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HEARING

ON

NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 2013

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED TWELFTH CONGRESS
SECOND SESSION

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES HEARING

ON

FISCAL YEAR 2013 NAVY, MARINE CORPS AND AIR FORCE TACTICAL AVIATION PROGRAMS

HEARING HELD
MARCH 20, 2012

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FISCAL YEAR 2013 NAVY, MARINE CORPS AND AIR FORCE TACTICAL AVIATION PROGRAMS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES,
Washington, DC, Tuesday, March 20, 2012.

The subcommittee met, pursuant to call, at 3:27 p.m., in room 2118, Rayburn House Office Building, Hon. Roscoe G. Bartlett (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. ROSCOE G. BARTLETT, A REPRESENTATIVE FROM MARYLAND, CHAIRMAN, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. BARTLETT. Good afternoon. Our hearing will come to order. The subcommittee meets today to receive testimony on the Navy, Marine Corps and Air Force budget request for tactical aircraft programs for fiscal year 2013.

We have a number of issues to cover today, but my opening remarks will focus on the F–35 program. The F–35 program is what has been called the centerpiece of DOD's [Department of Defense] long-term tactical aircraft planned force structure, with a major commitment of the Department's projected budget dedicated to F–35 acquisition and operations.

To date, significant technology and manufacturing capabilities have been demonstrated. Yet, after having already made a major commitment of resources to the program, progress in the development and early procurement of the F–35 has fallen significantly short of expectations.

Since the beginning of the final phase of development in 2001, the projected cost of the total research and development and procurement program has grown from $233 billion to nearly $400 billion. Compared to the currently approved baseline, full-rate production had been delayed 5 years.

The committee has supported, and continues to support, the F–35 program because of the high priority placed on the program by the Navy, Marine Corps and Air Force, and the recognition that a fifth-generation fighter is required to operate and achieve the effects necessary in the projected future threat environments.

However, early on in the F–35 program the committee had concerns with the acquisition strategy. In 2005, we disapproved the Department's request for the first procurement funds for F–35s, citing the request as premature, given the maturity of the development program. Each year, we have continued to express concerns regarding rushing into procurement too soon and planning an aggressive increase in annual production before required technology

was demonstrated, design stability was achieved, and flight testing was complete.

Unfortunately, the committee's and others' concerns regarding the program were well justified. As the Government Accountability Office reports, because of delays in research and development, and flight testing, the Department of Defense's projected request for procurement of F–35 aircraft through 2017 have been reduced by approximately 75 percent compared to the original schedule when the program began in 2001.

Compared to last year, the Department has removed procurement of 179 F–35 aircraft from its budget plan for fiscal years 2013 to 2017. Expectations for the F–35 program remain very high. There has been a significant commitment of this Nation's resources to the F–35 program, with major financial commitments required in the future.

Much of the promised capability of the F–35 has yet to be demonstrated and, consequently, the future performance of the F–35 acquisition program remains of major concern. Our witnesses have an extraordinary challenge and responsibility in the execution of the F–35 program, and we appreciate their personal commitment—professional commitment to the task.

Before we begin, let me call on the ranking member of the subcommittee, Mr. Reyes, for his opening remarks.

[The prepared statement of Mr. Bartlett can be found in the Appendix on page 27.]

STATEMENT OF HON. SILVESTRE REYES, A REPRESENTATIVE FROM TEXAS, RANKING MEMBER, SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

Mr. REYES. Thank you, Mr. Chairman. And gentlemen, welcome this afternoon to this very important hearing.

Today's hearing on Navy, Marine Corps and Air Force tactical aviation programs will focus on some, as the chairman just articulated, very challenging issues. First among these issues is how to keep the F–35 program on track, while we also modernize the rest of our tactical aviation fleet.

However, I think that keeping the big picture in perspective is also important. Despite the recent round of proposed reductions, it appears to me that the United States will remain the world's undisputed leader in military aircraft capability for many years to come. We retain that lead not just because of the aircraft that DOD buys, but also because of the decades of knowledge our aviation industrial base has with respect to building sensors, advanced weapons, stealth capability and other aircraft features that other nations can only hope to some day have available.

We also retain this lead because of the quality of our personnel, both in the air and also on the ground. A final reason we remain the preeminent military aviation power is the quality of our training, the quality of which is far beyond anything other nations even try to achieve. Simply put, we hold ourselves—as I think we should—to a very, very high standard.

As a result, the challenges that we face in producing, manning and maintaining combat aviation capability must be put in the proper context. Overall, although I have some reservations about a

few proposals, I believe that the budget request before the subcommittee will allow the United States to maintain its current dominance in the air for the foreseeable future.

With respect to the topic of the first panel of witnesses here before us, the F–35 Joint Strike Fighter, I think it is important to keep a few critical issues in mind as Congress considers a way forward. For any major program, there is a constant balance to be struck between the urgency of the need for that program, the technical risks of the program and also, of course, the cost of the program.

For the F–35, I think the need for the program is absolutely clear. The aircraft that we build in the next 10 years will be fighting the wars of the future. We have to think about the long term. Given the likely dispersion of various antiaircraft systems over the upcoming decades, it seems clear to me that unless the United States maintains its edge in stealth and other technologies that we simply won't be able to project power, to deter aggression, and protect allies in the future.

In short, to deter future enemies and win the wars of the future we need a large number of fifth-generation fighter aircraft, and the F–35 is the only program that we have to accomplish this goal. The second and third issues—technical risk and cost—can be summed up in the much talked about issue of concurrency, which refers to the simultaneous large-scale production and flight testing of the F–35 aircraft.

While many Members are frustrated with the added costs of this approach to production and testing, it is important to point out that many of the decisions that led DOD to the current situation were made more than a decade ago. And significantly, over many years these decisions were, to a large degree, underwritten and endorsed by Congress.

In my view, these decisions cannot now be undone without fundamentally breaking the program. However, much can be done to put the program on a better path. DOD has already cut back production of the F–35 dramatically in an effort to reduce the concurrency many Members here are worried about. Of course, this is also a limit to how far that F–35 production can be reduced before the program's production effort begins to unravel.

DOD's current plan appears to be a good compromise between reducing concurrency and keeping production at a viable rate. While I would like to see higher production rates, I think that this plan is a responsible one and I intend to support it.

However, while I support the need for the program, and DOD's concurrent effort to fix the problems that it is encountering, I do not believe the F–35 program deserves what is commonly referred to as a blank check. This program has changed dramatically. As an example, it is important to remember that according to the original schedule for the F–35 we should be procuring 200 F–35s in fiscal year 2012, but instead we are procuring just 29.

The program also faces significant challenges in terms of meeting critical technology requirements, keeping software development on time and on schedule, and reducing production costs. Overall, costs must be reduced, development must stay on schedule, and the gov-

ernment and the contractor must work together in a constructive manner in order to keep the program on track.

For the many other programs we will cover in today's hearing, after reviewing the budget proposals I think the aviation programs for the Navy and Marine Corps are in relatively good shape. The Marines are on track to continue V–22 production at slightly lower rates, and continue upgrades to Harriers and F–18s, while also continuing to invest in the future, with various unmanned aircraft R&D [research and development] efforts.

The Navy's aviation portfolio also appears healthy, with fighter aircraft, helicopter and UAS [unmanned aerial systems] development and production remaining on track, when compared to last year. The Air Force, on the other hand, has proposed some changes that I am not yet fully convinced are in the Nation's best interest.

Chief among those changes is the decision to mothball a practically new, brand-new, fleet of Global Hawk Block 30 aircraft, each of which was procured at a cost in excess of $100 million. Just a few months ago, Congress was told that the Global Hawk Block 30 was a program critical to protecting our Nation, and that they were no—that there were no alternatives to achieve its requirements at a lower cost.

We are now being told precisely the opposite, largely based on just a few changes to operational requirements which appear to be on shaky ground in terms of real-world needs. A change this dramatic, in such a short time, suggests a purely budget-driven decision rather than one that reflects the appropriate balance of budget reality and operational requirements.

Regardless of how the decision was reached, in my view no matter what the future holds, we will need more intelligence gathering capability and not less. If the United States does not reduce its forces in Afghanistan it will need even more ISR [intelligence, surveillance, and reconnaissance] capability to hunt for terrorists and deter potential enemies, and give our combat commanders the intelligence they need to properly advise the Commander in Chief. Given this high demand for ISR assets, I think a more gradual approach to the Global Hawk program may be required.

So I look forward to today's testimony to seek further information on this and many other issues. And with that, Mr. Chairman, thank you for calling this hearing, and I yield back my time.

[The prepared statement of Mr. Reyes can be found in the Appendix on page 29.]

Mr. BARTLETT. Thank you. We have two panels of witnesses this afternoon. The first panel will provide testimony on the F–35 program. The second panel will include Navy, Marine Corps and Air Force acquisition and requirements officials to provide testimony on their respective tactical aircraft programs. We welcome our witnesses today.

We have an administrative challenge in our hearing today. We just finished a series of votes. In a little more than an hour we expect them to call another series of votes. That will be the last series of votes. It will last for roughly an hour. And after that, there is an off-the-Hill event that will take at least half of the members away from our committee.

So we will—without objection, your written testimony, of course, is a part of the permanent record. We will proceed with your oral testimony. We will abbreviate our questions and, with your permission, we will give you questions for the record because there are questions which we must have answered in our oversight responsibility.

We will submit those for the record, and then we will proceed with the second panel so that we can get their testimony on the record and some abbreviated questions before the expected votes in a little more than an hour.

Panel one, the Honorable Frank Kendall, Acting Under Secretary of Defense for Acquisition, Technology and Logistics; Mr. David M. Van Buren, Acting Assistant Secretary of the Air Force for Acquisition; Vice Admiral David Venlet, a Program Executive Officer for the F–35 aircraft program; and Mr. Michael J. Sullivan, Director of Acquisition Sourcing and Government Accountability Office.

Gentlemen, you may proceed. Thank you.

STATEMENT OF HON. FRANK KENDALL, ACTING UNDER SECRETARY OF DEFENSE FOR ACQUISITION, TECHNOLOGY AND LOGISTICS, OFFICE OF THE SECRETARY OF DEFENSE

Mr. KENDALL. Chairman Bartlett, Ranking Member Reyes, members of the subcommittee, we appreciate the opportunity for the Department to testify today on the Joint Strike Fighter program. I am Frank Kendall, Acting Under Secretary of Defense for Acquisition, Technology and Logistics.

With me, of course, are Mr. David Van Buren, as you mentioned the Air Force acquisition executive, who currently serves as the acquisition executive for the Joint Strike Fighter program; and Vice Admiral David Venlet, the Program Executive Officer for Joint Strike Fighter.

I would like to mention that next week Dave Van Buren will depart the Department of the Air Force after 4 years of incredibly valuable service in the Air Force's acquisition leadership. We in the Department are tremendously thankful for the contributions Dave has made across the board in strengthening Air Force acquisition, by bringing strong professional technical management and business skills and acumen to everything that he does.

Dave will be greatly missed, and the Department and I are very thankful for his service to the Nation. Vice Admiral Venlet came on board to run the Joint Strike Fighter program early in 2010, and we are also deeply grateful for his leadership on this program.

The Joint Strike Fighter is the centerpiece of our future tactical aviation capability, and a key to implementing our recently published strategic guidance. Last fall, the Department engaged in a strategy and budget review in which everything, and I do mean everything, was on the table. After a careful look at the Joint Strike Fighter [JSF] program, the Department determined that we do need the JSF, that we need all three variants of the fighter, and that we need the planned inventory of 2,443 jets.

It is essential for the Department to deliver a program that both meets these needs and is also affordable. 2011 was a year of strong progress in the Joint Strike Fighter test program. The program made continued progress in technical and production maturity.

However, you must recognize that there is still a long way to go for JSF.

The flight test program is approximately 20 percent complete, and many of the more challenging elements of flight test are still ahead of us. Our focus is reflected in the written testimony. It is on managing risk and controlling program production and sustainment costs. The JSF program is undergoing the critical transition from development to production.

Historically, this is always a difficult phase for any program, but particularly so for a high-performance aircraft. The JSF, however, has been more difficult because the program began production very early, as was mentioned when we discussed concurrency, well before flight testing had begun.

This decision resulted in an unprecedented level of concurrency, which has subsequently driven the need for significant changes in the program. With this year's budget, I believe we are now set on a course for program stability. The JSF program is now operating on a baseline that does account for the risk of additional design changes.

The technical baseline review has given us a devolvement program that is realistic and includes margin to deal with unknown issues that may, and are likely to, arise. The production adjustments in the fiscal year 2013 budget give us a procurement profile that balances production efficiency to concurrency risk and delays production ramp-up until testing is more complete.

The decision to adopt this profile was based, in part, on a quick-look review, which I commissioned last fall, and looked in detail at the concurrency risk in the program and the knowledge points that we need to achieve to retire that risk. Another step we are taking to manage that risk is that for production lots 6 and 7 we have developed a contracting approach that allows us to make event-based production commitments.

Our contracting strategy also provides strong incentives for Lockheed to accelerate the incorporation of concurrency changes and retire concurrency risks as soon as possible, by ensuring that they share in concurrency costs starting in the fifth production lot. David Van Buren will go into more detail on our contracting approach in his statement.

In 2012, we are continuing to increase our focus on sustainment costs, which will ultimately be the largest element of cost in the program. The program office, my staff, and the services began to tackle this issue over the last year, carrying out an initial review of the O&S, operation and support, costs. This effort focused on flying hours, repair parts, manpower and depot-level repairable items and consumables.

The Air Force is also currently reevaluating its basing plans for F–35, another significant cost driver. This year, we will complete the business case analysis for sustainment, and take additional action to reduce costs. We will continue to attack Joint Strike Fighter operations and support costs throughout the program's full life cycle.

Let me close by saying that I appreciate the work this subcommittee has done in providing oversight to the Joint Strike Fighter program. We deeply appreciate the support you give to the

men and women of the armed services and to the Department generally day in and day out.

With your permission, I would like to ask Mr. Van Buren to briefly discuss our contracting strategy, and Admiral Venlet to discuss the status of the development and production elements of the program.

[The joint prepared statement of Mr. Kendall, Mr. Van Buren, and Admiral Venlet can be found in the Appendix on page 33.]

STATEMENT OF DAVID M. VAN BUREN, ACTING ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION, U.S. AIR FORCE

Mr. VAN BUREN. Mr. Chairman, Ranking Member Reyes, members of the committee, thank you for the opportunity to address this committee again regarding the F–35. Mr. Chairman, I would also like to thank you for your leadership in support of small business forums in which I was privileged to participate while I was in my position.

Events such as these are vital for our national economy. I would like to echo Mr. Kendall's comments regarding the importance of the F–35 program. Having been the F–35 acquisition executive since 2009, I believe the Department has taken numerous proactive steps in the management of the program.

These modified business strategies over this time period include the following: number one, a complete restructure of the remaining development fee to be paid only when on-schedule accomplishment by the industry team is accomplished; number two, a change from a cost-plus incentive fee to a fixed-price incentive fee in LRIP [low-rate initial production] contract number four, which was 2 years earlier than had been planned.

That new contract structure included a 50–50 share line and a tight, 120 percent ceiling. Number three, in December of last year contracts for Lot 5 were initiated via undefinitized contract actions, or UCAs, which will be definitized as fixed-price incentive fee contracts.

In addition, the government's cost risk is being mitigated by transferring some responsibility for concurrency cost risk to the prime contractor for the first time. Number four, the Department's Director of Defense Pricing led an LRIP–5 should-cost review of the contractor's submitted proposal. This effort has proved essential in informing Lot 5 negotiations.

We hope to definitize this contract in the first half of the year. Five, the Department is implementing an event-based contracting strategy for LRIP Lot 6 and 5 that buys aircraft production quantities based upon development and test progress. First, we will award 25 aircraft in Lot 6 out of 31 authorized and appropriated in fiscal year 2012.

Second, we will provide a means to procure anywhere from zero to six of the remaining fiscal year 2012 funded Lot 6 aircraft, concurrent with the Lot 7 contract award in 2013. We will link the total aircraft quantity ultimately procured in Lot 6 to Lockheed's development performance and concurrency cost risk reduction efforts.

Number six, the initial Lot 6 contract award for 25 aircraft will require a UCA to ensure that the production flow is not disrupted. However, the Department does not intend to award the Lot 6 UCA for 25 aircraft until essential agreement is reached for Lot 5. The Department intends to award the remaining Lot 6 variable quantity aircraft, as well as Lot 7 aircraft, through fully definitized contract actions in fiscal year 2013.

It is important that the industrial team demonstrate performance and help us to further confidence in the execution and affordability of the program. From my perspective, affordability for both production and sustainment of the F–35 has our greatest attention to ensure that the warfighters have a force structure that meets operational needs.

Thank you, and I will look forward to your questions.

[The joint prepared statement of Mr. Van Buren, Mr. Kendall, and Admiral Venlet can be found in the Appendix on page 33.]

Mr. BARTLETT. Thank you very much for your testimony.

Admiral Venlet.

STATEMENT OF VADM DAVID J. VENLET, PROGRAM EXECUTIVE OFFICER FOR THE F–35 LIGHTNING II PROGRAM, U.S. DEPARTMENT OF DEFENSE

Admiral VENLET. Thank you, Chairman Bartlett, Ranking Member Reyes, and members of the committee for inviting me to appear before you today on the F–35. It is my great honor to serve as the program executive officer with an outstanding Air Force, Navy, Marine, and international program team and supported by the world's best technical knowledge workforce found in the Air Force Aeronautical Systems Center at Dayton, Ohio, and Naval Air Systems Command at Patuxent River, Maryland.

That support, integrated into the daily actions of the joint program office team, made it possible to create the adjusted, realistic program plan and is critical to future dependable program performance. The performance of the F–35 industry team for the Department of Defense and our allies in engineering and testing fundamentals, in business fundamentals, and in sustainment will be successful to the degree our government technical knowledge workforce remains intimately involved in the program every step of the way.

I carry within me an understanding that what people believe about the F–35 is affected, and depends in some measure, upon what I believe and what I transparently communicate about the program. So let me begin with what I believe about the F–35.

I believe the F–35 is a critical presence in the combined force battlespace. It makes many other systems and capabilities and effects better because of the presence of the F–35 sensors. It is a critical presence in many nations as a powerful combined force capability to act and protect like-minded nations that want their people to live safe from aggression in freedom and opportunity.

I believe the F–35 is a bond of joint strength across all our services. It is a bond of capability and a bond economically across many nations that raises the level of technology benefit in our militaries and our industries. I believe the F–35 is an assurance of powerful effectiveness, it is an assurance of immediate powerful effective-

ness as soon as it is initially fielded, and it is the best possible growth platform to incorporate future advances in weapons sensors and networks for the next decades ahead.

It is an assurance for the men and women in all our services, and those we are still raising who will volunteer to serve something greater than themselves that they will succeed in every mission and return home safely to their loved ones. With that context, it is less what keeps me awake at night and more what makes me eager to be at work every day.

The F–35 has schedule and budget realism now, going forward. It is transparent in the discovery and correction of issues arising in tests that are typical in all fighter aircraft development. The service systems commands are closely involved and contributing to the correction of issues in view now and that will arise in remaining tests.

That creates confidence in delivering required capabilities suitable and effective from the sea and around the world. There is data and demonstrated performance in hand that gives confidence the F–35 basic design is sound and has clear potential to deliver the capability we expect. There is a lot of tests ahead.

Integrating the systems and sensors and expanding the envelope will bring discovery that sound systems engineering will solve. There has been very good engine and airframe contractor responsiveness and progress in many areas since we appeared before your committee last year. STOVL [short take-off/vertical landing] flight tests met plans and expectations, and completed a highly successful initial sea trial aboard USS [United States Ship] *Wasp*.

In addition to the impressive stability, control and performance of the STOVL in slow flight and vertical landing, the F–35 has flown to its maximum speed and hardest turn limits. It is a testimony to the very effective and impressive marriage of engine and airframe.

Three leading program issues occupy my focus for 2012. Technical and cost issues and challenges all certainly exist; all are being worked. I mention here what are the critical and significant few that, if successfully advanced, will bring beneficial tailwind for the entire program and genuine value for the Department and our partner nations.

First, software development and performance, and its dependable delivery of capability. Second, concurrency-changing corporation improvement and delivery of affordable full service life jets. Third, production quality, and its ultimate result on affordable price for the U.S. and our allies.

All three have a common fundamental that will advance the external result and performance, and keep reality clearly in view. Systems engineering-based, close-loop analysis and corrective action will be required in steady and committed execution throughout the industry team, primes and suppliers.

Rigorous management control by the joint program office, supported by the service systems commands, will be applied with a development dial-in production, reality and database negotiations and focus on affordable delivered capability, which is our only meaningful external result.

Presently, in the program, performance is all that matters. I look forward to your questions.

[The joint prepared statement of Admiral Venlet, Mr. Kendall, and Mr. Van Buren can be found in the Appendix on page 33.]

Mr. BARTLETT. Thank you very much.

And now Mr. Sullivan from the Government Accountability Office. Thank you.

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

Mr. SULLIVAN. Good afternoon, Chairman Bartlett, Ranking Member Reyes, members of the subcommittee. It is a pleasure to be here today to discuss the status of the F–35 acquisition.

Everyone is aware of the past history of the program. The chairman related additional costs and schedule growth on this program since its inception. Seventy percent cost growth since 2001, a full-rate production date that has been delayed by about 6 years. The program has been beset with problems as a result of concurrent development, testing and procurement.

Rather than dwell on how we got here for this statement, I would like to make a few points about what we believe the road looks like moving forward. The Department has taken positive steps to restructure the program over the past few years, and we believe the new strategy has reduced risk from the effects of concurrency by reducing the number of aircraft that we will buy while it is still testing.

The original strategy would have had almost 1,600 aircraft on contract by the end of flight testing in 2017. The new strategy has reduced that number to 365. While this delays capability to the warfighter, it also reduces the risk of incurring additional modification and retrofit cost to the aircraft and to the taxpayer.

In addition, the revamped test program has gained much momentum in the past year, and has now completed about 20 percent of its flight testing. While we are encouraged by these signs of momentum, plenty of risk remains as the program moves forward with concurrent testing and production.

We have identified five areas of concern that we believe are most important at this point. First, software development is behind schedule. The software complexity on this program has no rival. The lines of code now needed to achieve full capability is estimated at $24 million, three times that of the F–22 Raptor. And delivery of the final block of software—that which gives the aircraft most of its advanced capabilities—is still very much at risk.

Second, engineering changes from flight testing continue to be abnormally high for this point in production, which continues to put pressure on both development and procurement costs. The program will not know the true cost to produce the F–35 until these changes tail off and the manufacturing processes can stabilize.

Third, funding assumptions for the program now average about $13 billion per year for the next 23 years. This, during a time of extreme budgetary pressure. Fourth, mission system development is only about 4 percent validated at this point, and two critical systems—the helmet-mounted display and the logistic known as ALIS

[Autonomic Logistics Information System]—are continuing to be problematic for the program.

And fifth, the supplier base for the F–35 is large, global, and complex. It will continue to challenge the program's management capacity as production ramps up in the future. The restructured program has already calculated the impacts of concurrency on cost and schedule so far.

Cost overruns on the first four annual procurement contracts now total more than $1 billion, $673 million of which is the government's share. This adds about $11 million to the price tag of each of the 63 aircraft purchased under those contracts. In addition, the program now estimates the cost to retrofit aircraft produced before the completion of flight testing is about $373 million.

As I said earlier, this retrofit cost will grow as information from flight testing creates additional engineering changes that must be absorbed by a manufacturing process that is struggling for stability. The planned completion of flight testing is now set for 2017. This means four more years of potential engineering changes.

So we believe the Department has improved the outlook for the program to deliver aircraft more predictably in the past 2 years by adding time and money, and by reducing near-term purchases of the aircraft. However, there are still significant risks owing to the F–35's complexity, remaining concurrency between testing and production, and its requirement for large amounts of funds on an annual basis moving forward.

Mr. Chairman, this concludes my opening statement. I look forward to questions.

[The prepared statement of Mr. Sullivan can be found in the Appendix on page 51.]

Mr. BARTLETT. Thank you all very much for your statements.

As is my custom, I will reserve my questions until others have had a chance to ask theirs, hoping they will have asked the ones I would have asked.

Mr. Reyes.

Mr. REYES. Thank you, Mr. Chairman. I have a number of questions that I want to include for the record, but I did want to start maybe with a question to Mr. Sullivan. You know, given the complexity of the technologies incorporated into the F–35 program, would it be reasonable for anyone to think that this program could conceivably have a normal testing period?

And specifically, what are the chances that it won't be completed by 2017, as you just testified to?

Mr. SULLIVAN. I think, given the complexity of the technologies they are trying to bring together, I would say that probably the program has been through most of the—the real tough discovery in terms of technologies that they have had to integrate. So as I said in my statement, past history has been tough on this program.

I probably am a little optimistic that they have been through an awful lot of that. And I would focus most of the problem now on software. I think software—the development of the software that they need to make this aircraft fully combat-capable—is still as complex as anything on earth, I think it is going to drive the test program. The test program still has risk in it, as a result of that. The mission systems that are laden with software, as well, are

driving the test program. The program has to stay on top of software and these mission systems in order to make sure the test can complete in a timely fashion.

It is still very risky, I think.

