HEARING TO RECEIVE TESTIMONY ON THE F–35 JOINT STRIKE FIGHTER PROGRAM IN REVIEW OF THE DEFENSE AUTHORIZATION REQUEST FOR FISCAL YEAR 2012 AND FUTURE YEARS DEFENSE PROGRAM

THURSDAY, MAY 19, 2011

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

The committee met, pursuant to notice, at 9:35 a.m. in room SD–G50, Dirksen Senate Office Building, Senator Carl Levin (chairman) presiding.

Committee members present: Senators Levin, Lieberman, Reed, Webb, Udall, Hagan, Begich, Shaheen, Gillibrand, Blumenthal, McCain, Chambliss, Wicker, Brown, Portman, Ayotte, and Cornyn.

Committee staff members present: Richard D. DeBobes, staff director; and Leah C. Brewer, nominations and hearings clerk.

Majority staff members present: Creighton Greene, professional staff member; Gerald J. Leeling, counsel; and Peter K. Levine, general counsel.

Minority staff members present: David M. Morriss, minority staff director; Pablo E. Carrillo, minority investigative counsel; Christopher J. Paul, professional staff member; and Michael J. Sistak, research assistant.

Staff assistants present: Jennifer R. Knowles, Christine G. Lang, and Breon N. Wells.

Committee members' assistants present: Christopher Griffin, assistant to Senator Lieberman; Carolyn Chuhta, assistant to Senator Reed; Gordon Peterson, assistant to Senator Webb; Tressa Guenov, assistant to Senator McCaskill; Casey Howard, assistant to Senator Udall; Roger Pena, assistant to Senator Hagan; Lindsay Kavanaugh, assistant to Senator Begich; Chad Kreikemeier, assistant to Senator Shaheen; Jeremy Bratt, assistant to Senator Blumenthal; Lenwood Landrum, assistant to Senator Sessions; Clyde Taylor IV, assistant to Senator Chambliss; Joseph Lai, assistant to Senator Wicker; Charles Prosch, assistant to Senator Brown; Brent Bombach, assistant to Senator Portman; Brad Bowman, assistant to Senator Ayotte; Dave Hanke, assistant to Senator Cornyn; and Joshua Hodges, assistant to Senator Vitter.

OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN

Chairman LEVIN. Good morning, everybody.

Today we will seek a better understanding of what the Department of Defense found in various reviews of the Joint Strike Fighter program after the Nunn-McCurdy certification last year and what actions the Department has taken to ameliorate problems that it found with the program and what is the best judgment available as to how effective these actions will be in preventing further problems with the program, including cost overruns and delays.

I want to thank Senator McCain for suggesting that we have this hearing today.

Joining us today on our first panel is a distinguished group of officials: Ash Carter Under Secretary of Defense for Acquisition, Technology, and Logistics; Christine Fox, Director of the Office of Cost Assessment and Program Evaluation. That is the CAPE office. J. Michael Gilmore who is Director of Operational Test and Evaluation, and David Van Buren, Principal Deputy assistant Secretary of the Air Force for Acquisition, and in that capacity, Mr. Van Buren also serves as the Service Acquisition Executive for the Joint Strike Fighter program.

I want to extend a welcome to our witnesses, thank each of you for appearing before the committee this morning. Another important member of the Department of Defense JSF team, Vice Admiral David Venlet, is Program Executive Officer for the Joint Strike Fighter program, is in the audience and he will be appearing formally as a witness on the second panel.

We held a closed briefing for the committee on the Joint Strike Fighter program in December of 2009 where Secretary Carter and Director Fox briefed the committee.

We held an open hearing last year where we discussed the Joint Strike Fighter program, the potential scope of the problems facing the Department, and some of the options that the Department had for dealing with these problems.

The F–35 Joint Strike Fighter program is currently the largest acquisition program within the Defense Department's portfolio. Perturbations to the cost, schedule, or performance of a program that intends to buy more than 2,400 aircraft for the Air Force, Navy, and Marine Corps will have significant implications for the rest of the Department's acquisition program and for the DOD budget as a whole.

I would also note that this committee's strong effort on acquisition reform, which became the law on May 22, 2009, including those changes to the acquisition procedures required by implementation of the Weapons Systems Acquisition Reform Act of 2009, will not be judged well unless we can demonstrate some success with the largest of the Department's acquisition programs, even though this program, the F–35 program, started before we enacted acquisition reform.

Last year, delays in producing the F–35 developmental aircraft have caused an estimated 13-month slip in the program for completing testing. Some, including the CAPE office, the Office of Cost Assessment and Program Evaluation, had been predicting that development could slip by as much as 30 months. It now appears that the CAPE estimate may have been much closer to the mark of how

long it will really take to complete development than that 13-month estimate.

We know that the Department intends to release additional information on the new baseline and on a new initial operational capability, or the IOC, later this month after conducting a Defense Acquisition Board review of the program.

The additional delays that we see in the revised plan have both cost implications for the F–35 program itself and cost implications for the services as they try to manage their current force structure of legacy aircraft. The services have had to come up with more research and development funds, since we are now looking at an increase of more than $4 billion in the cost to complete the system development and demonstration, or SDD, program.

Now, what this means is that we now have roughly $13.8 billion left to go just on the SDD program, with total SDD costs now at $51 billion. Now, these are dismaying. Indeed, they are disturbing numbers and costs to us and to the taxpayers of the United States.

Now, the most recent SDD cost increase is somewhat offset by procurement reductions in the near term, but that just simply postpones costs to future years where these costs will add pressure to those budgets.

This year, we know that Secretary Gates announced that he is putting the short take-off/vertical landing, or STOVL, model of the aircraft known as the F–35B on probation, and he drastically cut the planned procurement for the F–35B in the near term. We want to hear more about that situation and when the Department will define what the F–35B test aircraft must demonstrate for that model to graduate from probation.

We also know that recent revelations of the new estimates of total life cycle costs for the JSF program exceed $1 trillion. We need to understand what that estimate reflects, what assumptions the Department has made to derive the estimates, and how those estimates might compare to a similar estimate for the aircraft that we are currently operating.

Last year, we raised concerns about the JSF program having lost focus on affordability. That was not our assessment alone. That was an observation of the DOD- chartered Independent Manufacturing Review Team report on the JSF program, and that report stated: "Affordability is no longer embraced as a core pillar." We need to hear today specifically how the Department has responded to that erosion in focus. We also need to hear what steps the Department has taken or plans to take to ensure that operating and support costs are reduced as a part of a renewed emphasis on affordability.

This committee has been a supporter of the JSF program from the beginning. Nonetheless, people should not conclude that we will be willing to continue that kind of support without regard to increased costs resulting from a lack of focus on affordability. We cannot sacrifice other important acquisitions in the Department of Defense investment portfolio to pay for this capability.

Those are a few issues that I know this committee will hear more about today.

And now I call on Senator McCain with, again, our thanks for his focus on this issue.

[The prepared statement of Chairman Levin follows:]
[COMMITTEE INSERT]

STATEMENT OF SENATOR JOHN MCCAIN

Senator MCCAIN. Thank you very much, Mr. Chairman, and thank you for holding this hearing and our continued oversight over this incredibly troubled defense program.

This hearing furthers this committee's obligation to the American taxpayer to ensure that we are training and equipping our fighting men and women in the most fiscally responsible manner possible and that every effort is being made to eliminate waste and unnecessary costs wherever possible.

The facts regarding this program are truly troubling. Originally, the JSF program was supposed to deliver an affordable, highly common, fifth generation aircraft that, by leveraging proven technologies, could be acquired by warfighters in large numbers. Acquiring these jets was supposed to cost a total of $233 billion, or an average of $69 million each, when adjusted for inflation. And the program was supposed to, first, deliver operational aircraft to the services back in 2008.

None of these promises have come to pass. The program first delivered operational aircraft in 2010. And when the services will get their JSF's with real combat capability is anyone's guess. As of today, the total cost to acquire these planes will be at least $385 billion, or an average of $133 million each, and will likely go higher.

Again, I repeat. Originally, they were supposed to be $69 million each. Now they have reached $133 million each and will likely go higher.

The fact is that after almost 10 years in development, 4 years in production, according to outside experts, the aircraft's design is still not stable. Manufacturing processes still need to improve, and the overall weapons system has not yet been proven to be reliable. Notably, it has taken Lockheed about 10 years and cost the taxpayers $56 billion to produce and deliver 9 of 12 test aircraft. Over that period, Congress has authorized and appropriated funds for 113 F–35 jets. Lockheed has, however, delivered just 11.

In my view, the program is now at a watershed moment. With austere defense budgets for as far as the eye can see, the JSF program must show now it can deliver JSF aircraft as needed on time and on budget.

Since 2009, Secretary gates significantly restructured the program twice, an indication of how serious this program's problems have become. Those efforts have rightly focused on reducing the risk of trying to develop, test, and procure cutting-edge aircraft that have plagued this program since it started. Cost and schedule changes that accumulated over the last few years resulted in critical breaches of the initial cost thresholds. Put simply, JSF is estimated to cost about 80 percent more than when the program started and about 30 percent more than the current baseline set in 2007. No program should expect to be continued with that kind of track record, especially in our current fiscal climate.

I understand that soon the Pentagon will announce new baselines for cost and schedule to reflect a total of $7.4 billion in addi-

tional funding, a cut of 246 aircraft from the near-term production ramp, and the addition of 33 months to complete development prescribed by Secretary Gates' restructuring efforts.

As for the future, daunting obstacles remain. Estimates have the early production facing cost overruns of between 11 percent and 15 percent. That is between $700 million and $960 million over the original estimate of $6.4 billion for 28 aircraft. Also, while there has been improvement in decreasing the number of design changes on the manufacturing floor, which tends to be a sign that the design is more stable, such changes are still being done more frequently than desired. And Lockheed Martin still needs to improve how efficiently it moves parts through its manufacturing processes and how it manages its global supply chain.

Additionally, developing the software that is vital to making JSF work as intended is lagging behind schedule. Plus, the new helmet display system that JSF will use is still not on track. Moreover, even after these production problems are solved, we still have to contend with potentially huge costs to maintain all three versions of the JSF. As the chairman mentioned, right now it is estimated to be about $1 trillion, adjusted for inflation. This jaw- dropping amount may be about twice as much as the cost to maintain other roughly comparable aircraft. I appreciate this estimate is still early and subject to change. But we need to know that the program is going to bring that number down.

Finally, I am also keenly aware that the Marines need to start replacing their aging combat aircraft soon, and yet the Marine variant has had the most difficulty in development so far and is facing a 2-year probation after which the Marine version must show improvement or face cancellation. Of all the services, the Marines face the most drastic consequences of further delays or cost increases due to age of their legacy aircraft.

I look forward to the testimony of all of our witnesses.

Thank you, Mr. Chairman.

[The prepared statement of Senator McCain follows:]

[COMMITTEE INSERT]

Chairman LEVIN. Thank you very much, Senator McCain.

And now we will call on Secretary Carter to kick it off. Thank you.

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

Dr. CARTER. Thank you, Mr. Chairman, Ranking Member McCain, other members of the committee. I appreciate this opportunity to come before you to talk about the Joint Strike Fighter.

I have submitted a written statement jointly with Mr. Dave Van Buren, our excellent Air Force Acquisition Executive, who is with me here today, and Admiral Dave Venlet, our Program Executive Officer for JSF. We three are the chain of command under Goldwater-Nichols for this important program, and we are responsible to the Secretary of Defense and to you for it.

I am sorry Dave is not at the table here with us, but he is here behind me. And I want to thank him in front of all of you for not retiring, as he had planned, but for agreeing to the Secretary's re-

quest a year ago that he take over management of this important program, and for all he is doing to put it on a stable and realistic course for which Dave Van Buren and Shawn Stackley, who is the Navy Acquisition Executive, and I, Dave, are very grateful.

I would ask that the joint statement of the three of us be entered into the record.

Chairman LEVIN. It will be made part of the record.

Dr. CARTER. And with your leave, I would just like to hit some of the main points, specifically to answer some of the questions raised by you, Mr. Chairman, and by Ranking Member McCain.

I think the main thing I want to convey to you today is the contrast between this appearance before you and my appearance before you in December 2009, which Chairman Levin referenced, in terms of the management information available to me to convey to you and the confidence I am able to have in it, this in contrast to the limited insight the DOD leadership had into the program before that.

Back in late 2009, in preparation for last year's budget, I received the first reports of the Joint Estimating Team, which you referenced and which Christine Fox's organization led; a Joint Assessment Team, which looked at the engine for the Joint Strike Fighter; and the Manufacturing Review Team, which you also referenced which looked at the activity in the Fort Worth final assembly line. They all indicated to me and to the Secretary of Defense at that time that JSF, our largest program and a vital one, needed management attention. Senator McCain's word was "troubled."

While these reports did not contain good news, as I indicated, I believe they were credible at the time, more credible than the information provided by the program office. Well, based on the work of a relatively small group of analysts, I believe them because when I look back on their track record of predicting the performance of the Joint Strike Fighter in the 2008–2009 period, I found that they had done a better job of predicting the program than had the program office itself.

I, therefore, used them as the basis to recommend to the Secretary of Defense a restructuring of the program's development phase, also new program management in the person of Admiral Venlet, to withhold award fee from the performers of the work, and in the restructuring, to slow production over the 5 years by 122 aircraft. These were important actions. They were based on the analysts' reviews.

But when I was here last year, I did not have the depth of technical information a program of this complexity and importance deserves.

Now the contrast to this year.

I asked Dave Venlet, when he came in to conduct a technical baseline review of the Joint Strike Fighter program. I said no holds barred. Tell it like it is. And he did that. He will describe that technical baseline review, but it was 120 subject matter experts going through each and every aspect, every activity of the program.

And so beginning in the fall of 2010, 1 year after I first met with you about the Joint Strike Fighter, Dave and I began to receive data from the technical baseline review and began discussions with the Secretary of Defense and other DOD leadership about what

management actions to take this year, and those we will be describing today.

So if you ask, as you might reasonably do, why should you believe what I am about to tell you, it is the depth of the technical baseline review that gives me confidence this year compared to when I appeared before you last year.

Secretary Gates and this committee have, as you noted, Mr. Chairman, insisted on performance. And Senator McCain rightly said we cannot support programs that do not perform. And nowhere is this more important than Joint Strike Fighter. It is our largest. It is a vital program.

So let me now summarize the changes we made to the program this year as a result of the technical baseline review and that are reflected in the President's budget for 2012, and I will organize my comments, if I may, Mr. Chairman, in the same way you did, namely development, production, sustainment or lifetime ownership cost, and then the particular issues associated with the STOVL variant.

First, for development. In the development phase, we made two principal changes.

First, we decoupled testing of STOVL from the CTOL and CV, the Air Force and Navy variants respectively, so that all are proceeding as rapidly as possible and STOVL is no longer delaying the other variants.

Second, the TBR indicated additional time and funding would be needed to complete development, extending development by a number of months and adding an estimated, as you said, $4.6 billion to the previously estimated $9.2 billion to complete.

There are two reasons for these adds. The first, the plan test performance has consistently been behind projections, indicating that it will cost more to complete the plan testing than the contractors had forecast. Second, the testing plan fell short of what we believe will be needed. So the plan that was there is going to cost more, and we believe more testing will be needed than was in the plan. Test points had been imprudently removed over the years and need to be restored the program. This adds time and cost. For example, we borrowed six of the LRIP aircraft for flight test, adding them to the 12 that had been previously planned to be part of the flight test program, as an example of more investment in the test program.

So much for development.

For production, also two things. First, a decision to delay the ramp-up to full production, and second, our determined efforts to control unit costs. Let me start with the first one.

In deciding at this difficult inflection point when you are going from development into production, you are trying to balance two things. You are trying balance going too fast and going too slow. If you go too fast, you build airplanes before you are sure of all of the changes that will be necessary in them to make them right, and you run the risk of having to rebuild them after you built them. That is called concurrency. That is the first risk. On the other hand, going too slow delays the airplanes and drives up their costs. So you are always trying, in deciding when and by how much to ramp up production, to balance those two things.

Extending the development phase meant that it made sense to reduce the ramp rate so that program concurrency remained in the proper balance. We, therefore, decided to hold at 32 aircraft in fiscal year 2012, which was the same number as in 2011, because quite honestly that is the limit of the ability of Fort Worth to deliver finished aircraft. I just cannot tell you that they can deliver more. So one can want more, but that is the number that we think really can actually deliver.

