITTED FOR THE RECORD

MARCH 24, 2010

Chairman Adam Smith

April 12, 2010

Question #22: Based on test hours accomplished to date, how many months behind is F136 testing?

Answer: The F136 is 2–3 months behind schedule to the original plan.

Question #6: How long are the F135 and F136 programs delayed, 21 months? Was the delay of 21 months for both engines?

Answer: The Joint Program Office does not recognize the 21-month delay. The original F135 Systems Development and Demonstration (SDD) contract, signed 26 October 2001, had an Initial Service Release (ISR) set for November 2007. The current F135 SDD program has achieved Conventional Take-off and Landing (CTOL) ISR 1st quarter FY2010 and Short Take-off and Vertical Landing (STOVL) ISR is planned for 4th quarter FY2010. The original F136 SDD contract, signed 19 August 2005, had an ISR of May 2012. The F136 is not currently funded in FY11 or the out years. A fully funded SDD program would plan for a CTOL ISR in December 2012 and a STOVL ISR December 2013.

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

MARCH 24, 2010

RESPONSE TO QUESTION SUBMITTED BY MR. SMITH

Secretary CARTER. The DCMA Fighter Engine Industrial Capability Assessment (ICA) focused on the Industrial Base (IB) and specifically the long-term outlook for fighter engine development. DCMA strategic conclusions and recommendations from the ICA focused on the inherent risks and/or benefits to the IB of various fighter engine procurement scenarios. This included the impact to maintaining a competitive environment. The overall DoD decision to not continue funding of the F136 engine is based on a multitude of other factors that were not within the scope of the assessment requirements. The factors, which included budget/mission tradeoffs, acquisition risks, performance, supportability and overall life cycle cost were analyzed by the Government Accountability Office and the Cost Analysis Improvement Group, now Cost Analysis and Program Evaluation. Positive outlook for engine manufactures in 2008 was largely attributable to commercial and services business; however, this workload will only partially sustain specialized skills, processes, facilities and technologies required to design and develop next generation fighter engines. At the completion of F135 and F136 SDD programs, industry will be without a major fighter engine development program for the first time in over 35 years. This is regardless of production strategies. Strategic recommendation included defining and funding requirements for next generation engines. The benefits included retaining critical engineering skills and attracting new generation of engineers to refill the pipeline.

Background

The DCMA Fighter Engine ICA performed in 2008 focused on a limited data set and assumptions including existing employment, unique skill sets, competition and market forecast. The ICA requirements from the Secretary of the Air Force for Acquisition included assessing Fighter Engine capabilities at Pratt and Whitney (P&W), General Electric (GE) and Rolls Royce (RR), analysis of production scenarios at each contractor, market and economic assessment of the commercial and fighter engine industrial base and impacts of Research Development Test and Evaluation budgets. The production scenarios included F136 engine cancelled, F136 engine cancelled and increased quantities of F–22 engines and F136 reinstated with a JSF engine workload split. Risk was assessed based on the three production scenarios and design engineering, commercial engine production and fighter engine production in 2008, 2012 and 2017. For decades, GE and P&W have had at least one new or derivative fighter engine under development. The ICA concluded that without the F136, GE's unique Fighter Engine design capabilities would erode. This would impact the ability of GE to compete on future fighter/combat engine contacts. From a tactical level, the study recommended that F136 production is reinstated under FY 2006 schedule. The ICA revealed that GE and RR were working on Adaptive Versatile Engine Technology (ADVENT), developing and demonstrating technologies for next generation engines. ADVENT and Highly Efficient Embedded Turbine Engine (HEETE) have been among the largest Science and Technology (S&T) efforts in the Air Force since 2007. The ICA concluded that ADVENT, HEETE, S&T, Tech Mat and Component Improvement Programs are not sufficient to sustain the engineering base for fighter engines long term. The ICA shows relatively little difference in outyear risk (2017), regardless of F135/136 engine sales, and revealed if new R&D efforts are not defined and launched at the Program level, design skills would be at risk at both GE and P&W. [See page 31.]

RESPONSES TO QUESTIONS SUBMITTED BY MR. TAYLOR

Secretary CARTER. [The Under Secretary of Defense for Acquisition, Technology and Logistics met with Representative Taylor on March 15, 2010, to discuss his concerns.] [See pages 21 and 22.]

Secretary STACKLEY. Under the SDD contract we procured data rights to the majority of the technical data created in developing the engine. This includes rights to drawings and specifications. There is still a significant portion of the technical data for which we have limited rights. Although limited, these rights are suitable for executing a sustainment strategy which includes standing up organic support for the F135 engine and components at government depots. Where warranted by business case analysis and consistent with the provisions of existing Memoranda of Understanding, the F–35 program will assess the merits of acquiring the technical data that would be required to compete sustainment of parts, components, or subsystems. [See page 40.]

RESPONSE TO QUESTION SUBMITTED BY MR. BARTLETT

Secretary STACKLEY. In those cases where the government paid for the development of all the intellectual property contained in the drawing/specifications for an engine part, the government retains unlimited rights and could obtain competitive bidding. In those cases where the government did not pay for the development of all the intellectual property, which is a significant portion of the engine, we acquired only those rights needed to sustain the parts throughout their life cycles. The program office will continue to assess the value to the government of paying the substantial up-front costs to procure a competitive data package for engine parts in the event that the sustainment strategy needs to be updated based on fleet experience or a change in business conditions.

In those cases where the government paid for the development of all the intellectual property contained in the drawings, specifications, and manufacturing processes for an engine part, the government retains unlimited rights. In those cases where the government did not pay for the development of all the intellectual property, which is a significant portion of the engine, we acquired only those rights needed to sustain the parts throughout their life cycles. The program office will continue to assess the value to the government of paying the substantial up-front costs to procure a competitive data package for engine parts in the event that the sustainment strategy needs to be updated based on fleet experience or a change in business conditions.

Regarding tooling, the government paid for the design and procurement of most of the tools uniquely needed for manufacturing the F135 and therefore owns the special purpose tooling and rights thereto. General purpose tooling used on multiple product lines is owned by the manufacturer. [See page 41.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 24, 2010

QUESTIONS SUBMITTED BY MR. SMITH

Mr. SMITH. In the letter of invitation for this hearing, the committee asked if there had been any fighter engine industrial base studies that had been completed by the Department or on behalf of the Department in the past five years of one-engine and two-engine F–35 programs.

Your staff-provided response indicated that there have been no studies beyond the Department's 2007 study prepared in response to a congressional requirement.

Your staff was apparently not aware of a May 2008 Defense Contract Management Agency "Fighter Engine Industrial Capability Assessment" that recommended that F136 alternate engine production be reinstated under the fiscal year 2006 schedule to provide for production deliveries in fiscal year 2010. As you are aware, fiscal year 2006 was the last year that the Department of Defense budgeted for the alternate engine. In your testimony you indicated you would like to have more than one military engine company in the U.S. The DCMA assessment indicates that the lack of a major engine development program threatens the survivability of the military engine industrial base after the development of the F135, regardless of whether the F136 is funded: At completion of the F–35 SDD program, the F–35 engine manufacturers "will be without a major fighter engine development program for the first time in over 35 years." What is the policy of the Department with regard to maintaining a competitive high performance-low observable engine industrial base and what FYDP plan and funding does the Department have to support the Department's policy? What is your view of the military engine industrial base's ability to develop and produce affordable low-observable high performance engines in a competitive environment absent the F136 program?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. As you know, section 213 of the National Defense Authorization Act for FY 2008 directed the Department to ensure the "obligation and expenditure in each fiscal year of sufficient annual amounts for the continued development and procurement of two options for the propulsion system for the Joint Strike Fighter."

How do you and the OSD General Counsel view the Department's conformance with section 213 by not including funds in the budget request for a competitive JSF engine?

What is the status of fiscal years 2009 and 2010 procurement and RDT&E appropriated funds specifically directed to the alternate engine? Has the Department withheld funding? Why and what are the plans for use of the withheld money?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. What has been the impact of funding withholds and uncertain future funding on the second engine contractor?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. The committee remains concerned that the Department is not complying with the intent of Congress and existing statute in the execution of the F136 program. The Department's continued failure to execute authorized and appropriated funding for the F136 makes management of the program unnecessarily difficult and ultimately more expensive for the Department.

Congress authorized and appropriated $35 million in each of fiscal years 2009 and 2010 for F135 advance procurement, as specified by the F–35 Joint Program Office as the amount needed and executable for the F135 program. The Department later determined that procurement funds in fiscal years were premature to need. Given the clear intent of Congress to proceed with the alternate engine, why has the Department not reprogrammed the $70 million for alternate engine development?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. As you know, the Department has a LRIP standard of ten percent of total production, yet determined in 2001, long before the major delays in the program, that exceeding the ten percent standard was warranted. The procurement profile currently planned would result in Congress being required to authorize a cumulative 550 F–35s in 2015, one year before the milestone C decision, for the highest year of annual production in 2016 of any year in the JSF program. What should determine LRIP annual and cumulative production rates prior to milestone C, the production facility's ability to produce airplanes or the progress of flight testing?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. Affordable life-cycle operating and support costs are a key tenet of the JSF program goals. It is critically important that the U.S. and international partners be able to afford future O&S bills. The estimate in the new SAR shows O&S costs per flying hour are materially higher than current costs for the F–16, one of the aircraft it is to replace.

Wasn't the JSF supposed to cost less per flying hour than the aircraft it is replacing? What are the implications and impacts on future budgets if costs are materially higher than those for legacy systems?

What factors are driving increased life cycle cost estimates?

We understand that the Naval Air Systems Command is projecting even higher O&S costs than the program. How much more? What are the key reasons why the NAVAIR estimate is higher? Do you agree or disagree with NAVAIR?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. Regarding the history of the F135 and F136 test delays due to engine anomalies during testing, for each significant finding during SDD testing, please: 1) describe the engine anomaly, 2) describe length of delay for redesign/repair, 3) provide the cost impact to the program as a result of this delay, and 4) provide the weight growth impact as a result of the necessary modifications to fix the anomaly.

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. In your statement you note that Secretary Gates directed the procurement of an additional carrier version to be used for flight testing, and that three early production jets planned for operational test would be loaned to developmental test. Of the three early production jets to be loaned to development test, what is the model of the aircraft (ie. A, B, or C) that the Joint Estimating Team II recommended, and what model is the Joint Program Office executing for this purpose? If they are different, why are they different?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. Is "business case" defined anywhere in Department regulations or directives? Is there a requirement as to what the content is for a business case analysis?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. With your statement you attached an enclosure 1 classified in its entirety as "For Official Use Only" and "Competition Sensitive-Company Proprietary." Please provide an updated copy of this document that identifies which paragraphs are "For Official Use Only," "Competition Sensitive-Company Proprietary," or unclassified.

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. SMITH. Ms. Fox, your recent analysis of the alternate engine program shows that, on a net present value basis, life-cycle costs to go are the same for either a one-engine or two-engine program. DOD's 2007 alternate engine study considered the non-financial factors of a two-engine program, including a hedge against risks in development and production, enhanced contractor responsiveness, technological innovation, and a more robust industrial base. In your latest analysis, what value did you ascribe to these non-financial factors? Why wouldn't a two-engine F–35 program be the best value since the costs to go for either option are the same?