Mr. REYES. From your viewpoint and your experience, is there any kind of—or is there a way to compare this to past programs, for instance the F–22 program? Did it ever, in terms of comparison, have the same kinds of challenges and——

Mr. SULLIVAN. Yes, oh yes. I think there are comparisons you could make to the F–22. I would say the F–22, in many ways, was more complex than this program. I think this program probably started with more mature technologies across the board.

But again, I will go back to the software on this program that I think is more complex than the F–22. And I think that typically what happens on these big programs, like the F–22 and the JSF, if this concurrency that you run into, you have concurrent flight testing as you are trying to ramp up production.

The manufacturing process just are never able to get stable because there is so much information coming in from testing and so many engineering changes that are going on. That, on this program, is very similar to what took place on, for example, the F–22.

Mr. REYES. Of the five concerns that you raised, I was mostly struck by the supplier base being large, global and complex. Did you give those issues to us in rank order of concern, or were they just five issues that you have——

Mr. SULLIVAN. They were—you know, I didn't think of it quite—I would say that software is number one.

Mr. REYES. Number one, right?

Mr. SULLIVAN. It is probably in some rank order there. I would say that the supplier base is a concern, but maybe the fifth one of those. Yes, it is a very complex global system.

Mr. REYES. Okay. Thank you, Mr. Chairman.

Mr. BARTLETT. Thank you very much.

Dr. Fleming.

Dr. FLEMING. Yes, thank you, Mr. Chairman.

Secretary Van Buren, in my district is Barksdale Air Force Base, which is a long-range bomber. So I am going to take this opportunity to ask you a couple of questions about that, if it is okay. I am encouraged by the support in the fiscal year 2013 budget request to continue development of the long-range bomber.

I want to help make the Department, make this program, a success, and invite you to stay in touch, as we are very interested in what is going on with that. In recent years, we have heard a variety of thoughts from the Air Force on this bomber. It may be manned, unmanned, or both; maybe nuclear-maybe conventional-capable, or both.

And it will have penetrating capabilities for anti-access environments. It may have a significant intelligence surveillance and reconnaissance capability. The Secretary of Defense has mentioned figures of 80 to 100 aircraft, at a unit cost of $550 million, with a target delivery for the mid-2020s.

He also mentioned the program would allow a streamlined acquisition process. My question is, can you share with the committee

your level of confidence that a new bomber will be designed in such a way to minimize risks and to avoid requirements creep?

Mr. VAN BUREN. At this particular stage of the development, the program is on track. As you well know, sir, many of the details of the development activity are classified. What is not classified is the overall funding level for the 5-year defense plan is roughly $6.3 billion.

I have every confidence that the way we are proceeding on this would not—taking on too much risk gives the program a much higher probability of success in achieving the goals that Secretary Gates wrote when he wrote that guidance in the beginning of last calendar year.

So at this particular point, I would have to defer to another venue for more details on the program. But I have confidence in the way the program is being currently run.

Dr. FLEMING. You know, 80 to 100 bombers, at $550 million. That really sounds good. But, you know, in the past, with the B–2 and other programs, we have had requirement creeps which is sort of a pejorative, where we start in one direction and we begin adding on more capabilities, or attempt to, and then the costs go out of sight.

Do you have reassurance that that is not going to happen in this case?

Mr. VAN BUREN. I believe the Department has been much more proactive and disciplined with regard to requirements. As you probably know, I worked on the B–2 for 9 years. I can say that an evidence of that is with regard to the KC–46A tanker which, since contract award a little bit more than a year ago, has had zero contract changes due to requirements changes.

And so I feel good about where we are with the development and the stability of our current design approach.

Dr. FLEMING. And the number 80 to 100, do you agree with that number?

Mr. VAN BUREN. That is the guidance from the Secretary, in which we embarked on the program.

Dr. FLEMING. Okay, well, again I would love to stay in touch with your office on this. We want to monitor this. Obviously, we have an aging B–52 fleet which is a wonderful bomber, but it is being flown by the grandsons of the builders. And someday it will have to be replaced. And even if we start today, it will be another decade at least.

So we definitely want to keep helping this along to make sure it stays on target.

Mr. VAN BUREN. Yes.

Dr. FLEMING. With that, I yield back, Mr. Chairman.

Mr. BARTLETT. Thank you. As per committee rules, those present at gavel fall are recognized in the order of their seniority on the committee. Those arriving after gavel fall, in their order of appearance in the committee.

Mr. Runyan.

Mr. RUNYAN. Thank you, Mr. Chairman. Just a few questions for Assistant Secretary Van Buren. What major weapons systems have you successfully procured over the last 10 years?

Mr. VAN BUREN. I have been in the position in the government for 4 years. I would say the procurement of the tanker, the development of the tanker, a success. I would say the JASSM [Joint Air-to-Surface Standoff Missile] missile is running well now, after some production difficulties.

I would say that the Project Liberty aircraft, 37 aircraft, were procured for the warfighter in a span of 22 months. Of the Predator and Reaper, we currently have 120 Reaper aircraft in high-rate production. Obviously, the MQ–1/MQ–9 fleets are around the world doing ISR missions on a daily basis. Those would be some.

Mr. RUNYAN. And how many of them have been at cost and on time?

Mr. VAN BUREN. Project Liberty was certainly on time, even at accelerated rate. The cost-effectiveness of MQ–1 and MQ–9, I think, are very, very good. In fact, at certain times the manufacturer has been producing aircraft ahead of schedule. The production of the air vehicles are not a limiting factor.

And there have been others. BACN [Battlefield Airborne Communications Node], a platform based on the Global Hawk Block 20, was a JUON [joint] urgent operational need, which went to field in a span of approximately 8 months.

Mr. RUNYAN. So I just really asked those questions not only for the Air Force, but many other branches also. That there is a systemic procurement problem in the Department and throughout each branches. And it is, frankly, not being addressed. We kind of take it as this is how we are going to conduct business.

And at the end of the day, our responsibility and the oversight that we have to the taxpayers is, I think many of us feel, being ignored. As you said there, even being the on-cost and on-time, that list is nowhere near the original procurement list that you gave me.

And it is something that I know needs to be addressed, and I just wanted to put that out there. Because it gets frustrating, day in and day out.

I guess, Chairman, I am going to actually yield back so we can move on. Thank you.

Mr. BARTLETT. Thank you very much.

Mr. Turner.

Mr. TURNER. Thank you, Mr. Chairman.

Doctor Kendall, the Department of Defense, DOD, has been the catalyst in the development of the unmanned aerial aircraft system, UAS, and it's certainly its market. The volume of UAS flights for commercial and governmental non-military applications could equal those being flown by military operations.

Future growth of the civilian UAS market is dependent on the ability of non-military UAS proponents to operate their UAS systems in the National Airspace System. As such, there is a strong innovative growth market for testing, research and development.

Inability to adhere to the FAA [Federal Aviation Administration] regulatory requirements is the major problem facing the military and commercial UAS sector in operating in domestic U.S. space. More specifically, flight rule 14 requires a sense-and-avoidance capability. Manned aircraft systems operating with specified FAA-

controlled—within FAA-specified control areas, or with sense-and-avoid equipment, are able to adhere to this rule.

Since UASs do not have pilots on board or collision and avoidance technology, they are not currently able to adhere to FAA rules. Congress has placed the requirement on FAA administrator to develop plans to accelerate the integration of unmanned aerial systems into the National Airspace System.

Currently, the NDAA [National Defense Authorization Act] budget request contains $34.6 million for sense-and-avoidance development to further UAS operations in the National Airspace System.

Dr. Kendall, do you believe that the FAA has articulated and documented the sense-and-avoid technology requirements in sufficient detail to allow the DOD to develop a solution that will allow UAS operations in these new airspaces? In other words, is the $34.6 million being spent on sense-and-avoid technologies going toward the fulfillment of a documented FAA requirement with a defined acceptable solution?

Given the current FAA safety of flight requirements, sense-and-avoid requirements, and our technological capabilities, how long do you think that it might take before we would be able to integrate UAS into the National Airspace System, and do you also similarly have concerns as to the coordination between DOD and the FAA with respect to our National Airspace System and UAS integration?

Thank you.

Mr. KENDALL. Thank you, Congressman Turner. I am going to have to take a lot of that for the record because I wasn't prepared to testify on that today. But I can tell you that we are aware of the statutory requirements and the Department is working closely with the FAA to address the issues that you described.

But I am going to have to get the details back to you for the record, if that is all right.

Mr. TURNER. That is fine. Thank you, Mr. Chairman.

[The information referred to can be found in the Appendix on page 135.]

Mr. BARTLETT. Mrs. Hartzler.

VOICE. She is gone.

Mr. BARTLETT. Oh, she is gone? Okay. She is back. Okay, there you go.

Mrs. HARTZLER. Thank you, Mr. Chairman. Sorry.

I appreciate the work that you are doing there. I know everyone has been kind of frustrated with the development of the F–35 and its hitches along the way. I just wanted to clarify, when do you anticipate that they will be operational—2017, is that——

Admiral VENLET. The IOCs [initial operational capability] are not declared in our program baseline, but the production will proceed to deliver a number of jets. The Block 2 initial warfighting capability in our current plan is projected to be released to the fleet for all three variants in 2015. And Block 3, in our schedule, will be released to the fleet in 2017.

There will be the detailed initial operational tests to go on after that, but the production will produce a significant number of aircraft with those capabilities in those years.

Mrs. HARTZLER. Okay. What are the key issues in deficiencies in the aircraft and engine manufacture that need to be addressed in order to ramp up production?

Admiral VENLET. The principal benefit we are getting from these years of level quantities that Mr. Sullivan spoke about, I believe, are a base camp time that are going to bring the benefit of getting that supplier base to perform dependably. There is the need to get world-class quality aspects to emerge in the aircraft production side.

It is doing much better in the engine side. I don't have any concerns with the engine production or quality at this point. And I don't have deep, long-term concerns, but it needs to appear quicker on the aircraft side. And I believe this range of level quantity in this—about 30 for these next couple years—will help that.

Mrs. HARTZLER. Okay. What are contractors and suppliers doing to improve, and what time frame are we looking at?

Admiral VENLET. They are addressing the—particularly, software is important to production. We need to produce productionized, fleet-releasable software each year because we are accepting production aircraft. So that adds a complexity to the development.

You just don't work on your software for the test program. You have to do it for production acceptance, as well. So that is being worked on. The software also in the off-board system, called ALIS that Mr. Sullivan mentioned, that is the ground maintenance information system that is not present in any aircraft system in the fleet today.

It is critical to F–35. Those would be the most important things.

Mrs. HARTZLER. Okay. Mr. Sullivan mentioned that some of the suppliers are global, and that kind of caught my attention. What aspects of the F–35 are being supplied by foreign companies?

Admiral VENLET. The most visible, when you look at the aircraft, is the aft fuselage by BAE [British Aerospace Industry] Systems. And there are smaller components—the ejection seat, also, from Martin-Baker in the United Kingdom. Turkey is contributing to center fuselage to Northrop Grumman. Alenia in Italy is commencing early work on wings, just to name a few of the more significant ones.

Mrs. HARTZLER. What is the policy of our country towards making sure that our suppliers are American-based?

Admiral VENLET. That is a very much important part of the program. This program was conceived and initiated with eight other partner countries at the outset. And there is not a work-share. There is a concept of best value from the source of supply to produce the end airplane.

So I do not speak to industry about sharing the work around our partner countries. I speak to them on the basis of the best price and the best quality, and leave that to them to deal with.

Mrs. HARTZLER. Okay. Thank you, gentlemen.

Thank you, Mr. Chairman.

Mr. BARTLETT. Thank you very much.

There are several additional questions that we need to ask. In the interest of time, since there are going to be votes fairly quickly, we will ask those questions for the record.

I just have one request. What we do here seems to fit Albert Einstein's definition of insanity. I have been here nearly 20 years now, and every program—essentially every program—I have watched here has run over in both time and dollars, sometimes monstrously.

I hope that when you are pursuing this program that you will keep your records so that when we do a post mortem when it is finished it will have a prescription so as how not to do this in the future.

Thank you very much, and now we will take a brief recess while we excuse you and we empanel our next set of witnesses.

Admiral VENLET. Thank you, Mr. Chairman.

[Recess.]

Mr. BARTLETT. Our subcommittee will come to order again. We will now have our second panel of witnesses. Vice Admiral Mark Skinner, USN [United States Navy], Principal Military Deputy to the Assistant Secretary of the Navy for Research, Development and Acquisition.

Lieutenant General Terry Robling, Deputy Commandant of the Marine Corps for Aviation; Rear Admiral Kenneth Floyd, Director of the Air Warfare Division of the U.S. Navy; Major General James Holmes, Air Force Assistant Chief of Staff Operations, Plans and Requirements; and Major General John Posner, Air Force Director of Global Power Programs.

Without objection, all witnesses prepared statements will be included in the hearing record.

And we will now begin the testimony with Admiral Skinner.

STATEMENT OF VADM W. MARK SKINNER, USN, PRINCIPAL MILITARY DEPUTY TO THE ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT, AND ACQUISITION), U.S. NAVY; LTGEN TERRY G. ROBLING, USMC, DEPUTY COMMANDANT OF THE MARINE CORPS FOR AVIATION, U.S. MARINE CORPS; AND RADM KENNETH E. FLOYD, USN, DIRECTOR OF WARFARE INTEGRATION, U.S. NAVY

STATEMENT OF VADM W. MARK SKINNER

Admiral SKINNER. Chairman Bartlett, Ranking Member Reyes, distinguished members of the subcommittee, it is our honor to appear before you today to discuss the Department of the Navy's tactical aviation procurement programs. Testifying with me today are Lieutenant General Terry Robling, Deputy Commandant for Marine Corps Aviation, and Rear Admiral Kenneth Floyd, the Navy's Director of Warfare Integration.

With the permission of the committee, I will keep our oral remarks brief. The fiscal requirement in the Budget Control Act of 2011 required hard choices to be made. In response, the Department of the Navy deferred procurement of F–35s, P–8s, E–2Ds, F/A–18Es-Fs and MV–22s, and terminated the MRMUAS [Medium Range Maritime Unmanned Aerial System] program and JAGM [Joint Air-to-Ground Missile] investment in this President's budget request.

We are facing tremendous challenges—the budget reductions necessitated by the Budget Control Act, and aging aircraft inventory and significant threats. During these austere times, we must per-

sist in modernizing and recapitalizing our naval aviation forces and increase our capability through force multipliers such as Naval Integrated Fire Control-Counter Air and using the should-cost/will-cost methodology to bring more affordable systems to our warfighters.

Affordability will be our business focus over this FYDP [Future Years Defense Program] so we can continue to deliver capabilities and meet the warfighters' needs. With your assistance, we are leveraging our buying power with successful multi-year procurements on the F/A–18, B–22 and H–60. And together, we are saving the taxpayers over $1.5 billion.

Last year, we embraced our past history as naval aviation celebrated our centennial. This year, Marine Corps Aviation will do the same. New history was also written this past year, when we conducted the first F–35 shipboard operations very successfully aboard the USS *Wasp*.

We deployed the first EA–18G Growler expeditionary squadron to Iraq in November of last year, and then successfully redeployed the squadron on short notice to support Operation Odyssey Dawn. We commenced E–2D advanced Hawkeye initial operational tests and evaluation, while the V–22 fleet reached 130,000 flight hours.

And we delivered the first P–8 Poseidon and the 500th Super Hornet and Growler on cost and on schedule. The Naval Air Systems Command hired 155 wounded warriors into the acquisition workforce ranks. We also continued to actively manage our TACAIR [Tactical Aviation] inventory.

The first Hornet will be inducted into SLEP [Shelf Life Extension Program] late on this year, and both SLEP and future aircraft procurements must continue on schedule to mitigate the Strike Fighter shortfall with manageable risk through 2028. The Navy will transition three Navy F–18 Charlie squadrons to F–18 Echo squadrons.

And the Marine Corps will reduce their force structure by four squadrons and delay the retirement of the AV–8B until 2030. And this year, we will begin an analysis of the Super Hornet's replacement, the F/A–XX, to ensure we have sufficient and viable TACAIR forces beyond 2028.

Thank you, and we welcome your questions on the Department of the Navy's Tactical Aviation Procurement programs.

[The joint prepared statement of Admiral Skinner, General Robling and Admiral Floyd can be found in the Appendix on page 76.]

Mr. BARTLETT. Thank you very much. They have not supplied us with the world's best microphones. If you will turn them on and pull them closer it will be helpful.

General Robling.

General ROBLING. Sir, we are going to—that was a dual statement for the Navy and the Marine Corps.

Mr. BARTLETT. Okay.

General Holmes.

STATEMENT OF MAJ GEN JAMES M. HOLMES, USAF, ASSISTANT DEPUTY CHIEF OF STAFF FOR OPERATIONS, PLANS AND REQUIREMENTS, U.S. AIR FORCE; AND MAJ GEN JOHN D. POSNER, USAF, DIRECTOR OF GLOBAL POWER PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

STATEMENT OF MAJ GEN JAMES M. HOLMES

General HOLMES. Chairman Bartlett, Ranking Member Reyes, and distinguished members of the subcommittee, thank you for the opportunity to provide an update on the Air Force's tactical, remotely piloted, and intelligence surveillance and reconnaissance aviation programs.

I am joined this afternoon, as you said, by Major General Posner, the Director of Global Power Programs for the Office of the Assistant Secretary of the Air Force in Acquisitions. Today, the Air Force is fully engaged in operations across the globe, supporting combatant commander requirements while maintaining our ability to defend the homeland.

Our airmen continue to excel on the battlefield with exceptional results. As you are well aware, the Air Force made cuts in response to both new strategic guidance and budget reductions directed by the 2011 Budget Control Act. Although we will become a smaller force, we are committed to maintaining the agility, flexibility and readiness required to engage a full range of contingencies and threats.

We continue to provide the joint force and its commanders unparalleled support for strike and ISR through our weapons system programs, and the phenomenal dedication and professionalism of our total force airmen. Thank you for your time and for your continued support of our Air Force and our teammates in the Army, Navy and Marine Corps.

And we stand by for your questions.

[The joint prepared statement of General Holmes and General Posner can be found in the Appendix on page 112.]

Mr. BARTLETT. Thank you all very much for your testimony. For those who have not testified, thank you for your preparation and your willingness to be here to answer our questions. Again, as is my custom, I will reserve my questions so others have had a chance to ask theirs.

Mr. Reyes.

Mr. REYES. Thank you, Mr. Chairman, and thank you gentlemen for being here.

The budget request includes a plan to mothball the current fleet of 14 Global Hawk Block 30s as well as the 4 Block 30s that are still in production. With these aircraft procured at a cost of more than $100 million each, this seems like an odd decision.

As an aside, from the potential loss of ISR capability, it is DOD decisions like this that reflect to people, including Members of Congress, the waste of millions of dollars, and can make it a challenge for Members who want to support more defense spending. The committee understands that up until this year the Air Force planned to operate both the Global Hawk Block 30 and the U–2 through the end of fiscal year 2014.

My question, General Holmes, is—well, several questions. One, why not continue with that plan, and defer a decision on retiring the Global Hawk Block 30 fleet? Secondly, are there other options beyond putting these brand-new $100 million aircraft into storage? Has there ever been a precedent for moving aircraft directly from TAC reproduction, literally from the production line, into storage?

And how much would it cost for the Air Force to continue Global Hawk Block 30 through fiscal year 2013 as it was originally planned?

General HOLMES. Thank you, Congressman Reyes. The decisions that the Air Force made this year on force structure cuts, we tried to balance the force structure, we tried to balance our modernization accounts, our readiness accounts, and then take care of our airmen through the personnel accounts.

Faced with a bill of about $50 billion over 5 years, we believed we needed to save about $8.7 billion in force cuts. And the cuts to the Global Hawk program account for more than $2 billion of that $8.7 billion over the FYDP. We built systems to meet the joint requirement as established by the Joint Requirements Oversight Council, the JROC.

And in this case, the JROC adjusted that requirement. And the requirement is set for sensor capability, for the distance that you have to fly to a station, and for the number of caps. The adjustment they made is classified, and we can come talk to you in person in a smaller group and go through that in detail at your convenience.

But under that new requirement, and under the pressure of the fiscal guidance, we believe that it was more cost effective to fly the U–2 and not fly both airplanes at the same time. And that we can meet the JROC requirement with the U–2 through the FYDP.

Mr. REYES. So is there any precedent to this decision, other than for budgetary issues?

General HOLMES. Well, with a history degree, Congressman, I think there have been times in our high times where we were buying airplanes more than we needed and we sent them almost directly into storage. I can't think of a recent precedent.

As we put the aircraft into storage, as you know there are several classes of storage. And the aircraft that we are retiring we have programmed to put them initially into Class 1000 storage, which means that they are returnable to action if we need to reverse the decision.

We will make decisions about exactly how many of the aircraft that are cut, then we will transition quickly into other forms of storage. But we initially programmed to put them into the storage class. It is the most easily reversible. And the savings that we achieve over the FYDP by retiring the Block 30 Global Hawk are more than $2 billion worth.

Mr. REYES. A little over $2 billion?

General HOLMES. Yes, sir.

Mr. REYES. Okay. I have got another question, but I will wait for the second round. Thank you, Mr. Chairman.

Mr. BARTLETT. Okay. Thank you very much.

We have almost 7 minutes remaining in the vote, so there is time for questions from Mr. Critz. And then we may have to give the rest of our questions to you for the record.

I want to apologize for the inconvenience. We do not control votes from our level. Thank you all so much for your attendance here and your preparation. And be sure that your prepared testimony, your oral testimony, and your answers to our questions, will be part of a record that will be pored over by a number of people for a long time.

Mr. Critz.

Mr. CRITZ. Thank you, Mr. Chairman.

General Holmes, the Advanced Medium Range Air-to-Air Missile, AMRAAM, production. The AIM–120D missiles experienced significant production delays. And from what I am told, it is mostly due to rocket motor production. As a result, the budget request for fiscal year 2013 and beyond has been substantially reduced.

However, the capability the AIM–120D will bring to the Air Force and Navy appears to be very important, given the air-to-air threat. Can you give me an update, give us an update, on the production? What steps are being taken to get production back on schedule?

And then when will the Air Force and Navy have this weapon in the field?

General HOLMES. Thank you, Congressman. You are exactly right that the AIM–120D is a very important requirement. And from an operator's perspective, it is key to our ability to operate in the anti-access and area denial threat that we expect to face in the future.

With your permission, I am going to hand that question off to General Posner.

Mr. CRITZ. Sure.

General POSNER. Thank you, Congressman. With respect to your question, you are exactly right. The AMRAAM has suffered some production problems. These problems are specifically related to the rocket motor. There has been a very aggressive initiative on the part of the companies to try and solve that particular problem.

I think it is important to note that the front end of the missile, the guidance and navigation and all the electronics continuing to be built, those production pieces are in storage awaiting mating to the rocket motors when those problems in the rocket motor are identified and solved.

Currently, we have 359 missiles versus the 552 that are on contract. So we are about 193 behind. In that regard, the contractor, Raytheon, has worked very, very diligently to come up with several options to work solutions towards this particular problem.

They have now provided a plan to recover. We are satisfied with the plan, and we will monitor them closely to make sure that the performance for the rocket motors matches the plan. We hope to solve the problem with the rocket motors quickly.

It should be a fairly simple matter, once the rocket motors are certified as operational, to get them mated to the front ends. And we hope to see recovery to the production schedule quickly.

Mr. CRITZ. Who makes the motors? It is not Raytheon, is it?

General POSNER. No, sir. That is a subcontractor, ATK.

Mr. CRITZ. ATK.

General POSNER. Yes, sir.

Mr. CRITZ. Thank you.

Well, considering our time allotment, Mr. Chairman, I yield back.

Mr. BARTLETT. Thank you. Thank you very much. And let me apologize again for the shortness of the time, and to thank you for your preparation. We will have a number of questions for the record in our oversight responsibility, and be assured that we will be looking at those, and a number of others looking at those, for a long time.

Thank you all so much for your preparation, your attendance here. And we now stand in adjournment.

[Whereupon, at 4:33 p.m., the subcommittee was adjourned.]

A P P E N D I X

MARCH 20, 2012

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 20, 2012

OPENING STATEMENT OF CHAIRMAN ROSCOE G. BARTLETT
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

HEARING ON FISCAL YEAR 2013 NAVY, MARINE CORPS, AND AIR FORCE COMBAT AVIATION PROGRAMS

March 20, 2012

Good afternoon. The hearing will come to order.

The subcommittee meets today to receive testimony on the Navy, Marine Corps and Air Force budget requests for tactical aircraft programs for fiscal year 2013. We have a number of issues to cover today, but my opening remarks will focus on the F-35 program.

The F-35 program is what has been called the centerpiece of DOD's long-term tactical aircraft planned force structure, with a major commitment of the Department's projected budget dedicated to F-35 acquisition and operations. To date, significant technology and manufacturing capabilities have been demonstrated.

Yet, after having already made a major commitment of resources to the program, progress in the development and early procurement of the F-35 has fallen significantly short of expectations. Since the beginning of the final phase of development in 2001, the projected cost of the total research and development and procurement programs has grown from $233 billion to nearly $400 billion. Compared to the currently approved baseline, full rate production has been delayed five years.

The committee has supported and continues to support the F-35 program because of the high priority placed on the program by the Navy, Marine Corps, and Air Force and the recognition that a fifth generation fighter is required to operate and achieve the effects necessary in the projected future threat environments. However, early-on in the F-35 program, the committee had concerns with the acquisition strategy. In 2005, we disapproved the Department's request for the

first procurement funds for F-35s, citing the request as premature, given the maturity of the development program. Each year we have continued to express concerns regarding rushing into procurement too soon and planning an aggressive increase in annual production before required technology was demonstrated, design stability was achieved, and flight testing was complete.