Thereafter, a ramp rate of 1.5, meaning that in each succeeding year you build 1.5 times the number you built in the preceding year, is about the right rate to expand production, starting in fiscal year 2013. That is what the management review team which looked again this year at the program recommended to us and we accepted that.

So that is how we are handling the question of ramp rate.

But with respect to cost, this is something—I think you spoke of an "erosion of focus on affordability," and I think that is an accurate phrase. Senator McCain gave you the numbers, which are that over the lifetime of this program, the decade or so, the per-aircraft cost of the 2,443 aircraft we want has doubled in real terms. That is our forecast for how much the aircraft is going to cost. Said differently, that is what it is going to cost if we keep doing what we are doing. And that is unacceptable. It is unaffordable at that rate. That cost growth has been in every aspect of the production of the airplane, the airframe, the engine, and so forth. And it is just too much.

So what we are asking is not what the aircraft will cost, if we keep doing what we are doing, but what it should cost, and we call that a should-cost analysis. And we are beginning that. That is underway now and it is a very simple thing. It involves scrutinizing every aspect of the bill, every aspect of the cost of the airplane, work by prime contractors, subcontractors, suppliers, direct costs and indirect costs, and seeing how they can be driven out over time of the program. They have crept in. We need to drive them out. My office, the services, and the Joint Program Office under Admiral Venlet, all involved in that.

So those are the two things we are doing. We have adjusted the production rate and the ramp, slowed it and stayed at 32 this year, and we are aggressively managing cost.

I should say—I just want to make one point—that our decision to delay the onset of the ramp-up to full rate production by year does not increase the average unit cost over the entire program appreciably, as some have suggested. That is actually not true. But still, we get the airplanes a little bit later.

One sign of our early efforts to get cost under control was the LRIP 4 contract we signed last year. We negotiated that as a fixed price incentive contract rather than a cost- based contract as an indication of the necessity to get stability in the Fort Worth line such that a fixed price could be named, and we are now aggressively working on the LRIP 5 contract with the same should-cost aim in mind.

We now go to sustainment. Sustainment is having the plane. I remind you that for all our programs, having the thing costs much more than buying the thing. 70 cents of the cost of every program

is having it; 30 cents is getting it. So out there beyond this, as I said, already unacceptably large projected acquisition bill, is a sustainment bill.

I will just tell you what I said to the partners in Fort Worth. They meet every year in Fort Worth, and about a month ago, I met with all the Joint Strike Fighter partners from around the world. And I said I am going to show you the estimates for sustainment, and I said they are unbelievable in two senses. First of all, they are unbelievable. They are huge. But second of all, you should not believe them because we have not really begun to manage them yet. They are parametric forecasts. Nobody is going to pay that bill. I said, if you thought that was really going to be the bill for sustaining the airplane, we might as well all get up and go out and leave now.

So what we have now is a parametric estimate of sustainment costs. There is nothing wrong with that. It is accurate based upon the information that goes into it, but it is way too high. And even as we go into production, we need to start driving production costs down. Sustainment seems like years away, but now is the time to face that bill and begin to get that under control.

Last note on STOVL. The Secretary decided to put STOVL on what he called "probation" for 2 years by being held at a production rate of six aircraft per year in fiscal year 2012 and 2013. The reason for probation is that STOVL is experiencing technical issues unique to this variant that will add to its weight and cost. The probation period is 2 years because that is the time we figure it will take to engineer solutions to these issues and assess their impact. We will fix all these problems. I do not doubt that. The question is how much the fix will cost and how much it will add to the aircraft's weight. Weight is important for the STOVL variant because it has to take off on a 500-foot amphibious ship and it has to land vertically. So it is all about gravity and the weight really matters.

At the end of probation, we will assess the cost and the weight and an informed decision can be made about whether and how to proceed with STOVL.

In the meantime, six per year is the minimum number required to ensure continuity in the engineering workforce involved in assembly of STOVL at Fort Worth without loss of learning and to sustain the supplier base of STOVL-unique parts.

I should say, as we work on the STOVL variant, we are success-oriented. We, as the Secretary said, expect success and want success. General Amos, the Commandant of the Marine Corps who is the customer for this aircraft, is taking briefings on it very frequently and a strong interest in it, and I very much appreciate that. But that is the story on STOVL probation, and I can walk more through any of those technical issues with STOVL as you wish, as can either of the Daves.

Let me just close by saying that as part of the Nunn- McCurdy process, this year we were asked whether there were any better alternatives to the Joint Strike Fighter, and we did not come up with any better alternatives to the Joint Strike Fighter. We want it. At the same time, it has to be affordable, and at the moment in its projections, it is not. I think we are determined to make it affordable, and those who are performing the work for us share in that

objective. We owe you that and we will be working to that end both for production and sustainment.

Thank you.

[The prepared statement of Dr. Carter, Mr. Van Buren, and Admiral Venlet follows:]

Chairman LEVIN. Thank you very much, Secretary Carter.

Director Fox?

STATEMENT OF HON. CHRISTINE H. FOX, DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION, DEPARTMENT OF DEFENSE

Ms. FOX. Mr. Chairman, Senator McCain, and distinguished members of the committee, thank you for the opportunity to appear before you to discuss the JSF program. Since I last testified before you in March of last year, as you have been hearing, there have been many updates to the program. Today I would like to focus on three of the most significant ones.

First, when I testified last year, there was a considerable difference in the cost and schedule estimates between the Joint Program Office and CAPE. Since then, as you know, Dr. Carter has assigned a new Program Director, Vice Admiral Venlet, who directed an in-depth technical baseline review, bringing us much closer in our estimates and adding valuable data that better informs the JSF assessments across the Department, including ours.

Last year, I told you that we predicted the average cost per aircraft would be somewhere between the Program Office estimate at the time of $80 million per aircraft in fiscal year 2002 baseline dollars and our estimate of $95 million per unit. Our current estimate is approximately $95 million per unit. Our estimate of average cost per aircraft has been at this approximate level since 2008 and it continues to hold there. This translates to $113 million per aircraft in fiscal year 2011 dollars and, as Senator McCain noted, $103 million per aircraft when adjusted for inflation.

The estimate that continues to change is the estimate for development cost and schedule. As a result of the insights from the Program Office's technical baseline review, CAPE now estimates that development will take an additional 1.5 years and cost approximately $4.5 billion more than we estimated in the spring of 2010. These estimates are in line with the current Program Office estimates.

As with all of our estimates, it is equally likely that this estimate will be too high as too low. We continue to update our estimate as we learn more from ongoing testing.

There are two key drivers behind the increase in development cost and schedule. The first is software and mission systems integration. CAPE has long said that software would be a driving factor in the time necessary to complete development. However, we underestimated how significant a driver it would be. Software development is proving more difficult than we previously estimated.

The second reason for the increase in development cost and schedule is the Marine Corps' Short Take-Off and Landing, or STOVL, variant. The STOVL variant accounts for approximately 40 percent of the increase in development costs. This is why Secretary Gates put this variant on probation for 2 years.

Second, I would like to discuss our estimate of the Joint Strike Fighter operating and support costs. CAPE conducted an extensive independent analysis of the O&S costs of JSF this past year. Experts from the Navy and Air Force participated in our effort. Our estimate, while developed independently, is consistent with that of the Program Office.

Our analysis indicates that the cost to operate and sustain the JSF are less than the F–22, about the same as the F–15C/D, but more than the F–16 and F–18. Given the significant increase in capability, it is not unreasonable that JSF costs more to operate and sustain than some legacy aircraft. However, the fact that it will cost about 33 percent more to operate JSF relative to the F–16 and F–18 aircraft it is replacing gives the Department a significant bill.

Finally, I would like to report on the strike fighter shortfall. Last year, I stated that CAPE would conduct an in-depth study of the strike fighter shortfall, and working with the services, we completed that study this past year.

For the Air Force, their engineering analysis showed that the F–16's have significantly greater service life than previously estimated, reducing the Air Force estimated shortfall to a manageable level.

The Department of Navy's aircraft shortfall was of greater concern, and the restructuring of the JSF program increased the magnitude, so additional measures were needed to ensure continued capability for the operational fleet. Department of Navy is addressing the shortfall with several management and investment measures to include a fully funded service life extension program for approximately 150 F–18 aircraft. Additionally, Secretary Gates added 41 F/A- 18E/F's to the PB 2012 budget request. These aircraft, when combined with the additional nine aircraft added by the Congress in 2011, reduce the previous shortfall of about 100 aircraft in half. Navy and CAPE assess that the latest shortfall projection is manageable.

That concludes the updates I have for you today. Thank you again for the opportunity to appear before you.

[The prepared statement of Ms. Fox follows:]

Chairman LEVIN. Thank you very much, Ms. Fox.

And now we will have Director Gilmore, Dr. Gilmore.

STATEMENT OF HON. J. MICHAEL GILMORE, DIRECTOR, OPERATIONAL TEST AND EVALUATION, DEPARTMENT OF DEFENSE

Dr. GILMORE. Mr. Chairman, Senator McCain, members of the committee, the two restructuring efforts that have already been referenced, the one leading up to the Nunn- McCurdy certification that added about 13 months to the program and additional aircraft and some additional flight test points and flight test hours, as well as the restructuring that really is still ongoing that Admiral Venlet is conducting as part of his technical baseline review which will probably yield another 16 to 18 months' extension in the program, have in my view yielded a realistic program for completion of the development of the Joint Strike Fighter.

Why do I say that? Well, one key reason is that the test program now, both for flight sciences testing and mission systems testing,

is consistent with our historical experience, including the inevitable discoveries that occur and have already occurred when testing aircraft as complex as the three variants of the Joint Strike Fighter.

The recent pace of flight testing, the rate at which flight tests have been conducted, is exceeding the technical baseline review plan somewhat, and that is good news. But that pace is still less than had been projected previously. Those previous plans really were not credible.

And then I would note also that there are difficulties. In particular, even though the pace of flight testing, the number of flight tests that are conducted per month per aircraft is somewhat above the plan, the achievement of mission systems test points is still lagging somewhat, and that is not a surprise because mission systems testing in all these aircraft is a challenge.

Although good progress is being made in the program, there are many challenges that remain. For example, flight testing at high angle of attack at high speed between Mach 1.2 and Mach 1.6 and at low altitude and transonic speeds and the problems that have been occurring the transonic regime—all those flight test regimes are not well predicted by modeling and could yield to additional discoveries.

Weapons integration, in particular, multiple releases from both the aircraft's bays could yield discoveries.

Flight with heavy external stores has yet to be done and could reveal additional structural issues. We hope not, but it is possible.

Continued durability testing of the aircraft's structure must be done. It was stopped at 2,000 hours of an 8,000-hour life because problems were discovered in some of the structures. It will resume shortly.

And then, of course, as I already mentioned, mission systems integration and testing, which is already a challenge that will only grow more complex because the very complex warfighting capabilities are yet to come and will be introduced particularly in block 3 of the software and currently we are in block 1.

My concerns for conducting IOT&E are several—Initial Operational Test and Evaluation are several—and they include the following.

Assuring that 18 aircraft are available incorporating all modifications that are going to be needed to make them fully production-representative, there are going to be modifications needed as a result of the discoveries that have already been made, and we need to make certain that all those modifications are incorporated in the aircraft used for operational testing.

Weapons certification has to be accomplished in a timely manner, enabling operationally realistic employment during operational testing.

We have to have full air vehicle clearance for all three variants throughout the flight envelope.

We have to have a fully accredited verification simulation.

And again, we have to have timely completion of mission systems testing and subsequent testing of something called a full mission data load which will actually be done in the run-up to operational testing after a lot of the contractor work has been completed.

Thank you.

[The prepared statement of Dr. Gilmore follows:]

Chairman LEVIN. Thank you very much, Dr. Gilmore.

Do you want to add anything here? I think the statement included your remarks, Mr. Van Buren, but would you like to add anything?

STATEMENT OF DAVID M. VAN BUREN, PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR THE AIR FORCE FOR ACQUISITION

Mr. VAN BUREN. I would, Senator. Very short comments.

Thank you very much, Chairman Levin, Ranking Member McCain, and other distinguished members of the committee.

I would like to start by echoing the sentiment of Dr. Carter's testimony in that our visibility into the program has become much clearer in the past year.

Since April 2009, I have been the SAE for the JSF program. Upon taking on that new responsibility, I observed a significant and unpredicted amount of changed traffic growth that occurred in the first half of 2009. This changed traffic was primarily in the subsystems hardware elements of the aircraft such as line replaceable unit redesign, tubing and wiring. This affected the ability of the prime contractor to ensure that all major sections of the aircraft, whether built by Lockheed Martin, Northrop Grumman, or BAE Systems, seamlessly fit together.

Because of the volume of this changed traffic, it was impossible to truly predict the overall impact to the delivery schedule of the flight test aircraft and early LRIP production deliveries. These changes were not driven by JPO scope increase, but rather by design and build execution. As a result, late deliveries of the jets delayed the flight test program and early LRIP deliveries were impacted by out- of-station work, late parts, and general inefficiency in the production line. And as Senator McCain notes, this created an overrun condition to production lots 1, 2, and 3.

The good news is that the changed traffic disruption and inefficiency is coming down now. The manufacturing leadership in Fort Worth is now executing to a production schedule that they can commit to. I must say, however, that this is to a delivery schedule that delivers jets at a rate of 1 to 1.5 per month for 2011.

The next step in this production maturity is to achieve a steady production rate of 4 aircraft per month, which I believe can occur in 2013. This will require continued further improvements in section build span times, subcontractor performance, and other various efficiencies. It will also require a continued reduction in change without major discovery issues of flight or structural tests that impact the configuration.

We in DOD leadership, as you noted, came to the conclusion in very early 2010 that the LRIP contract should be a fixed price incentive contract based on JPO and contractor assessment of risk. We successfully negotiated this fourth production contract significantly under the CAPE independent cost estimate, which is our job. We are now working with the contractor team on a should-cost of LRIP 5 to continue this drive for affordability.

Much is always made of the detailed measurement of manufacturing labor efficiency or learning on the production line and how

it impacts overall program cost. In the case of LRIP 5, the Fort Worth manufacturing, fabrication, and assembly labor cost portion is less than 1.5 percent of the overall proposed aircraft price. Therefore, the proper emphasis of our should-cost team will be to evaluate labor, support labor, material, and subcontracted equipment, and all elements of overhead costs. The focus of our affordability effort is to maximize the percentage of manufacturing cost and the overall delivery price and to minimize sustaining support labor cost and minimize the period of performance for each production lot build.

In summary, we have great confidence that the technical baseline review has addressed program risk in detail. While the production line has become more stable, significantly increased delivery rate execution has yet to be proven. In fact, during the LRIP 4 negotiations last year, deliveries moved to the right by 8 months on that contract. I can assure you that the Department has detailed oversight of execution to ensure that the program plan by profile is aligned with the industry's team ability to manufacture and deliver aircraft. In the same detailed light, we strive to achieve the most affordable JSF on a daily basis for our warfighters and the taxpayer.

Thank you again for the opportunity to appear.

Chairman LEVIN. Thank you very much, Mr. Van Buren.

Let us try an 8-minute first round.

You indicated, Secretary Carter, that there has been a significant increase just in this 1 year in the estimate for completing the development and demonstration program, the SDD. The total cost of development I believe now is going to be over $50 billion, just on development. And there is a $4 billion increase in the estimate to complete it just in this last year, and you have explained the reasons for that.

Secretary Gates last year announced that you have asked Lockheed Martin to share in some of the cost increases in SDD that now the independent reviews are predicting for this F–35 program. Has Lockheed agreed to share in these cost increases?

Dr. CARTER. Yes. "Agreed" is not exactly the right word. When it comes to award fee in a contract of this kind, the award fee is really in our hands. And last year, at the Secretary's direction, we removed an award fee that was awardable to Lockheed Martin and just took it away. And this year, we said here are some targets which, if you achieve each of these targets, you will get a portion of the award fee. And Lockheed Martin hit just a few of those targets and therefore received a very small fraction of their possible award fee.

Going forward——

Chairman LEVIN. Before you go any further, can you tell us for the record, get us each of those award fees, what they could have earned and what they were awarded?