Ms. FOX. OSD–CAPE did not assign a value to possible long-term aspirational nonfinancial factors in its 2010 update analysis. Rather, OSD–CAPE's analysis considered the tangible near-term factors that yield a savings in the short term.

Mr. SMITH. Ms. Fox, in your statement you note that CAPE concluded that the competitive procurement of F136 engines would now begin in 2017, three years later than the 2014 date assumed in prior analyses. Last year, the Joint Program Office noted a requirement for long-lead procurement funding so that engines could be procured in 2011 with a competition in 2014. What has changed about the F136 program that you now believe there is a three year delay? What information otherwise do you base your recommendation on to delay competitive procurement to 2017? Why is there necessarily a correlation between F–35 aircraft program delays and the ability of the F–35 aircraft program to test F136 engines? How many months delay in the F136 program do you attribute primarily to the delay in the F–35 aircraft program?

Ms. FOX. With the restructured program, the engine competition will slide to 2017 because additional time is necessary for: (1) completing the development program, i.e., SDD, for the alternate engine; (2) funding an engine component improvement program to maintain engine currency; (3) performing directed buys of engines from the primary and second sources to prepare for a competition, and (4) procuring tooling, support equipment, and spares.

Mr. SMITH. Ms. Fox, the Department concurred with GAO's recommendation in their recent report that DOD complete a full independent and comprehensive cost estimate for the JSF program. We understand that your CAPE team is continuing its good work. What is the status of the CAPE's work and the schedule for completing it? Will the new estimate be in the December 2009 Selected Acquisition Report? Military construction costs have been seriously under-estimated in past F–35 SARs. Past SARs projected MILCON from $0.5–$2 billion. Are you making a new projection of MILCON? Will it be in the December 2009 SAR? Do you have an idea on the order of magnitude of a more complete estimate? What about JSF-related expenses that are not funded through the program? Is your CAPE team looking at potential requirements such as strengthening and heat-shielding carrier decks? What about costs for reconfiguring carrier storage and servicing space and special facilities, support equipment, command and control systems for deployed JSF units? Are any of these already programmed for funding in the FYDP? What and how much? Are there initial projections for these kinds of costs and when they will be needed in the budget?

Ms. FOX. OSD–CAPE will assess MILCON and other JSF-related costs in the program, in accordance with the Nunn-McCurdy certification review, which is scheduled to be complete on 1 Jun 2010. The Office of the Under Secretary of Defense for Acquisition, Technology & Logistics (OUSD(AT&L)) is better able to answer questions related to the 2009 SAR, which was released on 6 Apr 2010. OSD–CAPE will conduct an independent cost analysis of the JSF program in accordance with the Nunn-McCurdy certification review. This analysis will conclude on or before 1 Jun 2010, with a new program baseline (including an estimate of MILCON costs) to be provided sometime in the summer. The SAR, published on 6 Apr 2010 does not reflect this work. The OSD–CAPE Nunn-McCurdy analysis will not include non-program-related costs, e.g., heat shielding. These are potential Service-specific requirements that, if required, will be funded by the Services.

Mr. SMITH. Ms. Fox, on the F135 and F136 engine, assuming fully funding the respective contractors at a dollar level that can be productively executed, what would be the required funding, in then-year dollars, by appropriation, for fiscal year 2011 and in total for the remainder of the future years defense program, (A) To complete development (B) To prepare for competitive procurement (C) And in what year would competition be possible?

Ms. FOX. OSD–CAPE estimates that $2.9 billion is required through FY 16 to prepare the alternate engine for competition starting in FY 17.

Mr. SMITH. Ms. Fox, what was the CAIG's estimated total cost ($TY), by fiscal year, for SDD, procurement, and operation and maintenance funding required for both the F135 and F136 engines when the 2007 study was accomplished (actual through 2006 and projected thereafter) and for the February 2010 provided update the CAPE's estimated total cost ($TY) for SDD, procurement, and operation and maintenance funding, by fiscal year, as currently projected (actual through 2009, projected thereafter) for both the F135 and F136 engines? Also, how much of the recently determined additional $2.9 billion (to take the F136 program to competition in 2017) was included in the 2007 study? If the amounts are higher in the 2010 analysis, please explain why.

Ms. FOX. Because question #40 contains two questions, the answers are provided in two parts.

Proposed Response: The Joint Strike Fighter Alternative Engine Acquisition and Independent Cost Analyses report prepared by the Office of the Secretary of Defense, Cost Analysis Improvement Group in 2007 was prepared in accordance with Section 211 of the FY 2007 National Defense Authorization Act (P.L. 109–364). The statute required preparation of a life-cycle cost estimate. The results of the life-cycle cost computations are captured in the following two tables extracted directly from the original report. The first table, Table 4 in the original report, shows the costs for an F135 only program except for the sunk costs which consists of both F135 and F136 funding through FY 2007.

Table 4. F135-Only Life-Cycle Cost Estimate

	TY $B	Constant FY02 $B	NPV $B
SDD	7.2	6.5	6.7
Sunk*	5.3	4.9	5.2
To Go	1.9	1.6	1.5
Production	36.4	24.5	18.0
O&S (US only)	66.4	29.0	14.2
Total	$110.0	$60.0	$38.9

* Through FY07

The second table, Table 5 in the original report, shows the estimated life-cycle cost savings associated with competition.

Table 5. F135/F136 Life-Cycle Cost Estimates Under Competition

	TY $B		Constant FY02 $B		NPV $B	
	Dual Source	Delta From Sole Source	Dual Source	Delta From Sole Source	Dual Source	Delta From Sole Source
SDD	9.6	+ 2.4	8.6	+ 2.1	8.6	+ 1.9
Sunk*	5.3	--	4.9	--	5.2	--
To Go	4.3	+ 2.4	3.7	+ 2.1	3.4	+ 1.9
Production	34.5	- 1.9	23.4	- 1.1	17.4	- 0.6
O&S (US only)	63.7	- 2.7	28.3	- 0.7	14.1	- 0.1
Total	$107.8	- $2.2	$60.3	+ $0.3	$40.1	+ $1.2

* Through FY07

This life-cycle cost analysis prepared in the FY 2007 report, as specified in law, required the estimation and integration of the total development, procurement, and operating and support costs over the anticipated life-cycle of the JSF aircraft program. As a result, no breakouts of costs by fiscal year or by appropriation were prepared during the preparation of the FY 2007 report.

A more recent "quick update" to the 2007 analysis, prepared in February 2010, updated two specific areas of SDD costs estimated in the FY 2007 report. First, "sunk costs" were updated to include the additional appropriations, through FY 2010, that had been directed by Congress for development of the F136 alternative engine. Second, the SDD costs to go were updated based on more recent actual cost information from both engine development programs. These changes were incorporated as changes to the original life cycle cost estimates from the 2007 report. Accordingly, breakouts by fiscal year or by appropriation are not available from this analysis.

A revised version of the two tables (i.e., Tables 4 and 5 in the 2007 report) is shown below. As expected, the 2010 "quick update" indicates that a competitive engine acquisition strategy becomes slightly more attractive in an economic sense than the 2007 analysis.

F135-Only Life-Cycle Cost Estimate - 2010 Quick Update

	TY$B	Constant FY02$B	NPV $B
SDD	$9.4	$8.4	$8.8
Sunk*	$8.8	$7.9	$8.4
To Go	$0.6	$0.5	$0.4
Production	$36.4	$24.5	$18.0
O&S (US only)	$66.4	$29.0	$14.2
Total	$112.2	$61.9	$41.0

* Through FY10

F135/F136 Life-Cycle Cost Estimates Under Competition-2010 Quick Update

	TY$B		Constant FY02$B		NPV $B	
	Dual Source	Delta From Sole Source	Dual Source	Delta From Sole Source	Dual Source	Delta From Sole Source
SDD	$10.4	+ $1.0	$9.2	+ $0.8	$9.5	+ $0.7
Sunk*	$8.8	–	$7.9	–	$8.4	–
To Go	$1.6	+ $1.0	$1.3	+ $0.8	$1.2	+ $0.7
Production	$34.5	- $1.9	$23.4	- $1.1	$17.4	- $0.6
O&S (US only)	$63.7	- $2.7	$28.3	- $0.7	$14.1	- $0.1
FY10 Update	$108.6	- $3.6	$60.9	- $1.0	$41.0	--

2nd question:

Also, how much of the recently determined additional $2.9 billion (to take the F136 program to competition in 2017) was included in the 2007 study? If the amounts are higher in the 2010 analysis, please explain why.

Proposed Response: It is important to note that $2.9B estimate of FY 2011–16 funding requirements is distinct from the 2007 acquisition study and the 2010 quick update analysis described above. Each of these analyses were built on different sets of assumptions and accomplished for different purposes. The 2010 $2.9B budget estimate was computed to provide an estimate of the annual funding requirements of an alternate engine program in FY 2011–16. It is based on what we believe to be the most current program assumptions with respect to aircraft quantities and when an engine competition can reasonably be expected to occur. Conversely, the 2007 study was intended as a more broadly-based, life-cycle, comparative analysis between two alternative acquisition strategies for the JSF propulsion system. The 2007 study was based on program assumptions current at the time but which have since changed. The purpose of the 2007 study was not to provide the foundation for short-term budget estimates, but rather to give insight into the relative costs and benefits of a single vs competitive source acquisition strategy over a program life-cycle, in accordance with the statutory requirements specified in the 2007 NDAA. It is therefore not possible to do an "apples to apples" comparison between the 2007 acquisition study and the 2010 $2.9B budget estimate.

There is, however, some overlap in methodologies between the two analyses. The 2010 $2.9B budget analysis includes the cost to complete development of the F136 engine; the cost to initiate and continue a component improvement program for the alternate engine; the cost to procure alternate engines; and costs to provide for the tooling, spares and initial sustainment of the alternate engine. It also includes the effects of reduced production efficiencies since the buy would be split over two contractors vice one and neither contractor is able to proceed down a learning curve as quickly with smaller quantities. Many of these same costs were explicitly or implicitly accounted for in the 2007 acquisition strategy analysis.

Mr. SMITH. Dr. Gilmore, in your December 2009 report on the F–35 program, you found that continued production concurrent with the slow increase in flight test over the next two years will commit the DOD and Services to testing, training, and deployment plans with substantial risk. Do you think that this risk has been eliminated with the removal of 122 F–35s in the future years defense program? Would reducing the budget request of 43 aircraft for fiscal year 2011 reduce risks further?

Dr. GILMORE. The removal of aircraft in LRIP lots 5 through 9 has reduced but not eliminated the risk to the Services of procuring systems that may need significant modifications resulting from discoveries made during flight test, which, at this point, is approximately 3 percent complete. LRIP 5, the lot funded in FY11, includes 4 IOT&E aircraft, 26 initial training aircraft, and 13 aircraft for other purposes. The numbers and delivery schedule for the IOT&E and initial training aircraft should not be changed; otherwise, the risks of concurrent development, testing and production would increase.