Unfortunately, the committee's and others' concerns regarding the program were well justified.

As the Government Accountability Office reports, because of delays in research and development and flight testing, the Department of Defense's projected requests for procurement of F-35 aircraft through 2017 have been reduced by approximately 75 percent compared to the original schedule when the program began in 2001.

Compared to last year, the Department has removed procurement of 179 F-35 aircraft from its budget plan for fiscal years 2013 to 2017.

Expectations for the F-35 program remain very high. There has been a significant commitment of this nation's resources to the F-35 program, with major financial commitments required in the future. Much of the promised capability of the F-35 has yet to be demonstrated and consequently the future performance of the F-35 acquisition program remains of major concern.

Our witnesses have an extraordinary challenge and responsibility in the execution of the F-35 program and we appreciate their professional commitment to the task. Before we begin, let me call on the Ranking Member of the subcommittee, Mr. Reyes for his opening remarks.

Statement of the Honorable Silvestre Reyes
Ranking Member, Subcommittee on Tactical Air and Land Forces
Fiscal Year 2013 Navy, Marine Corps, and Air Force Combat Aviation Programs

March 20, 2012

Today's hearing on Navy, Marine Corps, and Air Force tactical aviation programs will focus on some challenging issues.

First among these issues is how to keep the F-35 program on track while we also modernize the rest of our tactical aviation fleet.

However, I think that keeping the big picture in perspective is important.

Despite the recent round of proposed reductions, it appears to me that the United States will remain the world's undisputed leader in military aircraft capability for many years ahead.

We retain that lead not just because of the aircraft DOD buys, but also because of the decades of knowledge our aviation industrial base has with regard to building sensors, advanced weapons, stealth capability, and other aircraft features other nations can only hope to someday have available.

We also retain this lead because of the quality of our personnel, both in the air and on the ground.

A final reason we remain the preeminent military aviation power in the world is the quality of our training, the quality of which is far beyond anything other nations even try to achieve.

Simply put, we hold ourselves – as we should – to a very, very high standard.

As a result, the challenges we face in producing, manning, and maintaining combat aviation capability must be put in the proper context.

Overall, although I have some reservations about a few proposals, I believe the budget request before the subcommittee will allow the United States to maintain its current dominance in the air for the foreseeable future.
With regard to the topic of the first panel of witnesses, the F-35 Joint Strike Fighter, I think it is important to keep a few critical issues in mind as Congress considers the way forward.

For any major program, there is a constant balance to be struck between the urgency of the need for the program, the technical risks of the program, and the cost of the program.

For the F-35, I think the need for the program is absolutely clear.

The aircraft we build in the next 10 years will be fighting the wars of the future. We have to think about the long term.

Given the likely dispersion of various anti-aircraft systems over upcoming decades, it seems clear to me that unless the United States maintains its edge in stealth and other technologies that we simply won't be able to project power to deter aggression and protect allies in the future.

In short, to deter future enemies and win the wars of the future we need a large number of 5th generation fighter aircraft, and the F-35 is the only program we have to accomplish this goal.

The second and third issues – technical risk and cost – can be summed up in the much talked about issue of "concurrency", which refers to the simultaneous large scale production and flight testing of the F-35 aircraft.

While many members are frustrated with the added costs of this approach to production and testing, it is important to point out that many of the decisions that led DOD to the current situation were made more than a decade ago.

And, significantly, over many years these decisions were – to a large degree – underwritten and endorsed by Congress.

In my view, these decisions cannot now be undone without fundamentally breaking the program.

However, much can be done to put the program on a better path.

DOD has already cut back production of the F-35 dramatically in an effort to reduce the "concurrency" many members are worried about.

Of course, there is a limit to how far F-35 production can be reduced before the program's production effort begins to unravel.

DOD's current plan appears to be a good compromise between reducing concurrency and keeping production at a viable rate.

While I would like to see higher production rates, I think that this plan is a responsible one, and I support it.

However, while I support the need for the program and DOD's current effort to fix the problems it is encountering, I do not believe the F-35 program deserves a "blank check".

This program has changed dramatically. For example, it is important to remember that according to the original schedule for F-35 we should be procuring 200 F-35s in FY 2012 – and instead we are procuring just 29.

The program also faces significant challenges in terms of meeting critical technology requirements, keeping software development on time and schedule, and reducing production costs.

Overall, costs must be reduced, development must stay on schedule, and the government and the contractor must work together in a constructive manner in order to keep the program on track.

For the many other programs we will cover in today's hearing, after reviewing the budget proposal I think the aviation programs for the Navy and Marine Corps are in relatively good shape.

The Marines are on track to continue V-22 production at slightly lower rates and continue upgrades to Harriers and F-18s, while also continuing to invest in the future with various unmanned aircraft R&D efforts.

The Navy's aviation portfolio also appears healthy, with fighter aircraft, helicopter, and UAS development and production remaining on track when compared to last year.

The Air Force, on the other hand, has proposed some changes that I am not yet fully convinced are in the nation's best interests.

Chief among these changes is the decision to mothball a practically brand new fleet of Global Hawk Block 30 aircraft, each of which was procured at a cost in excess of $100 million.

Just a few months ago Congress was told the Global Hawk Block 30 was a program critical to protecting the nation, and that there were no alternatives to achieve its requirements at a lower cost.

We are now being told precisely the opposite, largely based on just a few changes to operational requirements which appear to be on shaky ground in terms of real-world needs.

A change this dramatic in such a short time suggests a purely budget-driven decision, rather than one that reflects the appropriate balance of budget reality and operational requirements.

Regardless of how the decision was reached, in my view no matter what the future holds we will need more Intelligence gathering capability, not less.

If the United States does reduce its forces in Afghanistan it will need ever more ISR capability to hunt for terrorists, deter potential enemies, and give our combatant commanders the intelligence they need to properly advise the commander in chief.

Given this high demand for ISR assets, I think a more gradual approach to the Global Hawk program may be required.

I look forward to today's testimony to illuminate this and other issues.

DEPARTMENT OF DEFENSE

WRITTEN TESTIMONY FOR THE
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
U.S. HOUSE OF REPRESENTATIVES

SUBJECT: Tactical Air and Land Forces

COMBINED STATEMENT OF: Mr Frank Kendall
Acting Undersecretary of Defense
for Acquisition, Technology and Logistics

Mr David Van Buren
Air Force Service Acquisition Executive

Vice Admiral David J. Venlet
Program Executive Officer F-35

March 20, 2012

Chairman Bartlett, Ranking Member Reyes, and distinguished Members of the Committee. Thank you for the opportunity to address this committee regarding the Joint Strike Fighter.

The Joint Strike Fighter is the Department of Defense`s largest acquisition program, and its importance to our national security is immense. The JSF will form the backbone of U.S. air combat superiority for generations to come. It will replace the legacy tactical fighter fleets of the Air Force, Navy, and Marine Corps with a dominant, multi- role, fifth-generation aircraft, capable of projecting U.S. power and deterring potential adversaries. Furthermore, the JSF will effectively perform missions across the full spectrum of combat operations. For our international partners and foreign military sales customers who are participating in the program, the JSF will become a linchpin for future coalition operations and will help to close a crucial capability gap that will enhance the strength of our security alliances.

The multi-role F-35 is the centerpiece of the Department of Defense's future precision attack capability. The JSF is designed to penetrate air defenses and deliver a wide range of precision munitions. This modern, fifth-generation aircraft brings the added benefit of increased allied interoperability and cost-sharing across Services and partner nations. The FY13 budget includes $9.3 billion for continued system development, test and procurement of 29 F-35 aircraft.

It is our duty to produce the next generation fighter jet for the United States and our and allies, understanding that we live in a resource constrained world. Holding fast to the three pillars Admiral Venlet embraced when he joined the Joint Strike Fighter team

– a commitment to fundamentals, a firm grasp on reality, and transparency in all we do - remains key to the successful completion of development, and delivery of critical capability.

Program Accomplishments in the Last Year

The F-35 program team achieved a number of accomplishments over the past year, including the delivery of 13 aircraft, 4 test aircraft to test bases and the first 9 production jets to Eglin Air Force Base. The F-35B Sea Trials conducted on the USS WASP marked a high point in the year. The F-35B conducted seventy-two vertical landings and short take-offs while exhibiting aircraft handling performance that met all expected standards. The program completed F-35C static structural testing and improved the schedule and cost performance of assembled wings and forward fuselage deliveries to the production line mate station. The F-35C conducted ship suitability events at Lakehurst, conducting 65 catapult launches, including one on the new Navy Electromagnetic Aircraft Launch System (EMALS). The F-35A has started Local Area Flights at Eglin AFB.

In January 2011, Secretary Gates placed the F-35B on "probation" because of the existence of several unique STOVL aircraft design issues. F-35B testing was decoupled from the other two variants, allowing the program to increase focus on F-35B-specific issues while test on the other variants progressed at the best possible pace. All three variants improved their test performance in 2011. In particular, the F-35B successfully completed more flights and test points than planned and STOVL unique issues progressed well with solutions tested and mitigations confirmed or in the process of verification. All F-35B test issues in view now are comparable to those being

encountered with the other F-35 variants and there is no reason at this point to single out the F-35B. All three F-35 variants are encountering the sort of design issues historically encountered in advanced technology programs of this complexity. Secretary Panetta made the decision to remove STOVL from probation on January 20, 2012. The decision to remove probation does not reduce the Department's oversight of the F-35B or the oversight given to the other variants as the program goes forward.

An Operational Assessment released in the fall of 2011 expressed concern about the risk associated with several design issues that had surfaced during the F-35 Joint Strike Fighter test program. After the F-35 Operational Assessment was released in October 2011, the Acting Under Secretary of Defense for Acquisition, Technology and Logistics (AUSD AT&L) commissioned a Quick Look Review (QLR) of the F-35 program. The review found that, while the overall F-35 design is sound, there is significant risk remaining in the program. Resolving key technical issues is important to address concerns about the F-35's operational capabilities and to having confidence in the design so that production rates can be increased. The Department used the result of the QLR to inform the FY 2013 Future Years Defense Program, which holds US production at 29 per year through 2014 to reduce concurrency and permit additional progress on the test program before increasing production. The technical issues are all being addressed in the restructured System Development and Demonstration (SDD) phase of the F 35 program.

The original MS B, approved in October 2001, was rescinded following a critical Nunn-McCurdy breach in March 2010. The Defense Acquisition Board (DAB) reviewed the F-35 development, production, and sustainment technical status and cost estimates in

February 2012. At that review, the program showed continued progress consistent with the direction given to the program in the June 2010 program certification.

International Partnership

The F-35 program continues to be the Department of Defense's largest cooperative program, with eight Partner countries participating under Memorandums of Understanding for System Development and Demonstration (SDD) and for Production, Sustainment and Follow-on Development (PSFD). The eight partner countries include the United Kingdom, Italy, The Netherlands, Turkey, Canada, Australia, Denmark, and Norway. The partners recently met and all expressed their continued commitment and support for the program.

In October 2010, Israel signed a letter of agreement to purchase 19 F-35A variants for $2.75 billion, with deliveries scheduled to begin in 2016. In December 2011, Japan selected F-35 using a competitive process. Japan signed a $6 million agreement to conduct F-35 studies on February 1, 2012. Japan is expected to sign an agreement to purchase the first 4 of a planned acquisition of 42 CTOL aircraft in the summer of 2012. Deliveries will begin in 2016. On January 20, 2012, the Republic of Korea released a competitive Request for Proposal for acquisition of its future fighter. The F-35 team is developing a proposal that will be delivered in June 2012.

Development Program restructure

The F-35 development program has been re-planned and is now resourced with realistic planning factors to complete the required Block 3 capability testing by the end of 2016. Key activities that created the re-plan include the development of an Integrated

Master Schedule (IMS), execution of a Schedule Risk Assessment (SRA), and completion of the Integrated Baseline Review (IBR). These efforts incorporated the 2010 Technical Baseline Review's recommendations including revised flight test rates, longer software development spans, new systems engineering processes, and reestablished technical performance measurement. This plan provides the time and resources realistically required for the development program to deliver Block 3 capabilities.

F-35 SDD Flight Test program exceeded overall test point and flight goals in 2011. The overall test point progress was 7% above the 2011 plan. The Integrated Test Force (ITF) achieved 972 test flights, a 137% increase from the total flights in 2010. The ITF also executed 7,823 unique test points, a 93% increase from that achieved in 2010. Key 2011 achievements included the completion of F-35A and F-35B Flight Science testing to support the Block 1 Training envelope; the accomplishment in 2011 of 268 F-35B Vertical Landings, 395 Short Take Offs and 156 Slow Landings; the completion of the first F-35B ship trials aboard USS WASP; initial land based F-35C ship suitability testing, consisting of Jet Blast Deflector testing and Catapult Structural Survey and Steam Ingestion testing; the first test of the F-35C launched by the Electromagnetic Aircraft Launch System (EMALS); completion of Radar Cross Section Baseline testing on 3 aircraft and the completion of Block 1A Mission Systems Maturity Testing. The 2012 F-35 flight test plan calls for the execution of 1,001 flights and 7,873 test points. We expect to see this high level of performance continue through 2012.

Pratt and Whitney F135 engines have completed a total of 20,558 hours of testing on ground-test engines, 7,807 hours on flight-test engines, and a total of 2,566 hours of flight testing on all three variants of F-35 aircraft.

Pratt and Whitney is currently supporting flight test on all three variants at three locations. Based on the total F-35 program restructure, the Pratt and Whitney contract is being adjusted to support the extended ground and flight testing required to complete SDD and to resource the resolution of integration issues currently in view.

In 2011, Pratt and Whitney F135 engines helped flight test exceed all goals. Various engine "firsts" were also achieved including a maximum speed demonstration (1.6 Mach).

Production Program Restructuring

The F-35 aircraft manufacturing plan, as adjusted in September 2010, continues to exhibit dependable aircraft assembly up to the point of aircraft rollout to the flight line. Current production performance to the September 2010 baseline is about 10 days behind schedule to aircraft roll-out from the factory, and about 4 months behind for aircraft roll-out to government acceptance. In 2011, the production program finished deliveries of the remaining SDD test aircraft (one CTOL, one STOVL, and two CV). One more Navy test aircraft, CF-5, is scheduled to deliver in 2012 as part of the Low Rate Initial Production (LRIP) 4. Included in the 2011 deliveries were nine LRIP aircraft (LRIP 1 and part of LRIP 2), for a total of 13 aircraft delivered out of 20 planned.

During the last year we have increased attention to manufacturing quality metrics, including supplier quality, assembly and test. Additionally, we have incorporated oversight into the contractor's supplier risk management process to ensure timely awareness of problems in the supply chain.

Pratt & Whitney has delivered 41 F135 Production propulsion systems. From early 2011 to the beginning of 2012, Pratt & Whitney has improved their delivery rate,

increasing from 1 per month to now 2 per month consistently, staying ahead of aircraft deliveries. Spare engines have also been delivering to Eglin to support current flight and sustainment efforts.

The Department of Defense established the F-35 program in 2001 with a planned measure of concurrent development and production that attempted to balance cost, risk, and the need for tactical aircraft modernization. That plan had unfounded optimism in time and resources, driven by assumptions about design stability through the test program. The development program is taking longer and costing more to overcome technical issues that have been discovered. Concurrency generated impacts. Changes that must be made to the production aircraft due to problems found in testing are very real and affect schedule and cost in hardware, software, test and production. However, concurrency is a transient issue in which risks progressively decline through the end of SDD and the test program. Concurrency changes have also been taking an unacceptable time, two to three production lots, to incorporate into the build baseline. These issues are being addressed with the incorporation of strong contract incentives to the prime contractor and by slowing the rate of production in 2013 and 2014. Concurrency risk will progressively recede between now and 2015, when second-life fatigue testing should complete for all variants and flight test will be through 80% of the loads envelope.

Flying Operations at Eglin AFB and Ready for Training

In close coordination with US Air Force staff and the Director, Operational Test and Evaluation, the Air Force Technical Airworthiness Authority (ASC/EN) signed a Military Flight Release (MFR) for F-35A aircraft on February 28, 2012, which allowed

the Commander of Air Education and Training Center (AETC/CC) to approve the start of Local Area Operations (LAO) at Eglin AFB for F-35A aircraft. LAO will build familiarity with the aircraft, exercise the logistics infrastructure, and measure the maturity of the air system. These flights will be conducted within the restrictions and limits of the MFR. AETC will continue LAO at Eglin until they judge that training operations are ready to begin.

Development Risk Mitigation and Control

The three F-35 variants are encountering the types of development problems historically encountered on highly sophisticated state-of-the-art high performance aircraft development programs at this stage of maturity. While risk does remain in the balance of the development and flight test program, there is no known design issue that cannot be overcome by effective engineering. There is also margin in the SDD plan to account for discovery during the balance of the test program. This section summarizes the major risks and the steps that are being taken to address them.

Software development and flight test of mission systems are the primary drivers to completion of the System Development and Demonstration (SDD) program. These program drivers were highlighted in the 2010 Technical Baseline Review and were a major focus of efforts to restructure the SDD program. Some of the solutions in the restructured program include additional planning for software rework and integration, as well as increasing lab capacity, which comes on-line in October 2012. The program plan includes three basic capability steps in this concurrent development. Block 1 is for initial training, Block 2 is for initial warfighting capability and Block 3 is the required full warfighting capability for the Services. Each year of production delivers a version of one

of these software blocks at government acceptance. Technical difficulties encountered in Block 1 and initial Block 2 development resulted in schedule delays. The performance in software development is under intense scrutiny by the program, and industry performance must improve to deliver within the boundaries of time and funding in the replanned program.

The pilot's helmet for the F-35 is a major technological advance and a design challenge. Three helmet technical risks affecting the original helmet design are night vision acuity, stability of the symbology or frame "jitter", and the latency of the displayed information. The second generation of the original helmet is the desired solution for its capability to display all information on the visor, day and night, without goggles. As a result of testing, the program now understands the measured latency that is acceptable for pilot tasks and this understanding is leading to cost effective system adjustments. Improved night vision acuity will be evaluated with new camera technology and visor symbology jitter will be evaluated with small inertial measurement units embedded in the helmet itself. As risk reduction, the program has funded development of a night vision goggle-based alternative helmet solution. The goggle-based helmet development will continue until we see demonstrated improvement in the three risk areas. A system-level design review will occur in the Fall of 2012 where the program will evaluate the development performance of both helmet designs.

During land based ship suitability testing, the F-35C tailhook did not catch the arresting wire. Comprehensive system improvement is ongoing and involves damping of hook bounce and hook point shape adjustment. Testing will be conducted in 2012 to evaluate the new design.

Early Fuel Dump testing revealed that fuel was migrating within the wing during fuel dumping and the fuel was impinging on the underside of the wing. Improved seals within the wing will mitigate the migration issue and the program is pursuing improvements in the fuel dump system to resolve the fuel impingement issue.

The flight test program continues to address known aero performance issues like Transonic Roll-Off (TRO); TRO is an issue every swept wing fighter has to deal with. We continue to refine our flight control laws to minimize the impact of TRO. At this point in testing, we're confident we have reduced TRO to an acceptable level for the F-35A and F-35B. The F-35C TRO testing is underway at this time.

Durability testing for the F-35B was restarted in January 2012. The test was halted to correct the bulkhead design in November 2010 and was one of the reasons cited for the F-35B "probation". This delay in the testing does not directly impact the flight test program or production schedules.

Aircraft are experiencing higher than predicted buffet during flight test and have not yet reached areas of highest predicted buffet loads. Flight testing in 2012 will assess the operational impacts to aircraft tracking and other requirements affected by buffet at low angles of attack. Future flight test will include higher buffet loads where the program will evaluate structural and systems fatigue impacts.

Cost Risk Mitigation and Control

Control of production costs is being achieved in part by movement from cost plus to fixed price contract types. The F-35 LRIP Lot 4 aircraft and F135 engine contracts purchased 30 Air Systems for the United States, plus one for the United Kingdom and

another for the Netherlands. The Lot 4 contracts were negotiated as fixed-price-incentive-fee (firm target) (FPIF) type contracts. The prime contractor, Lockheed Martin Aeronautics Company (LM Aero), is projected to overrun LRIP 4 costs by approximately 7%. This overrun percentage is approximately half the overrun experienced on the F-35 LRIP Lots 1 to 3 cost-reimbursement-type contracts. On the LRIP Lot 4 contracts, overrun costs on the aircraft and engines are shared equally between the government and the contractor until the overrun exceeds 20% of the target cost, at which point the contractor is responsible for all additional overrun costs.

FY 2011 Lot 5 fixed-price airframe and propulsion system production contracts

The FY 2011 airframe and engine contracts for Lot 5 were initiated via Undefinitized Contract Actions (UCAs) in the month of December 2011. The UCAs incorporate FPIF terms for the procurement of 30 aircraft and engines (21 F-35A, 3 F-35B, and 6 F-35C) but are being modified to procure one additional F-35A for the U.S. Air Force and one additional F-35C for the U.S. Navy, for a total FY 2011 purchase of 32 Air Systems. This brings the total number of Air Systems procured on the program to 95.

In Lot 5 the government's cost risk is being mitigated by transferring some responsibility for concurrency cost risk to the prime contractor for the first time. The terms of the UCA include a "cost-sharing/no fee" contract arrangement for known concurrency changes identified at the time of UCA award. The Government and LM Aero will share equally (50/50) in these costs (estimated at $150 million) with no fee for the known concurrency changes specified in the UCA. Newly discovered concurrency

changes will be added to the contract as Engineering Change Proposals (ECPs) and will cause a renegotiation of the target cost of the aircraft, but with no profit.

The Office of the Secretary of Defense's (OSD) Director of Defense Pricing led an F-35 LRIP 5 "Should Cost" effort from the contractor proposal submittal in late April 2011 through early October 2011. Following an OSD Peer Review, LRIP Lot 5 negotiations commenced on December 9, 2010 and are heavily informed by the F-35 LRIP Lot 5 "Should Cost" conclusions which are based on actual experienced costs. Negotiations on the definitized contracts for Lot 5 are anticipated to conclude in late Spring.

An effective Earned Value Management System is critical to monitoring performance and controlling costs. In accordance with DoD Federal Acquisition Regulations, the Defense Contract Management Agency (DCMA) imposed a 2% withhold against F-35 LRIP 5 Progress Payments as part of last year's Undefinitized Contract Action (UCA). This 2% withhold is a result of the disapproved status of LM Aero's Earned Value Management (EVM) System. The withhold will remain in place until LM Aero's EVM System deficiencies are corrected and the system regains approval status. The company is making good progress towards the recertification of their EVM System. Recertification should be accomplished in the next few months.

FY 2012 and FY2013 contracts

The JSF Program Office will obligate the majority of FY 2012 and FY 2013 procurement dollars to fixed-price-type contracts for F-35 aircraft and F135 engines. The JSF Program Office will ensure that future U.S. aircraft and engine procurements comply with Section 143 of the National Defense Authorization Act (NDAA) for FY 2012, which

provides: "...[t]he Secretary of Defense shall ensure each of the following: (1) That the contract is a fixed-price contract. (2) That the contract requires the contractor to assume full responsibility for costs under the contract above the target cost specified in the contract."

The F-35 Lightning II Joint Strike Fighter Program is implementing an event based contracting strategy for Low Rate Initial Production (LRIP) Lots 6 and 7 that buys aircraft production quantities based upon development and test progress. This strategy provides a means to have control (a "dial") on production that is informed by demonstrated development performance against the 2012 plan and concurrency cost risk reduction.

The Department will request Lockheed Martin provide a consolidated proposal for LRIP Lots 6 and 7 based on the following structure:

- Award 25 FY12 Lot 6 aircraft (31 are authorized/appropriated)
- Provide flexibility to procure 0 to 6 remaining FY12 funded Lot 6 aircraft concurrent with the Lot 7 contract award in 2013
- Link total aircraft quantity ultimately procured in Lot 6 to development performance and concurrency cost risk reduction

The Department will decide to award the additional aircraft based on progress expected in 2012, as planned and resourced in the development program Integrated Master Schedule. This schedule is executable, appropriately resourced, includes sufficient margin for issues that are normal in a development program, and has been agreed to by both Lockheed Martin and the F-35 program office.

Specific decision criteria include, but are not limited to, the following:

1. Planned 2012 System Engineering Technical Reviews for Block 3 software
2. Lockheed Martin progress improving concurrency change incorporation, both forward into production and back fit post delivery modification engineering.
3. Planned 2012 progress in F-35A, F-35B, and F-35C durability testing

4. Planned 2012 progress in flight test
5. Planned 2012 Line Replaceable Units (LRU) qualification

These criteria will enable the Department to determine that the additional quantity of six Lot 6 aircraft can be in optimum configuration. Each successive contract will include sharing of known concurrency changes, until concurrency change generation recedes, as we have on contract now with LRIP 5.

Currently appropriated FY12 funding is necessary to implement this contracting strategy. The variable quantity of up to 6 Lot 6 aircraft will be paid for with the FY12 funds originally authorized and appropriated for their purchase; however, these funds will not be obligated on contract until FY13.