Dr. CARTER. I would be happy to do that. In fact, I can give you that data throughout the lifetime of the SDD.

Chairman LEVIN. Some of those have already been reached or not reached. Right?

Dr. CARTER. Yes. The reality is this year they reached hardly any of them.

Chairman LEVIN. Now, before you continue, is that part of the $4 billion increase?

Dr. CARTER. No. There is no award fee in the increase.

Chairman LEVIN. Is that part of the estimated $13 billion to complete the SDD? Are those award fees included in that?

Dr. CARTER. They are.

Chairman LEVIN. Now you wanted to go forward.

Dr. CARTER. Yes. What I am saying is you have the numbers exactly right. We were at—9.2 was our estimate for how much it would cost to complete development. We added 4.6 to that. So that is almost exactly a 50 percent increase. So that is additional cost that we think is realistic that we will have to incur. We are not adding award fee to that because, needless to say, we are not pleased to have to pay the extra money in the first place.

Chairman LEVIN. If those award fees are given, will that increase that $9 billion?

Dr. CARTER. No. It is included within.

Chairman LEVIN. Thank you. Keep going.

Dr. CARTER. Then when you get to LRIP, the early LRIP contracts were cost-plus contracts. As I said, starting with LRIP 4, with an eye to instilling discipline, we insisted on a fixed price incentive contract.

Fixed price is good discipline for both us and for contractors who work for us because we have to be able to specify exactly what we want. That is good discipline on us. They have to be able to specify a price, which means they need to have control over their processes and their suppliers. That is good discipline for them. The earlier we can get into that kind of discipline in production, the better.

LRIP 4 was early to do that but we wanted to force the issue and we did. And we negotiated the LRIP 4 contract last year, as Dave indicated, at a price that was lower than CAPE had estimated, and that was good news.

We are now entering into the negotiations for LRIP 5. That too will be a fixed price incentive contract.

The way that works is good discipline again for both the government and the contractor. Every dollar of underrun is shared. So that is an incentive to the contractor. They get a piece of every dollar that is underrun. And every dollar that is overrun, they have to pay part of.

Chairman LEVIN. Going back to those award fees just for one moment. You say that is something that is not technically an agreement. That is something that you will award if they reach a certain target. Were targets changed since your last testimony?

Dr. CARTER. No. They were the ones that we established a year ago for this past year, and we set them up like a slalom course. And I said, they only got through a few of the gates.

Chairman LEVIN. So that there has really been no change in that since the testimony.

Dr. CARTER. Correct.

Chairman LEVIN. So then how are they sharing in cost increases? In other words, Secretary Gates said you are going to ask Lockheed to share in cost increases. There has been no change in the award fee system since he said that he would ask Lockheed. There has been not a cost-plus contract but the kind of contract going forward

for the LRIP 4 that you just described. But where are they sharing in the cost increases?

Dr. CARTER. In the SDD phase, the SDD contract, the extant contract, contains only award fee. It does not have a provision otherwise for cost sharing. So we shoulder the entirety of that cost growth, and they lose the award fee part.

Chairman LEVIN. Yes, but my point is here that there has been really no change in the award fee system since then.

Dr. CARTER. That is correct for the SDD because that contract was already negotiated many years ago.

Chairman LEVIN. Have you requested Lockheed to share in the cost increases here in a way that they have not agreed?

Dr. CARTER. No. I think that, obviously, they have sacrificed considerable award fee in SDD. They will be on a share line in LRIP.

Chairman LEVIN. They have not sacrificed. They have not met a target which had been previously set. That is not a sacrifice. That is not a change. That is something that they had agreed to.

Dr. CARTER. It was an award fee that was—

Chairman LEVIN. It was a system they had agreed to. They did not meet the award.

Dr. CARTER. That is correct.

Chairman LEVIN. So what I am looking for is where are we going to get some savings from Lockheed here. I mean, where are they going to share in this big headache that you folks clearly have and you are trying to solve? What is their piece of the solution?

Dr. CARTER. I think the most important piece of the solution right now for them and the others who work for us on the Joint Strike Fighter is going to be in the should- cost for production. Dave Van Buren indicated some of the drivers of cost. He gave you a number, which is worth focusing on, which is that the actual assembly at Fort Worth is a very small fraction of the overall bill. What is the rest of the bill for? Just like you go out to dinner and you get the bill after dinner and you want to say, well, why did I pay this much for a side of broccoli? And I did not realize if I ordered another iced tea, I had to pay twice and so forth. We are going through the bill that way with Lockheed Martin, with Northrop Grumman, with BAE Systems so that we are only going to be paying costs that we understand and are willing to justify. And where they have grown in the last 10 years, we are going to ask ourselves why is it larger than it was 10 years ago and what can we do to begin to drive it back to where it was when the program started. That is the short should-cost exercise, and we will do that both for production and for sustainment.

Chairman LEVIN. Thank you.

Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman.

Secretary Carter, I would like to begin by saying I appreciate the outstanding work that you are doing. I think that your work has been exemplary, and a great example of that is the process you went through in the awarding of the tanker process. I think that bidding and award for the tanker—and I do not think anybody could complain that it was not a fair and open and transparent process. So I thank you for the good work that you are doing.

Obviously, all of us are deeply disturbed about the progress or lack of progress, these incredible cost overruns that we have been experiencing. So maybe just to start with as briefly as possible because I do not have a lot of time, what happened?

Dr. CARTER. I think a couple of things happened over the last 10 years. You try to ask oneself the numbers that you gave, which showed a doubling in our forecasts for the cost of the airplane. I would say two things.

First of all, in the decade of ever increasing defense budgets which we have just enjoyed, it was always possible for our managers, when they ran into a technical problem or a difficult choice, to reach for more money. The money was available in the decade after 9/11. And so it is natural that some fat crept into all of our activities over that period. And it is identifying that and beginning to work that out that is what should-cost is all about.

The second thing that happened that is specific to the Joint Strike Fighter is that it was, because of its novelty and its joint nature, put in an organization, the Joint Program Office, separate from the Navy's normal NAVAIR and the Air Force's normal Aeronautical Systems Center, centers of expertise, in order to allow it to be new and novel and joint. And that was probably a good decision at the time, but 10 years later, I think we had overdone that.

And one of the things that Admiral Venlet and Dave Van Buren are doing now is restoring to the program the technical expertise resident at Pax River and Dayton and elsewhere and infusing this program office with it so that the Government side of the program is strong. I told you I did not have good management information a year ago because the program office was not strong. It did not have our very best people looking at this airplane, and all of our information came from the performers of the work and not from us. So that went on for a long time in the Joint Strike Fighter program, and the program office was not as strong technically as it should have been.

So I think those are the two causative factors.

Senator MCCAIN. Well, I thank you for that explanation.

I am sure you understand the frustration that members of this committee feel because we have received testimony after testimony over the 10-year period that you are describing that things were going pretty well, that we were pretty well on track, that yes, there were some cost overruns. And in all candor, we had to rely to some degree on the GAO for the facts, and many of us—or at least some of us—saw this train wreck coming which has led me to your comment that right now—is this accurate from what you said? Right now it is not an affordable program and the sustainment costs are not affordable. Is that correct?

Dr. CARTER. That is correct. If we live the estimates, we cannot afford to pay that much. I do not think we have to live those estimates, and our objective is to make sure that those estimates do not come true and that we do have an affordable program.

Senator MCCAIN. It seems to me we have to start at least considering alternatives. If the situation right now is not acceptable, we have to do two things, it seems to me: make it acceptable but also think of alternatives if we cannot do that.

I guess, Dr. Gilmore, did I hear you say the previous plans under your area of supervision were "not credible"?

Dr. GILMORE. Well, first, I advise on developmental testing. My focus is operational testing. So I am not actually responsible for planning the program.

But what I did do, when I first took office, is take a look at the planning factors that were being used. For example, there are planning factors for reflying sorties, test sorties, when you do not get all the information that you originally hoped you would get when you fly a sortie in the test aircraft. And there are planning factors for what are called regression sorties. That is, you have made a change to the aircraft. For example, they are making changes in the flight control system now in order to deal with something called transonic wing roll-off, which is an unexpected loss of lift on one wing in the transonic regime where models cannot predict very well what the chaotic air flow is. So you make a change to the flight control system software. You want to go back and refly previous points you have already flown to make sure you understand the behavior of the aircraft. That is a regression sortie.

The original plans for refly and regression—the original planning factors were 15 percent and 20 percent, 15 percent for refly and 20 percent for regression. Now we stand, as a result of the technical baseline review, at 35 percent and 66 percent. So that is one of the reasons that we now have 14,000 hours in the flight test program as opposed to 8,000 hours before all of the restructuring.

That is just one example of assumptions that were made that were clearly out of line with our experience with programs like F–18E/F and F–22. Now, you want to be somewhat aggressive. You do not want to put yourself in a position of inevitably repeating mistakes that were made before, assuming that you will repeat those mistakes. But you can see that those planning factors were well out of line with historical experience.

Senator MCCAIN. It is too bad that we cannot, Mr. Chairman, ask those people who made these estimates and made assumptions that were made before this committee to explain that. But probably would be a waste of time.

I do not know if it is Ms. Fox or Mr. Van Buren. According to the GAO, software providing essential JSF capability is not mature and releases to the test program are behind schedule. Is that you, Ms. Fox?

Ms. FOX. That is our understanding, sir. The software is behind, yes.

Senator MCCAIN. And so? What do we do?

Ms. FOX. Sir, I do not have an answer for what we do. We are absolutely tracking it. I know that the program office is on it. The software development is proving to be much more difficult, as I said, even than CAPE estimated originally.

Dr. GILMORE. Senator, one of the reasons that the software is behind schedule—Ms. Fox already mentioned one. It is a hard job to develop all this mission systems software. The mission systems software by source lines of code in Joint Strike Fighter is going to be between two and three times the number of source lines of code in the F–22. So this is a very complex job. We are just beginning.

One of the reasons that the achievement of mission systems flight test test points is behind schedule is because we have right now one dedicated mission systems flight test aircraft. Two or three of the other aircraft can do mission systems testing, but a couple of those aircraft are STOVL aircraft and right now they are being used primarily for STOVL flight sciences testing. There are two additional Air Force variant aircraft that have just been delivered that can do mission systems testing, but they are not going to be able to start doing that for about 4 months because they are going to be used to do what is called a maturity demonstration in order to enable training to start using unmonitored flight later this year down at Eglin.

So the problem is we only have one dedicated mission systems flight test aircraft. In another 4 or 5 months, we will have three, and that may enable us to catch up and drop the next block of software later this year as planned. It is planned in November. According to my estimates, it may slip a couple of months. But right now, we are limited by test aircraft.

Senator MCCAIN. Thank you.

My time has expired.

Mr. Secretary, I hope that we would, maybe for the record or maybe in conversation, ascertain what is being done on the issue of the unacceptable sustainment costs, what action or plans we have for that.

And I would share the chairman's concern about what Lockheed Martin has done to absorb some of the costs of these overruns. I am not sure that all of these costs, Mr. Chairman, should be borne by the taxpayer of America when it is clear that Lockheed Martin has done an abysmal job, certainly in not keeping with their original contract obligations which they had the luxury of cost-plus contracts at the time. So I think that that is an area we need to look at more seriously.

And I thank you, Mr. Chairman. I thank the witnesses.

Chairman LEVIN. Thank you, Senator McCain.

Senator Lieberman.

Senator LIEBERMAN. Thanks, Mr. Chairman.

Dr. Carter, a few times in your testimony this morning you referred to the Joint Strike Fighter as a vital program, and toward the end of your testimony, you said you have raised the question about whether there were any better alternatives. And your answer is no. But, of course, the program, as you said—and I agree—needs to be affordable.

I think it may be helpful at this point, at least in summary fashion, if you describe why the Department of Defense still feels this is a vital program and there are no better alternatives.

Dr. CARTER. That was part of the Nunn-McCurdy certification, and in this Nunn-McCurdy certification, I was required to and did look at alternatives to the Joint Strike Fighter program and found none that met the full spectrum of needs represented by the Joint Strike Fighter. I just remind you for each of the services, the needs are somewhat different, but the Marine Corps really does want a short take-off and vertical landing aircraft, and the Harriers are going out of the fleet. So this is it.

The Navy has the F/A–18's and we did decide—the Secretary decided to buy more F/A–18's. So for the Navy in the near term, there is an alternative. We are availing ourselves of that alternative.

For the Air Force in the long run, after the F–16 and the F–15 go out of the fleet, it will be the mainstay of the Air Force's air fleet.

So in that sense, for each of the services—the Navy a little bit less so, but only in the near term—are relying on the Joint Strike Fighter to come through. So in that sense, we do not have any alternative to it. We need to make it succeed. To make it succeed, we need to make it affordable.

Senator LIEBERMAN. In the consideration of alternatives—I know this is a hypothetical—but would it include unmanned aircraft which is a fascination of people right now?

Dr. CARTER. It does. Unmanned aircraft can do some of the missions of manned aircraft. We are not in a position to say at this juncture that in the time frame that the JSF would be delivered, that its missions could be accomplished by an unmanned aircraft.

Senator LIEBERMAN. Give us some sense, if you will—I know that there has been significant interest among our allies around the world. And, of course, they have bought into the program, in the Joint Strike Fighter. Does that continue to be so?

Dr. CARTER. The original partners are with the program. Some of them have slipped their buys to the right, for reasons having less to do with the Joint Strike Fighter per se. In many of these countries, their defense budgets are under pressure and they have had to defer their buys. That turns out to work out well since the production has not ramped up and is not going to ramp up as quickly as it was originally forecast. But there are a number of foreign partners.

Senator LIEBERMAN. That was very helpful. That, in short, is why the Department concludes, notwithstanding the concern about affordability, that the Joint Strike Fighter remains a vital and necessary program for our National defense.

Let me now go to the question that would be a layman's question at this point. And I appreciate everything you are trying to do to make the program affordable. If there are these concerns about exploding costs, is one alternative here to try to take off some of the bells and whistles?

Over the course of my service on this committee, as we have watched other programs go up in costs, sometimes even not quite work as we hoped, one of the explanations has been, well, we just tried to put too much into it. We got so carried away by advancing technologies, that we just tried to put too much into it.

Is one of the ways to make this program more affordable to take some of its advantages off of it?

Dr. CARTER. That is the last place I would go. Requirements creep has not been the driver. Requirements have been relatively stable. So this is not like the presidential Helo or something. And the services really want the capabilities that are represented by the aircraft that we are giving them.

The cost growth comes from all the individual processes and piece parts costing more than we thought they were going to and really more than they should.

So the last place I want to go is to dumb down the airplane. I do not think that is necessary. We are not at that point yet. I think we can have the airplane that is on the books and just control the processes that go into it. So I hope it does not come to that. I do not expect and we are not looking to do that.

Senator LIEBERMAN. I hope not too, but I hope we keep it in mind if the costs continue to escalate.

Dr. Gilmore, in your prepared testimony, you mentioned that a new flight test schedule is being developed based on the recommendations of the technical baseline review, and we have heard others testify to that. Based on your experience with this JSF and other programs, how much confidence do you have as an independent observer and commentator and judge that the new schedule will get the test program right? And what would you say are the biggest risks that you foresee in achieving the test program as it is now constituted?

Dr. GILMORE. I think the test program, as it is currently constituted and is emerging from the technical baseline review, has a reasonable chance of being executed consistent with expectations.

That is not a guarantee because, as I mentioned in my opening remarks, these are very complex aircraft. And I mentioned the challenges that lie ahead that could lead to additional discovery, and discovery means it is something that you had not necessarily expected and therefore you cannot predict with certainty how you will have to deal with it and what amount of time it might require to deal with whatever the discovery is. So there is no guarantee here.

But because the current assumptions like the two assumptions on refly and regression rates I was explaining to Senator McCain, because those now pretty much across the board—you know, the number of flight test points you need in order to build up and fully expand the flight envelope. Previous assumptions had been that we would be able to just go immediately to the edge of the envelope rather than building up—that was not reasonable. That is not the case now.

The pace of flight testing, which the aircraft currently have been exceeding—and that is a good thing—is more in line with historical experience. Previously we had assumed—the program had assumed they would build up almost immediately to 12 flights per aircraft per months. Well, that was not reasonable based on historical experience.