Mr. SMITH. Dr. Gilmore, the F–35 test program relies to an unprecedented degree on modeling, simulation, and similar tools to achieve test requirements normally achieved through flight testing. Are you confident in this approach to flight testing strategy? How many of these models are there and have they been accredited or validated? Is there a need for a backup strategy or is it just a matter of adding flight tests? If so, how many additional flight tests would be required to substitute for the current flight testing surrogates in the program?

Dr. GILMORE. There are 28 models and simulations in the JSF modeling and simulation accreditation plans, several of which will be accredited multiple times throughout System Design and Demonstration as systems are upgraded (40 total accreditations). The program office has accomplished three accreditations so far, ten more accreditations are planned before the end of 2010. It is my understanding that the contractor and program office plan to use flight test data during validation of the models without dedicating specific flight test missions for this purpose. Although possible, it remains to be seen to what degree this will occur and if the models can achieve accreditation. The progress made during the next 18 months in actually executing current plans in both the flight testing and model accreditation will be critical to improving my confidence in the development team's ability to accredit and use all the models as planned. The overall flight test program was reduced approximately 4,000 flight test hours when program management changed the test strategy to use the labs/models as verification venues. Since then, the flight test plan has increased by approximately 1,300 total flight test hours. The difference potentially establishes an upper bound for the estimate of additional flight testing needed should the labs/models not be accredited. Given the importance of the labs/models, the program needs to at least explicitly plan for the flight testing needed to validate and accredit them as test venues.

Mr. SMITH. Dr. Gilmore, in comparison with prior defense systems, the JSF development testing will depend much more heavily on ground test labs and computer simulations. Are you comfortable with both the in-place resources to do this and with this approach in general? How will DOD validate and verify results from test venues other than flight tests?

Dr. GILMORE. The process relies heavily on being able to gather adequate numbers of subject matter experts from within the program office and the services to evaluate the validation and accreditation data generated by the contractor team. I am concerned about the tempo of validation and accreditation activity that a small government team must manage, and the schedule pressure that is likely to occur. I am also concerned that the program schedule is predicated heavily on the expectation that modeling and simulation validation efforts will usually be successful on the first attempt. That is, I'm concerned that time has not been incorporated within the schedule to accommodate the need to fix flaws with models and simulations (M&S) that are discovered during the validation process. Historically, the discovery of M&S flaws during validation is fairly typical. In the DOT&E FY 2009 annual report, I recommended that verification, validation and accreditation of models be subject to disciplined government oversight and undergo an independent review. Independent review is necessary to assure that verification, validation, and accreditation is rigorous.

Mr. SMITH. Dr. Gilmore, you note that a recent operational assessment determined that the program is on track to achieve operational effectiveness requirements, but not operational suitability requirements. Do you believe the program is now taking the right actions to address meeting operational suitability requirements?

Dr. GILMORE. The Operational Assessment highlighted the need for significant work to improve the suitability of all JSF variants before entering IOT&E. Some design changes are being proposed and reviewed by the development team, such as altering the Autonomic Logistics Information System to enable it to support unit deployments from both main and forward operation locations. My understanding is that aircraft design changes are also being considered to address the surface compatibility and external environment effects (such as thermal damage to operating surfaces and downwash impact to equipment and personnel) included in the basing issues identified in the operational assessment. Sortie generation rate and logistics footprint are two contract specifications that will not be validated by flight test data before operational test. Performance affecting these requirements, such as reliability and maintainability, need to be closely monitored during developmental and operational flight test to confirm the predicted performance is being achieved. Internal cooling of JSF aircraft subsystems is also an area that requires continued monitoring of performance as flight test progresses. A change to the design of the fuel boost pump is planned for LRIP aircraft to address this problem. Data on the actual performance of the JSF thermal management systems in mission systems flight test aircraft and production aircraft are needed to confirm this modification fully addresses the problem. The suitability of the weapons system in all of its required operational environments needs to be carefully and continuously tracked by the Department as flight test progresses.

Mr. SMITH. Dr. Gilmore, what is your general assessment of the state of development testing and system maturity? Based on current test plans and schedules, do you expect DT&E to be sufficiently advanced and robust to allow scheduled initiation of initial operational testing?

Dr. GILMORE. The re-structure of the JSF program provides the opportunity to conduct the robust developmental testing that is a pre-requisite of successful IOT&E. With only 3 percent of developmental flight testing complete, the system is not yet mature. The first combat capability is not available until Block 2 is delivered in 2012. We are in the process of reviewing the details of the new integrated test plan. The need for a number of resource commitments has been identified. Initiating IOT&E of Block 3 capability in accordance with the most recent plan depends on providing those resources, delivering the test aircraft to the test centers, and timely delivery of effective mission systems software. The re-structured program provides the opportunity for these needs to be met.

Mr. SMITH. Dr. Gilmore, how many F–35 aircraft are needed to complete Initial Operational Test and Evaluation (IOT&E) in 2016, and how does that number compare with the Department's low-rate initial production (LRIP) plan? Should there be some correlation between the number of aircraft required to complete IOT&E and the LRIP plan?

Dr. GILMORE. Eighteen aircraft, six from each variant, are needed to conduct the Block 3 IOT&E, which are procured in LRIP lots 3, 4, and 5. An additional 53 US aircraft are planned for initial training at the Eglin training center. Aircraft in addition to these 53 will be needed to support achievement of the Marine Corps, Navy, and Air Force initial operational capabilities. LRIP quantities do not need to be limited to IOT&E and training assets. In addition to those purposes, Title 10 also identifies establishing an initial production base and permitting an orderly increase in the production rate for the system sufficient to lead to full rate production after successful completion of operational testing as justification for LRIP.

Mr. SMITH. Dr. Gilmore, your report states that "the mission capability of the LRIP systems is unclear." Could you please amplify this statement and how it impacts your testing plans as well as the Services' initial operational capability plans.

Dr. GILMORE. The capability that will actually be available when each LRIP aircraft leaves the production line depends on the progress of flight testing. The LRIP lot contracts predict based on current plans what that capability will be. However, flight testing yields the data used to generate the flight clearances and certifications needed by the operational testers, trainers, and fleet pilots to know what flight envelope and mission systems capabilities they will be able to use. Successful deliveries of software providing maintenance capability will also determine the combat capability that will be available. Thus, the development and implementation of a realistic, executable test and schedule—which the re-structure enables—is key to providing a clear understanding of the capability provided by LRIP aircraft.

Mr. SMITH. Dr. Gilmore, your report identifies eight important recommendations dating back to FY 2007 that have not yet been addressed. Are you expecting action on those recommendations? When? Your 2009 report makes additional recommendations. What 1 or 2 are most crucial in your mind and when are these expected to be implemented? Overall, how responsive have the JPO and contractors been to your team's efforts?

Dr. GILMORE. The DOT&E FY09 Annual Report stated that satisfactory progress had been made on 11 of 19 recommendations from FY06 through FY08. Four of the recommendations concern vulnerability issues and suggest design changes which have not been made. It is my understanding that space is available for some of these changes pending review of full-up system-level vulnerability test results. The remaining four recommendations concern resourcing a realistic test plan. The detailed integrated test review of the restructured test plan, which is in progress now, is intended to reveal resource issues that need to be addressed to execute the test plan. Adequately building up and maintaining resources at the two test centers (Edwards AFB and Patuxent River NAS) in accordance with the expectations for flight testing is the most crucial recommendation and I expect that recommendation to be implemented by the program's new leader. The JPO and contracting team have been willing to listen to DOT&E observations, provide responses to questions and access to information.

Mr. SMITH. Dr. Gilmore, Clearly, F–35 production will far exceed what is needed for operational test and evaluation and the 10 percent standard for low rate initial production before initial operational test and evaluation is completed in 2016. The path the program is on will result in funding for the highest rate of production of any other year in the program in 2016 before the full rate production decision is even made. The F–35 contractor argues that the production should be increased, stating that it is cheaper to modify airplanes than incur the inefficiencies of lower rate production. Please comment. What are your views?

Dr. GILMORE. The level of concurrency in the program creates high risk until flight test demonstrates the performance of the system and operational test confirms the required capability is resident in the system without extensive modifications to the aircraft. Numerous re-design efforts are already underway for all three variants. I cannot predict the potential costs of future modifications, but historical experience indicates that the sooner in development problems are discovered, the easier and less expensive it is to fix them.

Mr. SMITH. In your statement you say the JSF problems were foreseeable. What has been the primary cause of the poor cost and schedule outcomes to date? Have the problems been adequately rectified in your view?

Mr. SULLIVAN. We believe the proximate cause of the JSF program's continuing cost and schedule problems can be traced to an acquisition strategy and subsequent decisions at key junctures that did not adequately follow the best practices we have documented in successful commercial firms and government programs. From the start, the JSF acquisition strategy incorporated excessive concurrency, or overlap, in development, testing, and production activities increasing risks of poor cost, schedule, and performance outcomes. Purchasing aircraft before technologies are ready and testing successfully demonstrates that designs are mature and systems will perform as intended increases the likelihood and impact of design, manufacturing, and requirements changes resulting in subsequent cost growth, delivery delays, and performance shortfalls. In the JSF's case, the program started system development before requisite technologies were ready, started manufacturing test aircraft before designs were stable, and moved to production before flight tests have adequately demonstrated that the aircraft design meets performance and operational suitability requirements. The late release of engineering drawings resulted in a cascading of problems to establish a mature supplier base and manufacturing processes, which in turn led to late parts deliveries, inefficient manufacturing processes, and delays in delivering test aircraft.

Although we note some improvements in the supplier base and reduced out of station work, the impacts from these problems have persisted and are still contributing to poor program outcomes. Manufacturing labor hours have continued to increase, management reserves have been depleted, and test aircraft have been delivered late, contributing to delays in development testing. Poor decisions exacerbated the situation. In late 2007, DOD decided to cut two test aircraft and accelerate the reduction in contractor engineering staff in order to replenish management reserves. We disagreed with this plan because the reduction in test assets was not tenable and because the problems causing reserves to be depleted had not first been identified and fixed. We also determined that the official program cost estimate was not reliable and was understated, and we recommended that a new comprehensive and independent cost estimate through completion of the program be accomplished. DOD disagreed. Since that time, management reserves were again depleted and the Joint Estimating Team (JET) determined that program office cost and schedule estimates were understated and overly optimistic. The recently announced restructure extends the time for testing, and adds back in one test aircraft while providing for the use of three production aircraft to supplement development flight testing. Also, due to the program's recent critical Nunn-McCurdy breach, a comprehensive independent cost estimate is being prepared. We support the restructure and expect it to improve program outcomes in the future, but concurrency is still excessive. The Department now plans to procure up to 307 aircraft costing $58.2 billion before completing development testing. Also, the Independent Manufacturing Review Team (IMRT) identified major improvements needed to achieve planned production rates and the F135 Joint Assessment Team (JAT) noted substantial engine cost growth and opportunities to reduce costs; these improvements will require funding and will need time to implement and take effect.

Mr. SMITH. In past reports, the GAO has been critical of the level of concurrency in the program with development, test, and production. Do the actions being taken as part of the restructure alleviate your concerns? If so why? If not, why not?