The Department intends to award Lot 7 aircraft and the Lot 6 variable quantity aircraft through fully definitized contract actions in FY13. The initial Lot 6 contract award for 25 aircraft will require an Undefinitized Contract Action (UCA) to ensure production flow is not disrupted. However, the Department does not intend to award a UCA for the 25 aircraft in Lot 6 until essential agreement is reached for Lot 5.

The strategy outlined in this testimony continues the Department's rigorous management control of the F-35 Lightning II Joint Strike Fighter. Ensuring sufficient discipline and progress in development will deliver aircraft that last their required service life, come with the required mission capability, and reduce the need to modify delivered aircraft.

Operations and Sustainment Costs

F-35 Sustainment costs are a concern across the Department. While the F-35

Joint Program Office and the Services made progress in 2011 toward reducing its estimate, there is more work to do in this area, and this is an area of increasing focus. The Services and the Department will continue to support the F-35 JPO in its disciplined approach to analyzing and reducing sustainment costs. Over the next 12 months the JPO will complete the F-35 Business Case Analysis (BCA). The results from the BCA will assist the PEO in refining the current F-35 support strategy by identifying the best mix of existing Service/Partner organic capabilities with that of the industry team to develop the optimum long term best value F-35 support solution.

This year the Services and OSD, working in concert with the JPO, will analyze options outside of the PEO's span of control to reduce operating cost. These include reviewing basing options and the sequencing of those actions, unit level manpower/squadron size and discrete sustainment requirements. Through these efforts, the Department believes the PEO and the Department can converge on a more affordable F-35 sustainment strategy. The past year was largely about making progress in testing, moving toward a stable design, and controlling the cost and risk in the production program with an initial review of sustainment costs. The next year will continue those efforts, but the focus will shift more to identifying and implementing opportunities to reduce sustainment costs.

Conclusion

Our observations and assessments over the past year give us reason to believe the basic aircraft designs are sound and will deliver. The remaining development is focused on testing and integration. Schedule and resource adjustments that have been made to the remaining development program underpin a realistic plan to deliver the required

capability. While there is still risk in the program, we have confidence in the resilience of the plan to absorb expected further learning and discovery and stay on track, so long as it remains properly resourced.

Software development, coupled with flight test execution, will remain the major focus of program execution in the coming year and through the completion of SDD. We have observed past and current performance by industry on software that gives us concern about the ability to deliver full capability within the current schedule without improvement in performance. We will continue to closely examine progress and seek the changes needed to gain required performance. We have developed a solid program baseline, ensuring we have resources, tools, and processes in place to make proactive, disciplined decisions regarding the development and delivery of incremental capabilities to the F-35 fleet. However, industry must understand that this new schedule with all of the margin and realism will not execute itself. A rededication to the characteristics of systems engineering fundamentals is crucial and we continue to speak bluntly to industry on this issue.

Concurrency is a transient issue that we are dealing with right now, but which will lessen over time. We recognize that while we would prefer to not be in this concurrent program situation, it is now our responsibility to navigate through this and deliver the most capable aircraft at the best price.

We believe our plan for negotiations for LRIP 6 and 7 will allow us to control production quantity based on the performance of the development program. It is important that Lockheed Martin demonstrate performance and help us to establish the confidence that the F-35 is a stable and capable platform.

As in any complex development program there are challenges, but we believe the enhanced capability of the JSF will provide the backbone of the US combat air superiority for generations to come. The technological capabilities of the aircraft are sound. The program's management over the past year has put in place the right fundamentals and realistic plans using sound systems engineering processes, and we are monitoring and tracking performance using detailed metrics. Overall, there is much work still ahead of us, but through the multiple reviews and adjustments in the past year we believe we have put the program on sound footing for the future.

Thank you again for this opportunity to discuss the F-35 Joint Strike Fighter Program. We look forward to answering any questions you have.

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of Representatives

For Release on Delivery
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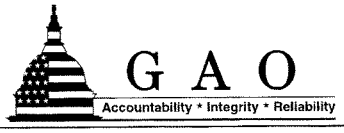
JOINT STRIKE FIGHTER

Restructuring Added Resources and Reduced Risk, but Concurrency Is Still a Major Concern

Statement of Michael J. Sullivan, Director
Acquisition and Sourcing Management



GAO-12-525T

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Highlights

Highlights of GAO-12-525T, a testimony before the Subcommittee on Tactical Air and Land Forces Committee on Armed Services, House of Representatives

March 20, 2012

JOINT STRIKE FIGHTER

Restructuring Added Resources and Reduced Risk, but Concurrency Is Still a Major Concern

Why GAO Did This Study

The F-35 Lightning II, also known as the JSF, is DOD's most costly and ambitious aircraft acquisition, seeking to simultaneously develop and field three aircraft variants for the Air Force, Navy, Marine Corps, and eight international partners. The JSF is critical to DOD's long-term recapitalization plans as it is intended to replace hundreds of legacy aircraft. Total U.S. investment in the JSF is nearing $400 billion to develop and procure 2,457 aircraft over several decades and will require a long-term, sustained funding commitment. In 2010, DOD began to extensively restructure the program to address relatively poor cost, schedule, and performance outcomes.

This testimony draws on GAO's extensive body of work on the JSF, including preliminary results from the current annual review mandated in the National Defense Authorization Act for Fiscal Year 2010. This testimony discusses (1) program costs, schedule changes, and affordability issues, (2) performance testing results, software, and technical risks, and (3) procurement contract cost performance, concurrency impacts, manufacturing results, and design changes. GAO's work included analyses of a wide range of program documents and interviews with defense and contractor officials.

What GAO Recommends

GAO has made prior recommendations to help reduce risk and improve outcomes, which DOD has implemented to varying degrees. GAO's forthcoming report will address these in detail along with potential new recommendations.

View GAO-12-525T. For more information, contact Michael J. Sullivan at (202) 512-4841 or sullivanm@gao.gov.

What GAO Found

Joint Strike Fighter (JSF) restructuring continues into a third year, adding to cost and schedule. Since June 2010, the total cost estimate increased about $15 billion, $5 billion for development and $10 billion for procurement. There will likely be additional changes when the Department of Defense (DOD) approves a new program baseline, expected soon. Compared to the current approved baseline from 2007, total costs have increased about $119 billion, full-rate production has been delayed 5 years, and initial operational capability dates are now unsettled because of program uncertainties. While the total number of aircraft the U. S. plans to buy has not changed, DOD has for 3 straight years reduced near-term procurement quantities, deferring aircraft and costs to future years. Since 2002, the program has reduced aircraft procurement quantities through 2017 by three-fourths, from 1,591 to 365. As the program continues to experience cost growth and delays, projected annual funding needs are unprecedented, averaging more than $13 billion a year through 2035.

Most of the instability in the program has been and continues to be the result of highly concurrent development, testing, and production. Overall performance in 2011 was mixed as the program achieved 6 of 11 primary objectives. Developmental flight testing gained momentum and is about one-fifth complete with the most challenging tasks still ahead. The program can expect more changes to aircraft design and manufacturing processes. Performance of the short takeoff and vertical landing variant improved this year and its "probation" period to fix deficiencies was ended early, even though several fixes are temporary and untested. Management and development of the more than 24 million lines of software code continue to be of concern and late software releases have delayed testing and training. Development of the critical mission systems that give the JSF its core combat capabilities remains behind schedule and risky. To date, only 4 percent of the mission system requirements for full capability has been verified. Testing of a fully integrated JSF aircraft is now expected in 2015 at the earliest. Deficiencies with the helmet mounted display, integral to mission systems functionality and concepts of operation, are most problematic. DOD is funding a less-capable alternate helmet as a back-up. The autonomic logistics information system, a key ground system for improving aircraft availability and lowering support costs, is not yet fully developed.

Cost overruns on the first four annual procurement contracts total more than $1 billion and aircraft deliveries are on average more than one year late. Officials said the government's share of the cost growth is $672 million; this adds about $11 million on average to the price of each of the 63 aircraft under those contracts. In addition to the overruns, the government also incurred an estimated $373 million in retrofit costs on produced aircraft to correct deficiencies discovered in testing. The manufacturing process is still absorbing a higher than expected number of engineering changes resulting from flight testing, which makes it difficult to achieve efficient production rates. Until engineering changes are reduced, there are risks of additional cost overruns and retrofit costs. The program now estimates that the number of changes will persist at elevated levels through 2019. Even with the substantial reductions in near-term procurement quantities, DOD is still investing billions of dollars on hundreds of aircraft while flight testing has years to go.

Chairman Bartlett, Ranking Member Reyes, and Members of the Subcommittee:

Thank you for the opportunity to discuss our work on the F-35 Lightning II, also known as the Joint Strike Fighter (JSF). The JSF is the Department of Defense's (DOD) most costly and ambitious aircraft acquisition, seeking to simultaneously develop and field three aircraft variants for the Air Force, Navy, Marine Corps, and eight international partners. The JSF is critical to DOD's long-term recapitalization plans as it is intended to replace hundreds of legacy fighters and strike aircraft. Total U.S. investment in the JSF will be substantial—approaching $400 billion to develop and acquire 2,457 aircraft over the next few decades—and will require a long-term sustained funding commitment. Over the last 2 years, the JSF program has been extensively restructured to address relatively poor cost, schedule, and performance outcomes.

We have reported on JSF issues for a number of years.[1] A recurring theme in our body of work since 2005 has been a concern about the substantial concurrency, or overlap, of JSF development, test, and production activities and the heightened risk it poses to achieving good program outcomes. The effects of concurrency became apparent in 2011 as the JSF program incurred an estimated $373 million in additional costs to retrofit already-built aircraft to correct deficiencies discovered during testing. Our prior reports have also made numerous recommendations for reducing risks and improving chances for successful outcomes. DOD has agreed with and taken actions on these recommendations to varying degrees. More detail on the status of these prior recommendations will be provided in our forthcoming report. In April 2011, we reported that the department's restructuring actions should lead to more achievable and predictable outcomes, albeit at higher costs and with extended times to test and deliver capabilities to the warfighter.[2] The report also identified continuing issues concerning affordability risks (both for acquiring JSF aircraft and supporting them over the life-cycle), delays in software development, a continued high rate of design changes, and immature manufacturing processes.

[1] See related GAO products at the end of this statement.

[2] GAO, *Joint Strike Fighter: Restructuring Places Program on Firmer Footing, but Progress Still Lags*, GAO-11-325 (Washington, D.C.: Apr. 7, 2011).

This testimony is largely based on preliminary results from our latest review. The National Defense Authorization Act for Fiscal Year 2010[3] requires GAO to review the JSF program annually for 6 years. We plan to issue our detailed report in April to incorporate new baseline cost and schedule data. My testimony will address (1) program cost and schedule changes and their implications on affordability; (2) performance testing results and technical risks; and (3) contract cost performance, concurrency impacts, and design and manufacturing maturity. To conduct this work, we reviewed program status reports, manufacturing data, contracts, test plans and performance, and internal DOD analyses. We evaluated restructuring actions and impacts, tracked cost and schedule changes, and identified factors driving the changes. We discussed program results to date and future plans with officials from the Office of the Secretary of Defense (OSD), JSF program office, military services, other defense offices, and contractors. We toured aircraft and engine manufacturing plants, obtained production and supply performance indicators, and discussed improvements underway with contractors. We discussed the information used to prepare this testimony with DOD officials and included their comments as appropriate. We conducted this performance audit from June 2011 to March 2012 in accordance with generally accepted government auditing standards. Those standards required that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Restructuring Reduces Near Term Risk, but Long Term Affordability Is Challenging

JSF restructuring continued throughout 2011 and into 2012 with additional costs and extended schedules incurred for key activities and decisions. The Department's actions have helped reduce near term risks by lowering annual procurement quantities and allowing more time for flight testing. The Department is expected to soon approve a new acquisition program baseline that will likely make further changes in cost and schedule. This decision, critical for program management and oversight, has been delayed several times and it has now been 2 years since the Department announced that the JSF program had breached the

[3] Pub. L. No. 111-84 § 244 (2009).

critical cost growth statutory thresholds[4] and that a new baseline would be established. Table 1 tracks historical changes in cost, schedule, and quantities since the start of development (2001), a major redesign (2004), a new baseline following the program's Nunn-McCurdy breach of the significant cost growth statutory threshold (2007), initial restructuring actions after the second Nunn-McCurdy breach (2010), and an interim DOD cost estimate (2011).

[4] Commonly referred to as Nunn-McCurdy, 10 U.S.C. § 2433 establishes the requirements for DOD to submit unit cost reports on major defense acquisition programs or designated major subprograms. Two measures are tracked against the current and original baseline estimates for a program: procurement unit cost (total procurement unit funds divided by the quantity of systems procured) and program acquisition unit cost (total funds for development, procurement, and system-specific military construction divided by the quantity of systems procured). If a program's procurement unit cost or acquisition unit cost increases by at least 25 percent over the current baseline estimate or at least 50 percent over the original baseline estimate, it constitutes a breach of the critical cost growth threshold. Programs are required to notify Congress if a Nunn-McCurdy breach is experienced. When a program experiences a Nunn-McCurdy breach of the critical cost growth threshold, DOD is required to take a number of steps, including reassessing the program and submitting a certification to Congress in order to continue the program, in accordance with 10 U.S.C. § 2433a.

Table 1: JSF Program Cost and Quantity Estimates over Time

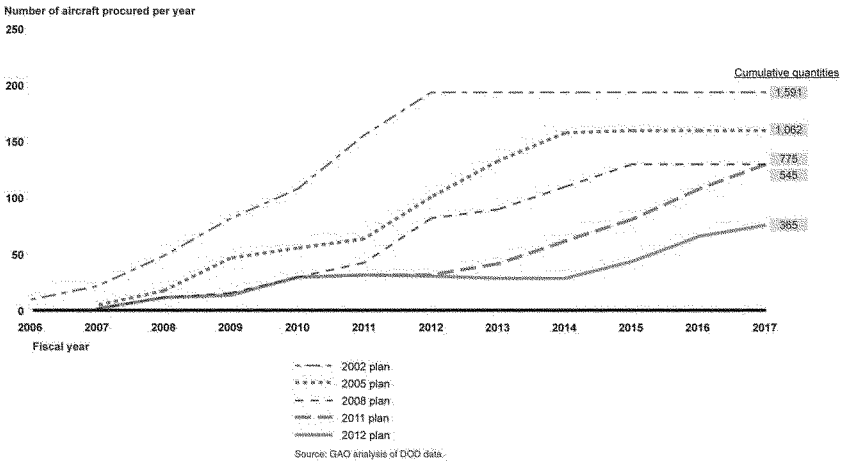
	October 2001 (system development start)	December 2003 (2004 replan)	March 2007 (approved baseline)	June 2010 (Nunn-McCurdy)	June 2011 (interim DOD estimate)
Expected quantities					
Development quantities	14	14	15	14	14
Procurement quantities (U.S. only)	2,852	2,443	2,443	2,443	2,443
Total quantities	2,866	2,457	2,458	2,457	2,457
Cost estimates (then-year dollars in billions)					
Development	$34.4	$44.8	$44.8	$51.8	$56.6
Procurement	196.6	199.8	231.7	325.1	335.6
Military construction	2.0	0.2	2.0	5.6	4.9
Total program acquisition	$233.0	$244.8	$278.5	$382.5	$397.1
Unit cost estimates (then-year dollars in millions)					
Program acquisition	$81	$100	$113	$156	$162
Average procurement	69	82	95	133	137
Estimated delivery and production dates					
First production aircraft delivery	2008	2009	2010	2010	2011
Initial operational capability	2010-2012	2012-2013	2012-2015	TBD	TBD
Full-rate production	2012	2013	2013	2016	2018

Source: GAO analysis of DOD data.

The interim total program cost estimate increased about $15 billion since the June 2010 estimate included in the Nunn-McCurdy certification, about $5 billion for development and $10 billion for procurement. Compared to the current approved baseline set in 2007, total costs have increased about $119 billion, unit procurement costs have risen more than 40 percent, and the start of full-rate production has been delayed 5 years. The department anticipates releasing its new cost and schedule estimates within the next few weeks. Department officials have indicated that the new figures will not be significantly different from the June 2011 interim estimate. Initial operational capability dates for the Air Force, Navy and Marine Corps—the critical dates when the warfighter expects the capability promised by the acquisition program to be available—have been delayed over time and are now unsettled. Until greater clarity is provided on the program's path forward, the military services are likely to wait to commit to new initial operational capability dates.

Concerned about concurrency risks, in February 2012, DOD reduced planned procurement quantities through fiscal year 2017 by 179 aircraft. This marked the third time in 3 years that near-term quantities were cut; combined with other changes since 2008, total JSF procurement quantity has been reduced by 410 aircraft through fiscal year 2017. Since the department still plans to eventually acquire the full complement of U.S. aircraft—2,443 procurement jets—the procurement costs, fielding schedules, and support requirements for the deferred aircraft will be incurred in future years beyond 2017. Figure 1 shows how planned quantities in the near-term have steadily declined over time. With the latest reduction, the program now plans to procure a total of 365 aircraft through 2017, about one-fourth of the 1,591 aircraft expected in the 2002 plan.

Figure 1: Changes in Procurement Plans over Time



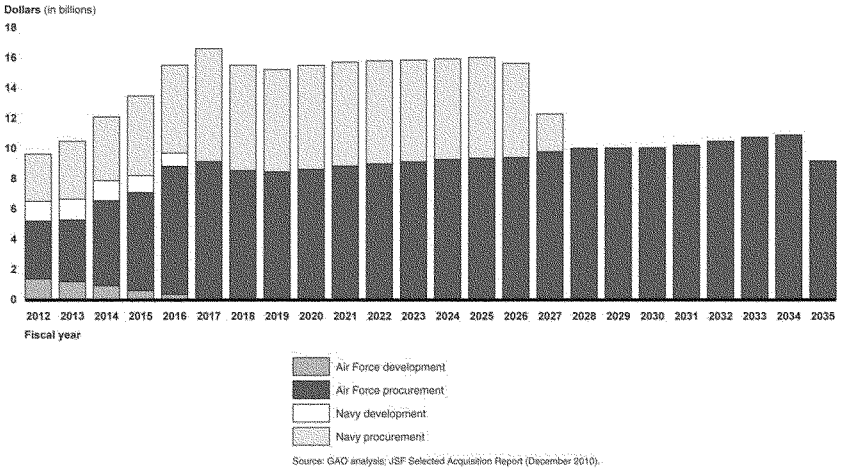
Source: GAO analysis of DOD data.

Slowing down procurement plans reduces concurrency risks to a degree, but overall program affordability—both in terms of the investment costs to acquire the JSF and the continuing costs to operate and maintain it over

the life-cycle—remains a major risk. The long-stated intent that the JSF program would deliver an affordable, highly common fifth generation aircraft that could be acquired in large numbers could be in question. As the JSF program moves forward, unprecedented levels of funding will be required during a period of more constrained defense funding expectations overall. As shown in figure 2, the JSF annual funding requirements average more than $13 billion through 2035, and approach $16 billion annually for an extended period. The Air Force alone needs to budget from $8 to $11 billion per year from fiscal year 2016 through 2035 for procurement.[5] At the same time, the Air Force is committed to other big-dollar projects such as the KC-46 tanker and a new bomber program.

[5] This is based on information contained in the December 2010 Selected Acquisition Report. Updated funding information for the entire JSF acquisition life-cycle was not available at the time of this testimony. The new baseline information is expected to add to JSF total costs through completion and change the distribution of annual budget requirements, but still show very large budget demands over a long period of time.

Figure 2: JSF Budgeted Development and Procurement Funding Requirements



Mixed Performance in 2011 Affected by Concurrency and Technical Risks

Much of the instability in the JSF program has been and continues to be the result of highly concurrent development, testing, and production activities. During 2011, overall performance was mixed as the program achieved 6 of 11 primary objectives for the year. Developmental flight testing has recently gained momentum, but has a long road ahead with testing of the most complex software and advanced capabilities still in the future. JSF software development is one of the largest and most complex projects in DOD history, providing essential capability, but software has grown in size and complexity, and is taking longer to complete than expected. Developing, testing, and integrating software, mission systems, and logistics systems are critical for demonstrating the operational effectiveness and suitability of a fully integrated, capable aircraft and pose significant technical risks moving forward.

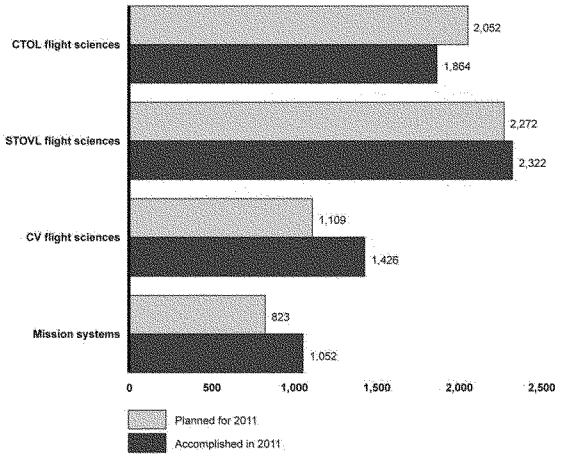
Program Performance against 2011 Objectives and Test Plans Was Mixed

The JSF program achieved 6 of 11 primary objectives it established for 2011. Five of the objectives were specific test and training actions tied to contractual expectations and award fees, according to program officials. The other 6 objectives were associated with cost, schedule, contract negotiations, and sustainment. The program successfully met 2 important test objectives: the Marine Corps' short takeoff and vertical landing (STOVL) variant accomplished sea trials and the Navy's carrier variant (CV) completed static structural testing. Two other test objectives were not met: the carrier variant did not demonstrate shipboard suitability because of problems with the tail hook, which requires redesign, and software was not released to flight test on time. The program also successfully completed objectives related to sustainment design reviews, schedule data, manufacturing processes, and cost control, but did not meet a training deadline or complete contract negotiations.

Development flight testing sustained momentum begun in 2010 and met or exceeded most objectives in its modified test plan for 2011. The program accomplished 972 test flights in 2011, more than double the flights in 2010. Flight test points[6] accomplished exceeded the plan, overall as shown in figure 3. The flight test points accomplished on the Air Force's conventional takeoff and landing (CTOL) variant were less than planned, due to operating limitations and aircraft reliability.

[6] Flight test points are specific, quantifiable objectives in flight plans that are needed to verify aircraft design and performance.

Figure 3: 2011 JSF Flight Test Points Progress



Source: GAO analysis of DOD data.

Even with the progress made in 2011, most development flight testing, including the most challenging, still lies ahead. Through 2011, the flight test program had completed 21 percent of the nearly 60,000 planned flight test points estimated for the entire program.[7] Program officials reported that flight tests to date have largely demonstrated air worthiness, flying qualities, speed, altitude, and maneuvering performance requirements. According to JSF test officials, the more complex testing such as low altitude flight operations, weapons and mission systems integration, and high angle of attack has yet to be done for any variant and may result in new discoveries. Initial development flight tests of a fully

[7] According to program officials, completion of a test point means that the test point has been flown and that flight engineers ruled that the point has met the need. Further analysis may be necessary for the test point to be closed out.

integrated, capable JSF aircraft to demonstrate full mission systems capabilities, weapons delivery, and autonomic logistics is now expected in 2015 at the earliest. This will be critical for verifying that the JSF aircraft will work as intended and for demonstrating that the design is not likely to need costly changes. Like other major weapon system acquisitions, the JSF will be susceptible to discovering costly problems later in development when the more complex software and advanced capabilities are integrated and flight tested. With most development flight testing still to go, the program can expect more changes to aircraft design and continued alterations of manufacturing processes.

STOVL Issues and Its Probation Period

The STOVL variant performed better than expected in flight tests during 2011. It increased flight test rates and STOVL-specific mode testing, surpassing planned test point progress for the year. Following reliability problems and performance issues, the Secretary of Defense in January 2011 had placed the STOVL on "probation" for two years, citing technical issues unique to the variant that would add to the aircraft's cost and weight. The probation limited the U.S. STOVL procurement to three aircraft in fiscal year 2011 and six aircraft in fiscal year 2012 and decoupled STOVL testing from CV and CTOL testing so as not to delay those variants. While no specific exit criteria was defined, the two year probation was expected to provide enough time to address STOVL-specific technical issues, engineer solutions, and assess their impact.

In January 2012, the Secretary of Defense lifted the STOVL probation after one year, citing improved performance and completion of the initial sea trials as a basis for the decision. The Department concluded that STOVL development, test, and product maturity is now comparable to the other two variants. While several technical issues have been addressed and some potential solutions engineered, assessing whether the deficiencies are resolved is ongoing and, in some cases, will not be known for years. According to the program office, two of the five specific problems cited are considered to be fixed while the other three have temporary fixes in place. The Director, Operational Test and Evaluation reported that significant work remains to verify and incorporate modifications to correct known STOVL deficiencies and prepare the system for operational use. Until the proposed technical solutions have been fully tested and demonstrated, it cannot be determined if the technical problems have been resolved.

Software and Mission Systems Represent Significant Risks

Software providing essential JSF capability has grown in size and complexity, and is taking longer to complete than expected. Late releases of software have delayed testing and training, and added costs. Software defects, low productivity, and concurrent development of successive blocks have created inefficiencies, taking longer to fix defects and delaying the demonstration of critical capabilities. The program has modified the software development and integration schedule several times, in each instance lengthening the time needed to complete work. In attempting to maintain schedule, the program has deferred some capabilities to later blocks. Deferring tasks to later phases of development adds more pressure and costs to future efforts and likely increases the probability of defects being realized later in the program, when the more complex capabilities in these later blocks are already expected to be a substantial technical challenge.