So I could go through a number of the key assumptions that are in the plan that are now consistent with our—and I am not talking ancient historical experience. I am talking historical experience with F–22, which had its own problems, as well as the F–18E/F. Because those assumptions are pretty much consistent with our historical experience, I say this has a reasonable chance of being executed according to expectations.

Now, with regard to the biggest challenge, the biggest challenge is one I have already mentioned in my view, and that is integrating and testing the mission systems software. The mission systems on this aircraft are going to be the most complex that we have ever had on any aircraft, multiple sensors, information from multiple sensors being fused in order to provide the pilots with extremely

good, unprecedented situational awareness, threat warning, modes of attack that our other aircraft do not have that we cannot discuss in open session but depend on the sensors and other capabilities. That is going to be a challenge. It already is a challenge, and I would say that is probably the greatest challenge to come. It is not until we drop block 3 software, which will not occur until June of 2015 on the current schedule, that we will be actually integrating all the weapons in the aircraft, all the weapons capability in the aircraft. Before that, we are getting increasing capability but it is not all the warfighting capability that comes with block 3. So that to me is the biggest challenge, and we are just at the beginning of that.

Senator LIEBERMAN. Thanks very much.

Thank you, Mr. Chairman.

Chairman LEVIN. Thank you, Senator Lieberman.

Senator Brown.

Senator BROWN. Thank you, Mr. Chairman. Thank you, Senator McCain, for having this hearing.

It seems to me like it is a situation where, you know, taking from Peter to give to Paul. And at first glance, I am wondering if the enormous amount of money that we are spending on this program in the shifting and the adjusting and everything is affecting other military programs by cancelling other programs, obviously, to pay for this. I am wondering. Is there a concern that this ultimately is going to trickle down to affect the safety and security of our troops at all because of the enormous amount of money we are going to be spending on this program, Mr. Secretary?

Dr. CARTER. Senator, I have that concern. That is why I do not want to pay what we are forecasting we are going to pay. We can use that money for other military capability, other military needs. It is clear the country is not going to give us ever more money, ever-increasing budget every year to accommodate this kind of thing.

In the near term, I will say that we have not had to add money to the F–35 budget for the simple reason that the money we have added to development we have taken out of production because, as I indicated, we slowed production.

Senator BROWN. Right. But by slowing production, we have gone from an amount that was requested and projected down to an amount that, quite frankly, I think will put us at a tactical disadvantage. You have Britain going from 138 to 40, obviously, because, I am presuming, they are deeply concerned about the delay and cost. Yes, there is pressure on their military budgets, but I think there is another message being sent which is, you know, are you guys ever going to get this thing done.

I mean, I concur with Senator McCain.

To use a little analogy, it seems like we are going across the ocean. You are at that point now where you have so much fuel to either go here or go there. And we are at that point right now. And where are we going? I mean, we are spending a tremendous amount of money. And then the sustainment costs—I mean, just the fact that you are saying that they are going to be tremendously more than what was anticipated and what we, quite frankly, can

afford, I mean, at what point do we kind of cut the cord and go in a different direction? Or can we at this point?

Dr. CARTER. I truly believe that we can manage out a substantial amount of production and sustainment costs and make the aircraft affordable. That is the path we are on. That is what you ought to expect of us. You are absolutely right. If the estimates do not change over the years, we are not going to be able to buy 2,443 of these airplanes.

Senator BROWN. And as a result of that, since it is going to be the primary weapons system being used in the military, that puts us, I would argue, at a tactical disadvantage. Is that right?

Dr. CARTER. Yes. It is less than the capability we want. You are absolutely right.

Senator BROWN. And then the whole cost-plus contracts, fixed price contracts. At what point do we say, hey, listen, here is a contract. You are working for the United States Government. You are getting paid top dollar, and here is what you need to do. Here is what we expect you to do. And we hold them to the contract. I have never seen anything like it where we just continuously—I am glad you have cut back on the award part of it. But is there a plan to go forward with fixed price contracts in the future so we can not keep getting into these messes?

Dr. CARTER. There absolutely is. That was, by the way, an important feature of the Weapons System Acquisition Reform Act thinking. We have taken that on board. We did a lot of cost-plus contracting in the last decade, in the decade of plenty, and we are going to do a lot less of it in the coming decade. We are going to do more fixed price contracting. And as I said, that requires discipline, both on our side and on the contractor's side, and we need to have that discipline. With a cost-plus contract, you just go in and say, well, I will pay whatever it takes to get there. Well, we cannot go into that.

Senator BROWN. We cannot do that anymore.

I was not going to mention it, but you brought it up about the cost overruns even of the engine associated with this. I noticed initially it had gone up 68 percent. Then since 2008, the engine costs have increased by 500 percent, whereas by the time that this program is fully implemented, which I believe is in 2035, the F–35 will comprise about 95 percent of our aircraft. Is that right?

Dr. CARTER. That is correct. The 500 percent number is not correct. I have seen that number elsewhere.

Senator BROWN. What is the number?

Dr. CARTER. It is about the same as the aircraft overall. It is about a factor of 2 in real terms over the decade. The engine shares in the cost growth of the JSF. It has not been a driver of the cost growth.

Senator BROWN. Are you concerned at all about the operational risk of having a one engine program for the entire F–35 fleet? If you are not, are you telling us that there is no chance that the primary engine will fail or undergo a major malfunction ever?

Dr. CARTER. We have one engine type for the F–22. We have one engine type for the F/A–18. So this is normal and routine now for our tactical aircraft. And it is something that we are very comfortable with.

Senator BROWN. But I have also heard you and others talk about, oh, you know, with competition, it brings great price benefits to the taxpayers. I know in the littoral combat ship, you have awarded two contracts to build the ship. Obviously, budget requests have gone through up through the fiscal year 2016. And I still have never really gotten a reason as to if it is good for the other programs, why is it not good for an engine, which here we are. We are going to basically put all our eggs in one basket. One engine is tremendously over budget and another engine is a little bit different. I still have not gotten a good reason.

Dr. CARTER. Let me try to explain our reasoning on the question of an alternate engine. It is simply an analytical judgment. It goes exactly to the point you named. If you had a second engine manufacturer, then you could compete the two engines against one another lot by lot as you built the aircraft. To get yourself to that point, you have to spend the money to develop the second engine, to get the tooling to build the second engine, the sustainment for a second engine. In other words, you have to have a whole second engine infrastructure. You have to pay that bill to develop the competitive alternative.

The question is whether that bill, which you pay up front, will ever be repaid in terms of lower prices induced by competition between the two variants. In our estimates, that bill will not be repaid, and that is why we do not favor investment—

Senator BROWN. The second engines—they are self- funding it for the next 2 years to keep moving it along at a point, hopefully, where they will be able to provide a competitive engine so we can actually save money, as we have done with many other programs, whether it is the littoral combat ship or other weapons systems. What is your position on the continuation and self-funding of that engine?

Dr. CARTER. We are in the process of terminating the contract for the F–136 engine. Obviously, whatever decisions the performers of that work make is up to them. Our estimate for the cost to prepare the alternate engine for real competition which, as I said, would not repay this cost in our calculations, is about $2.9 billion, which is a very substantial amount of money.

Senator BROWN. But it is nothing compared to what you guys have been spending so far, quite honestly, on this whole program. It is unbelievable. I have never seen anything like it. And I concur with Senator McCain in asking to hold this hearing because it just seems like there is this kind of go-along/get-along mentality up here where no one is watching the taxpayers' money.

So my time is over, but, Mr. Chairman, I have some questions I would like to submit for the record for the second panel as well. Thank you.

Senator Reed [presiding]: Thank you.

Secretary Carter, the 35B version is on a 2-year suspension. When General Amos was here, I asked him about whether that 2 years could be shortened, and he suggested that the Marine Corps is working very actively to try to bring that 2-year suspension down. So your thoughts on whether it is going to be a 2-year delay absolutely or something short of that.

Dr. CARTER. We have identified four problems so far and have a path to try to resolve those problems and a timetable for doing that. General Amos has seen that timetable. We certainly would like to resolve all those issues as quickly as we can. There may be, however, more problems that emerge from flight tests. We cannot really predict that.

I should say Secretary Gates wanted a 1-year probation, and it was we who advised him that we could not resolve all these issues reliably inside of 1 year.

So General Amos is right. We would like to do it quicker. I cannot, as I sit here right now—I could go through each of those problems with you—but promise that it will be resolved inside of 2 years, but if we get them all resolved inside of 2 years, then we can have a clearer picture and make the decisions sooner.

Senator REED. Thank you.

With respect to some of the issues, I will turn to Dr. Gilmore. One of the issues with the 35B is a software modification in terms of particularly the vertical ascent issues. You are going to have to make structural modifications with a spoiler. Are you any closer to ascertaining which approach? My presumption—I could be completely wrong—is that the software approach would probably be less expensive and quicker to implement. So if you could give me any help on those issues.

Dr. GILMORE. Yes. The answer to that question is yes.

There is a problem with the chaotic airflow in the transonic regime which causes loss of lift on the aircraft. It causes unpredictable loss of lift. It is called roll- off. It also causes the aircraft to yaw, side-slip, which then creates greater stresses on the structure in the vertical tail and other places, particularly in vertical tail.

And that problem has been seen on the STOVL aircraft. It has also been seen on the CTOL aircraft. And in the CTOL aircraft, the information I have is that they have been able to deal with this problem satisfactory through changes to the flight control software, scheduling forward flaps and that sort of thing.

They are trying the same sort of fixes in the flight control software on the STOVL version. They have made progress, but they still have not made as much progress as they would like. They are trying to develop a rigorous set of criteria that they can use. They are not trying. They are developing a rigorous set of criteria that they can use in order to evaluate the STOVL's handling qualities, and they have not yet made a decision whether—they are going to try to do some more changes to the flight control software, another round of those, do an evaluation, and then make a determination whether there would be any structural changes that would be needed.

There is provision in the structure of the CV aircraft, jumping yet another aircraft, for a spoiler, but there is not in the STOVL version. So that would be a major change if it were needed. I think the program office is hopeful it will not be needed, but they do not have the final answer yet.

Senator REED. Do you have a sense of how much more delay would be engaged if they had to make the structural change?

Dr. GILMORE. No, I do not know. You could ask the program office that.

Senator REED. Thank you.

The other issue—and this goes to the 35A. We have heard that the range is less than the requirements. It was 590 nautical miles. It is 584. And that raises a question with respect to the B and C models, whether we are going to see a decrease in range which means increased fuel costs, reduced time on station, et cetera. It seems to me 6 miles is not a lot, but operationally it could be very significant. So, Mr. Van Buren, I think you are the designated hitter.

Mr. VAN BUREN. Senator, both the B and C variants currently exceed the requirements with regard to range payload. Over the course of the last 2 years, the A model has historically been above that. It just recently dipped back down below. And over a flight test program over the continuation of the configuration definition, you normally get little fluctuations that are against this requirement number. I would ask Admiral Venlet in the second panel as to where he would proceed with the future, but I think that our expectation is that it will come in and meet that requirement of 590.

Senator REED. Very good.

Let me shift back to Dr. Gilmore or anyone on the panel who feels best able to respond. Our presumption is when we start talking about trying to rein in costs, you are going to look at every sort of system. You are doing that now. Secretary Carter pulled together lots of people around the table.

One issue is the helmet mounted display system. Is there a serious consideration about abandoning that system and going to something that is a traditional system? Or is the helmet mounted system so integral that it cannot be abandoned but it has to be fixed? Can you give me an idea about that? Dr. Gilmore?

Dr. GILMORE. As I explained in my written testimony, there are two paths that are being pursued. One is to push ahead and try to fix the problems with the helmet, which include latency in the images that are displayed, particularly the IR images at night. That is a problem.

And then there is jitter. You know, there is symbology which is projected on the helmet visor that in today's aircraft appears on the displays on the aircraft dash. And there is jitter. It moves around and it gets fuzzy.

And they are trying to fix those problems, but they are pursuing an alternative path which would take an existing helmet with capabilities similar to the helmets that are used for off poor sight cuing and aiming of the AIM–9X, use that helmet in conjunction with night vision goggles, which would give you night capability. Then the pilot would have to peer down underneath the night vision goggles in order to see symbology displayed on the cockpit displays. But that is the way pilots do business at night now. So it would not be an improvement, relative to what they do now, but it would be no worse relative to what they do now.

And then as a very last resort, the program would consider incorporating a heads-up display like exists in current aircraft, but my understanding is that the program thinks that one of the first two approaches will work out and that probably will not be needed.

And that would be a good thing because that would be a major modification to the aircraft.

Senator REED. Very good.

Final question. Secretary Carter, you have already mentioned the international participation here. Let me not prejudge the answer. One, this international participation seems almost logically to reduce the per cost of a copy to us. So it is critical in terms of the financing. And they also seem—well, let me ask you. Everyone seems to be in accord with the steps you are taking to develop the system. I know they have pushed back some of their acquisitions because of their budget problems. But they still seem to be there to buy their requisite number of aircraft and to do it in a timely manner.

Dr. CARTER. That is right. The numbers are—we are going to buy a little bit north of 2,400 of these airplanes, and the total projected foreign buy is in the neighborhood of 600 to 700. So it is a substantial increment to ours. It will drive down unit cost accordingly.

In the main, the partners are holding numbers but sliding to the right under largely their own budget pressures. Their counterparts of me I talk to all the time. They have the same concerns and determination about affordability that we all have. They know this aircraft very well. In the main, they are counting on it, the way we are counting on it. So they are in the same boat we are. I talk to them all the time trying to keep them informed.

Senator REED. Thank you very much.

Thank you, Mr. Chairman.

Chairman LEVIN [presiding]. Thank you very much, Senator Reed.

Senator Cornyn.

Senator CORNYN. Thank you, Mr. Chairman. Mr. Chairman, I want to express my gratitude to you and to Senator McCain for holding this hearing. This is some of the most important work we can do. As money is tighter and people are asked to share in the sacrifices at the Federal Government level in terms of what we provide, the Department of Defense needs to be part of that analysis, but I know we all agree that we don't want to sacrifice our preeminence when it comes to national security. But taxpayers ought to get their money's worth and not have one penny more wasted than we can possibly avoid.

What comes to mind when listening to some of the testimony is what Mark Twain said about if you are going to put all of your eggs in one basket—and I am paraphrasing—you better take care of that basket. And it sounds to me like that is what we have done, in large part, with the F–35.

And I guess my recollection is, and Mr. Van Buren, what is the age of our aircraft fleet? My understanding is most of the planes that our airmen fly are older than they are.

Mr. VAN BUREN. Obviously, the tanker aircraft are the oldest, and the last tanker will be retired when it is approximately 80 years old. And so, we are very thankful for the proceeding on with the tanker contract.

The fighters are younger, but still on the average of 20 to 30 years old.

Senator CORNYN. And as I know that, Secretary Carter, you described, I think to Senator Lieberman, this aircraft is vital. But in your written testimony, you described it as a dominant, multi-role, fifth-generation aircraft capable of projecting U.S. power and deterring potential adversaries.

Why is it important that we produce this aircraft, obviously as economically as possible, but why is it important to our National security and as well as to those of our partners who are joining us in the purchasing and the development of this aircraft?

Dr. CARTER. The advance that the Joint Strike Fighter represents over its predecessors is captured in the phrase "fifth generation" versus "fourth generation." And there are a couple of key differences there. One is that this is a very stealthy aircraft compared to its predecessors, and that is an advantage. And the second is that it has a very substantial onboard sensor suite and capacity for electronic attack.

So, as it flies against enemy air defenses, both the passive stealth, the inability of the radar to see it in the first place, and the active electronic attack measures are a level of sophistication over their predecessors. And therefore, it has a higher probability of penetrating more difficult and heavily defended airspace than its predecessors.

And then its onboard sensors allows it to acquire targets—airborne targets, ground targets, and so forth—with a lot more sophistication to attack them than the predecessor. So just every way. Not surprising with the passage of time that we can build a better airplane, and it is a lot better airplane than its predecessors.

Senator CORNYN. And my understanding is the Department of Defense plans to field an operational fleet of 2,443 aircraft at this point?

Dr. CARTER. That is correct.

Senator CORNYN. Although if you look at previous examples of the B–2 Stealth bomber and the F–22 Raptor, because of budgetary constraints, we saw the original projections of what the size of the fleet would be constrained. What would be the impact, in your view, of a reduction of the number of these aircraft for one reason or the other? What does this do in terms of our National security interests?