Mr. SULLIVAN. The restructure ordered several positive actions, including increasing funding and extending the schedule to complete system development, adding 4 more development test assets, and reducing near-term procurement. We think these and other actions, if effectively implemented, will improve program outcomes, but only marginally lessen concurrency. Restructure-related improvements are geared to specific functions and do not directly impact the acquisition strategy and concurrency among functions. There is still substantial overlap of development, test, and production activities now stretching another 2½ years to April 2016. Even with the reduced near-term procurement quantities, the program is still planning to procure as many as 307 aircraft costing $58.2 billion before development flight testing is completed. Purchasing aircraft before testing successfully demonstrates that the designs are mature and that the weapon system will work as intended increases the likelihood and impact of design, manufacturing, and requirements changes resulting in subsequent cost growth, delivery delays, and performance shortfalls.

Mr. SMITH. In your statement and in the past you have been concerned about DOD's use of cost-reimbursement contracts for procurement of low rate initial production. Last year's report recommended that DOD report to Congress plans to mitigate risks and migrate to fixed price contracts. Why is the program using these types of contracts and what are the risks? Does the restructuring adequately address these concerns for now?

Mr. SULLIVAN. The first 3 low-rate production lots are on cost reimbursement contracts, evidently because the knowledge about the JSF design, production processes, and costs for labor and material were not yet sufficiently mature and pricing information not yet exact enough for the contractor to assume the risk under a fixed-price contract. Cost reimbursement contracts provide for payment of allowable incurred costs, to the extent prescribed in the contract. Cost contracts place most of the risk on the buyer—DOD in this case— who is liable to pay more than budgeted should labor, material, or other incurred costs be more than expected when the contract was signed.

The February 24, 2010, JSF program restructure acquisition decision memorandum and related actions direct several positive steps concerning JSF development and low rate procurement contracts. DOD withheld some award fees on the development contract and directed revision of the contract structure with the intent to reward measurable progress and improved cost and schedule performance compared to the program plan. The decision memorandum also states that future aircraft and engine production contracts should move to fixed-price incentive fee structures as soon as possible. Supplementary information provided us by the Defense Director of Portfolio Systems Acquisition discussed (1) possibility of awarding a fixed price contract as early as LRIP lot 4 (fiscal year 2010 procurement) and (2) establishment of a Should Cost team to inform negotiation of a fixed price contract for LRIP 5 (fiscal year 2011 procurement). While the restructuring did reduce near-term procurement and establish critical business measure to move to fixed price contacts as soon as possible, until fixed price LRIP contracts are negotiated between DOD and the prime contractor, the government is still bearing most of the cost risk.

Mr. SMITH. In the GAO's F–35 report, you asked Congress to consider a matter that asks the Department to submit a tool or "system maturity matrix" for better measuring program progress in maturing the weapon system. What is your vision of this tool and how do you expect this to help the Congress in its annual deliberation of JSF's budget request? Has such a tool been used previously and with what impact?

Mr. SULLIVAN. Congress had similar concerns concerning the concurrency on the B–2 program and planned investment in procurement aircraft prior to fully testing the aircraft. Congress enacted legislation to control B–2 procurement decisions and require the Department to deliver assurances prior to procurement of additional B–2s. A key tool was a "full performance matrix" that Congress required DOD to develop and which identified minimum conditions that would be met before making annual procurements. The full performance matrix laid out over time how different capabilities for the B–2 would be demonstrated in relationship to procurement decisions. Such a tool helped provide visibility for decisionmakers into a program's progress in ensuring the maturity of the weapon system based on expected demonstrated knowledge against a baseline plan thus allowing for more informed investment decisions, and better managed risks of that inherit with a highly concurrent development and production program.

Appendix 1 is a suggested system maturity matrix for the JSF that could be used to track annual progress versus plans. Congress could apply the matrix in its annual deliberations on whether to approve, add to, reduce, or restrict the Department's annual procurement requests. The matrix provides criteria and conditions for comparing documented results by year to expected progressive levels of demonstrated weapon system maturity in relationship to planned increases in annual future procurement quantities. This matrix should explain how increasing levels of demonstrated, quantifiable knowledge about the weapon system maturity at annual procurement decision points justify ramp up of procurement quantities, and corresponding increasing funding needs, leading up to full-rate procurement.

Mr. SMITH. As you know the DOD is requesting funding for 43 aircraft (including one for overseas contingency operations) in its FY 2011 budget request, an increase of 13 aircraft from last year. Does GAO feel the aircraft system is at a maturity point that justifies such an increase? Why or why not? What are the risks?

Mr. SULLIVAN. Considering the increased costs, extended development schedule, and corrective actions directed, but not yet implemented, by the recent restructuring and the Nunn-McCurdy breach announcement, we believe that a significant ramp up in production is not warranted at this time. Increased manufacturing labor hours, parts problems, continuing design changes, and late deliveries indicate that design and manufacturing processes may lack the maturity needed to efficiently produce aircraft at planned rates. As of January 2010, only 4 test aircraft had been delivered and the first two production aircraft—ordered in 2007—are expected to be delivered later this fall. DOD has already bought 28 production aircraft through fiscal year 2009. Under the current plan, DOD proposes increasing production rates by 163 percent from fiscal year 2011 to 2015. DOD wants to buy as many as 307 aircraft at a total estimated cost of $58.2 billion before development flight testing is completed. However, at the same time, it has not been successful in meeting demonstration goals and testing schedules to support increases in production investments, placing billions of dollars at risk as it develops and produces aircraft concurrently. We have reported in the past on several occasions about the risks of producing aircraft before testing demonstrates the design is mature, costs are well understood, and manufacturing activities can support the ramp up in production. As the JSF's program development and test program slips, it further increases the chances that costly design changes will surface in the later years of flight testing.

Reducing fiscal year 2011 procurement would lessen the steep ramp rate and provide the program with more time to implement recommendations made by the Independent Manufacturing Review Team (IMRT) commissioned last year to assess the program's manufacturing capabilities and production plans. The IMRT notes that to reach the planned production levels, new production transition, risk mitigation, and supplier support plans are needed. Without such improvements, there is significant risk that the prime contractor will not produce planes according to plan and a backlog of production aircraft will develop. Considering the program's relatively slow test progress and manufacturing performance, procuring less aircraft in fiscal year 2011 would also better align the manufacturing and testing schedules without unduly disrupting the program. We have submitted Budget Justification Fact Sheets recommending the reduction of 7 total JSF aircraft out of the fiscal year 2011 procurement buy (Two aircraft from each Service's regular budget request and one aircraft from the Air Force's OCO request.)

Mr. SMITH. How confident is the GAO that the program will not encounter future cost and schedule perturbations? What things should Congress watch as indicators that the program is on track to deliver on cost and schedule moving forward?

Mr. SULLIVAN. The program will likely continue to experience cost increases and schedule delays despite the recent restructuring's positive steps. There remains substantial overlap of development, test, and production activities while DOD continues to push ahead and invest in large quantities of production aircraft before variant designs are proven and system performance verified. Also, DOD is repricing the procurement program through completion in 2035; this is expected to significantly increase future funding requirements. In addition, the IMRT and JAT identified numerous improvements needed in airframe and engine production, respectively, with associated costs and schedule impacts. Further, manufacturing inefficiencies will likely prevent the program from meeting the substantial increase in annual procurement quantities until certain steps are taken. Indicators for Congress to focus on include (1) test progress as measured by the number of flight test sorties completed, flight test hours, and test point burn down; and (2) scheduled versus actual delivery of test and production aircraft.

Mr. SMITH. Members of Congress are perturbed about a general lack of access to JSF program information and the Department's late announcement of cost and schedule problems resulting in a major restructuring and Nunn-McCurdy breach. How has your access been? In particular, to what extent have you and your team had timely visibility into efforts such as the JET, JAT, and IMRT in the past year?

Mr. SULLIVAN. The team generally had poor visibility into the independent reviews conducted by the Joint Estimating Team (JET), Independent Manufacturing Assessment Team (IMRT), and the F135 Engine Joint Assessment Team (JAT) until very late. We made repeated requests for this information starting in November 2009, but was not briefed and provided supporting documentation by DOD until February 25, 2010. This occurred while our draft report was in processing and we ended up delaying issuance by one week, in part, so we could provide more current and accurate information about these important reviews. We did not, however, have sufficient time to do the necessary follow-up work and analysis to fully evaluate the reviews and their significance to the JSF program. We plan to do this during our next review starting soon.

Mr. SMITH. On the F135 and F136 engine, assuming fully funding the respective contractors at a dollar level that can be productively executed, what would be the required funding, in then-year dollars, by appropriation, for fiscal year 2011 and in total for the remainder of the future years defense program,

- To complete development
- To prepare for competitive procurement
- And in what year would competition be possible?

Mr. SULLIVAN. For our engine cost analysis, we did not conduct an independent cost estimate to include the required funding for the F135 and F136 and our analysis was not intended to provide a definitive estimate of the total government funding requirement to execute the F135 and F136 programs. The cost analysis was intended to provide a reasonable cost comparison for the completion of system development and demonstration, engine recurring flyaway costs, production support and, sustainment on sole source basis and under two different competitive scenarios. It was also intended to provide a reasonable estimate of the level savings needed to recoup the additional costs of competition given certain assumptions. It was based on the best information we had available at the time we conducted our analysis in March 2010.[1] For our analysis, we assumed that competitive procurement would begin in fiscal year 2015. This aligns with the completion of the JSF aircraft program development flight test program and would start the competition with the last low-rate initial production aircraft buy.

Table 1 and 2 below provide the estimated costs we used in our updated analysis for the sole source scenario and the additional estimated costs (converted to then year dollars) to execute the competitive scenarios (50/50 and 70/30 split of total engine purchases to either contractor) for Fiscal Year 2011 and for the periods Fiscal Year 2012 to 2015, respectively. It is important to note that the cost analysis presented in our March 2010 testimony was presented in constant fiscal year 2002 dollars.

Table 1: Costs for F135 Engine Program (Then year dollars in millions)

Cost Element	Fiscal Year 2011 Estimated Costs	Fiscal Year 2012 to 2015 Estimated Costs
System development and demonstration costs	$211.8	$373.2
Total engine recurring flyaway costs	$753.3	$5,121.8
Production support costs (including initial spares, training, manpower, and depot standup)	$278.5	$2,051.8

Source: GAO analysis of DOD data

Note: We did not include sustainment costs because we did not have current information and we assume no additional costs under either a sole source or competitive scenario because the number of aircraft and cost per flight hour would be same.

Table 2: Additional Costs for Competition in JSF Engine Program (Then years in millions)

Cost Element	Fiscal Year 2011 Estimated Costs	Fiscal Year 2012 to 2015 Estimated Costs
System development and demonstration costs	$410.0	$1,020.0
Total engine recurring flyaway costs[a]	$30.6-$62.7	$657.3-$915.1
Production support costs (including initial spares, training, manpower, and depot standup)	23.9	$87.1

Source: GAO Analysis of DOD data

Note: We did not include sustainment costs because we did not have current information and we assume no additional costs under either a sole source or competitive scenario because the number of aircraft and cost per flight hour would be same.