The lines of code necessary for the JSF's capabilities have now grown to over 24 million—9.5 million on board the aircraft. By comparison, JSF has about 3 times more on-board software lines of code than the F-22A Raptor and 6 times more than the F/A-18 E/F Super Hornet. This has added work and increased the overall complexity of the effort. The software on-board the aircraft and needed for operations has grown 37 percent since the critical design review in 2005. While software growth appears to be moderating, contractor officials report that almost half of the on-board software has yet to complete integration and test—typically the most challenging phase of software development. JSF software growth is not much different than other recent defense acquisitions which have experienced from 30 to 100 percent growth in software code over time. However, the sheer number of lines of code for the JSF makes the growth a notable cost and schedule challenge.

JSF's mission systems[8] and logistics systems are critical to realizing the operational and support capabilities expected by the warfighter, but the hardware and software for these systems are immature and unproven at this time. Only 4 percent of mission systems requirements have been verified and significant learning and development remains before the program can demonstrate mature software and hardware. The program

[8] Mission systems provide combat effectiveness through next generation sensors with fused information from on-board and off-board systems (i.e., Electronic Warfare, Communication Navigation Identification, Electro-Optical Target System, Electro-Optical Distributed Aperture System, Radar, and Data Links).

has experienced significant technical challenges developing and integrating mission and logistics systems software and hardware, including problems with the radar, integrated processor, communication and navigation equipment, and electronic warfare capabilities.

- Problems with the helmet mounted display may pose the greatest risk. The helmet is integral to fusing and displaying sensor and weapons employment data, providing situational awareness, and reducing pilot workload. Helmet shortfalls–including night vision capability, display jitter (varying image), and latency (or delay) in transmitting data–could limit capability or change operational concepts. DOD is pursuing a dual path by funding a less-capable alternate helmet as a back-up; this development effort will cost more than $80 million. The selected helmet will not be integrated with the baseline aircraft until 2014 or later, increasing the risks of a major system redesign, retrofits of already built aircraft, or changes in concepts of operation.

- The Autonomic Logistics Information System (ALIS) is a ground system essential to managing and streamlining logistics and maintenance functions and for controlling life-cycle operating and support costs. ALIS is also not mature and may require some design changes to address known deficiencies. ALIS is in limited operations at test and training sites and officials are evaluating proposed solutions. While additional development time and resources may resolve some deficiencies, several requirements are not going to be met given current schedules, according to the JSF test team report.

Initial dedicated operational testing of a fully integrated JSF is tentatively scheduled to begin in 2017. Operational testing is important for evaluating the warfighting effectiveness and suitability of the JSF, and successfully completing initial operational testing is required to support the full rate production decision, now expected in 2019. Operational testers assessed progress of JSF development testing and its readiness for operational testing, and concluded that the program was not on track to meet operational effectiveness or suitability requirements. The test team's October 2011 report identified deficiencies with the helmet mounted display, night vision capability, aircraft handling characteristics, and shortfalls in maneuvering performance. The report also cited an inadequate logistics system for deployments, excessive time to repair and restore low observable features, low reliability, and poor maintainability performance. It also stated that the JSF will require substantial improvements in order to achieve sortie generation rates and life cycle cost requirements.

Contract Overruns and Concurrency Costs Indicate the Program Has Not Yet Stabilized Design and Manufacturing

The program has not yet demonstrated a stable design and manufacturing processes capable of efficient production. Engineering changes are persisting at relatively high rates and additional changes will be needed as testing continues. Manufacturing processes and performance indicators show some progress, but performance on the first four low-rate initial production contracts has not been good. All four have experienced cost overruns and late aircraft deliveries. In addition, the government is also incurring substantial additional costs to retrofit produced aircraft to correct deficiencies discovered in testing. Until manufacturing processes are in control and engineering design changes resulting from information gained during developmental testing are reduced, there is risk of more cost growth. Actions the Department has taken to restructure the program have helped, but remaining concurrency between flight testing and production continues to put cost and schedule at risk. Even with the substantial reductions in near-term procurement quantities, DOD is still investing billions of dollars on hundreds of aircraft while flight testing has years to go.

Cost Overruns and Delivery Delays Indicate Need to Further Mature the Manufacturing Process

As was the experience with building the development test aircraft, manufacturing the procurement aircraft is costing more and taking longer than planned. Cost overruns and delivery slips are two indicators that manufacturing processes, worker efficiency, quality control, and supplier performance are not yet sufficiently capable to handle the volume of work scheduled. Cost overruns on each of the first four annual procurement contracts are projected to total about $1 billion (see table 2).

Table 2: Procurement Contract Costs as of November 2011

Dollars in millions

Contract	Number of aircraft	Contract cost at award	Current contract cost estimate	Cost increase	Percent increase
LRIP 1	2	$511.7	$561.5	$49.8	9.7
LRIP 2	12	$2,278.5	$2,607.7	$329.2	14.4
LRIP 3	17	$3,154.2	$3,569.5	$415.3	13.2
LRIP 4	32	$3,458.3	$3,703.3	$245.0	7.1
Total	63	$9,402.7	$10,442.0	$1,039.3	11.1

Source: GAO analysis of DOD data.

Note: LRIP is low-rate initial production. These are the first four annual procurements.

According to program documentation, through the cost sharing provisions in these contracts, the government's share of the total overrun is about $672 million. On average, the government is paying an additional $11 million for the 63 aircraft on under contract (58 are U.S. aircraft and 5 are for international partners). There is risk of additional cost overruns because all work is not completed. Defense officials reduced the buy quantity in the fifth annual procurement contract to help fund these cost overruns and additional retrofit costs to fix deficiencies discovered in testing.

While Lockheed Martin, the prime contractor, is demonstrating somewhat better throughput capacity and showing improved performance indicators, the lingering effects of critical parts shortages, out of station work[9], and quality issues continue to be key cost and schedule drivers on the first four production lots. Design modifications to address deficiencies discovered in testing, incorporation of bulkhead and wing process improvements, and production of the first carrier variant further impacted manufacturing during 2011. Lockheed had expected to deliver 30 procurement aircraft by the end of 2011 but delivered only nine procurement aircraft. Each was delivered more than 1 year late. The manufacturing effort still has thousands of aircraft planned for production over the next 25 years and the rate of production is expected to increase substantially starting in 2015. This will make it vital that the contractor achieve an efficient manufacturing process.

Pratt & Whitney, the engine manufacturer, had delivered 42 production engines and 12 lift fans at the time of our review.[10] Like the aircraft system, the propulsion system is still under development working to complete testing and fix deficiencies while concurrently delivering engines under the initial procurement contracts. The program office's estimated cost for the system development and demonstration of the engine has increased by 75 percent, from $4.8 billion to $8.4 billion, since the start of development. Engine deliveries continue to miss expected contract due dates but still met aircraft need dates because of longer slips in aircraft

[9] Out of station work occurs when manufacturing steps are not completed at its designated work station and must be finished elsewhere later in production. This is highly inefficient, increasing labor hours, causing delays, and sometimes quality problems.

[10] Note: The prime engine contractor has production contracts with the government and the engines are provided as government furnished equipment to the JSF prime contractor.

production. Supplier performance problems and design changes are driving cost increases and late engines. Lift fan system components and processes are driving the major share of cost and schedule problems.

Going forward, Lockheed Martin's ability to manage its expanding global supplier network is fundamental to meeting production rates and throughput expectations. DOD's Independent Manufacturing Review Team earlier identified global supply chain management as the most critical challenge for meeting production expectations. The cooperative aspect of the supply chain provides both benefits and challenges. The international program structure is based on a complex set of relationships involving both government and industry from the United States and eight other countries. Overseas suppliers are playing a major and increasing role in JSF manufacturing and logistics. For example, center fuselage and wings will be manufactured by Turkish and Italian suppliers, respectively, as second sources. In addition to ongoing supplier challenges–parts shortages, failed parts, and late deliveries– incorporating international suppliers presents additional challenges. In addition, the program must deal with exchange rate fluctuations, disagreements over work shares, technology transfer concerns, different accounting methods, and transportation requirements that have already caused some delays. Also, suppliers have sometimes struggled to develop critical and complex parts while others have had problems with limited production capacity. Lockheed Martin has implemented a stricter supplier assessment program to help manage supplier performance.

Testing and Production Overlap Increases Engineering Changes and Concurrency Costs

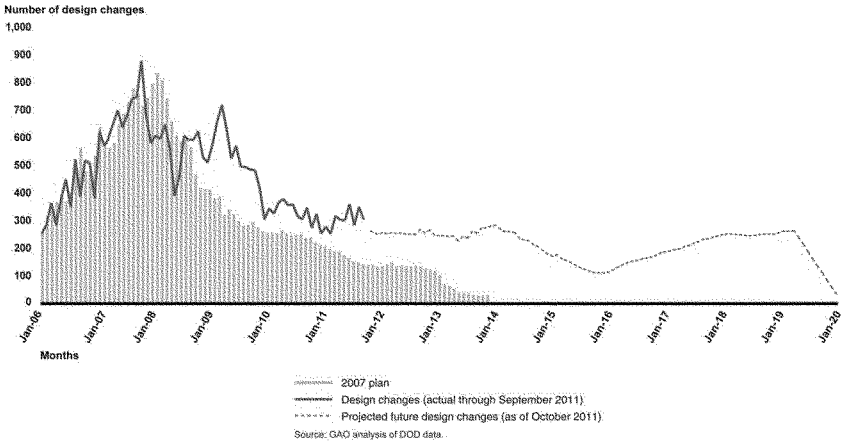
We and several defense offices cautioned the Department years ago about the risks posed by the extremely high degree of concurrency, or overlap, among the JSF development, testing, and production activities.[11] To date, the Government has incurred an estimated $373 million in retrofit costs on already-built aircraft to correct deficiencies discovered in development testing. This is in addition to the $672 million for the government's share of contract cost overruns. The program office projects additional retrofit costs through lot 10, but at decreasing amounts. Questions about who will pay for additional retrofit costs under

[11] GAO, *Joint Strike Fighter: DOD Plans to Enter Production before Testing Demonstrates Acceptable Performance*, GAO-06-356 (Washington, D.C.: Mar. 15, 2006) and GAO, *Joint Strike Fighter: Progress Made and Challenges Remain*, GAO-07-360 (Washington, D.C.: Apr. 2, 2007).

the planned fixed price contracts–the contractor or the government–and how much, have delayed final contract negotiations on the fifth lot.

Producing aircraft before testing sufficiently demonstrates the design is mature increases the likelihood of future design changes, which drives cost growth, schedule delays, and manufacturing inefficiencies. Design changes needed in one JSF variant could also impact the other two variants, reducing efficiencies necessary to lower production and operational costs with common parts and manufacturing processes for the three variants. While the JSF program's engineering change traffic–the monthly volume of changes made to engineering drawings–is declining, it is still higher than expected for a program entering its sixth year of production. The total number of engineering drawings continues to grow due to design changes, discoveries during ground and flight testing, and other revisions to drawings. Figure 4 tracks design changes over time and shows that changes are expected to persist at an elevated pace through 2019.

Figure 4: JSF Design Changes Over Time



Source: GAO analysis of DOD data.

Defense officials have long acknowledged the substantial concurrency built into the JSF acquisition strategy, but until recently stated that risks were manageable. However, a recent high-level departmental review of JSF concurrency determined that the program is continuing to discover issues at a rate more typical of early design experience, questioning the assumed design maturity that supported the highly concurrent acquisition strategy.[12] DOD's November 2011 report concluded that the "team assesses the current confidence in the design maturity of the F-35 to be lower than one would expect given the quantity of LRIP aircraft procurements planned and the potential cost of reworking these aircraft as new test discoveries are made. This lack of confidence, in conjunction with the concurrency driven consequences of the required fixes, supports serious reconsideration of procurement and production planning." The review identified substantial risk of needed modifications to already produced aircraft as the flight testing enters into more strenuous test activities. Already, as a result of problems found in less strenuous basic airworthiness testing, critical design modifications are being fed back through the production line. For example, the program will be cutting in aircraft modifications to address bulkhead cracks discovered during airframe ground testing and STOVL auxiliary inlet door durability issues. More critical test discoveries are likely as the program moves into the more demanding phases of testing.

Restructuring actions by the Department since early 2010 have provided the JSF program with more achievable development and production goals, and has reduced, but not eliminated, risks of additional retrofit costs due to concurrency in current and future lots. The Department has progressively lowered the production ramp-up rate and cut near term procurement quantities; fewer aircraft procured while testing is still ongoing lowers the risk of having to modify already produced aircraft. However, even with the most recent reductions in quantities, the program will still procure a large number of aircraft before system development is complete and flight testing confirms that the aircraft design and performance meets warfighter requirements. Table 3 shows the current plan that will procure 365 aircraft for $69 billion by the end of planned developmental flight tests.

[12] *F-35 Joint Strike Fighter Concurrency Quick Look Review*, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, Nov. 29, 2011.

Table 3: JSF Procurement Investments and Flight Test Progress

fiscal years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cumulative procurement (billions of dollars)	$0.8	$3.5	$7.1	$14.3	$21.3	$27.6	$33.8	$40.1	$47.9	$57.8	$69.0
Cumulative aircraft procured	2	14	28	58	90	121	150	179	223	289	365
Percentage of total planned flight tests completed (est.)	<1	<1	<1	1	5	17	32	52	72	91	100

Source: GAO analysis of DOD budget and test plan data.

Note: Advanced procurement funding from 2006 was incorporated into fiscal year 2007 total funding, as 2007 was the first year of aircraft procurement. Flight testing data reflect the percentage of the total flight test completed at the time of the planned investment decision, which is the beginning of the fiscal year.

Concluding Observations

Over the last 2 years, the JSF program has undergone extensive restructuring that places it on a more achievable course, albeit a lengthier and more expensive one. At the same time, the near-constant churn (change) in cost, schedule, and performance expectations has hampered oversight and insight into the program, in particular the ability to firmly assess progress and prospects for future success. Going forward, it will be imperative to bring stability to the program and provide a firm understanding of near- and far-term financial requirements so that all parties—the Congress, Defense Department, and international partners—can reasonably set priorities and make informed decisions amid a tough fiscal environment.

The JSF remains the critical centerpiece of DOD's long-term tactical aircraft portfolio. System development of the aircraft and engine ongoing for over a decade, continue to experience significant challenges. The program's strategic framework, laden with concurrency, has proved to be problematic and ultimately, a very costly approach. DOD over the past year has identified substantial cost overruns attributed to relatively poor execution in production and specific concurrency-related inefficiencies. There is risk of future cost growth from test discoveries driving changes to design and manufacturing processes. Effectively managing software and the global supply chain is critical to improving program outcomes, increasing manufacturing throughput, and enabling future expansion of JSF procurement.

Chairman Bartlett, Ranking Member Reyes, and members of the House Armed Services Committee, this completes my prepared statement. I would be pleased to respond to any questions you may have. We look forward to continuing to work with the Congress as we finalize our upcoming report with potential new recommendations that will address these issues in more detail.

GAO Contacts and Acknowledgments

For further information on this statement, please contact Michael Sullivan at (202) 512-4841 or sullivanm@gao.gov. Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this statement. Individuals making key contributions to this statement are Bruce Fairbairn, Charlie Shivers, LeAnna Parkey, W. Kendal Roberts, Sean Merrill, and Matt Lea.

Related GAO Products

Joint Strike Fighter: Implications of Program Restructuring and Other Recent Developments on Key Aspects of DOD's Prior Alternate Engine Analyses. GAO-11-903R. Washington, D.C.: September 14, 2011.

Joint Strike Fighter: Restructuring Places Program on Firmer Footing, but Progress Is Still Lagging. GAO-11-677T. Washington, D.C.: May 19, 2011.

Joint Strike Fighter: Restructuring Places Program on Firmer Footing, but Progress Still Lags. GAO-11-325. Washington, D.C.: April 7, 2011.

Joint Strike Fighter: Restructuring Should Improve Outcomes, but Progress Is Still Lagging Overall. GAO-11-450T. Washington, D.C.: March 15, 2011.

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HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES
SUBCOMMITTEE

STATEMENT OF

VADM W. MARK SKINNER
PRINCIPAL MILITARY DEPUTY, ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISITION)

AND

LIEUTENANT GENERAL TERRY G. ROBLING, USMC
DEPUTY COMMANDANT FOR AVIATION

AND

REAR ADMIRAL KENNETH E. FLOYD, USN
DIRECTOR, WARFARE INTEGRATION

BEFORE THE

TACTICAL AIR AND LAND FORCES
SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

DEPARTMENT OF THE NAVY'S AVIATION PROCUREMENT PROGRAM

MARCH 20, 2012

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HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. Chairman, Representative Reyes, and distinguished members of the Subcommittee, we thank you for the opportunity to appear before you today to discuss the Department of the Navy's (DoN) Aviation programs. Our testimony will provide background and rationale for the Department's Fiscal Year 2013 budget request for aviation programs aligning to our strategic priorities and budgetary goals.

The United States is a maritime nation with global responsibilities. For 236 years, our Navy and Marine Corps' persistent presence and multi-mission capability have been the representation of U.S. power across the global commons. Our naval tradition informs our decisions today, as we remain firmly in a forward posture for engagement and action. We continue to build on our ability to come from the sea to conduct our missions rapidly across the range of military operations. We are an agile strike and amphibious power projection force in readiness, and such agility requires that the tactical aviation arm of our naval strike and expeditionary forces remain strong.

The Fiscal Year 2013 DoN budget request, while less than was requested in Fiscal Year 2012 aligns with the new strategic guidance for the Department of Defense (DoD) and provides the Department with the best balance of naval aviation assets. Guided by the Defense Strategic Guidance, the Navy-Marine Corps team is built for war, capable of operating forward to preserve the peace, respond to crises and protect United States and allied interests. The force will be leaner, agile, flexible, ready and technologically advanced. Most of the aircraft in TACAIR are electromagnetic pulse (EMP) hardened or have development requirements based on mission requirements.

The Navy and Marine Corps are committed to the Joint Strike Fighter (JSF) program in both the F-35B and F-35C variants. We have reduced the Fiscal Year 2013 procurement request by 69 aircraft to minimize the number of aircraft the Department will have to modify for concurrency. This action funds the costs associated with concurrency from within the JSF program as well as reduces the Department's overall investment in the JSF Program. The budget also has optimized Unmanned Aerial Systems (UAS) investments across the DoN's portfolio and is developing a comprehensive and flexible portfolio of unmanned systems to meet a variety of maritime reconnaissance requirements. In 2012 we began the Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) development program; while the MQ-8B Fire Scout aircraft demonstrated in-theater capability and follow-on MQ-8C upgrade have superseded the need for the Medium Range Unmanned Aerial System (MRMUAS) which was terminated in the Fiscal Year 2013 request. We continue to optimize our buying power through the use of multi-year procurements (MYP) of the F/A-18E/F, EA-18G, MV-22 and H-60 programs. We are recapitalizing our aging fleet of E-2C, EA-6B and P-3 aircraft with more capable and more supportable aircraft – the E-2D, EA-18G and P-8A. We are exploring alternatives and concepts for the recapitalization of the Executive Helicopter, the C-2A and the F/A-18E/F – we will do so with lean acquisition and optimized technology at an affordable cost.

The Fiscal Year 2013 President's Budget requests funding for 94 aircraft including 10 F-35 JSFs for both the Navy and the Marine Corps, 13 P-8As to replace the aging current Anti-Submarine Warfare and maritime patrol squadrons, 17 MV-22 tilt-rotor aircraft, 26 F/A-18E/F fighter attack planes, 12 EA-18G to complete the replacement of the EA-6B, 5 E-2D Advanced Hawkeyes and

11 Unmanned Aerial Vehicles (UAV). The DoN has also requested funds for the continued development of the Broad Area Maritime Surveillance (BAMS) unmanned system and for the demonstration of the Navy Unmanned Combat Aerial System (N-UCAS). The DoN Fiscal Year 2013 aircraft program budget request is funded for planned program execution throughout the Future Years Defense Program (FYDP).

TACTICAL AVIATION (TACAIR)

TACAIR Inventory Management

In 2010, we estimated the DoN Strike Fighter Shortfall (SFS) to be about 100 aircraft, but the net effect of the Fiscal Year 2013 President's Budget, which includes restructuring the F-35B/C ramp and moving 69 aircraft out of the FYDP, along with the impact of reduced operational rates and force structure requirements, put the DoN's projected shortfall at a manageable level below 65 aircraft in the 2020's.

While the SFS continues to fall within the manageable levels throughout the DoN, the Marine Corps may experience elevated operational risk in the 2020's if the predicted shortfall comes to fruition. Over the past two Presidential Budgets, the Marine Corps TACAIR transition completion has extended from 2023 to 2031. This eight year slide has forced the Marine Corps to evaluate inventory availability amongst its Harrier and Hornet fleet in the later years and adjust its transition priorities and timing. The last active Marine F/A-18 squadron is currently scheduled to transition in 2027, and the current F/A-18 reserve squadron does not receive its F-35's until the year 2030. The Harriers were expected to complete their transitions in 2022 in the Fiscal Year 2011 President's Budget, and then 2026 in Fiscal Year 2012 President's Budget. The Harriers are now planned to remain in service through 2030 due to reduced F-35 ramp rates and the fact that they have more flight hour life remaining than the Hornets.

As legacy F/A-18 squadrons are reduced, the service shortfall number must be considered in proportion to the primary mission aircraft inventory requirement. Due to a lower number of F/A-18 squadrons in the 2023 to 2026 timeframe, the shortfall number associated with the Marine Corps will have a more significant impact on their few remaining F/A-18 operational squadrons.

Additionally, the AV-8B will operate with a shortfall of ten aircraft in Fiscal Year 2012, reaching twelve aircraft during Fiscal Year 2013, based on attrition. One AV-8B squadron will be retired at the end of Fiscal Year 2013 to meet USMC manpower reductions, allowing the remaining squadrons to operate without a shortfall. The Navy will transition three additional squadrons from F/A-18C to F/A-18E and then redistribute those F/A-18C aircraft amongst the DoN requirements.

The DoN continues to meticulously manage the fatigue life and flight hours of our tactical aircraft. Since 2004, we have provided fleet users guidance and actions to optimize aircraft utilization rates while maximizing training and operational opportunities. The Inventory Forecasting Tool (IFT) projects the combined effects of transition plans, attrition, and pipeline requirements on the total strike fighter aircraft inventory. The IFT is updated in conjunction with budget submittals to provide forecasts of the strike fighter inventory compared to the

requirements. The tool utilizes these critical variables to project future inventories – F/A-18E/F and F-35B/C deliveries, force structure, aircraft usage rates, structural life limits, depot turnaround time, Fatigue Life Expenditure (FLE), arrested and field landings, and catapult launches.

F-35B/F-35C Lightning II:

The DoN remains firmly committed to both the F-35B Short Take-Off and Vertical Landing (STOVL) variant and the F-35C Carrier Variant (CV) of the JSF program, as they are essential to our immediate and long-range Navy and Marine Corps aviation strategy and the nation's security. F-35 will supplant the DoN's aging TACAIR fleet by replacing the Navy and Marine Corps legacy F/A-18A-D Hornet and the Marine Corps AV-8B Harrier and EA-6B Prowlers. The incorporation of F-35B and F-35C aircraft into our naval force will provide the dominant, multi-role, fifth-generation capabilities that are essential across the full spectrum of combat operations to deter potential adversaries and enable future naval aviation power projection.

The F-35B STOVL variant combines the multi-role versatility and strike fighter capability of the legacy F/A-18 with the basing flexibility of the AV-8B. The Marine Corps will leverage the F-35B's sophisticated sensor suite and very low observable fifth-generation strike fighter capabilities, particularly in the area of data collection and information dissemination, to support the Marine Air Ground Task Force (MAGTF) well beyond the abilities of today's MAGTF expeditionary attack, strike and electronic warfare assets. Having these capabilities in one aircraft will provide the joint force commander and the MAGTF commander unprecedented strategic and operational agility. Similarly, the F-35C CV variant complements the F/A-18E/F Block II and EA-18G in providing survivable, long-range strike capability and persistence in an access-denied environment. Together, the F-35B and F-35C will provide the Expeditionary Strike Group and Carrier Strike Group commanders a survivable, "day-one" strike capability in a denied access environment with the tactical agility and strategic flexibility to counter a broad spectrum of threats and win in operational scenarios that cannot be addressed by current legacy aircraft.

The overall F-35 development program has been re-planned and is now resourced with adequate margin and realistic planning factors to complete System Development and Demonstration (SDD). Key activities that supported the re-plan included the development of an Integrated Master Schedule, execution of a Schedule Risk Assessment, and completion of the Integrated Baseline Review. Under these efforts, the DoD revised flight test rates, established longer software development spans, included revised systems engineering processes, and established new performance measurements. This plan has strong support within the DoN as we believe it places the development program on sound footing towards delivering full Block 3 capabilities.

The F-35 SDD flight test program exceeded overall test point and flight targets for 2011 for all variants. Both F-35B and F-35C testing ended 2011 ahead of schedule, reducing risk, and increasing overall confidence in the JSF program. JSF aircraft achieved 972 test flights in 2011, a 137 percent increase from the total flights in 2010. The JSFs also executed 7,823 unique test points, a 93 percent increase from the total test points achieved in 2010 and the total SDD flight time surpassed 2,000 flight hours on October 14, 2011. F-35 firsts in 2011 included the first F-

35 ship-board operations, with BF-2 and BF-4 aboard the USS WASP, and the first F-35 ship suitability testing, including Jet Blast Deflector, nominal and steam ingestion catapult tests and compatibility test with the Electromagnetic Aircraft Launch System.