Dr. CARTER. I think a reduction that is forced by the inability to produce the aircraft for the amount of money it was originally projected to cost would be really unfortunate. If we decide later we don't need that many airplanes for a legitimate national security reason, that is one thing. If we decide we are forced to fewer than we want simply by cost, that is the outcome I am trying to avoid, we are all trying to avoid.

Senator CORNYN. Well, I appreciate your good work. I believe, and I think we all believe, that we need to do whatever we need to do to protect our National security. But obviously, waste, money that can be not spent because of greater oversight and care in terms of the development and production of these aircraft is a critical role this committee plays and what I think the taxpayers expect from us.

How would you characterize, Secretary Carter, the program's overall test flight performance to date?

Dr. CARTER. I think, as my colleagues here have indicated, it has consistently fallen short of expectations over the last 3 or 4 years but is beginning to catch up. Of the issues mentioned so far, I think the two that I focus on are software. That was mentioned. I think we still owe you collectively an answer on what we are doing about the software.

I think we have described and I completely agree with Ms. Fox's and Dr. Gilmore's concerns about software, and I won't try to do it myself. But perhaps later, Admiral Venlet can address that software issue.

And then, in the STOVL variant, there are those four STOVL-unique issues, which are the door that opens up over the engine in the back when the lift fan is on; the drive shaft that connects the engine to the transmission—from the main engine to the transmission that, in turn, drives the lift fan; the heating within the transmission itself; and then the things that are called the roll posts that go into the wings. Those are the four issues on the STOVL variant. They are the ones that we are going to work through and see how much weight and cost they add to the STOVL.

STOVL is inherently more complicated. It is not surprising that we are having more difficulty with it because it has this complex flight envelope and this necessity to land vertically. So those are the two most serious engineering concerns I think we have going forward. And we have plans to address all of those, and I think they are realistic plans. But we still have to accomplish those plans.

Senator CORNYN. Currently, we have eight partner nations, and I understand there may be a ninth that is going to make a commitment to purchase as many as 19 of these F–35A variants. And of course, the goal of sort of putting all our eggs in this one basket is to create a common multi- service platform and one where the costs could be spread among our partners, our allies.

What would a reduction—or let me rephrase it this way. If our partner nations perceived uncertainty and potentially reduced funding on the part of the United States toward completion of the F–35 program, how do you think it would impact their commitment to this program?

Dr. CARTER. I think they have the same attitude toward our commitment that we have to theirs. They want us to buy more because they know that will drive down their unit cost. They all want the airplane, just like we want the airplane.

And so far, the solidarity among the JSF partners has been pretty impressive. And if we get to where we want to get to with the Joint Strike Fighter, there won't be any other airplane that you can buy that is as good for the dollar as the Joint Strike Fighter, and we may see our export sales in decades ahead expand further, and that is a great thing.

Senator CORNYN. Thank you very much. My time is up.

Chairman LEVIN. Thank you, Senator Cornyn.

Senator Begich.

Senator BEGICH. Thank you very much, Mr. Chairman.

I wanted to have a couple of questions, but then just some quick follow-up. I want to follow up on the efforts with our allies in purchasing I think you said 600 to 700, is that, over the span.

What is—just for my own edification, what is or has the contractor indicated that if they didn't participate, what would happen to the price? Ten, 20, 40 percent—what would be the—

Dr. CARTER. I don't know whether Christine has done that assessment, but if you backed down the buy—

Senator BEGICH. Yes.

Dr. CARTER.—Christine, from the neighborhood of 3,100 to 2,600, do you have an idea of the affect on the average procurement unit cost would be?

Ms. FOX. I don't have that answer off the top of my head. I would be happy to get back with you.

Senator BEGICH. Would you?

Ms. FOX. But it would obviously increase the cost. You change the denominator, you are going to increase the cost. But I don't want to give you an off the top of the head.

Senator BEGICH. Could you share that with me?

Ms. FOX. Absolutely.

[The information referred to follows:]

[COMMITTEE INSERT]

Senator BEGICH. The second part, I know the pricing from cost plus to fixed price has been shifted to now happening. Tell me, if you could—and I think that seems like a good step—I know a year or so ago, 2 years ago, we had a subcommittee meeting about this issue, and we have had several other meetings. And one of the concerns that I had back then is can we get to a fixed price sooner?

My understanding is now you are there, and can you tell me the positives of that? And I am assuming the contractor, everyone has agreed to it because you wouldn't be able to get there unless the contractor agreed to it. Can you tell me the positives of that, whoever could respond to that?

Dr. CARTER. The positives of a fixed price are that, in the first instance, it requires us and the contractor to both get completely disciplined about the design we are asking for and for them the processes they are delivering to. We wanted to get to that point earlier on the Joint Strike Fighter and not leave it loose for another couple years, which was the original plan.

Senator BEGICH. Right.

Dr. CARTER. Now you can't just wish for discipline. So just changing contract type doesn't make it so.

But we wanted to create an environment in which it was necessary for Admiral Venlet and his people on the Government side and Lockheed Martin and the other contractors on their side to have that kind of discipline. And so, we did that in Lot 4. We will do that again in Lot 5.

And what it means is everybody needs to stare in the face the fact that if they overrun, they pay. That is good discipline.

Senator BEGICH. Right. And good for the taxpayers. And so, again, I want to thank you and Lockheed for doing a good job and getting that sooner than later.

Let me ask a question. I wanted to follow up on a question Senator McCain was probing on, and that is how they determine the

pricing, the estimation, and of course, where we are today and where we didn't get to. It is a question I ask most departments when I hear this.

Are the same people who did those estimates still within the system of the DOD bureaucracy doing more estimates on other stuff? And the reason I ask you this is because if we don't change that component, and you made a major change—to be very frank with you—in this program by changing who was running it. And I give you credit for that. That is a strong statement.

But if you saw the same estimators estimating the same stuff, how am I going to be comfortable and confident? And so, first question is are those same people, the bulk of them, still working in those same areas of estimation?

Dr. CARTER. Well, let me say at the beginning that I value the function of cost estimators. In some cases, they are excellent experts, many of whom work for Ms. Fox.

And when I got those estimates, it wasn't that I didn't believe them. It was that I didn't want to live them. And so, they were entirely credible. But what I want our mangers to do, and this is what I and Dave tell our managers all the time, is just because we budgeted your program to that much money because, historically, things like this have cost this much, that is how we do the budgets.

When you ask us, or in this case, this committee has required us to budget to the independent cost estimate performed by Ms. Fox's office, and I respect that process. It requires us to put an amount of money in the budget that history tells us in the past we have paid for that kind of program.

But I don't want my managers to spend all that money. I want them so that is—

Senator BEGICH. I understand that.

Dr. CARTER. I want them to underrun.

Senator BEGICH. I guess my struggle is, you know, the F–35 is one. I can sit here and list off other programs that have had estimates, and then they are off not 1 or 2 or 3 percent, but multiples. And it seems the system of how we are going after these and trying to be more accurate in our estimation, which, of course, is important for us as we are trying to appropriate resources, creates a confidence gap.

And I am trying to resolve that confidence gap, to be very frank with you. I think there are some great steps you have done. I have been on this issue since the day I got here 2½ years ago. So I appreciate it because I think it is a good platform. It is a great opportunity for us. But we have got to continue to ride, and I would show others.

Ms. Fox, you seem you want to respond?

Ms. FOX. Sir, I just wanted to say that one of the requirements of the Weapon Systems Acquisition Reform Act is that my office work across the department on cost estimating techniques. And so, that is one of the things that we are doing to try to raise the ability to do cost estimation across the department.

And then the other thing that the act requires is that we bring those forward more visibly at the very beginning of a program, and that is another effort that is underway. Obviously, Dr. Carter

doesn't want to pay the estimation that we have, and I am with him in that.

But doing the cost estimation in a way that doesn't make assumptions that allow us to go forward for a program where we have just significantly underestimated it is the goal of the legislation. And we are trying to help with that.

Senator BEGICH. And at some point, I am assuming—maybe I shouldn't assume this—there is some metric of measurement that you will determine those techniques are working or not working?

Ms. FOX. Sir, we always track back how did we do? What did we get right? What did we get wrong? There is no one metric, but we will—we keep all the historical information, and we are keeping track of our own estimate, as well as others in the department's estimates.

Senator BEGICH. And I forget what that legislation, does it require you to come back to the committee at some point and report or give some written document of the accuracy of your technical estimation?

Ms. FOX. Sir, we owe you an annual report on our cost estimation work of the previous year. That report was provided last year for the first time and is about to come to you this year.

Senator BEGICH. Right. Let me go into one other area. And Secretary Carter, you mentioned, and I agree with you, sustainment is a big ticket. So let me kind of get some refinement here on what is, and I can't remember the exact phrase you used. But the costs are acceptable or they are not acceptable now based on sustainment costs.

How big a differential is it between what they are saying it will cost and what you want to see it? In other words, because so far I haven't heard, and maybe I don't want to. But I am curious, is it 10 percent too much, 100 percent too much? What are they saying it will cost and what you are trying to get to that makes it sustainable?

Does that make sense, the question?

Dr. CARTER. It does. I can't give you a good answer on that now because my basic answer is I want to get out as much as I can of the cost that is in there, and I can go through each of the drivers of cost and, see, there are 10 drivers—I won't take the time to go through them—of sustainment costs for the Joint Strike Fighter. And I want to get each one of those down.

I am greedy. So I want to——

Senator BEGICH. Is your goal 30 percent, 20 percent, 50 percent?

Dr. CARTER. You are in the right ballpark easily.

Senator BEGICH. Okay. Okay. So it is not a small amount?

Dr. CARTER. No.

Senator BEGICH. It is a significant amount?

Dr. CARTER. It is, exactly.

Senator BEGICH. Okay. My time is up. But I want to just comment. I know Senator McCain made a comment about sustainability, and if that doesn't—if you can't get there, what is planned? What is the next plan? So I will leave that as an open question maybe for the record or for another time.

But thank you very much.

Chairman LEVIN. If you would get us that for the record, what are the backup plans if these goals, targets are not met? I think it is an important exercise in discipline for you and for us.

So a number of Senators have made that request. I think Senator McCain raised that issue, and Senator Begich and others. We need to know what the driver is to succeed here, and part of that driver is to have a backup plan.

[The information referred to follows:]

[COMMITTEE INSERT]

Chairman LEVIN. Thank you, Senator Begich.

Senator Portman.

Senator PORTMAN. Thank you, Senator Levin. Well said.

Senator McCain, Senator Levin, thanks for holding this hearing. As a new member of the committee, this has been a frustrating process because I have heard today just incredible numbers in terms of the estimates of the cost and the timing being so far off.

And in these fiscal times we face, it is particularly concerning. We are talking about not just restraining spending in the Defense Department budget, but many, including your boss, have talked about reducing spending in programs. And here we are, talking about a program that, based on the information we have heard today, is estimated now to cost 80 percent more than when the program started.

Ms. Fox, you said it is $4.5 billion more expensive than it was just a couple of years ago, just 1 year ago, actually, in your testimony—$4.5 billion in the last year. It is taking years longer than originally estimated, of course. In fact, there has been a 4-year delay in the program just since 4 years ago.

And so, I share in the frustration, and we have to have a qualitative edge, and this is our next generation, our fifth-generation qualitative edge. So we need to get it right. We have talked about software and STOVL, and we have talked about the pilot helmet mounted display problem. So it sounds like we are beginning to identify the problems.

And Secretary Carter, it sounds like you are on top of some of these specific issues, but this is a program that just cries out for reform and help and competition. Dr. Carter, you have been big on this better buying power idea, head-to-head competition drives productivity and value. And I couldn't agree with you more.

And based on all the experience of previous systems, weapon systems, having competition enables us not to just get the cost down, which we obviously have to do in this case. You had just said, in response to Senator Begich, we can't afford it. And the sustainment costs, we have talked about, but it also improves the quality.

And so, from an operational point of view, when you have got 95 percent of our fighters, with some of these gentlemen behind you who have been, like Senator McCain, in a position of having to be out there as warfighters and wanting to have that qualitative edge, we have got to be sure we have competition on the operational side as well.

You know my concerns, Secretary Carter, because we have talked about them. But I just think given these incredible cost overruns, the huge problems we are having with this program, that not to have a competitive engine makes no sense.

And in response to earlier questions about this, you said it is normal and routine not to have competition. Well, I would say the GAO is going to tell us later how it has been normal and routine in some programs to have competition. They will talk about the F–16 program and the great engine wars of the '80s and how much money was saved.

And you probably disagree with GAO's estimates that they say we can save up to $20 billion, $10 billion to $20 billion just by having competition. And again, that doesn't even get at the operational concerns of having 95 percent.

I don't think there is anything normal and routine, by the way, about having 95 percent of our fighters depend on one engine. That is not normal and routine. Nor is, again, these unprecedented cost overruns that we have seen. We have never seen a program like this in terms of the amount of money we are talking about.

So you also said that it is an analytical judgment, and the analytical judgment was the upfront cost can never be repaid. Well, the costs in this program so far have been about $3 billion to develop a competitive engine. And that is all wasted when you terminate, as you guys have decided to do, apparently. And you are even talking about destroying some of the incredible technology that has been developed with that $3 billion of taxpayer money.

You said it will cost about another $2.9 billion going forward in order to develop a competitive engine. And again, this is in the context we are talking about a $110 billion program, which, I guess, is going to be an estimate that will be increased soon. And the GAO said that you can save $10 billion to $20 billion just through competition.

But that $2.9 billion, of course, others would not agree. What GAO says, it is $1.8 billion. They said that last year.

They said that before, by the way, the competitive engine manufacturers, GE and Rolls-Royce, decided that they were going to self-fund over the next 2 years. They said it is only $1.8 billion, and their self-funding is in response to your decision to terminate the competition.

So I guess I would ask you the question about your $2.9 billion number, those testing costs, does that take into account the fact that GE and Rolls have committed to bear the costs for the F–136 development over the next couple of years? And by the way, also to move to a fixed-price contract, per Senator Begich's question, which is, to me, a template that ought to be used in all this.

So I just see a real inconsistency here between the incredible and frustrating numbers we have been talking about on costs and delays and then on this one idea of competition, where we are talking about 95 percent of the fighters to say that somehow our analytical judgment is that we can't have competition.

And let me just be candid about something. I started off getting interested in this particular issue with this particular program because GE Aircraft has its headquarters in Ohio, and they don't manufacture as much in Ohio as they do in other States. But their headquarters are there, and they have a presence there that is important.

But the more I dig into this and more I learn about it and more I learn about not just this program, but other programs and what

competition has meant, the more convinced I am that this is one area, relatively important area, in an airplane, what the engine is, where we can make strides in terms of the cost and, of course, on the operational side.

So, with that, Dr. Carter, I would love for you to respond to my comments and questions on the $2.9 billion testing cost. Do you still hold by those numbers, despite the GAO report and despite the decision in the interim of GE and Rolls to go ahead and commit to bear the cost of development over the next couple of years?

Dr. CARTER. We do, and I may ask Ms. Fox to comment further. Just to be clear, the $2.9 billion, the dollars that we talk about is to prepare the second engine for competition. That includes completing development. It includes some production tooling, everything it takes to have a second engine available for competition.

So that is the estimate. Actually, Christine's people have done that estimate, and I believe that number is still good. And it is the same number no matter who pays it. It is $2.9 billion.

Senator PORTMAN. Wait a minute. It is the same number to the taxpayers, no matter who pays it?

Dr. CARTER. No. It is obviously not the same number, but it is the same cost—

Senator PORTMAN. So your $2.9 billion is not the cost to the taxpayer?

Dr. CARTER. Sorry?

Senator PORTMAN. The $2.9 billion is not the cost to the taxpayer?

Dr. CARTER. No, $2.9 billion that I was speaking about is the cost to complete the development in our estimate.

Senator PORTMAN. Okay. So you weren't talking about your cost or the taxpayer cost.

Dr. CARTER. In preparation for competition of the—

Senator PORTMAN. You were talking about the costs.

Dr. CARTER. Correct.

Senator PORTMAN. And over the next 2 years, the industry, the contractors have agreed to bear those costs and then go to a fixed-price contract. So does that change your $2.9 billion figure as to the cost to the program, meaning the cost to the taxpayer?