[a] A cost range is presented since we assume costs would be different under the different competitive scenarios. This range assumes no cost benefits from competition beginning in 2015, a key assumption used in our analysis.

Mr. SMITH. Clearly, F–35 production will far exceed what is needed for operational test and evaluation and the 10 percent standard for low rate initial production before initial operational test and evaluation is completed in 2016. The path the program is on will result in funding for the highest rate of production of any other year in the program in 2016 before the full rate production decision is even

[1] Refer to GAO–10–478T for details on the scope and methodology of our analysis.

made. The F–35 contractor argues that the production should be increased, stating that it is cheaper to modify airplanes than incur the inefficiencies of lower rate production. Please comment. What are your views?

Mr. SULLIVAN. Although officials recently reduced near-term procurement plans, DOD still plans significant investments in procuring large quantities of JSF aircraft before flight testing proves they will perform as required. We believe this strategy contains risk for further cost growth resulting from design changes uncovered from flight testing. The cost of discovering design problems during production could be significant if testing shows that large, structural components of the aircraft require modifications. Design changes needed in one variant could also ripple through the other two variants, reducing efficiencies necessary to lower production and operational costs with common parts and manufacturing processes for the three variants. The intent of development flight testing is to discover and fix design and performance deficiencies during development when it is cheaper to do so than discovering problems and shortfalls during follow-on operational testing and after initial fielding. Purchasing aircraft before testing successfully demonstrates that the designs are mature and that the weapon system will work as intended increases the likelihood and impact of design, manufacturing, and requirements changes resulting in subsequent cost growth, schedule delays, and performance shortfalls. Systems already built and fielded may require substantial modifications, driving further costs.

Some of the more stressing and critical testing for the program still lies ahead. This includes high angle of attack tests, ship tests, full up mission system tests and operational testing. By the time these events occur, the program will have purchased as many as 307 aircraft at a cost of over $58 billion. The program believes the risk of major modifications resulting from flight testing is low because of its extensive use of modeling and simulation. As we reported in March 2010, despite the extensive network of simulation labs, their ability to substitute for flight testing is unproven and the contractor's progress in reducing program risk is difficult to assess, as many labs and models have yet to be accredited. Rand Corporation reported in a 2004 study on testing and evaluation that modeling is not a substitute for flight testing.[2] Rand found that even in performance areas that are well understood, it is not unusual for flight testing to uncover problems that were not apparent in simulations. Examples include flight effects on the wing of the F/A–18 E/F and buffeting of stores externally carried on various aircraft when flown in certain conditions. Additionally, OSD testing officials have indicated that flight testing of each variant is necessary to demonstrate designed capabilities. Our past work has found that flying quality problems were identified during actual flight testing on programs like the F–22A, B–2A, and V–22.

[2] Rand Corporation, *Test and Evaluation Trends and Costs for Aircraft and Guided Weapons* (Santa Monica, California, 2004).

	Procurement Investment Decision						
	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013	Fiscal Year 2014	Fiscal Year 2015	Fiscal Year 2016	SDD Completion
Maturity Elements	**(XX aircraft)**	**(XX aircraft)**	**(XX aircraft)**	**(XX aircraft)**	**(XX aircraft)**	**(XX aircraft)**	
Design and Mfg Maturity Demonstrated							
Design change rate (avg. per month)							
Traveled work (labor hours)							
Aircraft delivered (SDD and LRIP)							
Learning curve							
# of critical manufacturing processes identified and in statistical control							
System software released							
Development Flight Testing Completed							
Flights accomplished							
Flight test hours							
Flight test points							
Capabilities Demonstrated							
Flight envelope							
Signature/survivability							
Mission systems							
Weapons/armament							
Propulsion							
Shipboard tests							
Autonomic logistics							
Operational flight testing							
Reliability Demonstrated							
Mean flight hours between failure							
Maintenance man hours per flying hour							
System Verification Completed							
Key Performance Parameters verified							
Total system specifications verified							
Logistics/operational Support							
Flight training (pilots trained)							
Operational aircraft delivered							
Maintenance personnel trained							
Contracting/Finance							
Unit recurring flyaway costs (For lot buy)							
Contract types for production							

Mr. SMITH. From an acquisition perspective, with 1,763 Air Force F–35s in the current program, and the fact that a one-engine and two-engine F–35 program cost the same on a net present value basis, why wouldn't the Air Force want to choose a competitive engine strategy for the F–35 when it would also provide additional non-financial factors such as technological innovation, enhanced contractor responsiveness, and a more robust industrial base?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. When was the 1763 F–35A requirement established?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. When the 1763 F–35A aircraft requirement was established, what was the IOC at that time and when is the IOC projected now?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. When the 1763 F–35A aircraft requirement was established, what was the projected average procurement unit cost ($TY) for the F–35A? Projected average unit flyaway cost ($TY)?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. What are the current projected APUC and average unit flyaway costs ($TY)?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. When the percentage increase in the APUC and flyaway cost are calculated, is the Air Force expecting its budget in the FYDP and extended planning period for the F–35A to increase proportionately?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. Does the AF foresee a need to adjust its planned procurement of the F–35A proportionately?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. When the Air Force budget was submitted for fiscal year 2009, what was the projected F–35A procurement quantity for fiscal year 2010? What was the F–35A budget request for procurement for fiscal year 10?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. Has a fighter engine ever been required to have the capabilities that the F135 and F136 are being required to satisfy?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. How many foreign countries have procured both the F100 and F110?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. Air Force official statements express concern that funding of an alternate engine program could result in a decrement of F–35A aircraft in Air Force procurement: (CSAF) "If you have a fixed program top line for the F–35, if you fund the alternate engine out of that top line, it has an inescapable effect of reducing aircraft procurement." The JSF program has increased in cost by $100 billion and the F135 SDD contract has increased 50 percent. Yet the Air Force continues to project a total procurement of 1,763 aircraft. Given this apparent flexibility in the AF budget, why is not possible, in order to maintain competition for the F–35 engine and a balanced F–35 program, to also fund the F136 engine?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. A May 2008 Defense Contract Management Agency study done on behalf of SAF/AQ, "Fighter Engine Industrial Capability Assessment," recommended that F136 alternate engine production be reinstated under the fiscal year 2006 schedule to provide for production deliveries in fiscal year 2010. As you are aware, fiscal year 2006 was the last year that the Department of Defense budgeted for the alternate engine. The DCMA assessment indicates that the lack of a major engine development program threatens the survivability of the military engine industrial base after the development of the F135, regardless of whether the F136 is funded: At completion of the F–35 SDD program, the F–35 engine manufacturers will be without a major fighter engine development program for the first time in over 35 years. What is the policy of the Department of the Air Force with regard to maintaining a competitive high performance engine industrial base and what FYDP plan and funding does the Department of the AF have to support its policy?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. The committee understands that the Department's new position on long-range strike is that a "family of systems" is required to meet warfighting requirements. Can you explain to the committee why you feel it will be more cost-effective to operate and maintain multiple long-range strike platforms rather than integrating technologically feasible technologies onto a single platform?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. As it relates to the long-range strike development program, what specifically about sustaining the industrial base workforce concerns you, and how will the $200.0 million requested in fiscal year 2011 be applied to address your concerns?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. SMITH. Are service life extension programs (SLEPs) budgeted that will allow legacy aircraft to address fighter aircraft inventory requirements?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

QUESTIONS SUBMITTED BY MR. TAYLOR

Mr. TAYLOR. Dr. Carter, during the JSF program restructuring, we understand that Secretary Gates directed a withhold of $614 million dollars of award fee from the contractor based on the program's poor performance because he stated that the taxpayer shouldn't be the only one's held responsible for the cost and schedule overrun in this cost-plus development contract. However, it's our understanding that you are giving the contractor a chance to recoup $614 million dollar award fee in the future. So given the contractor's poor performance and their ability to recoup the award fee, the taxpayer is really going to be paying all of the cost overrun, correct? Why does that make sense?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Ms. Fox, in terms of percentages, what do you assess the commonality of each of the airframes, missions systems, engines, and vehicle systems to be for all three models of JSF aircraft for the phases of development, production and operating and support? What is your assessment of how the commonality, or lack thereof, is contributing to the increased cost growth for the total ownership costs of each of the aircraft and are commonality expectations being realized?

Ms. FOX. Proposed Response: With respect to Joint Strike Fighter cost estimates, the assessment of commonality comes primarily into play with respect to the production cost estimate for the airframe. Assuming more commonality translates into lower costs through the application of learning curves. The second JSF Joint Estimating Team (i.e., JET II), led by OSD CAPE, employed a methodology in assessing commonality that is based on airframe weight classified as either being common to all variants, common to a subset combination of the variants, or unique to individual variants. Through this assessment, the JET II assesses airframe commonality of approximately 25% whereas the joint program office and contractor assessments are greater than 80%. This generates a significant cost difference between the two airframe production cost estimates.

As part of the Nunn-McCurdy recertification process, OSD/CAPE will re-assess its treatment of airframe commonality, including the review of actual contractor production cost data for the early LRIP production aircraft. However, it should be recognized that the actual commonality data is based on a limited number of aircraft delivered to date, and that we will not have a better foundation of actuals for Carrier Variant aircraft for another 2–3 years. Similarly, O&S costs should be reduced with higher levels of commonality. CAPE has not yet performed a quantitative assessment of commonality related to O&S costs.

Mr. TAYLOR. Ms. Fox, what do you estimate to be the total ownership life-cycle costs for the Department of the Navy for the F–35B and F–35C, and what are the assumptions that go into that estimate?

Ms. FOX. We do not have a current estimate of the total life-cycle costs. We expect to complete a life-cycle cost estimate later this summer, and will provide the information to the committee at that time.

Mr. TAYLOR. Ms. Fox, if the F/A–18E/F aircraft was procured for the Navy, in lieu of the F–35C, what do you estimate would be the total ownership life-cycle costs of the F/A–18E/F would be, assuming that it would be operated for the planned service-life of the F–35C?

Ms. FOX. We do not have current estimates of F/A–18E/F total ownership life-cycle costs. These calculations are difficult to compute. We are looking at them as part of the FY 2012 program review. What we can do is show you a comparison using average procurement costs (APUC) between the F–35C and the F/A–18 E/F.

Consider the table below. The Navy is planning to buy 680 F–35s. They have not decided on how that total will be split between variants. For the purpose of this exercise, we assumed a 50/50 split meaning that we assume a total of 340 F–35Cs. The F–35 SAR lists an APUC (in 2010 dollars) of $93 million per aircraft for a "total cost" of $31.6 billion. If the Navy bought 340 F/A–18 E/Fs at an estimated APUC of $90 million per aircraft, the "total cost" would be $30.6 billion.