In January 2011, Secretary Gates placed the F-35B on probationary status because it was experiencing significant unique technical issues. F-35B testing was decoupled from the other two variants, allowing the program to increase focus on F-35B-specific development issues while testing on the other variants progressed. All three variants improved their testing performance in 2011. In particular, the F-35B successfully completed more flights and more test points than planned. The F-35B is now demonstrating development, test, and production maturity comparable to and not substantially different from the other F-35 variants. With this data, SECDEF made the decision to lift STOVL from probation on January 20, 2012. As with the other variants, some additional technical issues have been identified on the F-35B since probation began. However, none of these issues rises to the level of significance of those that placed STOVL on probation, and they are consistent with the kind of discovery to be expected in any complex tactical aircraft development program. Similar F-35A and F-35C technical issues being discovered in test have been proactively addressed and are being resolved concurrent with flight test. The decision to lift probation will result in absolutely no reduction in DoN F-35B oversight or the level of attention given by the DoD to each of the JSF variants going forward.

DoD established the F-35 program with a planned measure of concurrent development and production that balanced cost, risk, and need for TACAIR modernization. Concurrency, however, is a transient issue in which risks progressively decline through the end of SDD. The F-35 program is currently experiencing changes driven by design maturity discoveries as ground test, flight test, and overall system qualification efforts proceed. As more testing is completed, concurrency risks are progressively reduced as the design is confirmed or issues identified requiring changes are incorporated. Earlier aircraft are open to a greater need for changes, and as succeeding Low-Rate Initial Production (LRIP) lots are built, their cumulative requirements for retrofit modifications decline.

F-35 sustainment costs remain a concern. The DoN continues to support the F-35 Joint Program Office (JPO) in its disciplined approach to analyzing and reducing sustainment costs and while the JPO and the Services made progress in 2011, there is more work to do in this area and the focus remains. For example over the next 12 months the JPO will complete the F-35 Business Case Analysis (BCA). The results from the BCA will assist the Program Executive Office (PEO) in refining the current F-35 support strategy by identifying the best mix of existing Service/Partner Organic capabilities with that of the Industry team to develop the optimum long term best value F-35 support solution. The DoN, working in concert with the JPO, will analyze options outside of the PEO's span of control to reduce operating cost; such as reviewing basing options and the sequencing of those actions, unit level manpower/squadron size and discrete sustainment requirements. Through these combined efforts, the Department believes the PEO can increase convergence on an affordable F-35 sustainment strategy that both meets the required level of Service/Partner performance and lowers the total life cycle cost of the overall program.

The Initial Operational Capability (IOC) dates for F-35B and F-35C have not yet been established and will be determined by each service, based on both the program's performance and how the service defines IOC. In general terms, for example, the Marine Corps F-35B IOC is defined as a squadron of ten aircraft able to execute the full range of TACAIR directed mission sets and to deploy and operate from F-35B compatible ships and austere expeditionary sites. The Marine Corps plans to achieve IOC with a multi-mission capable Block 2B aircraft as described in the JSF Operational Requirements Document (ORD)/Change 3. For the Navy F-35C, IOC is defined as a squadron of ten ORD compliant Block 3F aircraft that are ready to deploy and operate from CVNs after having completed Initial Operational Test and Evaluation (IOT&E). The Marine Corps IOC for the F-35C will follow the Navy's lead to ensure capability symmetry onboard carriers.

The Fiscal Year 2013 President's Budget requests $1.48 billion in Research, Development, Test & Evaluation (RDT&E,N) to continue the F-35 SDD program and $2.7 billion in Aircraft Procurement, Navy (APN) for ten F-35 aircraft (six F-35B and four F-35C) with associated aircraft hardware and spares. These resource requirements fully align to the Secretary of Defense's F-35 program re-plan. Maintaining this rate, and an eventual optimum production ramp rate, is critical towards achieving F-35 affordability goals and preventing excessive expenditures on aircraft with limited service-life and decreasing operational relevance.

The DoN is aware of the many challenges that remain on the F-35 program. However, this aircraft is an essential future Navy/Marine Corps Aviation capability and we are fully committed to the F-35B and F-35C variants of this program. Towards obtaining this capability at the lowest cost, and at the earliest date possible, we continue to closely monitor all F-35 development, production, and sustainment efforts to ensure we are ready to meet our national security obligations.

F/A-18 Overview

The F/A-18 Hornets have consistently met readiness and operational commitments. There are 22 Navy Super Hornet squadrons with 440 F/A-18E/Fs; deliveries and squadron transitions will continue through 2016. There are 15 Navy and 13 Marine F/A-18 A-D squadrons with 625 legacy A-D Hornets. While the F/A-18A-Ds transition to the F/A-18E/F and F-35, the current inventory of F/A-18A-Ds will comprise more than half of the DoN's strike fighter inventory well into 2013. Super Hornets and legacy Hornets have conducted more than 148,000 combat missions since September 11, 2001. While deployed ashore and aboard our aircraft carriers at sea, F/A-18s have brought significant precision ordnance and laser-guided munitions to the fight, and have employed thousands of rounds of twenty-millimeter ammunition supporting forces during strafing runs. These aircraft continue to provide vital overwatch and direct support to our troops on the ground in combat overseas.

Both the legacy Hornet and the Super Hornet were procured with an objective of 20 years' time in service. The average legacy Hornet has exceeded that goal, while the Super Hornet is already at almost 30 percent of its expected 20 year life. It is reasonable to conclude, based on current trends, that most aircraft will substantially exceed 20 years in service.

F/A-18 A/B/C/D (Legacy) Hornet

The Fiscal Year 2013 President's Budget request is $79.6 million in APN for the continuation of SLEP, systems upgrades and obsolescence programs for the inventory of 625 legacy F/A-18 Hornets. Funds requested will procure and install center-barrel modifications and Service Life Extension Program (SLEP) kits required for extending the service life to 10,000 flight hours of select candidate F/A-18A-D aircraft. The High Flight Hour (HFH) inspections and SLEP modifications can extend the F/A-18A-D service life to 10,000 hours and mitigate the impacts of the SFS. Continued investment in Program Related Engineering (PRE) and Program Related Logistics funds within the Operations and Maintenance, Navy accounts is critical for sustaining the combat relevancy of the DoN's legacy platforms through the TACAIR transition.

The Service Life Management Program (SLMP) monitors and improves the health of the F/A-18A-D fleet through analyses of TACAIR inventories and management of usage rates at the squadron level. 74 percent of the F/A-18 A-D fleet have over 6,000 flight hours while 32 aircraft have over 8,000 flight hours. To meet our operational commitments through mid 2020s, we will be required to extend the service life of at least 150 F/A-18A-D to 10,000 flight hours. The F/A-18 A-D Service Life Assessment Program (SLAP) has completed and we are identifying all of the inspections and modifications necessary to extend the airframe service life to 10,000 flight hours. Based upon those results, we are midway through a three-phased SLEP. SLEP Phase A identified the critical safety of flight locations that needed immediate inspection and identified notional repair concepts. SLEP Phase B categorized parts by criticality, and upgraded analytical tools for use by the Naval Air Systems Command (NAVAIR) and Original Equipment Manufacturer engineers to design repairs. SLEP Phase C will finalize all remaining Phase B work and develop inspections and modifications required to extend the service life of 150 legacy F/A-18s. Efforts to extend the life of the F/A-18 A-D's major subsystems and avionics, independent of the airframe, are also underway.

The Fiscal Year 2013 President's Budget request includes SLEP requirements for 150 airframes. The first aircraft were inducted in early Fiscal Year 2012. Although risk is inherent in extending the service life of an aircraft, the technical risk in developing modification kits to achieve the goal of 10,000 flight hours is low. The Fleet Readiness Centers have the capacity to execute the required number of HFH inspections and SLEP modifications. Material availability and engineering disposition turn-around times influence depot efficiencies.

In order to maintain a tactical advantage, we will continue to procure and install advanced systems such as Joint Helmet-Mounted Cueing Systems (JHMCS), Multi-Function Information Distribution System (MIDS), APG-73 radar enhancements, Advanced Targeting FLIR (ATFLIR) upgrades, and LITENING for the Marines on selected F/A-18A-D aircraft.

F/A-18 E/F Super Hornet

The Fiscal Year 2013 President's Budget requests $2.0 billion in APN for procurement of 26 F/A-18 E/F Block II (Lot 26-38) aircraft. The F/A-18E/F continues to transition into the fleet, improving the survivability and strike capability of the carrier air wing. The Super Hornet

provides increased combat radius and endurance, and a 25 percent increase in weapons payload over the legacy Hornets. The President's Budget request for Fiscal Year 2013 includes $276.7 million in APN to implement commonality, maintain capabilities and improve reliability and structural safety of the Super Hornet fleet. The Super Hornet uses an incremental development approach to incorporate new technologies and capabilities: the JHMCS, ATFLIR with shared real-time video, Shared Reconnaissance Pod System (ShARP), MIDS data-link, Multi-Sensor Integration, & continued advancement of the APG-79 Active Electronically Scanned Array (AESA) radar.

The program continues to deliver on-cost and on-schedule and the last year of procurement to complete the Program of Record (POR) of 565 aircraft is planned for 2014. Production shutdown begins in mid-2012 at the sub-vendor level and concludes in 2016. A MYP contract for 124 (Fiscal Years 2010 through 2013) F/A-18E/F Super Hornets and EA-18G Growlers was signed on September 24, 2010. In December 2010, SECDEF added 41 E/F aircraft to the Fiscal Year 2012 President's Budget request in Fiscal Years 2012 through 2014. The DON is looking to extend the existing MYP authorization to include the Fiscal Year 2014 procurement of 13 aircraft.

All Lot 30 (Fiscal Year 2006) and beyond F/A-18E/Fs and EA-18Gs have the APG-79 AESA radar system installed in production, and a retrofit program exists to modify 133 Lot 26-29 Block II aircraft with the AESA radar. More than 300 APG-79 AESA radars have been produced to date. The Navy plans to equip all 419 Block II Super Hornets with AESA radars, providing the Super Hornet a significant increase in detection range, lethality and survivability over the legacy Hornets. Successfully deploying since 2007, AESA radar equipped squadrons are highly valued by fleet commanders because of their ability to share tactical battle space management data with the non-AESA radar tactical aircraft in the carrier battle group. The F/A-18E/F and EA-18G with the APG-79 are force multipliers.

The Fiscal Year 2013 President's Budget includes a request for $11.0 million RDT&E,N to support the F/A-18E/F SLAP study requirement. Currently, the F/A-18 E/F fleet has flown approximately 30 percent of the available 6,000 total flight hours; the remaining service life will not be adequate to meet operational commitments through 2035. In 2008, the Navy commenced a three phased F/A-18E/F SLAP to analyze actual usage versus structural test data and identify the feasibility of extending F/A-18E/F service life from 6,000 to 9,000 flight hours via a follow-on SLEP. The F/A-18E/F SLAP will define the necessary inspections and modifications required to achieve 9,000 flight hours and increase total and arrested landings, and catapults beyond currently defined life limits and is currently assessed as low risk. The SLMP philosophy has been applied to the F/A-18E/F fleet at an earlier point in its lifecycle than the F/A-18A-D, which will optimize FLE, flight hours and total landings aligning aircraft service life with fleet requirements.

Airborne Electronic Attack (AEA) / EA-6B Prowler

The Fiscal Year 2013 President's Budget request includes $19.7 million in RDT&E,N for Electronic Warfare (EW) Counter Response; $187.0 million RDT&E,N for Next Generation Jammer (NGJ); $10.6 million RDT&E,N for MAGTF EW, $50.0 million in APN for common

Airborne Electronic Attack (AEA) systems; $30.1 million in APN for all EA-6B series aircraft; and $34.1 million APN for MAGTF EW.

Currently, 72 EA-6Bs in the Navy and Marine Corps support 67 operational aircraft in 13 active squadrons and one reserve squadron. This includes 40 Navy and Marine Corps Improved Capability (ICAP) II aircraft and 32 ICAP III aircraft. Following the final Navy EA-6B transitions to EA-18G in 2015, all ICAP III EA-6Bs will transfer to and be operated by the Marine Corps. The final retirement of the EA-6B from the DoN inventory will be by the end of 2019.

Marine aviation is on a path towards a distributed AEA system of systems that is a critical element in achieving the MAGTF EW vision: a composite of manned and unmanned surface, air, and space assets, on a fully collaborative network providing the MAGTF commander control the electromagnetic spectrum when and where desired. In development are the ALQ-231 Intrepid Tiger II communications jammer, UAS EW payloads, a Software Reprogrammable Payload and an EW Services Architecture to facilitate collaborative networked Electronic Warfare Battle Management.

The Intrepid Tiger II is intended to be carried on the AV-8B and eventually other fixed and rotary wing platforms and will provide direct AEA support to ground troops engaged in combat operations. Intrepid Tiger II development and procurement is in response to Marine Corps requirements for increased precision EW capability and capacity across the MAGTF and provides EW capability directly to tactical commanders without reliance upon the limited availability of the low density/high demand EA-6B Prowler.

The NGJ is new electronic warfare technology that replaces the 40-year-old ALQ-99 system and is designed to provide modified escort power in support of joint and coalition air, land, and sea tactical strike missions. NGJ is critical to the Navy's vision for the future of airborne electronic attack strike warfare. Funding is vital to maintain schedule, allowing the program to transition to the technology development phase and ensure timely start of the EA-18G long lead integration activities, release of the TD Request for Proposal to industry.

Airborne Electronic Attack (AEA) / EA-18G Growler

The Fiscal Year 2013 President's Budget request is $1.1 billion in APN for procurement of 12 EA-18G aircraft and $13 million in RDT&E,N for correction of deficiencies. The first EA-18G squadron deployed in an expeditionary role in November 2010 to Iraq and subsequently redeployed on short notice to Italy in March 2011 in support of Operation NEW DAWN (OND) and Operation UNIFIED PROTECTOR (OUP). The EA-18G received accolades from both U.S. Central Command (CENTCOM) and Supreme Headquarters Allied Powers Europe for the AEA's enabling contribution to the battlespace.

In 2009 the Navy began transition from EA-6Bs to EA-18Gs. The first carrier-based EA-18G squadron deployed in May 2011. All three active component Navy expeditionary squadrons and two of the 10 carrier based squadrons have completed transition to the EA-18G. The Navy will be divested of EA-6Bs by 2015. The program of record is for 114 EA-18G aircraft, of which 90

have been procured to date. The final procurement of EA-18Gs is planned for 2012. As directed by the Quadrennial Defense Review in 2009, SECDEF added 26 EA-18G aircraft to the program of record across the FYDP to increase joint force capacity to conduct expeditionary electronic attack. The EA-18G fleet has flown approximately five percent of the 7,500 total flight hours per aircraft and are meeting all operational commitments.

The Navy has completed an analysis of alternatives (AoA) to determine the best path forward for the NGJ. The NGJ system will replace the aging and limited inventory of ALQ-99 electronic warfare pods currently flown on the EA-18G and EA-6Bs and provide the DoD with the advanced comprehensive electronic attack capability required to outpace the threat.

E-2D Advanced Hawkeye (AHE)

The Fiscal Year 2013 President's Budget requests $119.1 million in RDT&E,N for continuation of SDD and $1.040 million in APN for five Full Rate Production (FRP) Lot 1 aircraft and advance procurement (AP) for Fiscal Year 2014 FRP Lot 2 aircraft.

The E-2D Advanced Hawkeye is the Navy's carrier-based Airborne Early Warning and Battle Management Command and Control system. The E-2D provides Theater Air and Missile Defense and is capable of synthesizing information from multiple onboard and off-board sensors, making complex tactical decisions and then disseminating actionable information to Joint Forces in a distributed, open-architecture environment.

Utilizing the newly developed AN/APY-9 Mechanical Electronic Scan Array radar and the Cooperative Engagement Capability system, the E-2D works in concert with surface combatants equipped with the Aegis combat system to detect, track and defeat air and cruise missile threats at extended range and provide Battle Group Commanders required reaction time. This system-of-systems architecture, known as Naval Integrated Fire Control-Counter Air, provides vital force protection and allows the Navy to safely project forces into the littorals and overland to ensure access in contested areas.

The E-2D Advanced Hawkeye program is in the Production and Deployment phase after the Defense Acquisition Board (DAB) approved Milestone C in June 2009, at which time the program received authorization for procurement of the first two lots of LRIP aircraft (LRIP Lot 1 is two aircraft and LRIP Lot 2 is three aircraft). The SDD flight test program is 100 percent complete and all Key Performance Parameter thresholds have been met. An Operational Test Readiness Review was successfully conducted on February 1, 2012, certifying entry into Initial IOT&E, and IOT&E will continue through August 2012. Both LRIP Lot 1 aircraft were delivered in 2011, and delivery of the three LRIP Lot 2 aircraft will be completed in 2013. A DAB for approval to procure the final two lots of LRIP aircraft, Lots 3 (five aircraft) and 4 (five aircraft), as well as AP for FRP Lot 1, was successfully held on in March 2011 and the respective contracts have been awarded. LRIP Lots 3 and 4 aircraft will be delivered in 2014 and 2015, respectively. From a cost standpoint, the Estimate at Complete has been stable for over 54 months and the program is on schedule for an FRP Decision in the first quarter of Fiscal Year 2013. All major acquisition milestones have been achieved on or ahead of schedule since program inception in 2003.

AV-8B Harrier

The Fiscal Year 2013 President's Budget requests $38.7 million in APN funds to continue development of the AV-8B Readiness Management Program, Operational Flight Program and Avionics Weapons Systems Development and Integration, and Engine Life Management Program. The Fiscal Year 2013 President's Budget requests $42.2 million in OCO procurement funding for Marine Corps expeditionary LITENING targeting pod upgrades installation of OCO-procured ALE-47 kits (improved aircraft self protection, expendable system).

The AV-8B continues to be deployed heavily in support of operational contingencies. Each Marine Expeditionary Unit (MEU) deploys with embarked AV-8Bs. As of 2012 the AV-8B, equipped with precision weapons, LITENING targeting pods with a video downlink to ROVER ground stations, beyond visual range air-to-air radar missiles, is a proven, invaluable asset for the MAGTF and joint commander across the spectrum of operations. In 2012, the AV-8B has received the H6.0 Operational Flight Program enabling full integration of the ALE-47 suite and Digital Improved Triple Ejector Rack increasing the smart weapon carriage capability from four weapons to ten. The Harrier out-of-service date has been extended from 2022 to 2030, based on current F-35B transition plans. As a result, the AV-8B program must focus on sustainment efforts to mitigate significant legacy inventory shortfalls, maintain airframe sustainment and address reliability and obsolescence issues of avionics and subsystems. Additionally, this aircraft must be funded to maintain combat relevance to include tactical datalink and sensor improvements in order provide continued operation in support of operational contingencies and transition qualified aircrew to the F-35. The current digital aided Close Air Support (CAS) technology installed on the AV-8B is obsolete.

Operation ODYSSEY DAWN confirmed the expeditionary advantages of STOVL capabilities by placing the Harrier as the closest fixed-wing asset to Libya. Such dynamic support slashed transit times to the battlefield by two-thirds and kept close air support aircraft on station without strategic tanking assets. Capability upgrades, obsolescence mitigation and readiness initiatives must be funded to ensure the AV-8B remains relevant, healthy and sustained through 2030.

ASSAULT SUPPORT AIRCRAFT

MV-22

The Fiscal Year 2013 President's Budget requests $54.4 million in RDT&E, N for continued product improvements and $1.5 billion in APN for procurement of 17 MV-22Bs (Lot 17) and $95.9 million for continuation of follow-on block upgrades. Fiscal Year 2013 is the first year of the planned follow-on V-22 MYP contract covering Fiscal Year 2013-2017. The funds requested in the Fiscal Year 2013 President's Budget fully fund Lot 17 and procure long lead items for Lot 18 as well as Economic Order Quantity buys for Lots 18 - 21. The Marine Corps continues to field and transition aircraft on time. The APN request includes $95.9 million to

support the ongoing Operations and Safety Improvement Programs (OSIP), including Correction of Deficiencies and Readiness.

The MV-22B has been supporting the Marines continuously since October 2007, in extreme environmental conditions during thirteen deployments to Iraq, Afghanistan and aboard amphibious shipping. In February 2011, the V-22 fleet exceeded a total of 100,000 flight hours. The MV-22B squadrons in Afghanistan and the MEU are seeing mission capable rates in the seventy percent range and are performing every assigned mission. Additionally, the Osprey has the lowest Class A flight mishap rate of any USMC fielded tactical rotorcraft over the past ten years.

The effectiveness and survivability of this revolutionary, first-of-type MV-22B Osprey tiltrotor has been repeatedly demonstrated in combat. The rescue of a downed F-15E airman during Operation ODYSSEY DAWN was an example of what the Navy and Marine Corps' expeditionary force brings our nation. As an integral part of that seaborne presence, the MV-22B was able to perform its part of this mission with unprecedented speed and agility. Twenty minutes from the time he was evading capture in hostile territory, the rescued pilot was safely back on American territory aboard USS KEARSARGE.

Under the existing MYP, Ospreys have been delivered under cost and on time. The fifth and final buy under the multiyear occurred in Fiscal Year 2012; the Fiscal Year 2013 President's Budget request includes provisions for a second MYP which builds on the successes of the first. This second MYP will procure 91 MVs over five years and will produce significant savings when compared to single year procurements. The stability it provides supports the Marine Corps' need to retire old aircraft and field new and better capabilities. Additionally, the stabilization of the supplier base encourages long-term cost reduction initiatives on the part of the prime contractors and their suppliers.

The introduction of this new tiltrotor capability into combat has provided valuable lessons with respect to readiness and operating costs. Improvements to both continue and are having a clear effect on increasing aircraft availability and decreasing flight hour costs. At the close of Fiscal Year 2011, the mission capability rate of the MV was up 19 percent over Fiscal Year 2010 and the cost per flight hour decreased 13 percent in the same period. Due to these cost reduction efforts, the V-22 program received the prestigious David Packard Excellence in Acquisition Award which recognizes exemplary performance and innovation acquiring and delivering products and capabilities to the warfighter.

To keep these improvements on track a readiness OSIP was introduced into the Fiscal Year 2012 President's Budget. This OSIP provides a stable source of crucial modification funding as the Ospreys continue to improve readiness and reduce operating cost.

The MV-22B capability is being increased and fielded over time via a block upgrade acquisition strategy. The great benefit of a fly-by-wire rotorcraft was very clear recently when the Osprey increased airspeed and lift by simply modifying the flight control software. Such improvements require thorough testing; Fiscal Year 2013 RDT&E,N funds will be utilized to complete a fully-instrumented test aircraft which will replace the existing test aircraft. The current test aircraft is

five iterations behind the V-22 being flown today and requires hundreds of maintenance man-hours per flight hour to operate and maintain.

FIXED WING AIRCRAFT

KC-130J

The Fiscal Year 2013 President's Budget requests $942 million in APN across the FYDP for procurement of eight KC-130J's and continued product improvements. Targeted improvements include propeller and air-to-air refueling hose reel reliability, aircraft survivability through advanced electronic countermeasure modernization and replacing Vietnam era flare dispensers used for battlefield illumination, greatly enhancing mission effectiveness.

The KC-130J Hercules achieved IOC in 2005 and has been fielded throughout our active force, bringing increased capability, performance and survivability with lower operating and sustainment costs to the Marine Air Ground Task Force. Forward deployed continuously in support of Operations Iraqi and Enduring Freedom since 2005, the KC-130J continues to deliver Marines, fuel and cargo wherever needed. In 2011 the KC-130J continued to be a force multiplier for the Marine Corps through its support to combat operations in Afghanistan, humanitarian and disaster relief efforts in Pakistan, Tunisia and Japan, tactical recovery of downed aircrew in Libya, and support to Marine Expeditionary Units worldwide.

In September 2010, the Marine Corps fielded the first bolt-on / bolt-off Harvest HAWK Intelligence, Surveillance and Reconnaissance (ISR)/weapon mission kit for the KC-130J, expanding the role of the MAGTF's tanker. With the mission kit installed, the KC-130J is capable of providing persistent close air support and multi-sensor imagery reconnaissance for our Marines in harm's way. Three mission kits have been fielded to date, with three more expected to field in Fiscal Year 2013.

The USMC has procured 47 KC-130Js, 32 aircraft short of the 79 aircraft program of record. Procurement of the program of record will allow us to fully outfit our active and reserve force with this unique, multi-mission assault support and refueling platform. The reserve component is programmed to begin transition from the legacy KC-130T aircraft to the more capable, more efficient KC-130J aircraft beginning in Fiscal Year 2015. This reserve component transition will begin with the aircraft requested in the Fiscal Year 2013 President's Budget. Delays in procurement would force the Marine Corps to sustain the KC-130T aircraft longer than planned at an increased cost.