Dr. CARTER. Two comments on that. First, as I said, it is $2.9 billion, irrespective of who is paying the bill. Obviously, less to the taxpayer if somebody else is paying for it.

You also mentioned a fixed-price contract, and this gets back to a comment I made earlier about a fixed-price contract. The F–136 engine isn't at a point yet where its technical specifications are clear. That is normal in an aircraft engine program at the early state that the F–136 engine is at.

And therefore, and at that stage, a fixed-price offer isn't really meaningful because the engine that is offered, that is on the test stand, is not the engine that we intend to use. It is, instead, the engine that evolves from that one. So fixed price isn't really appropriate to discuss for the F–136 engine at this stage.

And let me ask Ms. Fox to comment on the $2.9 billion.

Ms. FOX. Certainly. We did do the cost estimate of the $2.9 billion. It does include, as Dr. Carter said, the cost to complete development, which is about $1.2 billion in our estimation. And then it

includes the other things that you would have to pay for to bring it up to a place where it could fairly compete.

Our estimate last year and in previous work that we did was that would happen in 2014. But with changes to the program, including changes to the engine, including changes to the F–136 engine development program, we now estimate that would not be possible until 2017.

And so, you have to continue on with your investment until then. That is part of it. So there is procurement cost, tooling—

Senator PORTMAN. So we have gone from 2014 to 2017, assuming you are going to rely on one engine?

Ms. FOX. Sir, that is the time where we think that the two engines would be in a place where they could fairly compete. In other words, the time when the F–136 could have achieved all of the things that—

Senator PORTMAN. Well, since you terminated the other engine, why would you be estimating two engines?

Ms. FOX. This is our estimate before termination, sir. This is the estimate that—

Senator PORTMAN. Okay. Could you get back to us, please, Dr. Carter, on what the costs are? I mean, I think it is unusual, Mr. Chairman, that before the committee, DOD is telling us what a cost is, and the assumption has to be that is the cost to the Government. And then coming back and saying that is the cost of development that doesn't include the private sector commitment here.

So I would like to know what the net cost is to the taxpayer and what the savings would be. And then in terms of a fixed-price contract, I would love to hear more about why a fixed-price contract isn't appropriate.

But thank you very much. My time is expired. I appreciate the chairman's indulgence and appreciate your testimony here this morning.

Chairman LEVIN. Will you provide that figure for the record as to how the $2.9 billion will be changed or would be changed with the agreement or the decision on the part of the manufacturer to take the cost to themselves during the next 2 years? How does that $2.9 billion figure change with that willingness on the part of the second engine manufacturer?

You will do that for the record, will you, Secretary Carter?

Dr. CARTER. Yes, sir.

[The information referred to follows:]

[COMMITTEE INSERT]

Chairman LEVIN. Thank you.

Thank you, Senator Portman.

Senator Blumenthal.

Senator BLUMENTHAL. Thank you, Mr. Chairman.

To pursue that line of questioning and, first, let me thank all of you for your work and your expertise and the dedication of this project. Is there any precedent for self-funding a program of this magnitude in dollars and importance to our National security? Dr. Carter?

Dr. CARTER. Not that I am aware of.

Senator BLUMENTHAL. And do you have a concern that even though the representation is that there will be self-funding, that

American taxpayers could, in fact, foot the bill for these expenditures?

Dr. CARTER. Well, $2.9 billion is a lot of money for anybody, and I would be concerned if the idea is that we are going to pay for it later by acquiring engines that, as I said, we don't think are necessary and don't make the cut for us in terms of their contribution to taxpayer value for national defense. That is why we haven't wanted to invest in the second engine.

I would certainly hope no one has it in their mind that we are going to pay for that later. Because whether you pay for it now or pay for it later, it is $2.9 billion we can't afford for an engine we don't need.

Senator BLUMENTHAL. And in fact, perhaps I am just stating it in different terms, there may be claims down the road—and there are these claims all the time in defense procurement contracts—that American taxpayers may, in fact, pay that will increase the cost of this project? Is that true?

Dr. CARTER. I would have that concern.

Senator BLUMENTHAL. Let me ask you about the equipment, the tooling, the property involved in the second engine. Doesn't that belong to the American taxpayer? It is not GE's, is it?

Dr. CARTER. No. It is taxpayer property, and it is now the termination contracting officer, in our normal procedures, is arranging for the disposition of that. But it is Government property.

Senator BLUMENTHAL. And the Defense Department has decided to terminate it and, therefore, is entitled to have that property back. Correct?

Dr. CARTER. That is correct.

Senator BLUMENTHAL. And are you taking steps, you have mentioned a couple of them, to, in effect, take that property back, terminate the program, stop any potential risk to the American taxpayer so that the project will be completed in the least cost possible.

Dr. CARTER. The termination contracting officer is doing precisely that, following the normal procedure for contract termination, taking possession of Government property, and arranging for its disposition.

Senator BLUMENTHAL. You have talked very credibly and persuasively about managing out and driving out the costs, unnecessary costs in the range of 20, 30, 40 percent. When will we know whether, in fact, that goal is possible?

Dr. CARTER. I hope and expect that you will see indications of that in the LRIP 5 contract negotiations, which will be concluding in the next few months. Then you will see them again in LRIP 6. Then you will see more in LRIP 7.

I think that they will be—I hope and expect that they will be progressively better. It has taken time for cost to creep in. It will take time to drive it out. So I am expecting over the years that we will get better and better, as all businesses do, at identifying costs and driving out costs.

All businesses are constantly in the process of driving costs down, and our enterprises that are working for us on this particular project will be doing the same thing.

Senator BLUMENTHAL. As your shareholders, though, if we were asking the question, give us a date by when we will know whether or not that goal can be met. What would you say?

Dr. CARTER. Again, I think that we will have much better indication in a few months of the cost structure of the Joint Strike Fighter than we have ever had and that we have right now. It is a little bit like the difference between what we knew about SDD last year and what we know now.

I think we are going to have a very greatly improved understanding of the cost structure of the Joint Strike Fighter in just a few months. We are working on it very intensively. We have to.

And we are going through every piece of it. We have a very substantial effort. Dave Venlet is involved in it. Dave Van Buren is involved in it. I am involved in it personally.

Senator BLUMENTHAL. And none of us, I think on this panel—I can't speak for others—but certainly, I have no doubt about your dedication, your expertise, your skill in seeking to achieve that goal. But you have just used the term "over the years" we would know, and that is a little fuzzier than "over the next few months."

If you think it will be over the next few months, that is a lot more comforting than over the years.

Dr. CARTER. No, I am sorry. I don't mean to be vague. Our understanding of the cost structure will improve dramatically in the next few months.

The actual reduction of cost will occur during the period of production of the aircraft, which is some years out. And so, we will be eliminating cost as the production process ramps up because it is in the future, and it will be a progressive process.

We can't snap our fingers and remove all that cost. It is something we need to work out over time. But what we will have in the next few months I think is a much better understanding of what that path is.

Senator BLUMENTHAL. So we would be able to ask you these questions with more specificity in, let us say, the next quarter?

Dr. CARTER. I think so, yes.

Senator BLUMENTHAL. Finally, let me just turn to what I regard as sort of the elephant in the room here. Senator McCain, others have asked you about alternatives, and the chairman asked you to come back as to what the alternatives are. And without asking you to speculate, are there alternatives here?

Dr. CARTER. There are not good alternatives to the Joint Strike Fighter for either of our services or our international partners. We just went through that analysis, as we are required to do by law under Nunn-McCurdy. And we looked at alternatives, and we don't have any good alternatives. We want the airplane.

Senator BLUMENTHAL. Is there anything that we can do to help you drive down cost, to manage out those costs that the Congress, the Senate, this panel can do in light of the fact that apparently, and I take you at your word, there are no good alternatives here. We need this aircraft. We need to make it work. We need to make it affordable.

And maybe most important, we need to convince the American taxpayer that it is necessary, affordable, and that there are no good alternatives.

Dr. CARTER. This committee has contributed a lot to our acquisition practices over the last couple of years. That was through the Weapon Systems Acquisition Reform Act and other provisions. So I appreciate that and thank the committee for giving us many of the tools that we do use to try to deliver better value to the taxpayer and warfighter.

Senator BLUMENTHAL. Thank you very much.

Chairman LEVIN. Thank you, Senator Blumenthal.

Senator Ayotte.

Senator AYOTTE. Thank you, Mr. Chairman.

I also want to thank you again and Ranking Member McCain for holding this important hearing.

And just to summarize what you are saying, this is still a very critical project for our country, and there isn't a good alternative. So the importance of the F–35 Joint Strike Fighter program is one that we agree on in terms of getting that capability to our warfighter in a way that we can afford and in the production rates that we want them to be, at the levels that we hope that they will come to.

And I share all of the panel members' concerns about the cost overruns and look forward to your detailed analysis that you have just described you will be coming forward to as to how we will be able to meet the cost measures to afford this program going forward.

I wanted to ask you about the ramp-up rates for production. And Secretary Carter, as I understand it, in 2010, 32 Joint Strike Fighters were funded. And then, in 2011, 35 were funded. And yet, for '12, the proposal of the Department of Defense is actually to go back to 32.

And just looking at what we are trying to get at in terms of overall production rates, I was surprised to see us kind of creeping up and then go down in terms of production rates and wanted to understand why our production rates aren't increasing, given what we are trying to produce overall?

As I understand it, the goal is to produce almost 2,500 of these Joint Strike Fighter aircraft in the next 25 years. And so, we would hope that the production would be going, even if it were gradually, in the opposite direction. And Senator Begich already had asked Ms. Fox about the production costs and as we produce more what that impacts on the individual cost for each fighter that is produced.

And as I understand it, you are going to get back to the committee on that issue, but I wanted you to overall comment on what the thought process was as to why we are not going in this direction, as opposed to this direction in '12?

Dr. CARTER. I can do that, and the difference between 35 and 32 is a difference between the U.S. buy and some addition few airplanes bought by others. So our buy has been stable at 32. But your question still is why aren't you going up?

Senator AYOTTE. Right.

Dr. CARTER. Why are you flat? And the reason for that is that based on their performance to date, that is what I can sit before you today and tell you the Fort Worth line can produce. So the line

has not matured in a way that makes it reasonable for me to ask you to give me money for more airplanes than 32.

A second reason—so that is just sort of fact of life. Second reason is that it would be imprudent to try to go faster up the ramp for the following reason. That risks building aircraft that we are, at the same moment we are building it, discovering in tests need modifications.

So you don't want to build too many—you want to get into production as quickly as you can. But you don't want to get in there so fast that you end up rebuilding the early aircraft on the basis of what you learn in tests.

That is the balance between going too fast and going too slow that I was referring to, and we think that the 1.5 factor per year is the right balance between—strikes the right balance between going too fast and too slow. So those two things together explain why flat in '12. Just not ready to go up the ramp. And then why the ramp is a 1.5 ramp in the out-years.

That seems to be—that is, to us, and we are advised by the manufacturing review team, but I think well advised by them that that is the maximum year-on-year increase in production rate that we can prudently plan for the Fort Worth facility.

Senator AYOTTE. And I really look forward to your getting back to us on the information on what you anticipate the rates in terms of if we increase production, how do we reduce cost? And I think that goes into the cost analysis overall of what we are looking at, to whether we can not only produce the right specifications we want for our warfighters, but also make sure that we can actually get production so it is a viable program going forward.

Ms. FOX. Could I just add that as long as the total of 2,443 aircraft holds, the change in the ramp, it delays when we get aircraft. It is reflected in the cost and the development cost. But the average cost per aircraft doesn't significantly change with regard to the ramp, just for your information.

Senator AYOTTE. And I appreciate your also—since you had said earlier, so you don't think that there is any change?

Ms. FOX. The change in the ramp is not a significant driver in cost in any way in the average cost per aircraft.

The reason for the change in the ramp, the increased development, that is an increase in cost, as we have all already testified to. That is the cost that we are experiencing in the near term, but the average cost per aircraft won't change with the ramp.

Senator AYOTTE. And I just wanted to clarify, Secretary Carter, you were saying that the 35 in '11, that some of them were due to international acquisitions? That is different than what I understood. So—

Dr. CARTER. Well, let me get back to you on that, and perhaps the second panel, I am sure Dave has that at his fingertips. And I could find it out here. I remember a couple of UK and Dutch planes in there.

Senator AYOTTE. Okay. If you could get back to us—

Dr. CARTER. I think that explains the difference.

Senator AYOTTE.—on that, I would really appreciate it, just so we can understand which way we are going, if we are zigging.

[The information referred to follows:]

[COMMITTEE INSERT]

Senator AYOTTE. I also wanted to ask, just as a follow-up on the extra engine issue and in response to what Senator Blumenthal raised, I think it is very important for the committee to understand the full costs. We have GE offering to pay for the next 2 years what it will cost to build the extra engine.

But there are additional costs, as I understand it, that go beyond those 2 years of development that taxpayers would incur. And so, I think it is important for us to understand what those costs would be. So as we are looking for, particularly when you come to us, which is quite unusual, to tell us don't spend money here, we take that very seriously. And I look forward to seeing what those numbers are.

Thank you.

Chairman LEVIN. Thank you very much, Senator Ayotte.

Senator Shaheen?

Senator SHAHEEN. Thank you, Mr. Chairman.

And thank you to all of our panelists for being here. Hopefully, you are almost finished this morning.

Dr. Carter, as the chair of the European Affairs Subcommittee of the Foreign Relations Committee, I am particularly aware of the importance of the F–35 program to our international partners and to our NATO allies. As we are seeing in Libya and Afghanistan, interoperability is particularly important with the threats that we are facing today.

I know there have been a number of questions about how our international partners are participating in viewing the program. So I am not going to repeat those. But I do just want to reiterate the importance of making sure that our allies are fully aware of what is happening with the program and are updated on that on a regular basis.

Dr. CARTER. They are, indeed. I make a point whenever we make an important decision or there is a change in data or something, I usually call them all. And at a minimum, send them a letter.

What they, quite understandably, do not like is to read in the newspapers something about an airplane that their government is buying. I try to avoid that.

Senator SHAHEEN. Good. Thank you.

One area I don't think we have talked about today is the importance of the supplier base for the F–35 and what the impact is on the supplier base of dramatic changes and timelines and cost estimates for many of the small companies that are part of that supplier base. We hear from companies in New Hampshire about the difficulties in planning when there are dramatic changes in contracts.

So I wonder if you could speak to that or Ms. Fox could speak to that, and how we maintain supplier stability throughout this process?

Dr. CARTER. It is a very important point, and in fact, turbulence is a serious driver of cost at the prime level and the sub level, which is why we would like to get ourselves on a smooth glide slope for the Joint Strike Fighter and hold to it. Because there is great economy in stability in these programs.

You are absolutely right. Most of the cost associated with the airplane isn't retained at the prime contractor level. It is paid down to the subs. The two big airframe subs are BAE Systems and Northrop Grumman. They, in turn, have their chain of subs.

And those companies that are small and sometimes very innovative are an important part of our industrial base. So they are a conveyor belt of new faces, new ideas, and so forth. So the supplier base is something very important to national defense. I mean, the whole defense industrial base is important to national defense, but that is an important piece of it.

We were talking about the engine earlier. The engine is, let us take the Pratt & Whitney engine. The Pratt & Whitney engine is—about 15 percent of the cost of that engine is to assemble—is for Pratt & Whitney to assemble the parts. Eighty-five percent on a dollar is paid out to the subcontractors for the parts.

So the majority, most of the cost of these articles actually filters down to the supplier base. And so, their competence, their efficiency is essential to our success.

Senator SHAHEEN. I am pleased to hear you say that. We have a lot of those subcontractors in New Hampshire who are providing parts to BAE and to Northrop Grumman, and so we think they are very important, and we want to see them continue.

And as you point out, the innovation that they are developing is critical, as we look not just at this aircraft, but at the future needs that the military will have.

So we have all talked about how many times the program has been restructured. So I want you to think about next year and imagine if you are testifying a year from now before this committee. What would you want to be able to say about where the program is? How will we know that it is back on track, and what is the biggest obstacle to achieving progress over the next year?

Dr. CARTER. I would like to take the four phases. I would like to tell you that SDD is executing the way we wanted it to. The biggest risk there is software.

I would like to tell you that we had made a substantial dent in the projected average procurement unit cost of the aircraft, and I don't think there is any risk there except stubbornness. I think there is excess cost in there. We can identify it.