Estimated "Total Cost" Comparisons for F/A-18 E/F and F-35

	*Total F-35Cs**	*F-35 APUC (In BY 2010)*	*F/A-18 E/F APUC (In BY 2010)***	*"Total Cost"*
F-35C Buy	340	$93M		$31.6B
Notional F/A-18E/F Buy	340		$90M	$30.6B

** 340 aircraft is an estimate. The Navy is planning on buying at total of 680 but has not decided how much of each variants.*

***The F/A-18 E/F APUC figure is the BY 2000 figure from the March 2010 F/A-18 E/F SAR divided by a conversion factor to put it in BY 2010 dollars.*

Mr. TAYLOR. Ms. Fox, in testimony to the Senate Armed Services Committee two weeks ago, you stated that in your estimate, the Navy's 100 aircraft strike-fighter shortfall was an old number. Can you provide us the CAPE estimate for the number of strike-fighter aircraft that the Department of the Navy will be short and when that shortfall is supposed to peak?

Ms. FOX. We are in the process of analyzing this question as part of the PB 2012 program review. We will be happy to show this analysis with you upon completion.

Mr. TAYLOR. Dr. Gilmore, you state in your testimony that because of durability issues, the Marine Corps' current version of the JSF requires a re-design of the drive-shaft that connects the main engine to the vertical lift-fan, and the clutch that connects the drive-shaft to the lift-fan also needs to be re-designed because of excessive heating issues which could cause it to fail during vertical flight operations. In your opinion, how serious do characterize these issues, how long do you assess it will take to redesign and test the new drive-shaft and clutch, and how do you assess the Marine Corps being able to declare IOC in year 2012?

Dr. GILMORE. The issues are serious enough that the design must be changed soon and incorporated with production plans beginning with the upcoming LRIP lot 4. The final nature of these two re-designs is not yet known and all the implications are not fully understood. Test aircraft are receiving new instrumentation to collect more data on the problems to determine root cause. My understanding is that these design changes will be finalized late this year and, in the meantime, the SDD and initial LRIP aircraft will have operating limits. The redesigns are needed for the system to complete the SDD flight test program and meet operational requirements. Successful redesign and implementation by LRIP 4, plus retrofit of prior systems may be possible in time for the STOVL IOC in late 2012, but there is little margin in the schedule.

Mr. TAYLOR. Dr. Gilmore, we understand that the Logistics Information System that is required to pre-flight and trouble-shoot the JSF before and after flight is very large and cumbersome and is not suitable for forward deployed operations. How do you assess this will affect the Marine Corps' ability to declare IOC in year 2012 and when do you expect a suitable forward deployed system will be available to support Marine Corps forward-deployed operations?

Dr. GILMORE. A Logistics Information System which is not designed for deployment will limit all the Services' abilities to operate from forward bases. As designed, the entire squadron operating unit weighs 2,400 pounds and is six feet tall, excluding transportation dolly and packaging material, making it difficult to transport on and off ships, or to detachment-type operations at forward operating locations. The program office is currently developing deployment procedures for a squadron kit to support Marine Corps requirements in 2012, but that kit will have limited capability. It is my understanding that the Marine Corps is reviewing this solution to determine if it meets the need for STOVL IOC. The program office has also begun a detailed analysis of deployment requirements and is planning to develop, deliver, and test a fully deployable solution in the 2014–2015 time frame.

Mr. TAYLOR. Dr. Gilmore, your report mentions that the program's recent removal of shutoff fuses for engine fueldraulics lines coupled with the removal of fire extinguishers has increased the likelihood of combat losses from ballistic threat induced fires. Do you believe these items were removed to save cost? Do you believe these are prudent actions for a combat aircraft?

Dr. GILMORE. The JSF program office removed the engine fueldraulics shutoff fuses and five of six dry bay fire suppression systems to save weight and costs. DOT&E continues to recommend that these features be reinstated and does not view their removal as prudent. JSF Live Fire ballistic testing has demonstrated that the JSF is vulnerable to threat induced fires. Live Fire testing has also demonstrated that an effective fire suppression system exists and can be installed. Historical combat data indicate that threat induced fire is a leading cause (25 percent) of combat aircraft loss. The program office estimates that removal of these systems will reduce life cycle costs for the total program by $125M. This equates to the cost of less than two aircraft (December 2009 unit cost estimates) losses during combat operations over the JSF aircraft's entire combat service lifetime. The dollar value of additional likely combat losses, due to lack of these systems, would more than offset these savings.

Mr. TAYLOR. Dr. Gilmore, what are the current aircraft operating limitations for the F–35B aircraft participating in the SDD program as it relates to crosswinds, monitored parameters, vertical lift performance as it relates to hot gas ingestion, thunderstorms, wet and standing water runways, descent rate as it relates to the fuel system and icing? Will sufficient aircraft operating limitations be lifted in time to support initial pilot aircraft training to support Marine Corps IOC in 2012?

Dr. GILMORE. I cannot assess when the series of STOVL aircraft operating limitations, or those on the other variants, will be lifted. The new test plan schedule is being finalized. As flight test yields a better understanding of performance and achievable pace of envelope expansion, a more accurate prediction of the resolution for each limitation can be made. Current F–35B SDD aircraft operating limitations include the following:

- Crosswinds. Current limit is between 5 and 15 knots depending on type of test, transition points, temperature, engine thrust, conventional or vertical mode, airspeed, and whether the aircraft is monitored or unmonitored. For example, conventional takeoffs and landings without flying qualities monitoring by control room personnel are limited to 10 knots crosswind component; conventional takeoffs and landings with flying qualities monitoring are limited to 15 knots crosswind component (See also vertical lift performance—hot gas ingestion.)
- Monitored parameters. Each test flight tailors the data it collects and monitors from over 1,200 parameters depending on the condition, risks and test being accomplished. For example, there are no lift fan engagements unless in contact with the control room.
- Vertical lift performance as it relates to hot gas ingestion. Aircraft operations are limited to specific wind components and limitations vary depending on the SDD aircraft and what kinds of test points are being pursued. For example, 5 knots is the maximum wind speed within 22 degrees of the nose and from abeam to behind the aircraft for BF–1 performing certain "initial transition" vertical landing test points. BF–2, BF–3, and BF–4 cannot perform vertical landings with wind components greater than 5 knots for wind directions greater than 22 degrees off the nose. Limits for vertical landing envelope expansion in BF–1 increase up to 20 knots crosswind component for wind directions within 30 degrees left of the nose and 45 degrees right of the nose.
- Thunderstorms. The airplane is restricted from flight within 25 nm of lightning due to structural bonding issues.
- Wet and standing water. Takeoff or landing with standing water in the intended area of runway operations is prohibited. With no engine ice protection systems installed, ground operations are prohibited if standing water is present within 10 feet of the engine inlet. No lift fan operations are allowed in the presence of rain or above specific relative humidity limits (e.g. 100 percent allowed until 80 degrees, then decreasing depending on temperature).
- Descent rate relative to fuel system. Descents of greater than 5,000 feet are limited to 20,000 feet per minute at idle power, and 10,000 feet per minute if above idle power, unless within specific technical parameters monitored by the flight test control room, including confirmation that the fuel pressure and vent system are working.
- Icing. With no engine ice protection system installed, no ground operations below 40 degrees F with precipitation or standing water present within 10 feet of the engine inlet, or dew point within 5 degrees of ambient temperature between −4 degrees F and 40 degrees F. Flight in icing conditions in excess of 30 seconds is prohibited. STOVL lift fan operation in flight in visible moisture is also prohibited.

Mr. TAYLOR. Dr. Gilmore, as it relates to potential mishap rates, what do you assess and characterize the risk to be for LRIP 1 aircraft regarding immaturity of the aircraft system and in-flight limitations to support initial pilot training, and would you expect the potential for Class A mishaps to be higher than historical experiences?

Dr. GILMORE. At this point, I cannot predict mishap rates for JSF production aircraft. The program is working to close the test points needed before delivery of the two LRIP 1 aircraft early next year. These aircraft will have a very limited flight envelope and only the initial, limited mission systems capabilities provided by Block 0.5. The flight envelope will need to be expanded and the mission systems capability will need to be upgraded to Block 1 through flight test before the planned crew training can begin in mid-2011. The aircraft limitations are being reviewed by the training center and Service planners, who are aware of the challenge created by concurrent development and production. Safely increasing capability through flight test, adding more aircraft, and continuously training operators and maintainers requires tight coordination and planning by the Services and development team.

Mr. TAYLOR. Secretary Stackley, the 30 year aviation plan provides no discussion of operational risk as it relates to meeting combatant commander warfighting requirements and the National Defense Strategy . . . how would you characterize, in terms of risk, the force structure outlined in the 30 year aviation plan for bombers and the ability for the legacy bomber fleet to survive against more advanced integrated air defenses in 2015 and beyond since a new bomber will not be fielded now until towards the end of the 2020 decade?

Secretary STACKLEY. The Department of the Navy has no oversight of any bomber programs. We defer this question to the Department of the Air Force who manages/oversees all bomber programs.

Mr. TAYLOR. Secretary Stackley, given the lack of "affordability" in the JSF program, have you looked at the option of foregoing development and production for the F–35C in favor of buying more F/A–18E/F Super Hornets?

Secretary STACKLEY. With the SECDEF approved F–35 program restructure, the Department of Defense has added $2.8B across FYDP to fully fund development of the program. As part of the restructure, we significantly reduced the production profile to fund these additional System Development and Demonstration requirements, accounted for increased costs due to Partner projected procurements moving to the right, accounted for higher Joint Estimating Team (JET II) procurement estimates, and adjusted the production ramp due to recommendations made by an Independent Manufacturing and Resources Team (IMRT). As such, the Department is fully committed to the restructured F–35 program and the existing F–18E/F program of record.

Mr. TAYLOR. Secretary Stackley, how do you define "affordability" as it relates to the Joint Strike Fighter program and how has the definition and concept of "affordability" changed since the initiation of SDD and present day in which the cost of the program is markedly greater?

Secretary STACKLEY. Affordability needs to account not only for the overall cost of a weapon system but the capability any given weapon system provides as measured against existing and emerging threats to the security of the nation. The Department is not satisfied with the cost growth brought forward with the recent F–35 program restructure and remains focused on improving upon this cost projection. However, the F–35 program is essential towards providing the necessary 5th generation tactical aviation capability needed by the nation and that this capability is considered affordable within the resources requested by the FY 2011 President's Budget. This question will be further addressed in the ongoing assessment associated with the Nunn-McCurdy review and certification process.

Mr. TAYLOR. Secretary Stackley, according to NAVAIR, the F–35B and F–35C operations and sustainment cost is predicted to be 40 percent higher than the legacy fleet of F/A–18A–D and AV–8B aircraft combined. Do you agree with this assessment? If not, why not? What do you assess the operations and support cost of the F–35B and F–35C to be per flight hour? How does this compare to the cost per flight hour for the F/A–18E/F?

Secretary STACKLEY. Understanding and controlling total ownership costs is a priority for the Department, and we will continue to pursue ways to reduce our long-term operations and support costs for all our ships and aircraft. I have directed my leaders to study and understand the total ownership costs of new and existing systems. Early assessments serve to highlight risk areas which need to be managed in order to mitigate operations and support costs. The NAVAIR estimate of JSF cost per flight hour is consistent with that intent and will be further informed by other service and Department assessments to validate the findings while initiating 'next steps' to mitigating costs. As well, the unique in-service support plan for JSF poses challenges for direct comparison with legacy sustainment costs, and we are taking added measures to align bases of estimates. Accordingly, it is not prudent to conclude the total ownership costs of JSF based on the NAVAIR study alone. The more complete analysis will be accomplished in conjunction with the Nunn-McCurdy review and certification process.