P-8A Poseidon

The P-8A Poseidon recapitalizes the maritime Patrol Anti-submarine Warfare (ASW), Anti-Surface Warfare (ASUW) and armed ISR capability currently resident in the P-3C Orion. The P-8A combines the proven reliability of the commercial 737 airframe and avionics with an open architecture that enables integration of modern sensors and robust communications. The Fiscal Year 2013 President's Budget requests $421 million in RDT&E, N for integrated development

and associated testing and $2.837 billion for procurement of 13 FRP P-8A Poseidon aircraft which are scheduled to begin delivery in May 2015. APN funding supports AP for the subsequent FRP procurement lot. The program is on track for IOC in late 2013 when the first squadron will have completed transition and is ready to deploy. The P-8A program is meeting all cost, schedule and performance parameters in accordance with the Acquisition Program Baseline.

In August 2010 the P-8A program surpassed Milestone C, authorizing the Navy to proceed with procurement of LRIP Lots 1, 2, and 3 for six aircraft in Fiscal Year 2010, seven aircraft in Fiscal Year 2011 and eleven aircraft in Fiscal Year 2012. The Navy awarded the LRIP Lot 1 contract in January 2011 and LRIP Lot 2 contract in November 2011. The first LRIP aircraft delivery occurs in March 2012 to Patrol Squadron 30 at NAS Jacksonville, Fl. The first three flight test aircraft are being flown at NAS Patuxent River, MD, in support of Integrated Test & Evaluation (IT&E). Two of three production representative aircraft have been accepted by the Navy to support IOT&E. The third of these aircraft has been supporting integrated test and training in preparation for IOT&E and will be formally accepted by the Navy prior to commencement of IOT&E.

P-3C Orion

The legacy P-3C fleet continues to provide ASW, ASUW, and ISR support for Joint and Naval operations worldwide. In Fiscal Year 2013, $148.4 million is requested for P-3C airframe and mission systems sustainment. Nearly one third ($41.4 million) is for wing modifications to support the CNO's P-3 Fleet Response Plan, as well as supporting EP-3E requirements, which are executed within the P-3 Airframe Sustainment Program. Mission systems sustainment and modernization totals $107 million to address numerous safety of flight and obsolescence issues. The P-3C is being sustained to maintain warfighting capability and capacity until completion of P-8A transition in Fiscal Year 2018.

The aircraft is well beyond planned fatigue life of 7,500 hours for critical components, with an average airframe usage of over 17,000 hours. Since February 2005, 14 aircraft grounding bulletins have impacted 118 P-3 aircraft. In December 2007, NAVAIR's ongoing RDT&E funded P-3 Fatigue Life Management Program determined that in addition to existing structural fatigue issues associated with the forward lower wing section (Zones 2-4), the lower aft wing surface (Zone 5) of the P-3 aircraft showed fatigue damage beyond acceptable risk resulting in the grounding of an additional 39 P-3 aircraft. As of February 2012, a total of 75 aircraft have been grounded for Zone 5 fatigue. P-3 groundings due to known material fatigue will continue for the remainder of the P-3 program, and unknown fatigue issues will continue to present persistent risk until P-8A transition is complete. A return to pre- December 2007 aircraft availability numbers was achieved in December 2010; 83 P-3C mission aircraft are available today. Preserving funding for Zone 5 and outer wing kits and installations is critical to sustaining the minimum number of P-3Cs until replaced by the P-8A. The Navy will continue to manage closely the service life of the P-3C through transition to the P-8A Poseidon.

EP-3 Aries Replacement/Sustainment

The EP-3E ARIES is the Navy's premier manned Airborne Intelligence, Surveillance, Reconnaissance, and Targeting (AISR&T) platform. The Joint Airborne SIGINT Common Configuration includes Signals Intelligence (SIGINT) spiral upgrades, which, in conjunction with Secretary of Defense and the ISR Task Force (ISR TF) surge efforts, are fielding a robust Multi-Intelligence (INT) capability inside the FYDP. Multi-INT sensors, robust communication, voice over IP and data links employed by the flexible and dependable P-3 air vehicle help ensure effective AISR&T support to conventional and non-conventional warfare across the current Range of Military Operations. Operating around the globe, the EP-3E continues to satisfy critical Joint, Combatant Commander, and Service airborne ISR priorities and requirements.

In Fiscal Year 2013, the President's Budget request is $79.4 million in APN, including $13.0 million for OCO to address EP-3E SIGINT and Communications capability upgrades and obsolescence. The APN request supports the FRP installations and procurements for communications intelligence modifications necessary to keep pace with the evolving threat. The EP-3E program continues to modify aircraft with multi-intelligence capability to meet emergent classified requirements. Modifications are necessary to keep the platform viable until the EP-3 capabilities are recapitalized.

The Navy is in the process of developing the AISR&T family of systems construct to recapitalize the EP-3 AISR&T capabilities within existing of Program of Record platforms; BAMS, VTUAV, UCLASS, P-8, H-60, and E-2D. The strategy has been further refined to focus on module systems and payloads required for the Navy to conduct AISR&T on a variety of vehicles, providing the COCOM with scalable capability and capacity. An inclusive full spectrum approach of the Navy sea and shore based manned and unmanned platforms align with the CNO's priorities.

UNMANNED AERIAL SYSTEMS

MQ-4C Broad Area Maritime Surveillance (BAMS) UAS

The Fiscal Year 2013 President's Budget requests $657.5 million RDT&E,N to continue SDD of the BAMS UAS, $51.1 million in APN for procurement of long-lead materials for the first lot of low-rate initial production aircraft, and $70.9 million in Military Construction to construct a Main Operating Base at NAS Jacksonville, as well as a Forward Operating Base and a maintenance training facility to support IOC. The Milestone B decision for the BAMS UAS program was achieved on April 18, 2008. The program is on schedule and will complete first flight this year, with Milestone C planned for Fiscal Year 2013. The BAMS UAS program will meet the Navy requirement for a persistent ISR capability. BAMS UAS is a large Group-5 system that will greatly enhance situational awareness of the battle-space and shorten the sensor-to-shooter kill chain.

The Navy procured two Air Force (USAF) Global Hawk (Block 10) UASs in Fiscal Year 2004 for demonstration purposes and to perform risk reduction activities for the BAMS UAS Program. This effort is known as the BAMS-Demonstrator (BAMS-D) program. In April 2011, Navy

accepted three additional Block 10 aircraft from the USAF to be utilized as spare parts assets. BAMS-D UAS has been deployed to the CENTCOM theater of operations for over three years.

MQ-8B Vertical Takeoff and landing Unmanned Aerial Vehicle (VTUAV) and associated Rapid Deployment Capability (RDC) efforts

The MQ-8 Fire Scout is an autonomous vertical takeoff and landing tactical UAV (VTUAV) designed to operate from all air-capable ships, carry modular mission payloads, and operate using the Tactical Control System and Line-Of-Sight Tactical Common Data Link. Fire Scout has completed over 200 autonomous ship board take-offs and landings. The Fiscal Year 2013 President's Budget requests $99.6 million RDT&E to continue development of an endurance upgrade (MQ-8C), integrate radar and integrate weapons on the MQ-8B, and $133.8 million APN for the production of six Fire Scout MQ-8C aircraft and Ship Control Stations. The RDT&E budget includes funding to increase endurance and integrate specialty payloads to support the Special Operation Forces (SOF) mission using the RDC process (Approved AFRICOM JUONS) and satisfy a NAVCENT Urgent Operational Needs Statement 18-month Rapid Deployment Capability for the Weaponization of the MQ-8B. The MQ-8B aircraft quantity supports Littoral Combat Ship (LCS) missions, near-term SOF missions until the MQ-8C Endurance Upgrade is fielded and ISR TF demands in Afghanistan. Procurement of ship-based control stations is aligned with both the LCS mission and outfitting frigates (FFGs) and other ships to support the SOF missions. The ship-based control station and other ship ancillary equipment is common between MQ-8B and MQ-8C. Production of the MQ-8C was included in the APN budget starting in Fiscal Year 2012. Commonality of avionics, software, and payloads between the MQ-8B and MQ-8C is being maximized. The primary difference between the MQ-8B and MQ-8C is in the commercial airframe provided for each variant. The MQ-8B uses the Schweitzer 333 helicopter while the MQ-8C uses the Bell 407 helicopter. The MQ-8C will almost triple the MQ-8B endurance and greatly increase the payload capacity. At least 28 MQ-8C aircraft Endurance Upgrades are required to support the SOF mission and are included in the RDC. The MQ-8B system has performed a Military Utility Assessment (MUA) aboard USS HALYBURTON to evolve fleet concepts for operation of the system and successfully completed a two month SOF Proof of Concept evaluation in an operational environment. Fire Scout has been integrated into and is currently deployed aboard USS SIMPSON and deployments are in work for USS KLAKRING, USS BRADLEY, and USS Samuel B. ROBERTS to support SOF and Navy operations in 2012 and 2013. Fire Scout was deployed to Afghanistan in April 2011 to support the ISR Task Force with 300 hours per month of ISR video from an expeditionary facility. As of February 2012, Fire Scout has provided over 2,100 ISR flight hours in Afghanistan. The Afghan 90 day user assessment gave Fire Scout its highest grades in all categories, and the user has requested additional Fire Scout aircraft and spares to grow the requirement to 600 hours per month. The Fire Scout program will also continue to support integration and testing in all LCS-based mission modules. Navy continues to cooperate with the Coast Guard for their ship-based UAS planning.

Unmanned Combat Air System Carrier Demonstration (UCAS-D)

The Fiscal Year 2013 President's Budget requests $142.3 million RDT&E to continue the Navy UCAS-D efforts to research a tactical jet-sized, carrier-suitable, low-observable-relevant, unmanned aircraft system. The UCAS-D program will demonstrate UCAS carrier operations

and autonomous aerial refueling (AAR), and mature required technologies to technology readiness level (TRL)-6 in support of potential follow on unmanned acquisition programs. The aviation/ship integration portion of the program is meeting all technical objectives, with surrogate aircraft flights in vicinity of aircraft carriers (CV) completed in 2009 and 2010. In July 2011, the first ever unmanned coupled approaches to CVN landing were completed and integration data was gathered during F/A-18 surrogate testing aboard USS DWIGHT D. EISENHOWER (CVN-69). The UCAS-D contract was competitively awarded to Northrop Grumman in August 2007. The program was re-baselined in 2010 due to delays in the original contract schedule which was focused on early completion of UCAS-D objectives. The re-baselined schedule is executable within existing resources; completion of the carrier demonstration is planned for Fiscal Year 2013. The first X-47B (AV-1) completed its first flight February 4, 2011 and has flown a total of 16 envelope expansion flights at Edwards AFB, CA. AV-2 completed its first flight November 22, 2011. AV-1 completed transport to NAS Patuxent River, MD in December 2011 to begin check-outs and testing in support of carrier suitability and operations. Shipboard X-47B deck handling operations and flight operations in the vicinity of an aircraft carrier are scheduled to begin in 4Q 2012. Actual catapult launches, arrested landings and additional flight operations in the vicinity of a CV are scheduled to be completed in 2013. The latest AAR testing period was completed in January 2012 utilizing a manned surrogate aircraft, and AAR development and testing will continue throughout 2012 and 2013. The program is constrained by USN CVN schedules and planning. Currently the program is working closely with USN and CVN leadership to reduce risk and align program and CVN operational schedules to best accommodate demonstration objectives. UCAS-D is an essential first step toward full-scale development of a carrier-suitable unmanned ISR/strike platform. Successful UCAS-D sea trials will set the stage for potential follow-on acquisition programs.

Medium Range Maritime UAS (MRMUAS)

The Fiscal Year 2013 President's Budget indefinitely defers the MRMUAS prior to initiation of Milestone A. OSD (AT&L) approved the MRMUAS Material Solution Analysis and authorized the start of an AoA and a draft Capability Development Document (CDD) in Fiscal Year 2011. The AoA and CDD drafting will be completed in Fiscal Year 2012. These documents will support the Navy's next generation of sea based Group 4 UAS and identify technology investments needed to improve the Navy's sea based UAS systems.

Tactical Control Station (TCS)

The Fiscal Year 2013 President's Budget requests $9.1M RDT&E for the Tactical Control Station (TCS). TCS provides a standards compliant, open architecture, with scalable capabilities for command, control, of the VTUAV system. TCS completed the software transition from the Solaris operating system to the Linux operating system in 2011. The Linux operating system conversion will overcome hardware obsolescent issues with the VTUAV Solaris based Control Stations and provide lower cost software updates using DoD common application software. In addition, the TCS Linux upgrade will enhance collaboration with the Navy's future UAS common control station. The TCS program is also supporting the VTUAV weaponization, radar, and MQ-8C endurance upgrade RDC efforts. The TCS program has continually met schedule and cost goals over the last five years while delivering quality software. In Fiscal Year 2013,

TCS will continue the VTUAV RDC efforts, support transitioning the Linux operating system software to a technology refreshed control station, enhance the VTUAV Ocean Surveillance Initiative for ships Automatic Identification System and sensor track generation, and develop an interface to an ISR Process Exploit Dissemination (PED) system. The PED system will facilitate imagery analysis and utilization by the host ship.

Cargo Unmanned Aerial System (CUAS)

The Fiscal Year 2013 President's Budget is not requesting funding for continued CUAS deployment in Fiscal Year 2013. The previous effort supported the USMC operational requirements captured in a Cargo UAS Joint Urgent Operational Needs (JUONS). The Marine Corps is assigned the lead service. Two vendors were awarded contracts in support of Cargo UAS development. The CUAS initiative is a MUA which will inform a follow-on program of record.

Lockheed Martin/Kaman KMAX Cargo UAS completed the Quick Re-action Assessment on time and was selected for the RDC. CUAS operations were started in November 2011 and are planned for six months with priced options for an addition six months. The CUAS is meeting the RDC goals and is also supporting the development of UAS concept of operations (CONOPS).

The purpose of the Cargo UAS capability is to develop CONOPS to "get trucks off the roads" in combat zones, minimizing the improvised explosive device threat to logistics convoys. The CUAS will provide a low risk, persistent, 24-hour capability for dispersed forces on the battlefield. This capability mitigates the requirement for manned ground vehicles to resupply forces in remote locations. The CUAS will also augment manned aviation assault support assets and airdrop methods when the weather, terrain, and enemy pose an unsuitable level of risk. Aerial delivery of cargo by the CUAS, between main logistical hubs and remote "spokes," is being executed under the control of a ground control station at a main operating base and a remote terminal at the drop-off zone.

RQ-21A Small Tactical Unmanned Aircraft System (STUAS)

The Fiscal Year 2013 President's Budget requests $33.9million in RDT&E,N ($9.73 million Navy, $24.2 million Marine Corps) and $9.6 million in APN and $27.6 million in PMC for 15 (five USN, ten USMC) RQ-21A Integrator STUAS that will address Marine Corps and Navy ISR capability shortfalls currently supported by service contracts. This Group 3 UAS will provide persistent, ship and land-based ISR support for tactical-level maneuver decisions and unit level force defense/force protection missions. Milestone B and contract award occurred in July 2010. Milestone C and LRIP decisions are scheduled for the first quarter of Fiscal Year 2013. STUAS will enter into IOT&E 3rd Qtr Fiscal Year 2013.

RQ-7B Marine Corps Tactical UAS (MCTUAS)

The Fiscal Year 2013 President's Budget requests $0.9 million RDT&E to continue development efforts and government engineering support and $49.3 million in APN to support the continuation of congressionally mandated TCDL retrofits for RQ-7B Shadow units. USMC

Shadow squadrons have seen continuous service in Iraq and Afghanistan since 2007. The USMC received its 13th RQ-7B Shadow system in first quarter Fiscal Year 2012, completing baseline fielding for four squadrons. The USMC Shadow systems are identical to Army Shadow systems, bringing interoperability and commonality between Army and Marine Corps unmanned aircraft units operating side-by-side in Afghanistan. An eighteen-month initiative to weaponize two USMC RQ-7B systems with a laser-guided projectile was started in first quarter Fiscal Year 2012.

Unmanned Carrier Launched Airborne Surveillance and Strike (UCLASS) System

The Fiscal Year 2013 President's Budget requests $122.5 million RDT&E for the UCLASS System efforts. The UCLASS system will enhance carrier capability and versatility for the Joint Forces commander through integration of a persistent and mission flexible unmanned aircraft into the Carrier Air Wing. In April 2011, the UCLASS initial capabilities document was approved by the Joint Requirements Oversight Council. The UCLASS system will provide persistent intelligence surveillance and reconnaissance (ISR) with precision strike in a range of mission including irregular warfare and major combatant operations environments. It will be sustainable onboard an aircraft carrier, as well as ashore, and will be designed to minimize increases in the logistics footprint of the current carrier air wing. The UCLASS system will have the ability to pass command and control information along with sensor data to other aircraft, naval vessels, and ground forces. Sensor data will be transmitted, in either raw or processed forms, at appropriate classification levels, to exploitation nodes afloat and ashore. Interfaces will be provided with existing ship and land-based command and control systems, including ISR tasking, as well as processing, exploitation, and dissemination systems. The UCLASS system will achieve these capabilities through the use of a carrier-suitable, semi-autonomous, unmanned Air Segment, a Control System and Connectivity Segment, and a Carrier Segment.

WEAPONS PROGRAMS

Tactical Tomahawk BLK IV Cruise Missile Program

The Fiscal Year 2013 President's Budget requests $308.97 million of Weapons Procurement, Navy (WPN) for procurement of an additional 196 BLK IV weapons and associated support, $34.9 million of OPN for the Tactical Tomahawk Weapon Control System (TTWCS), and $8.8 million in RDT&E for capability updates of the weapon system. WPN resources will be for the continued procurement of this versatile, combat-proven, deep-strike weapon system in order to meet surface and subsurface ship-fill load-outs and combat requirements. OPN resources will address the resolution of TTWCS obsolescence and interoperability mandates. RDT&E will be used to complete engineering, test, and transition of the Joint Multi-Effect Warhead System into the program production baseline. Since the submittal of the President's Budget request for 2012, Congress approved the Fiscal Year 2011 Omnibus reprogramming request for $310M to replace the 221 missiles expended in Operation ODYSSEY DAWN. These additional missiles will be procured in Fiscal Year 2012. Due to constraints in the ceiling in the Fiscal Year 2012 contract, the 56 missiles funded with Fiscal Year 2012 procurement funds will be ordered under the Fiscal Year 2013 contract.

Tomahawk Theater Mission Planning Center (TMPC)

TMPC is the mission planning segment of the Tomahawk Weapon System. Under the umbrella of TMPC, Tomahawk Command and Control System (TC2S) develops and distributes strike missions for the Tomahawk Missile; provides precision strike planning, execution, coordination, control and reporting; and enables Maritime Component Commanders the capability to plan and/or modify conventional Tomahawk Land-Attack Missile missions. The Fiscal Year 2013 President's Budget requests $2.5 million RDT&E and $42.9 million OPN for continued TMPC system upgrades and support. These resources will complete fielding of TC2S Version 4.3, complete the upgrade and testing to TC2S Versions 5.0, and initiate the upgrade to TC2S Version 6.0. These planned upgrades will improve joint interoperability, mission planning time and system usability. These resources are critical towards supporting 125 planning sites, to include Cruise Missile Support Activities; Tomahawk Strike and Mission Planning Cells; Carrier Strike Groups, Command and Control Nodes and Labs/Training Classrooms.

Sidewinder Air-Intercept Missile (AIM-9X)

The Fiscal Year 2013 President's Budget requests $21.1 million of RDT&E and $80.2 million of WPN for this joint DoN and USAF program. RDT&E will be applied toward AIM-9X/BLK II developmental/operational tests and requirements definition for Joint Staff directed Insensitive Munitions requirements, as well as initial AIM-9X/Block III development activities. WPN will be for production of a combined 150 all-up-rounds and Captive Air Training Missiles and missile-related hardware. The AIM-9X Sidewinder missile is the newest in the Sidewinder family and is the only short-range infrared air-to-air missile integrated on USN/USMC/USAF strike-fighter aircraft. This fifth-generation weapon incorporates high off-boresight acquisition capability and increased seeker sensitivity through an imaging infrared focal plane array seeker with advanced guidance processing for improved target acquisition; and advanced thrust vectoring capability to achieve superior maneuverability and increase the probability of intercept of adversary aircraft.

Advanced Medium-Range Air-to-Air Missile (AMRAAM/AIM-120)

The Fiscal Year 2013 President's Budget requests $2.9 million for continuing RDT&E efforts and $102.7 million for production of 67 captive air training missiles and missile-related hardware. AMRAAM is a joint Navy and Air Force missile that counters existing aircraft and cruise-missile threats. It uses advanced electronic attack capabilities at both high and low altitudes, and can engage from beyond visual range as well as within visual range. AMRAAM provides an air-to-air first look, first shot, first kill capability, while working within a networked environment in support of the Navy's Theater Air and Missile Defense Mission Area.

Small Diameter Bomb II (SDB II)

The Fiscal Year 2013 President's Budget requests $31.1 million of RDT&E for the continued development of this joint DoN and USAF weapon and bomb-rack program. SDB II provides an adverse weather, day or night standoff capability against mobile, moving, and fixed targets, and enables target prosecution while minimizing collateral damage. SDB II will be integrated into

the internal carriage of both the Navy (F-35C) and Marine Corps (F-35B) variants of the Joint Strike Fighter and will be compatible with the BRU-61/A miniature-munitions carriage. The Joint Miniature Munitions Bomb Rack Unit (JMM BRU) BRU-61A/A is being developed to meet the operational and environmental integration requirements for internal bay carriage of the SDB II in the F-35B and F-35C. SDB II entered Milestone B in August 2010 and successfully completed its Critical Design Review in January 2011. JMM BRU will enter Technology Development in May 2013.

Joint Standoff Weapon (JSOW)

The Fiscal Year 2013 President's Budget requests $5.5 million of RDT&E for continued JSOW-C-1 test activity and $127.6 million of WPN for production of 280 All-Up Rounds. The JSOW-C-1 variant fills a critical capability gap by adding maritime moving-target capability to the highly successful baseline JSOW-C program. JSOW-C-1 targeting is achieved via a data-link and guidance software improvements.

Advanced Anti-Radiation Guided Missile (AARGM)

The Fiscal Year 2013 President's Budget requests $7.0 million of RDT&E for the follow-on development and test program and $86.7 million of WPN for production of 100 All-Up-Rounds and Captive Training Missiles. The AARGM development program transforms the legacy High-Speed Anti-Radiation Missile (HARM) into an affordable, lethal, and flexible time-sensitive strike weapon system for conducting Destruction of Enemy Air Defense (DEAD) missions. AARGM adds multi-spectral targeting capability and targeting geospecificity to its supersonic fly-out to destroy sophisticated enemy air defenses and expand upon the HARM anti-radiation missile target set. The program was approved for its third LRIP contract in Fiscal Year 2011. IOT&E re-started on August 10, 2011 and is scheduled to end during the second quarter of Fiscal Year 2012; with IOC on the F/A-18C/D aircraft no later than the fourth quarter of Fiscal Year 2012.

Hellfire Weapon System

The Fiscal Year 2013 President's Budget requests $91.5 million, including $17.0 million of OCO funding, for 1,210 Hellfire all-up-round weapons. Hellfire procurements are a mix of thermobaric, blast/fragmentation, and anti-armor warheads, to provide maximum operational flexibility to our warfighters. This procurement quantity will bring the inventory total to approximately sixty-percent of the munitions requirement and will increase our training assets. The DoN continues to support legacy Hellfire weapons as well as procure and support technology enhancements that will provide the warfighter the flexibility to prosecute new and emerging threats. The Hellfire missile continues to be a priority weapon for current military operations as it enables our warfighters to attack targets in the caves of Afghanistan, as well as to prosecute military operations in urban environments.

Advanced Precision Kill Weapon System II (APKWS II)

The Fiscal Year 2013 President's Budget requests $42.1 million of PAN&MC, including $17.9 million of OCO funding, for procurement of 2,358 APKWS II Precision Guidance Kits. After

the DoN assumed program authority from the Army on September 30, 2008, Congress appropriated funding and approved a DoN above-threshold reprogramming (ATR) request in Fiscal Year 2008 to complete APKWS II development. Milestone C was achieved in April 2010 and LRIP contract award in July 2010. IOT&E was successfully completed in January 2012. IOC is planned for the second quarter of Fiscal Year 2012. APKWS II will provide an unprecedented precision guidance capability upgrading our current unguided rockets, improving accuracy and minimizing collateral damage. The program is on schedule and on budget to meet the needs of our warfighters in today's theaters of operations.

Direct Attack Moving Target Capability (DAMTC)

The Fiscal Year 2013 President's Budget requests $15.4 million for the second FRP order of 1,069 weapons. DAMTC was initiated as a Fiscal Year 2007 RDC in response to an urgent requirement identified by the combatant commander overseeing operations in Iraq and Afghanistan. The RDC has now transitioned to a formal program of record entering the Department's formal acquisition system at Milestone C. DAMTC provides a flexible, dual-mode weapon capable of precision guidance and attack on stationary targets through the weather, as well as reactive targeting and attack of moving and maneuvering targets in clear weather. The material solution for the DAMTC program is the Laser Joint Direct Attack Munition (LJDAM). The Laser JDAM leverages proven baseline JDAM technology and the existing JDAM logistics infrastructure mitigating life-cycle support costs.

Joint Air-to-Ground Missile (JAGM)

The Joint Air-to-Ground Missile (JAGM) system is currently a Joint Department of the Army/Department of the Navy pre-Major Defense Acquisition Program with the Army designated as the lead service. The Government utilized full and open competition to initiate the Technology Development (TD) phase of the JAGM program. The originally planned 27- month TD phase is complete. In the TD Phase, the two contractors completed a Preliminary Design Review (PDR), wind tunnel and ground testing, and flight testing in support of initial Navy platform integration activities. The Services recognize that HELLFIRE capability and inventory issues need to be addressed and that the requirement for JAGM remains valid. Discussions are underway between the DoN, the Army and OSD on the path forward.