I would like to be able to tell you that our estimates for sustainment are realistically lower. I don't think there is a lot of risk there either. They certainly will be more realistic because we just haven't done a good—we haven't really taken that on yet. So they will be better. I hope they are lower also.

And then, finally, for STOVL, I would like to be able to report that we are working through the problems on STOVL and that we are able to solve them at acceptable cost and weight penalty.

Senator SHAHEEN. So what do you mean by "stubbornness?"

Dr. CARTER. Just resistance to changing the way we are doing things on this airplane and the way it has evolved over the last 10 years and getting it back to where it started when it was a much more affordable airplane.

Senator SHAHEEN. Thank you.

And finally, how would rate the fifth-generation stealth capabilities in the F–22 and F–35 to those that we have seen from Russia

and their T–50 and Chinese J–20? Where does our technology—with respect to theirs?

Dr. CARTER. I think, in all respects—yes, in all respects, the F–35 dominates those aircraft and will, therefore, dominate them in the skies. And we will have more of them, and they will be better. And that is the prize here for getting this program right.

Senator SHAHEEN. Thank you.

Thank you, Mr. Chairman.

Chairman LEVIN. Thank you, Senator Shaheen.

Senator Chambliss.

Senator CHAMBLISS. Thanks, Mr. Chairman.

Let me make something clear here. When you just responded to Senator Shaheen, with respect to the other aircraft, Secretary Carter, she mentioned the F–22 in that mix. Now, F–22 is clearly a far superior air-to-air airplane than the F–35. Do we agree on that?

Dr. CARTER. Yes, absolutely.

Senator CHAMBLISS. Okay. I listened to you back in my office a little while, to all of you talk about this program. And those of us who have been in such strong support of this program and know that the program has to succeed are obviously very, very frustrated. And I am sure some of that frustration exists with each of you.

Secretary Carter, you and I have been through this it seems like on an annual basis for the last few years, and we keep waiting for that good news to come forward. And it just doesn't seem to be there, and I am really concerned.

And there is no question but what there is no alternative. But we have got to keep pounding away here until we get this thing right. And I would just urge all of you to redouble your efforts, both on the IOC, on the costs, on all of these issues that keep coming up. This thing has got to succeed.

I am concerned, Secretary Carter, about the comment that Ms. Fox made in her statement that the operating and support costs of the F–35 are less than the F–22, equal to the F–15C and D, and greater than the F–16 and the F/A–18. This is significant because it is going to cost 33 percent more per flight hour to operate the F–35 than it does the F–16, the F/A–18, and obviously, that is why you are going to experience a shortfall of 40 to 100 aircraft due to that cost increase.

I understand the shortfall is a manageable shortfall, but the Navy has a greater concern than the Air Force with the shortfall. And as a result of that, they have invested in or the department has invested in 150 F/A–18s. Did any of the funds used to purchase those F/A–18s come from F–35 funds?

Dr. CARTER. I think, in effect, they did. It was a change made at the same time, and while that wasn't our first choice, that was what we needed to do to avoid the shortfall. So the funding for the 41 this year, I think Ms. Fox will agree with me, in effect, came from the F–35 line.

Senator CHAMBLISS. And see, that is very, very troublesome that we are spending, what is it, $6 billion I think we are spending on those F/A–18s, fourth-generation aircraft that are going to have limited utility, particularly the longer they stay in the inventory.

And we know they are going to be there 15, 20, 25, 30 years maybe.

And with our potential adversaries developing stealthy aircraft that is going to be much superior to the F/A–18 and here we are equipping our folks with airplanes and spending a lot of money that if we just waited and bought more F–35s, it just seems to me like it would be money better spent.

And in that vein, I am a little troubled by some press reports that I am seeing that our F–35 partner nations are in contact with Boeing to purchase F/A–18s to compensate for the delays in the F–35 deliveries. And I think, again, it is a huge mistake.

We can't tell other folks what to do, but here we are because of the delays in this program, putting our partners in a position of maybe taking money they would use to buy F- 35s, and they are going to buy fourth-generation aircraft. Is that, in fact, the case? Do we know whether our partners are negotiating to buy fourth-generation aircraft?

Dr. CARTER. There are some that, like we, as a partial short-term mitigation to the slip in the JSF schedule, are buying other aircraft instead.

Senator CHAMBLISS. Well, Mr. Van Buren, would you care to comment on this issue as it relates to the Air Force, the shortfall issue?

Mr. VAN BUREN. I think that in the short term, we will look at life extension programs for the F–16 to compensate for the later deliveries of the F–35. But I think the Air Force understands the balance of producing these aircraft when the configuration is known and that the ramp that has been created by the department is a prudent one with regard to making sure that the configuration we finally accept is one that will be fully capable.

Senator CHAMBLISS. To Mr. Van Buren, Secretary Carter, the recent selected acquisition report states that the F–35 will have to recertify milestone B decision later this month. Are we on track to do that?

Dr. CARTER. We are. At this point, that is kind of a formality. We have gone through the Nunn-McCurdy process. It requires us to do this. We have done all the work. CAPE has done the cost estimate. Ms. Fox has presented you with that data essentially today, or that is available.

So that will occur in the next few weeks. But it is, at this point, kind of a formality.

Senator CHAMBLISS. Ms. Fox, affordability is the underlying premise of the F–35 apparently in Europe and as I note from your statement. In your opinion, what can be done in the near term to help drive down these costs that Dr. Carter has kind of promised before he leaves, he is going to come back next year and tell us is happening.

Ms. FOX. Well, sir, I do think that the software is an area we all really do need to focus. And if we can get the software development up, the lines of code required have been known for a long time. The difference in the estimate is how quickly the contractor can produce the code.

They are producing it at a slower rate currently than we had estimated before or had been hoped. If we can figure out how they

can produce the code more quickly and, as Dr. Gilmore said, test it more quickly, that will help quite a lot in getting the development cost down. I defer to Dr. Carter's expertise in negotiating the average cost per aircraft through fixed-price contracting.

O&S is hard. There are certainly aspects of O&S that we want to help and support Dr. Carter's efforts to try to get those costs down for the long term, as we field these aircraft in numbers. There are certain parts of O&S, though, like the cost of fuel and the fuel consumption that this high-performance aircraft will use compared to legacy that will be very difficult to address.

So whether we can get it all the way down to legacy is something that I and my office doubts. Whether we can get it down, however, we do believe that there is ways to get it down in some of the repairables, for example, and the contractor logistic support, which is a focus area of the program office and Dr. Carter as well.

Senator CHAMBLISS. Dr. Carter, are we having problems with the F–22 software today?

Dr. CARTER. We are.

Senator CHAMBLISS. Is there any relativity to the problems there with the problems with the F–35 software?

Dr. CARTER. For F–22, we have software that is fully functioning but does not have all the functionality we want. So we have basic software builds that we are now adding capability to. In the F–35 at this stage, we are still building the basic capability, which we will then add to, block by block, later.

The F–22 modernization program is a concern to us. Dave and I talk about it a lot. Let me just ask, Dave, if you have anything to add about F–22 modernization?

Mr. VAN BUREN. The Increment 3.2 that we are currently embarking on in the F–22 to our warfighting customer is taking too long to implement, and so we are working with the company to try to speed that up, make it more affordable, more economical, and get the capability into the warfighter hands sooner.

Senator CHAMBLISS. Was the software problem with the F–22 the reason it was not used in the Libya operation?

Mr. VAN BUREN. That is outside of my area of expertise, and I would defer to the operational side.

Senator CHAMBLISS. Dr. Carter, do you know?

Dr. CARTER. I would prefer to have General Schwartz or someone respond, make sure he gets an answer to you. But that was an operational decision that he and General Fraser made, and I wouldn't like to speak for them. If you don't mind, I will get an answer for you.

Senator CHAMBLISS. If you could get us an answer for the record, I would appreciate it.

[The information referred to follows:]

[COMMITTEE INSERT]

Senator CHAMBLISS. Thanks, Mr. Chairman.

Chairman LEVIN. Thank you, Senator Chambliss.

We will excuse this panel and move to our second panel, and we thank you very much. There is a number of questions for the record that you have been asked to provide, and we would ask that those be provided within a week.

Thank you.

Our second panel this morning, or this afternoon now, will be Vice Admiral David Venlet, program executive officer for the Joint Strike Fighter program; Michael Sullivan, director of acquisition and sourcing management team of the GAO; Tom Burbage, the executive vice president, general manager of the F–35 program integration at Lockheed Martin.

[Pause.]

Chairman LEVIN. Thank you, gentlemen, all of you, for coming this afternoon. We appreciate your being here.

I am in kind of an unusual situation here now where I must leave. I am going to leave you with a question, however, that I would appreciate you answering, Admiral, when it is your turn.

I will leave the gavel in the hands of Senator McCain, unless there is someone on my side shows up. But, and I don't know if you have opening statements or not? If you do, they will be welcome, but I am going to have to ask you in your opening statement, Admiral, to answer the following question for me. And I will have to ask my staff what the answer was.

And that is this question. Last year, you completed negotiations on the F–35 aircraft in the Fiscal 2010 program that was so-called Lot 4 aircraft. Now that was a fixed- price incentive fee contract, which, of course, is a good thing. We would encourage the department to move away from cost-plus contracts. I understand that the contract price, including the potential ceiling price of the contract, was lower than the CAPE estimate of the production cost, and that is also good.

However, unfortunately, it was announced earlier this year that you are expecting overruns from $700 million to as much as $964 million on the Lot 1 through Lot 3 aircraft, which are being bought with cost-plus contracts. And we have also heard press reports that the bid prices for the Lot 5 contract are higher than the negotiated prices for the Lot 4 aircraft. And if that is true, those facts would be very troubling.

As I turn the gavel over to Senator McCain for any opening statement that he might have and then to recognize you for your opening statements, I would ask you, Admiral, if you would address that question in your opening statement?

I want to thank my colleague, Senator McCain, again for his initiative in this matter and for taking over at this point.

Thank you.

Senator MCCAIN [presiding]. Thank you, Mr. Chairman.

And I have no opening statement, and I appreciate the patience of the witnesses, and I know you will appreciate the lateness of the hour. And so, please proceed.

Are you first, Admiral?

STATEMENT OF VADM DAVID J. VENLET, USN, PROGRAM EXECUTIVE OFFICER, F–35 LIGHTNING II PROGRAM

Admiral VENLET. Yes, sir. Happy to go first.

Thank you, Chairman Levin and Ranking Member McCain.

Distinguished members, thank you for being here today.

My opening statement, I would like to tie three points from the previous panel's questions, several that you all asked, and I would like to start with the Weapon Systems Acquisition Reform Act.

You asked a question about what happened and what we can do, Senator. Senator Lieberman asked about confidence in the plan going forward. And there is an intersection in my mind, and that intersection is the fundamentals of systems engineering.

I would say that the mention and the emphasis in the Reform Act on systems engineering was applauded as a SYSCOM commander where I sat. And that is what forms the basis for confidence in this adjusted plan going forward. There is not a record of performance for you to have confidence in, Senator.

There is right now I am bringing you a plan with changes in it, with resilience in it, with realism in costs and an embracing of those fundamentals of systems acquisition that has not been there. And that is the basis for the confidence going forward. What can we do? What does this new plan do?

This new plan adds time, and it adds money because the risk to software, how you address the risk, is you have time for the rework, and you resource that plan with people to do the work and a schedule.

One of the most significant adjustments in this new schedule was a 2-year extension of what we call that middle capability block of Block 2. That is the most powerful lever of what we can do about it to handle and put some resilience in this program to deal with the expected further discovery of issues that we need to do about it.

You have a unified and aligned assessment of the program across GAO, DOT, and the CAPE and the program office like never before. There is a long road ahead to complete development and deliver aircraft at rate dependably and begin sustainment in the fleet. There will be setbacks and missed goals, as there will be advances and accomplishments.

The firm grasp on realism and determination to live within the currently committed resources will go beyond keeping the independent assessments aligned. It will enable the solutions to each of the challenges we discover and deliver the capability that the services need so critically.

To specifically speak to Chairman Levin's questions about the 2010 LRIP 4 contract, the ceiling is below the unit recurring flyaway cost estimate line. The issues that are at play in affecting the current costs are a combination of what you experience in any program and learning curve from building the aircraft. It is also affected by the change generated from the concurrency of building while we are testing, and it is also affected by the movement of quantities.

Most of the time, programs have any one of those factors working singly at a point in time. This program has all three working at the same time. Thus, the challenge. It is what it is. So we are dealing with it.

The LRIP 4 fixed-price incentive contract with that 50- 50 share line of overruns, where industry would yield fee for overrun at that 50–50 share, and the ceiling of 120 percent does protect the exposure of the Government to an overrun in the percentage range of approximately 6.4 to 6.5 percent. Because of that ceiling protection where if the costs would exceed that, they would be borne by the company.

The first 3 years of production—LRIP 1, 2, and 3—were cost plus. Yes, I do see a range of possible ultimate costs between 11 to 15 percent. We are working to get resources to pay those bills in the program. But that is the major lever of near-term affordability impact. That was pulled in the 2010 choice to pursue fixed-price incentive.

We are in receipt of the contractor's proposal for LRIP 5, and we are in the initial stages of fact finding. And we are also conducting that rigorous "should cost" that the previous panel spoke about. And we will negotiate privately with the company, and the Government fully expects to get the benefit of learning wherever we land.

Now we will negotiate privately, sir. But the fundamentals of getting the benefit for the taxpayer better than what we got last year, we will continue with at least as good, if not stronger, incentive lines and ceilings as we negotiate that.

And I will stop and look forward to your questions, sir.

[The prepared statement of Admiral Venlet follows:]

Senator MCCAIN. Mr. Burbage, welcome.

STATEMENT OF CHARLES T. "TOM" BURBAGE, EXECUTIVE VICE PRESIDENT AND GENERAL MANAGER, F–35 PROGRAM INTEGRATION, LOCKHEED MARTIN AERONAUTICS COMPANY

Mr. BURBAGE. Good afternoon, Mr. Chairman.

My name is Tom Burbage. I am the executive vice president for the F–35 program integration for Lockheed Martin. I joined the F–35 program in the summer of 2000 and have spent a full third of my industrial career of 32 years with the F–35 team.

Since 2005, my responsibilities have been to ensure that all requirements for the U.S. and our international customers are fulfilled and to coordinate with our international partners around the world to achieve the full potential of the F–35 program.

Lockheed Martin is very sensitive to the committee's concerns on ensuring predictability and discipline in the execution of our current plan and visibility of our costs in all dimensions. I sincerely appreciate the time your staff has spent with us to see and understand the progress and importance of this critical program.

Thank you for the opportunity to represent the F–35 industrial team. I have submitted a full statement for the record, which I ask to be made part of the hearing record.

And in the interest of time, I will forgo any additional opening statement and look forward to your questions, sir.

[The prepared statement of Mr. Burbage follows:]

Senator MCCAIN. Thank you.

Welcome back, Mr. Sullivan.

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

Mr. SULLIVAN. It is a pleasure to be here again to discuss the Joint Strike Fighter program, DOD's largest ever and so important to plans for recapitalizing our tactical air forces.

I will make some brief comments and then be happy to take questions. I have submitted a written testimony for the record.

Mr. Chairman, over the last 15 months, defense leadership has taken positive action to restructure the Joint Strike Fighter program. We strongly support the actions that leadership has taken, many overdue, that we and some other organizations have previously recommended.

We have been concerned since program start about the risks posed by the high degree of concurrency between development, testing, and production activities and have consistently recommended reducing annual procurement quantities until sufficient testing is completed.

The Secretary's substantial reduction of 246 aircraft through 2016 certainly helps lessen the risk of concurrency. Even with that reduction, however, total development cost is now estimated at about $56.4 billion, and the development program will not be completed until 2018, a 26 percent cost increase and a 5-year schedule slip from the program's baseline.

We also note that over the next 5 years, annual funding requirements for procurement on this program more than double, and the annual quantities will more than triple.

The program had mixed results in 2010 against the goals that it had established for itself, achieving 6 of the 12 major goals and progressing in varying degrees on the rest. There are some encouraging signs. The pace of the flight testing accelerated in 2010. Program accomplished three times as many flights as in the 3 prior years combined. Also, there is much more work in process on the manufacturing floor.