Mr. TAYLOR. Secretary Stackley, what do you estimate to be the total ownership costs of the F–35B and F–35C for the Navy and Marine Corps?

Secretary STACKLEY. Understanding and controlling total ownership costs is a priority for the Department, and we will continue to pursue ways to reduce our long-term operations and support costs for all our ships and aircraft. I have directed my leaders to study and understand the total ownership costs of new and existing systems. Early assessments serve to highlight risk areas which need to be managed in order to mitigate operations and support costs. The NAVAIR estimate of JSF cost per flight hour is consistent with that intent and will be further informed by other service and Department assessments to validate the findings while initiating 'next steps' to mitigating costs. As well, the unique in-service support plan for JSF poses challenges for direct comparison with legacy sustainment costs, and we are taking added measures to align bases of estimates. Accordingly, it is not prudent to conclude the total ownership costs of JSF based on the NAVAIR study alone. The more complete analysis will be accomplished in conjunction with the Nunn-McCurdy review and certification process.

Mr. TAYLOR. Admiral Philman and General Trautman, the JSF program office now estimates the JSF will now cost you $112 million per aircraft to buy instead of $59 million per aircraft, and Naval Air Systems Command estimates that the JSF will cost you $31,000 dollars per hour to operate compared to the current fleet of aircraft that costs you $18,000 dollars per hour. How will these increased costs affect your ability to buy and operate JSF given all the other priorities the Navy has concerning its challenges to pay for new ships, personnel and operations and maintenance costs for its ships? Wasn't the JSF originally planned to cost you less than your current fleet of tactical aircraft?

Admiral PHILMAN and General TRAUTMAN. Understanding and controlling total ownership costs of new and existing weapon systems are priorities for the Navy in order to reduce long term operations and support costs. The most opportune time to control such costs is early in the weapon system's development when actions can be taken which will carry over the life of the system. As such, acquisition programs are encouraged to study the issue in depth considering many different scenarios. While such information taken alone is interesting, it's true value is realized when the entire body of work is analyzed, vetted and formally presented. The release of such information piecemeal without benefit of full analysis can be misleading and should be avoided.

The Navy believes that recapitalizing the fleet with the JSF F–35C, delivering a true 5th generation strike aircraft combining stealth and enhanced sensors to provide lethal, survivable, and supportable tactical jet aviation strike fighters that complement the F/A–18E/F, provides the most flexibility and striking capability for the investment. The JSF will provide a survivable "Day One" strike capability in a denied access environment that can not be accomplished by current legacy aircraft. It can be misleading to compare current year procurement costs of aircraft with very different capabilities, different quantity assumptions, and at very different stages of the acquisition cycle (i.e., F/A–18E/F is nearing the end of production and F–35 is early in the production phase (i.e., FY11 is Low Rate Initial Production Lot V and Full Rate Production is several years away).

For the Marine Corps the return on investment in capabilities of the F–35B outweighs the unavoidable legacy aircraft O&S cost increases of not replacing three different aircraft; F/A–18, AV–8B, and EA–6B we will incur as these aircraft age far beyond their original service life and require substantial modifications to maintain operational relevancy and airworthiness, specifically maintaining safety without performance limitations. Supporting three aging and lesser technological different type model series aircraft exceeds the cost of operating one common aircraft with the depth and synergy provided by a collaborative globally based program.

Mr. TAYLOR. Admiral Philman and General Trautman, the Navy currently operates 6 types of aircraft engines on its carriers and is forecasted to operate 4 engines when JSF is fielded. Why would operating an alternate engine be a challenge for the Navy or Marine Corps since you are predicting to operate at least 4 engines on the carrier now? Also, wouldn't it be possible for carrier air wings to be outfitted with either the F135 or F136 engine which means that during deployments carrier air wings would only have either engine on board the carrier? How do you assess the operational risk of having only 1 engine type available for the JSF? Are you not concerned about potential fleet wide grounding issues due to an unexpected engine problem?

Admiral PHILMAN and General TRAUTMAN. A numerical engine count does not provide the full context for this discussion. The JSF engine is the largest tactical fighter engine in size and overall logistics footprint in the history of the Department of Defense. In comparison to legacy F/A–18E/F (Model F414), the F135 engine is approximate twice the size of the Super Hornet F414 engine. While the performance of the F135 engine brings significant performance gains and warfighting advantage, it presents logistical challenge for all of the Services—but no more so than to the Navy and Marine Corps who operate in already constrained spaces aboard L–Class and CVN ships.

The Navy Department believes the implementation of two JSF engines onboard aircraft carriers is suboptimal due to increased operational logistics foot print (LFP). Current LFP challenges available hangar deck space due to the JSF engines being too large to fit in the aviation bulk storage or jet shop (either F135 or F136). LFP problem compounds with both F135 & F136 engines afloat on the same ship, each engine has unique support equipment and tools effectively doubling the LFP required for these items. Spotting and supporting two engines will negatively affect hangar bay aircraft spotting and maintenance operations. Regardless of the decision on an alternate engine, it would be the Navy's intent to deploy only one engine variant on any one CV.

The Navy does not fly aircraft that have interchangeable engines. While some model types such as the F/A–18 are supported by two distinct engines, they are unique to the model series (A/B, C or E/F) and are not interchangeable across series. If there is a fleet wide grounding of an aircraft due to engine issues, there is no alternate engine to mitigate the problem.

Mr. TAYLOR. Admiral Philman and General Trautman, according to Dr Gilmore's written testimony from panel 1, we understand that unlike all aircraft now in service, the JSF is being designed without a fire-suppression system in its engine bay because of aircraft weight issues? Why is this acceptable since all aircraft in operation currently have a fire-suppression system and what level of risk does this pose for a single-engine aircraft being unable to put out an engine fire due to a fuel leak or enemy ballistic fire?

Admiral PHILMAN and General TRAUTMAN. The JSF is being designed with an engine bay fire detection and fire suppression system. Several features in the F–35 vulnerability design resulted in a system that exceeded the specification in the Operational Requirements Document (ORD): "4.1.3.2 The JSF Vulnerability Posture shall be better than the F–16C." These unprecedented survivability features led to design trades to better balance performance, weight, cost, and risk. These trades included: a ballistic liner, dry bay fire extinguishing, and coolant/hydraulic shutoff valves. The resulting design met the ORD requirement with the exception of a 30mm high-explosive incendiary round typically associated with light anti-aircraft artillery. The option to remove these features was fully debated through the requirements process to ensure the true cost benefit was fully evaluated. The identified weight and cost penalties (11 lbs and $1.4M) were compared against the minimal survivability increases (6%) predicted by the assessment models. The Joint Executive Steering Board (JESB) concurred with this decision and stipulated that an updated Vulnerability Assessment be conducted after the conclusion of the Live Fire Testing (2011). The overall survivability posture of the F–35 is without equal due to the advanced avionics and sensor suite, fifth generation stealth performance, advanced countermeasures and balanced vulnerability reduction design. The functionality and benefit of each design feature is carefully weighed against the overall system impact to cost, weight and supportability. After careful, detailed, and extensive deliberations the risk posed by removal of these systems was deemed acceptable.

Mr. TAYLOR. Admiral Philman and General Trautman, can you describe for us the ship integration challenges and expected costs you foresee for integrating the JSF onto Large Deck Amphibs and Aircraft Carriers as it relates to the significant engine thrust, pressure and temperature challenges over what has been experienced with legacy aircraft?

Admiral PHILMAN and General TRAUTMAN. JSF integration on L Class ships is progressing on a logical path aligned across engineering, acquisition, and implementation. NAVSEA generated specific ship changes "Cornerstone Alts" to provide shipboard infrastructure (i.e., power, weapons stowage, secure facilities). These cornerstone modifications start in PR–11 ($27M per hull) and are programmed throughout the FYDP. External environment impacts are still being evaluated through engineering analysis, land based testing and during Developmental Testing (DT) 1 in 2nd quarter FY2011. The DT 1 ship will be fully instrumented to collect heat, pressure, noise and velocity data with topside equipment/systems either being temporarily removed or shielded to lower risk to damage. This DT event will assist in defining shipboard mitigation required to meet USMC IOC such as relocating systems, material changes and shielding. External environment modifications are a POM–12 issue ($43M per Hull) and are programmed to support Operational Test in the later part of 2012 and our first operational F–35B MEU deployment in 2014. There will be an L Class ship available in 2012 with all the F–35B integration modifications incorporated to support a shipboard deployment if required.

Aircraft carrier F–35 integration poses similar challenges for both the STOVL and CV variants. There is a large degree of synergy between infrastructure support requirements and design for the shipboard compatibility required for shipboard integration. Environmental effects differ due to the unique take-off and landing characteristics of each variant. The L Class F–35B integration challenges represent the most difficult situation for STOVL operations, when combined with the more robust CVN design and ship structure we anticipate less effort required for F–35B carrier operations.

Mr. TAYLOR. General Trautman: As you know, the JSF program has experienced a 13 month delay in its SDD program, yet the Marine Corps is confident that it can still meet IOC for the F–35B in fiscal year 2012, and the Navy and the Air Force have officially delayed their IOC's by two years as a result. And given the challenges with JSF ship integration, the fact that JSF has only completed three percent of its test sorties. Can you discuss why the Marine Corps is confident that it can meet the 2012 date and also what specific capabilities do you expect to have in the F–35B at IOC?

General TRAUTMAN. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Admiral Philman: In determining future year strike fighter inventory requirements, why is the Department of the Navy using 1,154 aircraft as its requirement, which is derived solely by existing tactical air demand in current operations, and not the Department of the Navy validated requirement of 1,240 strike fighter aircraft? Can you explain the rationale of why you are basing future fighter requirements on current operational demand?

Admiral PHILMAN. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Admiral Philman: Why is the Navy not planning to buy additional F/A–18E/F aircraft to fill the 263 aircraft gap predicted to peak in fiscal year 2017? Do you believe that our adversaries will have the ability to detect with their air defenses both stealth and non-stealth aircraft by that date? Has the Navy totally ruled out as an option additional Super Hornets? Do you agree with Admiral Mullen's testimony to the HAC–D on March 24, 2010, that the extension of the F/A–18E/F production line through 2013 will be used as a hedge to mitigate additional cost growth and/or schedule slip of the Joint Strike Fighter program?

Admiral PHILMAN. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Secretary Gates stated that previous Next Generation Bomber studies were accomplished to determine "if" we needed a new bomber, and that the upcoming studies will determine "what type" of bomber we need. However, given the progress to date that was made in system design and development (SDD) of the Next Generation Bomber platform before it was cancelled, and the fact that the Air Force was given formal approval to enter SDD by the same Secretary of Defense three years ago, can you explain to us why the Department's position now is that it didn't know "what type" of bomber was needed?

Mr. VAN BUREN and General BREEDLOVE. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. What requirements and key performance parameters have changed that the cancelled Next Generation Bomber platform (NGB), as laid out in the systems requirements document for the NGB, would not have been able to execute or meet?

Mr. VAN BUREN and General BREEDLOVE. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Which organization has the lead to reaccomplish the Long Range Strike AoA, when is it estimated to be complete and provide a wire diagram of the organizational structure of all organizations and agencies involved in the AoA process?

Mr. VAN BUREN and General BREEDLOVE. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Mr. Van Buren: The committee understands that the Department's new position on long-range strike is that a "family of systems" is required to meet warfighting requirements. Can you explain to the committee why you feel it will be more cost-effective to operate and maintain multiple long-range strike platforms rather than integrating technologically feasible technologies onto a single platform?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. Mr. Van Buren: As it relates to the long-range strike development program, what specifically about sustaining the industrial base workforce concerns you, and how will the $200.0 million requested in fiscal year 2011 be applied to address your concerns?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. General Breedlove: Secretary Gates cancelled the Air Force's Next Generation Bomber program last April, but now there is $1.7 billion of funding requested in fiscal years 2011 through 2015 for development of a long-range strike platform. Can you walk us through your deliberative process of canceling a program just 10 months ago and now reinstating funding for development of a Next Generation Bomber platform in this year's budget? Have requirements or capabilities for a new long-range strike platform changed since the previously validated requirements and capabilities of the canceled Next Generation Bomber program?

General BREEDLOVE. [The information referred to was not available at the time of printing.]

Mr. TAYLOR. General Breedlove: The 30 year aviation plan provides no discussion of operational risk as it relates to meeting combatant commander warfighting requirements and the National Defense Strategy . . . how would you characterize, in terms of risk, the force structure outlined in the 30 year aviation plan for bombers and the ability for the legacy bomber fleet to survive against more advanced integrated air defenses in 2015 and beyond since a new bomber will not be fielded now until towards the end of the 2020 decade?

General BREEDLOVE. [The information referred to was not available at the time of printing.]

QUESTIONS SUBMITTED BY MR. BRADY

Mr. BRADY. Dr. Carter, the Alternate JSF engine has been a source of controversy, and both sides have legitimate points. Since the delivery of the aircraft has slid, isn't it possible to have a legitimate competition for the service engine? The delays haven't been engine-related, so how difficult would it be and would there be any further delays in having a competition between the two engines?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. BRADY. I have heard from maintainers in the field that as long as the engines are interchangeable and differences in tools and procedures are minimal, that having an alternate engine would pose little to no problem in maintaining combat-ready aircraft. Operators say that understanding the nuances of two engines (operating limits, etc.) make a single engine more practical. What perceptions have you heard from the field?

Secretary CARTER. [The information referred to was not available at the time of printing.]

Mr. BRADY. Secretary Stackley, the Alternate JSF engine has been a source of controversy, and both sides have legitimate points. Since the delivery of the aircraft has slid, isn't it possible to have a legitimate competition for the service engine? The delays haven't been engine-related, so how difficult would it be and would there be any further delays in having a competition between the two engines?

Secretary STACKLEY. The Department of the Navy supports the conclusions of the analysis completed by the Director of Cost Assessment and Program Evaluation (D/CAPE) within the Office of the Secretary of Defense. D/CAPE estimates that $2.9B is required to take the alternate engine to competitive procurement in FY 2017—of which $2.5B is required over the next five years. And that the additional costs and the burden of maintaining two logistical systems are not offset by the potential savings generated through competition—even taking into account the recent F–35 program restructure.

Mr. BRADY. Secretary Stackley, I have heard from maintainers in the field that as long as the engines are interchangeable and differences in tools and procedures are minimal, that having an alternate engine would pose little to no problem in maintaining combat-ready aircraft. Operators say that understanding the nuances of two engines (operating limits, etc.) make a single engine more practical. What perceptions have you heard from the field?

Secretary STACKLEY. A numerical engine count does not provide the full context for this discussion. The JSF engine is the largest tactical fighter engine in size and overall logistics footprint in the history of the Department of Defense. In comparison to legacy F/A–18E/F (Model F414), the F135 engine is approximately twice the size of the Super Hornet F414 engine. The Navy does not fly aircraft that have interchangeable engines. While some model types such as the F/A–18 are supported by two distinct engines, they are unique to the model series (A/B, C or E/F) and are not interchangeable across series. While the performance of the F135 engine brings significant performance gains and warfighting advantage, it presents logistical challenge for all of the Services—but particularly for the Navy and Marine Corps who operate in already constrained spaces aboard L–Class and CVN ships. Our Navy personnel are dedicated and will go to great lengths to get the job done. However, with the diminishing space and manpower aboard Navy ships, we must look for ways to optimize our resources.

The Department of the Navy believes the implementation of two JSF engines onboard aircraft carriers is suboptimal due to increased operational logistics foot print (LFP). Proposed LFP concept of operations will challenge the available hangar deck space. This is mainly due to the JSF engines being too large to fit in the aviation bulk storage or jet shop (either F135 or F136). LFP problem compounds with both F135 & F136 engines afloat on the same ship, each engine has unique support equipment and tools effectively doubling the LFP required for these items. Spotting and supporting two engines will negatively affect hangar bay aircraft spotting and maintenance operations. Regardless of the decision on an alternate engine, it would be the Navy's intent to deploy only one engine variant on any one carrier.

Mr. BRADY. LTG. Trautman, what's the long term strategy for EA in support of the MAGTF? The EA–6Bs will be over 40 years old by 2020, and with delays in JSF, the development of an EA variant of that aircraft seems even further off. Is USMC going to shed the role, or are Growlers on the table as an option to provide that aircraft and ground force support that Marines are asking for everyday in the field?

General TRAUTMAN. We certainly are not shedding the EW mission. In fact, the emphasis for the entire Marine Corps is becoming more focused on ensuring we have EW available to support both ground and air forces down to the lowest tactical levels. We are already on a path to fulfill our vision of MAGTF EW: the composite of manned and unmanned surface, air, and space-based assets, fully networked and collaborating to provide the MAGTF commander the ability to control the electromagnetic spectrum at the time and place of his choosing, at sea or ashore, regardless of the basing posture or environment.

The Nation has relied upon and will continue to operate with an EW System of Systems approach to address the threat, as there is no "silver bullet," single program solution that fits every scenario. Today our Corps relies upon the EA–6B Prowler from the air and a mix of Radio Battalion and the proliferated Counter Radio-frequency controlled improvised explosive device EW systems, better known as CREW, on the ground to provide MAGTF EW. We are expanding this EW system of systems over time. As we build up our concepts of employment and concepts of operations (CONEMPS/CONOPS), we see MAGTF EW focusing on addressing and mitigating current EW capability gaps and shortfalls to ensure that there will be the growth necessary to support all MAGTF operations in the future. Wherever and whenever Marines go, they will have access to organic EW capabilities. Our goal is to take EW from its current state of low density/high demand (LD/HD) to one of high density/high demand (HD/HD).

We are increasing the number of EA–6Bs in the Corps (by folding in Navy Prowlers as they transition to EA–18Gs) and introducing the Improved Capabilities III (ICAP III) upgrade. As part of the transition to ICAP III the Marine EA–6B aircraft inventory will be increased to 32. The ICAP III system, or ALQ–218, is the same system the US Navy is incorporating in the FA–18F to make it an EA–18G, thus maintaining a common capability across the Department of the Navy. The first USMC ICAP III aircraft has already been delivered to Marine Tactical Electronic Warfare Squadron Four (VMAQ–4) at MCAS Cherry Point, NC.

While there is no intent to have a mission-specific "EF–35," all three variants of the F–35 come with significant EP, ES and EA capabilities for autonomous operations in the Block 2 aircraft which we will IOC in 2012. In this configuration it will not only be able to protect itself in the fighter and attack roles, but also do a great job escorting Assault Support assets (helicopters, tiltrotar aircraft, and KC–130's/C–17's) in hybrid threat environments. The sensors and data fusion capabilities of the F–35 make it a superb platform to host an increased EW capability—on par with EA–18Gs—by integrating the Next Generation Jammer (NGJ) on the platform.

As advanced EW payloads, such as Intrepid Tiger II Software Reprogrammable Payload (SRP), and Next Generation Jammer (NGJ) technologies are developed they will be deployed on both our manned and unmanned systems. These technologies capitalize on already proven deployed systems. Intrepid Tiger I deployed to OIF on

AV–8 & FA–18 and the Pioneer UAS Electronic Attack Payload (PEAPL) demonstrated the art of reality.

In addition to our Aviation assets, the Marine Corps is expanding its ground based EW as well. With the deployment of Communication Emitter Sensing and Attacking System (CESAS), the EW capabilities resident in the Radio Battalions are growing beyond the Mobile Electronic Warfare Support System (MEWSS). Additionally, the CREW systems proliferated across the battlefield will also be incorporated as EW nodes to collaboratively provide ELINT/COMINT, as well as EA. All together, the Marine Corps is actually expanding EW capabilities across the entire MAGTF and is NOT shirking the EW mission.

Mr. BRADY. The Alternate JSF engine has been a source of controversy, and both sides have legitimate points. Since the delivery of the aircraft has slid, isn't it possible to have a legitimate competition for the service engine? The delays haven't been engine-related, so how difficult would it be and would there be any further delays in having a competition between the two engines?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. BRADY. I have heard from maintainers in the field that as long as the engines are interchangeable and differences in tools and procedures are minimal, that having an alternate engine would pose little to no problem in maintaining combat-ready aircraft. Operators say that understanding the nuances of two engines (operating limits, etc.) make a single engine more practical. What perceptions have you heard from the field?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. BRADY. What's the long term strategy for EA in support of the Air Force Expeditionary Wing? In response to the retirement of the EF–111 and seconded by an F–117 shootdown over Serbia, the Navy stood up four squadrons in the '90s to support the USAF and just expanded the purchase of EA–18Gs to maintain sole support of combatant commander requests for EA in support of land and air forces, including USAF. So as the Navy is finalizing plans to enhance its EA capabilities to support the joint force, the USAF looks like it's going down a road travelled before: relying on stealth technology until it fails us, then asking the Navy to cover down. Is the USAF committed to providing these capabilities at some point?

General BREEDLOVE. [The information referred to was not available at the time of printing.]

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. Mr. Secretary, can you give us an update on the status of the reorganization of the weapon systems acquisition organizations under the Air Force Acquisition Improvement Plan and explain how this will benefit Air Force acquisition? How will this affect the location of current and future jobs?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

Mr. TURNER. Mr. Secretary, as you look at ways to reform the acquisition process to ensure greater efficiency and higher performance standards, have you considered the advantage of seeking prime contractors located in the vicinity of the Air Force research and acquisition organizations with responsibility for the execution of that contractor's program? As you well know, there is considerably inefficiency with contracting officers and other government technical experts shuttling from their offices to provide contractor oversight. Moreover, there would be valuable opportunities for creative interaction among contractor, contracting staff, and technical experts if all were located just a few minutes away. Would you be willing to work with me to fashion a pilot program to test the concept?

Mr. VAN BUREN. [The information referred to was not available at the time of printing.]

○