These signs of improvement are counterbalanced with continuing setbacks in some areas, however. For example, while the Air Force's conventional variant and the Navy's carrier variant performed well in limited flight tests in the past year, the short takeoff and landing variant, essential to the Marines' future aviation plans, had numerous technical problems, and DOD has directed the 2-year probation to solve them.

Also, the final delivery of test and production aircraft is still lagging, and improving factory throughput and the global supply chain are now urgent priorities for the program. Also, design changes on the manufacturing floor continue at higher rates than expected and may increase further as flight testing continues and the design has to be tweaked. This indicates the design is still not fully stable several years after the critical design review.

And finally, integration and testing of software, which we have heard from most of the panelists today already, which is essential for achieving 80 percent of the fighter's functionality, is significantly behind schedule as it enters its most challenging phase.

Mr. Chairman, let me conclude by saying the Joint Strike Fighter program's time to perform at cost and schedule targets has definitely come. The GAO pointed out several years ago that official estimates were unrealistic, that they were based on optimistic assumptions rather than robust systems engineering knowledge, and that plans to cut test assets and reduce flight testing were ill advised.

We now support recent restructuring efforts and believe that the added funding, extended time to complete systems development, and a more robust flight test program provide a more achievable

program. However, this program still lags behind expectations and is not out of the woods yet. Now is the time for much more disciplined decision-making.

So, looking forward, a focus on affordability and continued strong oversight is critical. With future budgets likely to be austere, the Joint Strike Fighter program is planning an unprecedented amount of funding for a sustained period, averaging more than $13 billion of funding requests per year through 2034.

That is why we recommended in our last report that the department take measures to ensure that it does not exceed current planned funding limits outlined in the Future Years Defense Plan, and if it must, it should report the reasons for increases to the Congress first. After 10 years of product development and 4 years of production, it is time for the Joint Strike Fighter program to make good on its estimates now and deliver aircraft in a predictable manner.

Mr. Chairman, that concludes my statement.

[The prepared statement of Mr. Sullivan follows:]

Senator MCCAIN. How long, Mr. Sullivan, have you been tracking this program?

Mr. SULLIVAN. I have been tracking it on and off for probably 10 years, but solidly for probably the last 6 or 7.

Senator MCCAIN. So, given that experience, what is your degree of optimism that the sustainment costs can be brought under control and the cost overruns can be brought under control? What is your overall assessment of the prospects?

Mr. SULLIVAN. I think what we have seen from GAO's perspective is for years what we thought were some fairly significant risks went unaddressed. For example, the Mid- Course Risk Reduction Program that took place in the mid 2000s we thought added more risk. It didn't reduce risk and, therefore, added more cost to the program.

Senator MCCAIN. And you testified so before this committee?

Mr. SULLIVAN. Yes, we have. And we made recommendations to the department, beginning in 2001, when we were talking about technology maturity, all the way through until—I mean, we made many recommendations that they should reduce their ramp-up rate because they weren't ready to go to production.

Now all these things have come—

Senator MCCAIN. Home to roost.

Mr. SULLIVAN.—to pass, and they have come home to pass probably more inefficiently than if it would have been planned better in the first place.

But I would say with the beginning of the Nunn-McCurdy breach, when we had the Nunn-McCurdy breach and they came in and did the analysis, I think that they have done a pretty good job of being a lot more candid. They have got a lot more actual data to bring into it now.

Now, of course, it resulted in yet again another pretty significant cost increase, both to RDT&E costs and procurement costs, and significant schedule delays. But I think what we got in the last 15 months with this review that has gone on, and I think what Admiral Venlet referred to, is we have got a lot more sense of the systems engineering knowledge that we need. And I think we have re-

duced risk a lot, and they have an estimate now that at least it is an estimate.

Senator MCCAIN. Again, given your long experience, would you believe that perhaps at least alternatives need to be considered?

Mr. SULLIVAN. I think alternatives should always be considered. That is a little bit out of my—

Senator MCCAIN. Yes, I understand.

Mr. SULLIVAN.—you know, my bailiwick. But yes, I think it is reasonable to assume that alternatives should always be considered, especially for our National security interests.

Senator MCCAIN. Mr. Burbage, Mr. Sullivan has just testified that they alerted the Congress and, I am sure, you of these significant risks, which, Mr. Sullivan's testimony, were unaddressed for 8 or 9 years. What is your response to that?

Mr. BURBAGE. Well, sir, the process on this program is complex. It is challenging. We have lots of independent looks at the program. We try to accommodate those independent looks as we can within the constraints that we operate in, and those are annual budgets and annual schedule constraints.

Can we accommodate all of them? No.

Senator MCCAIN. Annual budgets? You have exceeded your annual budgets by almost double.

Mr. BURBAGE. Well, sir, we have a set of requirements we are designing the airplane to meet. We mature that design as we go forward in time. We then bring the design into production. We then test the design.

We don't have full knowledge of how that is going to unfold. And as it unfolds over time, we accommodate the different risks and challenges that come up.

Now the contract geometry is established upfront to accommodate the fact that there will be unknowns in this process, and we work our way through those.

Senator MCCAIN. You know, but the sad part about that is that we sit here, and contractor and Department of Defense come over and tells us this is how much it is going to cost your taxpayers. And consistently—this isn't unique—we find cost overruns with no incentives to bring those cost overruns under control because they are "cost-plus contracts." Nowhere in our economy do we have cost-plus contracts except in Defense, that I know of.

And yet Lockheed Martin is doing pretty well. Do you recall what their profits were in 2010?

Mr. BURBAGE. No, sir. I don't.

Senator MCCAIN. Probably, maybe you could submit it for the record? But I know that there has been a handsome return to the shareholders, but there hasn't been a handsome return to the taxpayers.

And if I convey a sense of frustration, it is because I have been a member of this committee, and I at least initially accepted the testimony of the Department of Defense and the program managers. And consistently, the GAO has come forward with testimony saying that would contradict that, and now we find ourselves in a situation where previous witnesses say that sustainment costs are unacceptable, and the present rate, the weapon system is not affordable.

So I guess my question is, is that when you entered into the original contract with DOD, did you anticipate these kinds of cost overruns, breach of Nunn-McCurdy?

Mr. BURBAGE. No, sir.

Senator MCCAIN. Admiral, since the 2-year extensive review of the programs over the JSF has estimated it cost about 80 percent more than when the program started about 10 years ago, what can you tell the committee to give us confidence that the unsustainable cost growth we have seen in the program is now ending?

Admiral VENLET. Sir, the cost position in the situation of the program and Nunn-McCurdy was judged to be, as you said, 80 percent higher. That was on a path that was failed, basically. It did not have the realism in it. That is why the cost to bring this capability to bear was underplanned, both in content and in how it was estimated to be in price.

The hope for discipline going forward is it was a very serious commitment by the Defense Department to commit these resources of this extra $4.6 billion, not an easy thing, not taken lightly. Very seriously understood by me, when I brought that recommendation forward.

And I told Dr. Carter that it was my estimation that this change and this adjustment to the program had an ability to absorb the learning that remains and the number of flight tests and the years of continued development that should because of that grounding in realism and refly rates, capacity to do software, resource the helmet issues that have been discussed, would have a high confidence of delivering within that timeframe and within that dollar amount.

Now it is not a given that it will. It requires to deliver particularly in the software area. From today, from the day I got here until the day the program declares its development complete, software will be the highest risk and the most intense focus of the program.

In parallel with this resourced and planned with realism, and it must come, the cultural change to never lose that grasp on the systems engineering processes. If we stray from that, we will go back to the old ways, and we will not live to this plan. That is a determination that those here and those that follow us must not lose to deliver this program.

Senator MCCAIN. I just have two more quick questions, Admiral. One of them is why are the sustainment costs for this system so much higher than others, and what can be done about that?

Admiral VENLET. Yes, sir. In the sustainment costs, the striking estimate that we are facing right now is a buildup of factors that what we believe today about the size of the manpower that will be required to sustain this aircraft, the number that we will own, the number of hours per month that we will fly them, which goes into the fuel cost, the price of the aircraft drives the estimated—

Senator MCCAIN. The price of fuel is the same for every aircraft.

Admiral VENLET. Yes, sir. Yes, sir. But the size of the fleet—2,400 of these would be more than the F–18 fleet, the F–15 fleet.

Senator MCCAIN. So you are saying that the F–18 sustainment costs are less because there are fewer of them?

Admiral VENLET. Only one factor, sir. Now I am going to complete the factors that are in the estimate now. My duty for the

service chiefs and the Secretaries are to illuminate them the consequences of those choices.

So how many that we have, where we bed them down, how many bases, how many support equipment sets, simulators that we need, the number of maintenance technicians we believe are going to be required.

My focus this year, if 2010 was the year we focused on the development program and the manufacturing plan, this is the year we were focusing on needs estimates and these parameters, and I need to illuminate for those leaders what those drivers are and then bring them forward, bring forward to them some choices to make to make those go down.

Senator MCCAIN. Well, I would have hoped that since we are in the 10th year of this program that some of those decisions would have been made a long time ago.

My final question is what degree of confidence do you have that the Marine Corps version can get off probation?

Admiral VENLET. Sir, I have high confidence that the Marine Corps STOVL will succeed this period of scrutiny. Every technical issue—and they are principally the propulsion system integration, the ones that Dr. Carter spoke of. Every issue within our view today has an engineering solution to lead the STOVL to the air worthy, flight clearance for unmonitored operation by the fleet.

I have high confidence that we will get the STOVL to its initial sea trials before the end of this year. I have high confidence that we will be able to achieve a flight clearance from the Naval Air Systems Command for a conventional monitored mode of flight first while we prove out the engineering solutions I spoke about for the STOVL mode, and that will help the Commandant immensely, sir.

Senator MCCAIN. Thank you. I thank the witnesses for their patience.

Senator Chambliss.

Senator CHAMBLISS. Thanks, Senator McCain.

Mr. Sullivan, you said you think that looking at alternatives is always a good idea and in this case certainly is a good idea. Do you know whether or not the purchase of additional F–22s is being considered by the Department of Defense as an alternative to the problems we are experiencing here?

Mr. SULLIVAN. I don't think so, but I don't know that for sure.

Senator CHAMBLISS. So what kind of alternative might be considered?

Mr. SULLIVAN. I think, as Under Secretary Carter said, I am not sure that I think they believe that there are no alternatives at this point.

Senator CHAMBLISS. Going back to Senator McCain's question to Admiral Venlet, I want to give, Tom—Mr. Burbage—you and Mr. Sullivan the opportunity to address this issue of the operating and the support costs, and why in the world—let me first ask do you disagree with Ms. Fox's statement that the operating and support costs for the F–35 are higher than the—or lower than the—excuse me, less than the F–22, but equal and greater than the F–16 and the F/A–18?

Is that statement correct? And if so, why is that the case, and what are we doing about that? Tom?

Mr. BURBAGE. Senator, thank you.

I would only begin the conversation by saying that we are given a very strict set of requirements at the beginning of the program to design an airplane that has increased reliability and addresses those things that have been issues over the lifecycle of airplanes that have come before us. I think we have done that with the design.

We have also been asked to put forward a performance- based logistics concept, which is not legacy based. And going between how the airplane is designed to operate, what we think it will actually do in the long run, and how it will compare to legacy is a very complex process. The estimates for operating and support over the lifetime of the program go out to about 2065, and they are susceptible to how you set the ground rules and assumptions that underlie that.

So I think that the objective of all of us, and certainly the industry team this year, is to put a tight focus on that and try and see how we can, in fact, set those knobs correctly so that we get the right predictions of what the airplane is going to cost.

But there is a very rigid menu set of items that we cost the F–35 to that legacy airplanes are not tracked to today and are not forward looking for the next 57 or so years that we calculate this program forward. So it is very important to get an equal basis comparison. And some of the sensationalized numbers that come out, the trillion dollar estimate and those kind of things, are not comparable. They are very sensational, but they are not comparable to what it would cost to maintain a legacy-type airplane over that same length of time.

So we are hard at work on those analyses right now, and hopefully, we will bring you a different story when we come back.

Senator CHAMBLISS. Mr. Sullivan?

Mr. SULLIVAN. Yes, I think that the O&S costs on this program are going to be very, very challenging to figure out. I think one of the reasons right now is that the program is still, in many ways still defining itself. The design, they are churning through a lot of design changes. That will continue as the test program progresses.

But O&S, an important part of operating and support cost is reliability, and I think there is always a friction between developing an aircraft and the amount of money you want to spend during the design of an aircraft and how much you are going to have to spend to maintain it.

So right now, on the Joint Strike Fighter program, their reliability growth curve looks still pretty risky to us, but it is mostly I think because of unknowns and they need more information.

For example, I think that if you looked at it in terms of mean flying hours between failure, the STOVL aircraft, for example, right now has a target of—this is system wide. So, basically, they have a target of 4 flight hours mean time between any systemic kind of failure. And right now, I think that they can only estimate that they are at about 0.4 of 1 hour.

And the other aircraft are better than that, but they are all in some state of they are not quickly achieving what they need to achieve on a reliability growth curve. And so, I think one of the important issues to track now is how well they come down that reli-

ability growth curve. A lot of that depends on how much testing they can get done, what they find in that testing, what happens to the reliability of the design, and things like that.

But O&S costs, in the end, it is going to be very difficult to estimate them until they have data like that.

Senator CHAMBLISS. Admiral Venlet, there has been some reporting that the Navy is somewhat soft on the carrier version of the F–35. Can you commit to us today that the Air Force is 100 percent behind the purchase of this carrier version?

Admiral VENLET. Sir, I sit with the service chiefs at least once a month, and the Chief of Naval Operations is solidly 100 percent behind the carrier version of the F–35, as much as the Commandant is behind the B, as much as General Schwartz is behind the A, sir.

Senator CHAMBLISS. Thank you.

Lastly, Mr. Burbage, Mr. Sullivan, both of you have had extensive experience in the field of tactical aircraft, and I would like for both of you to give the committee your opinion as to the long-term performance of this aircraft. Is it going to be able to do what it is designed to do, and are we going to be able to get these costs under control?

Mr. Burbage?

Mr. BURBAGE. Yes, sir. The airplane has revolutionary capabilities. To go beyond just stealth, as Dr. Carter said earlier, it goes into the innovative avionics. The sense of situational awareness that the pilot will have, his ability to share that awareness with other pilots in his flight and with other sensors and other operations, that command and control-type activity.

What is really unique is it is tri-service and it is multinational with our closest coalition allies. So the ability to operate, forward deploy in long-term peacekeeping or combat operations as a joint service coalition operation significantly changes when this program gets introduced.

There is a cost associated with that. It is a cost that is not often addressed, but the cost of sustaining those long-term operations with that kind of a force is another revolutionary change that is coming with the airplane.

My personal knowledge of the airplane's technical capabilities tell me that it is going to be exactly what it is designed to do.

Senator CHAMBLISS. Mr. Sullivan?

Mr. SULLIVAN. My experience is really in looking at the—reviewing performance on aircraft, and I would say that, generally speaking, in the end, the United States always gets a top-flight performing aircraft. So I don't have any doubt that, eventually, the Joint Strike Fighter will be a very high-performing aircraft.

But as I look at programs in the past, this program, as I said in my statement, that I don't think they are out of the woods yet. I think there is still significant risk in stabilizing the design, getting the manufacturing costs down. And I really think O&S costs are going to be the big—software I guess also would be a big challenge.

The software, to get the functionality that they need, the Block 3 software especially, is still going to be a huge challenge for this aircraft. But the O&S costs, I think, are going to be the big chal-

lenge going forward because, as everyone knows, it has been stated here that is 70 percent of your lifecycle costs on an aircraft.

Senator CHAMBLISS [presiding]. I guess I am it. Senator McCain has gone. [Laughter.]

Gentlemen, thank you very much.

And as all of us have indicated here, this program has got to be successful. And we have a job of oversight, just like you have a job, obviously, of making sure that you are addressing all of these issues. And I sure do hope that when you come back next year, as we prepare for the authorization bill in 2012, you can come in with some positive reports about the success that we have had over the past 12 months.

So thanks for being here. Thanks for what you are doing for all the branches of our service that are going to utilize this valuable weapon system.

Mr. SULLIVAN. Thank you, Senator.

Senator CHAMBLISS. And I guess we are adjourned.

[Whereupon, at 12:43 p.m., the hearing was adjourned.]