Responses to the Specific Questions
from the Tactical Air and Land Forces Subcommittee

Provide a discussion of the validated 1,240 DoN aircraft strike-fighter force structure inventory DoN requirement and the projected peak inventory shortfall through 2025

The 1,240 aircraft strike-fighter force is the projected DoN inventory needed to support the anticipated operational demand through the 2024 timeframe. The Navy inventory requirement of 820 aircraft supports - 40 active duty Strike Fighter Squadrons composed of 440 aircraft, and two reserve squadrons with 20 aircraft. In order to maintain the operational aircraft, support aircraft are required for aviator training, flight test, attrition reserve and the depot pipeline. This inventory projection is estimated based on historical averages and assumes 100 percent squadron entitlement (no productive ratio reductions) and does not account for potential future efficiencies gained from TACAIR Integration (TAI). Both services remain committed to TAI.

The Marine Corps TACAIR requirement is 420. To meet operational demands, commitments, and force structure reductions the Marine Corps will have 18 active and 2 reserve squadrons. Integral to our current force structure reductions, our tactical aviation squadrons were restructured to optimize the support they provide to the Marine Air Ground Task Force. The Marines increased their flexibility and responsiveness by increasing the number of 16 aircraft squadrons (from 7 to 9) thereby enabling tactical flexibility for simultaneous expeditionary afloat and ashore operations with current and future employment models. A total of 254 (234 active and 20 reserve) aircraft will be assigned to operational squadrons, 60 aircraft for training use, six aircraft for test and evaluation, and the remainder for pipeline maintenance and attrition replacement. The reduction in squadrons (24 to 20) will mitigate the previous risk of lower pipeline and attrition aircraft procurement by re-categorizing the reduced primary mission aircraft to fill the pipeline and attrition gaps.

The inventory projection is based on detailed projected and historical operational analysis, optimization of the JSF multi-mission capabilities, complete legacy TACAIR replacement by the F-35, and expected improvements in reliability, maintainability and survivability. The DoN defines the shortfall as the amount of aircraft by which operational requirement (force structure demand) exceeds the aircraft available for tasking. The Fiscal Year 2013 President's Budget request Strike Fighter Shortfall is predicted to peak at a manageable level below 65, and the DoN will continue to mitigate the Strike Fighter sustainment issue through the implementation of management, demand, and supply initiatives. Supply initiatives include service life extension of Legacy Hornets, procurement of additional F/A-18E/F Super Hornets, and new JSF deliveries. Management initiatives include the accelerated transition of Legacy Hornet squadrons into Super Hornets and the service life extension of 150 Legacy Hornets. Demand initiatives include reducing DoN expeditionary squadron size and modifying Joint Strike Fighter (JSF) transition plans.

These efforts, combined with a substantial decrease in Legacy Hornet utilization rates and changes to USMC force structure, resulted in a decrease in the projected shortfall despite the flattening of the F-35B/C ramp that moved 69 aircraft to outside the Future Years Defense Program (FYDP).

The Strike Fighter Shortfall is projected to fluctuate throughout the next 20 years. The Marine Corps will experience a majority of the projected shortfall in the next 10 years as it relies heavily on the F-35 procurement rates and the management of remaining service life on the F/A-18A-D. As legacy F/A-18 squadrons are reduced the service shortfall number must be considered in proportion to the primary mission aircraft inventory requirement. Due to a low number of F/A-18 squadrons in the 2023 to 2026 timeframe, the shortfall number associated with the USMC will have a more significant impact on those few remaining F/A-18 operational squadrons. In the years beyond 2020, the Navy will possess the majority of the shortfall as the F/A-18E/F reaches its service life limit.

The USN and USMC continue to adjust transition plans as F-35 procurement ramps are flattened. The Marine Corps is taking advantage of higher service life remaining in its AV-8B inventory by sliding them to the end of the transition, thus reducing the demand for F/A-18A-D in the later years. Sustainment and relevancy funding will be imperative to maintain the requisite operational capability throughout the 2020's.

Discussion of the service life assessment program being conducted to evaluate the feasibility of extending the service life of the F/A-18E/F to 9,000 and 12,000 flight hours and a description of the funding currently contained in the FY 2013-2016 FYDP for such program

The F/A-18E/Fs have flown approximately 30 percent of the total flight hours available at the 6,000 hour limit and this will not be adequate to meet operational commitments out to 2035. As a result, the three-phased F/A-18E/F Service Life Assessment Program (SLAP) commenced in 2008 will last through 2015. Its goal is to analyze actual usage versus structural test data to identify the feasibility of extending F/A-18E/F service life from 6,000 flight hours to 9,000 flight hours via a follow on SLEP. The Fiscal Year 2013 President's Budget includes a request for $95.8 million RDT&E (Fiscal Years 2013-2017) to support the F/A-18E/F SLAP requirement. One of the F/A-18E/F SLAP goals is to define the necessary inspections and modifications required to achieve 9,000 flight hours. No analysis has been conducted, nor is any currently planned to extend the F/A-18E/F service life to 12,000 flight hours. Other SLAP goals relate to increasing total landings, arrested landings and catapults beyond currently defined life limits. Phase A is currently underway and is developing methodologies to be used and assessing airframe, flight controls and subsystems. Phases B and C will continue those assessments along with landing gear and multiple fleet teardowns.

The F/A-18E/F SLAP is incorporating lessons learned from the F/A-18A-D analysis. The F/A-18E/F SLAP was started sooner in its life cycle than the F/A-18A-D SLAP, and encompasses the entire weapon system vice just the airframe. The F/A-18E/F SLAP also has the advantage of having a third lifetime of test cycles completed on multiple test articles providing detailed information on high fatigue areas early in the program. The Service Life Management Program

(SLMP) philosophy has also been applied to the F/A-18E/F fleet much sooner in its lifecycle than the F/A-18A-D, which will optimize Fatigue Life Expended (FLE), flight hours and total landings so that they all converge at approximately the same time, which should align aircraft service life with fleet requirements.

An update on the three phases of legacy F/A-18A-D airframe, major subsystems and avionics service-life assessment and extension programs, and a discussion regarding the estimated costs, implementation risks, schedule and depot capability in executing these programs;

The F/A-18A-D SLAP showed that the airframe can fly to 10,000 hours with significant modifications and inspections to maintain airworthiness. The inspection results to date have matched the previously briefed models. The F/A-18A-D aircraft have been kept operationally relevant through upgrades. Ongoing High Flight Hour (HFH) inspections are designed to extend service life beyond 8,000 flight hours.

SLEP goals of 10,000 flight hours will likely involve wholesale replacement of aircraft structure (center barrel, inner wings, etc.) as well as repairs and inspections. Squadron commanders manage each aircraft's service life (flight hours, wing root fatigue, landings, cat/traps) to ensure full utilization of available service life. The progress of the SLMP is reviewed periodically at the three-star level via the Naval Aviation Enterprise (NAE) process.

F/A-18A-D SLEP Phase B is complete and SLEP Phase C is now underway. Analysis thus far has revealed extensive areas of the airframe will require inspections and modifications to reach service life goals of 10,000 flight hours. To date there have been no SLEP modifications installed under SLEP Phase C as this activity is scheduled to begin in Fiscal Year 2012. Overall, the SLEP Phase C effort is on track per the current schedule, and is anticipated to complete in Fiscal Year 2018. HFH inspections have been ongoing for three years. Revisions to the HFH suite have been issued as a result of SLAP Phase I and II. Sixty-one (61) aircraft have completed the initial HFH inspection and 58 are currently in work.

The F/A-18A-D SLEP effort has utilized a phased approach since inception. This approach addresses the most critical airframe requirements first to ensure timely fielding of priority inspections and modifications. This approach reduces both airworthiness and cost risks.
The SLEP cost uncertainty analysis conducted by NAVAIR 4.2 cost estimators calculated a range of costs; the submitted budget request reflects the "most likely" costs for both labor and material. The phased approach allows for future program trade space to mitigate potential program-wide delays. Major subsystems and avionics are not a part of the SLEP effort. Capability upgrades are also not included; SLEP only extends the service life of the airframe. Upgrades are an independent cost, not associated with extending the service life.
The projected average cost per aircraft for a SLEP induction is $15.5M TY$ ($13.8M (APN5) and $1.7M (O&M,N)). Additional costs are $9.6M TY$ (APN5) per aircraft to address capability upgrades, obsolescence, and sustainment.

The DoN plans to conduct SLEP inspections/modifications at any one of six Fleet Readiness Center (FRC) Field or Industrial locations. Sufficient capacity exists to support the SLEP

program. The six locations include: NAS Lemoore, Lemoore, CA; NAS North Island, San Diego, CA; NAS Jacksonville, Jacksonville, FL; Boeing, Cecil Field, Jacksonville, FL; MCAS Beaufort, Beaufort SC; and NAS Oceana, Virginia Beach, VA. When practical, SLEP inspections/modifications will be done concurrently during major depot events such as Center Barrel Replacement modifications or during other scheduled maintenance events, and as dictated by the compliance requirements of the applicable Technical Directive.

In order to maintain a tactical advantage, procurement and installation of advanced systems will continue Joint Helmet-Mounted Cueing Systems (JHMCS), Multi-Function Information Distribution System (MIDS) and LITENING for USMC)) on selected F/A-18A-D aircraft. The Marine Corps is upgrading 56 Lot 7-9 F/A-18As and 30 Lot 10/11 F/A-18Cs to a Lot 21 avionics capability with digital communications, tactical data link, JHMCS, MIDS and LITENING.

The February 2012 Flight Hour and Inventory Report shows the average flight hours on DoN operational F/A-18 A-D models at 7,029, 6,320, 6,666, and 6,501 respectively.

A discussion on the health of the F/A-18A-F, EA-18G and AV-8B fleets;

F/A-18A-F, EA-18G

The F/A-18A-D has been a highly effective aircraft for the Navy and Marine Corps in OIF/OEF, and will continue as such in future conflicts. The F/A-18A-D aircraft have been kept operationally relevant through upgrades that include: Combined Interrogator Transponder to determine friend or foe, a JHMCS, MIDS, Link-16 data-link, advanced Integrated Defense Electronic Counter Measures, APG-73 radar and digital CAS. The aircraft was originally designed for 6,000 flight hours, and was recently extended to 8,000 flight hours by analysis. Extensions beyond 8,000 flight hours require inspections and/or repairs/modifications.

Although the F/A-18A-Ds are out of production, the existing inventory of 625 Navy and Marine Corps aircraft will comprise over half of Naval Aviations TACAIR force structure through 2013. They are scheduled to remain in inventory through the mid 2020s. The SLMP continues to monitor and improve the health of the legacy F/A-18A-D fleet through analyses of TACAIR inventories and the management of usage rates at the squadron level. 74 percent of the F/A-18A/D fleet has over 6,000 flight hours and 32 aircraft have over 8,000 flight hours. Service Life Bulletin 008 provided a service life extension increase to 8,000 hours. To meet USN and USMC operational commitments out to 2026 for active squadrons, and through 2029 for USMCR, the DoN will SLEP 150 aircraft to extend their service life to 10,000 flight hours.

The F/A-18E/F began FRP in 2000. Eighty percent of the total procurement objective has been delivered (453 of 565). IOC was achieved in September 2001. Fiscal Year 2013 President's Budget supports the thirteenth year of FRP. This installment includes planned procurement of EA-18G as follow-on to EA-6B (F/A-18E/F and EA-18G share a common Boeing production line). Production line shutdown is scheduled to begin in 2012 with the shutdown of long lead items suppliers. Multi-Year Procurement III (MYPIII) was approved on September 28, 2010.

Discussions are underway to extend MYPIII to include the procurement of 13 F/A-18E/F aircraft in Fiscal Year 2014.

The F/A-18E/F fleet has flown approximately 30 percent of the total flight hours available at the 6,000 hour limit and this will not be adequate to meet operational commitments out to 2035. As a result, the F/A-18E/F SLAP commenced in 2008 and will continue through 2015.

The EA-18G is in FRP. EA-18G is procured under F/A-18 MYPIII (Fiscal Years 2010-2013). Airborne Electronic Attack (AEA) Kits are procured via a separate contract. To date, 56 aircraft have been delivered; this represents 49 percent of the Inventory Objective of 114 aircraft. FRP was approved November 2009 and IOC was in September 2009. The Fiscal Year 2013 President's Budget is the last procurement year and completes the Navy's total EA-18G procurement of 114 aircraft. EA-18Gs in-service have flown approximately five percent of the 7,500 total flight hours per aircraft and are meeting all operational commitments.
To date, five squadrons have completed transition including all three active component expeditionary squadrons. First EA-18G squadron deployed in an expeditionary role in November 2010 in support of Operation New Dawn (OND) and redeployed in March 2011 in support of Operation Odyssey Dawn (OOD)/Operation Unified Protector (OUP) combat operations. First carrier based EA-18G squadron deployed on board the USS George H.W. Bush (CVN-77) in May 2011. The EA-18G will be employed "From the Sea" by the Joint Force Maritime Component Commander (JFMCC) to support Joint Airborne Electronic Attack (AEA) missions requested by the COCOM.

Our adversaries' expanded use of the electromagnetic spectrum has increased the Joint requirement for expeditionary AEA, while at the same time also increasing the operational necessity for the Carrier Strike Group to maintain its own organic AEA capability. While 114 EA-18Gs are sufficient, the current jamming pods (ALQ-99) on the EA-18G are obsolete and continued support for the Next Generation Jammer (IOC 2020) program development is required.

AV-8B

The current USMC inventory consists of 144 AV-8B aircraft. This number includes 16 TAV-8B trainers, five Day Attack, 35 Night Attack and 88 Radar aircraft. Of the total inventory, 35 aircraft (24 percent of USMC inventory) were out of reporting for PMI and special re-work during 2011.

The AV-8B was originally a 6,000-hour airframe. In 2010, PMA-257 transitioned to a Fatigue Life Expended (FLE) model that more accurately measures actual stress history on individual airframe components, enabling the airframe to fly beyond 6,000 hours. Fleet averages for Night Attack, Production Radar, and Remanufactured Radar variants of the Harrier are 28 percent, 18.8 percent, and 30.4 percent FLE, respectively. However, the AV-8B is currently experiencing an increasing number of required modification and obsolescence issues. Intangibles that will affect service life are aircraft component(s) that enter obsolescence or reach end of service life before the airframe planned fatigue life expended reaches 100 percent. Reduction in demand signal

may also cause proportional reduction in sub venders and supply contractors.

A discussion of current and future capabilities inherent in the F/A-18E/F that do not meet future Combatant Commander operational requirements for strike-fighter aircraft;

The F/A-18E/F is a highly capable aircraft designed to meet and defeat today's threats with growth potential for the future. The aircraft provides a 40 percent increase in combat radius, 50 percent increase in endurance, 25 percent greater weapons payload, three times more ordnance bring-back, and is five times more survivable than legacy F/A-18A/C models. The Super Hornet will be a complementary platform on the nation's carrier decks with the F-35C into the 2030s and will meet current and projected requirements, with planned investments in the Fiscal Years 2012-2016 and beyond. These investments in F/A-18E/F spirals, to include upgraded avionics and sensors, will ensure relevancy against emerging and future threats.

JSF and F/A-18E/F capabilities will be complementary, with an ideal balance of versatility, lethality, survivability, and capacity that will pace the threat through 2030. A mix of the two aircraft in future carrier air wings represents an affordable, timely solution to the strike-fighter shortfall and provides conventional conflict analysis validated, combat capability and capacity to support foreseen carrier strike group mission requirements through 2030.

A discussion regarding all issues, associated risks, feasibility, costs and schedule of integrating the F-35B and F-35C aircraft into L-Class and CVN-Class ships for forward deployed operations, and when changes to L-Class ships will be made to support the forward deployability of the Marine Corps' planned IOC date for the F-35B.

In October 2011, F-35B (STOVL variant) testing aboard the USS WASP (LHD-1) was completed. Seventy-two Vertical Landings (VL) and Short Take-Offs (STO) were conducted with the following results: thermal and acoustic data was consistent between landings and aligned with predictions; temperatures, displacements and strains all remained below limits for a single VL; data was obtained for critical multiple-landing (quick-repeat) VLs. The on-going data analysis is expected to improve predictions of operationally-relevant ship impacts. To date, the ship alterations required to integrate F-35B (STOVL variant) into LHA and LHD-Class ships are as listed (with no known show-stoppers for F-35B operations aboard LHAs and LHDs):

- F-35B L-Class "Cornerstone" Alterations: There are eight known modifications required to provide necessary electrical servicing upgrades, expanded weapons handling and storage, provision for the F-35B Autonomic Logistics Information System (ALIS), secure access facilities, deployable mission rehearsal training (DMRT), and relocation of the flight deck tramline for flight safety. The tramline modification was completed to support DT-1 flight testing. The remaining "cornerstone" ship alterations will commence on USS WASP (LHD 1) in September 2012 (estimated).
- F-35B L-Class "External Environment" Alterations: These are the design changes necessary to protect external equipment from the effects of downwash and exhaust impingement during takeoff and landing evolutions. These alterations will be completed once all DT data has been analyzed.
- L-Class Cornerstone Alterations started with the USS Bonhomme Richard in Calendar Year 2011 and will finish with the USS Bataan in Calendar Year 2021.

- L-Class "External Environment" Alterations will start with the USS Wasp in Calendar Year 2013 and will finish with the USS Bataan in Calendar Year 2021.
- USMC, CFFC, and OPNAV are conducting planning to ensure a JSF capable L-Class ship is available in the western Pacific theater in 2017, when VMFA-121 permanently relocates to MCAS Iwakuni.

Regarding alterations required to integrate F-35C (carrier variant) into the CVN 68 Class and CVN 78 Class aircraft carriers, the following is provided:

- Initial analysis has been completed and modifications required for F-35C integration on CVNs are actively being developed to maturity or are being installed (with no known show-stoppers). They include: electrical servicing upgrades, expanded weapons handling, construction of secure access facilities, Autonomic Logistics Information System (ALIS), mission rehearsal training, Joint Precision Approach and Landing System (JPALS), thermal effect mitigation (additional Jet Blast Deflector (JBD) side-panel cooling), Li-Ion battery facility, canopy explosive HAZMAT storage, noise abatement and aircraft specific maintenance shops and services modifications.
- Current modeling analysis of land-based test results conducted in 2011 indicate that additional JBD side-panel cooling modules and orifice adjustments will be required to manage thermal impacts of jet exhaust at afterburner limited (ABLim) thrust setting.
- Required CVN modifications will be incorporated into CVN 68 (NIMITZ) Class aircraft carriers during planned maintenance availabilities in advance of F-35C arrival. All known modifications have been incorporated into CVN 78 Class design except additional JBD side-panel cooling, Li-ion battery facility, canopy explosive HAZMAT storage, and aircraft specific maintenance shops and services modifications, which will be incorporated into the ship prior to F-35C deployment.

A discussion regarding the analysis and probability of when the F-35B and F-35C are scheduled to declare Initial Operational Capability as it relates to the restructured System Development and Demonstration (SDD) delay resulting from the recent technical baseline review.

The IOC dates for F-35B and F-35C has not yet been determined by leadership. The Navy and Marine Corps require Service specific operational capabilities as defined in the F-35 Operational Requirements Document (ORD) prior to considering declaration of IOC. Achieving these capabilities are event driven and dependent upon the progress of the re-baselined F-35 program.

For the F-35B, the Marine Corps requires: One squadron of ten F-35B aircraft with required spares, ground support equipment, tools, technical publications, and a functional ALIS (including peripherals); one squadron manned with trained/certified personnel capable of conducting autonomous operations; F-35B aircraft with the requisite performance envelope, mission systems, sensors, and weapon clearances (Block 2B); home base supporting infrastructure and facilities ready and capable of supporting and sustaining operations; qualifications/certifications required for deploying on F-35B compatible ships and to austere expeditionary sites; the ability to execute the TACAIR directed mission sets; and Joint Program Office and F-35 contractor procedures, processes, and infrastructure capable of sustaining operations of the IOC squadron. The reduced ramp rate has delayed the completion date of the

Marine Corps' transition to the Joint Strike Fighter by over four years. The Marine Corps' IOC is event driven based on key operational and sustainment capabilities required to support operations.

For the F-35C, the Navy requires: One squadron of ten F-35C aircraft with full stealth and ORD compliant avionics/weapons capabilities (Block 3F) with the capability to execute the F-35C's primary mission sets; functional ALIS (including peripherals) and carrier integration modifications in place to support CVN deployments, airworthiness and flight deck certifications; trained aircrew, maintainers, and support personnel; and SDD/OPEVAL complete and Joint Program Office/F-35 contractor procedures, processes, and infrastructure capable of sustaining operations of the F-35C IOC squadron.

A discussion of the known risks and issues specifically related to the DoN regarding the development, fielding and deployment of the Autonomic Logistics Information System for sustaining the F-35 as it relates to maintenance and logistics operations

F-35 Autonomic Logistics Global Sustainment is built concurrently with the aircraft and ALIS is being used to support flight test operations today. As with any new system, there has been a learning curve associated with this new logistics support system and it is expected to continue. Currently, the Department is managing all key risk items. An overview of the primary ALIS issues and risks affecting the DoN are:

- Fielding of ALIS Software Release 103 to support Block 1B aircraft and beyond. At present the ALIS Release 103 schedule is at risk due to Certification & Accreditation (C&A) and data quality concerns. PEO(JSF) is working closely with the OEM and air system C&A experts to mitigate the C&A issues. An element of this mitigation involves implementing an interim solution involving workarounds, based on an updated release of ALIS 102 that will sustain Block 1B aircraft at Eglin AFB. With regard to data quality, ALIS functionality is dependent upon the provision of accurately structured and populated logistics data (e.g., Air Vehicle Sustainment Data Build, Bill of Material). At present, the DoN has identified a number of data quality shortcomings that are being addressed by the OEM and PEO(JSF) personnel and manual workarounds have been instituted; permanent resolution of these issues is expected by second quarter CY2013. We expect the first release of ALIS 103 to commence Flight Test assessment at Edwards AFB during the week of March 5, 2012; ALIS 103 will provide the initial integrated sustainment solution covering a range of capabilities including Maintenance, Supply Chain, Customer Relations Management and Mission Planning Support.

- DoN ALIS Deployment Suitability: PEO(JSF) is currently managing a USMC instituted initiative in regards to the deployment suitability of the existing ALIS baseline design. The strategy to ensure functional deployability includes a three phase program of effort to develop Deployable ALIS. The initial requirements analysis and definition phase of this project will conclude in March 2012 and the second phase conducts technology risk reduction studies and is currently in progress, scheduled to conclude this year. Phase III, the engineering design activity effort, is projected to commence in early 2013 with a

target of producing a prototype for initial assessment by late 2014, and a production standard design by mid 2015.

- Successful Integration of Propulsion System Sustainment into ALIS: Currently the Propulsion System is managed by the OEM utilizing an independent contractor sustainment application. This is a recognized temporary solution pending the fielding of the appropriate ALIS capability. However, retirement of this capability is dependent upon the resolution of Air Vehicle and Off-Board system related integration challenges. An element of this is the incorporation of appropriate functionality to sustain the F135 engine in ALIS. The prime system integrator, and the engine OEM are in the process of defining the remaining actions necessary to successfully integrate propulsion sustainment by the end of CY2012. Achievement of this task is a priority for the Program and carries moderate to high schedule risk.

An update on the V-22 procurement program and contractor performance, and performance of the MV-22 during Operations Iraqi and Enduring Freedom;

The V-22 program continues to perform extremely well in the field and in production. Under the current MYP I contract, industry delivered 34 V-22s (28 MV/6 CV) during CY 2011 – all were delivered on or ahead of contract schedule. The first three MYP I lots are performing well and cost reduction initiatives are delivering expected results. The program is also on track to award a follow-on MYP contract (Fiscal Years 2013-2017) which will yield significant savings.

The V-22's strong performance in the field continues to be demonstrated on a daily basis with over 160 aircraft now fielded across the Marine Corps and Air Force Special Operations Command. The combined MV and CV fleet has accumulated more than 130,000 flight hours including 17 deployments since 2007, and the MV-22 has exhibited the lowest Class A flight mishap rate of any tactical rotorcraft in the Marine Corps over the last 10 years.

MV-22B squadrons redeployed from a successful 18 month combat tour in Operation Iraqi Freedom (OIF) in April 2009 having flown over 6,000 sorties, nearly 10,000 flight hours and transporting more than 45,000 passengers and 2.2 million pounds of cargo.

MV-22B squadrons supporting Operation Enduring Freedom (OEF) in Afghanistan and the Marine Expeditionary Units (MEU) aboard amphibious warships are seeing mission capable rates in the seventy percent range and are performing every assigned mission. Since deploying to combat operations in OEF, from November 2009 through September 2011, the MV-22Bs have flown 9,487 flight hours, carried 86,697 passengers, and delivered 3,680,174 lbs of cargo.

The effectiveness and survivability of this revolutionary, first-of-type MV-22B Osprey tilt-rotor has been repeatedly demonstrated in combat. The rescue of a downed F-15E airman during Operation ODYSSEY DAWN was an example of what the Navy and Marine Corps' expeditionary force brings to our nation. As an integral part of that seaborne presence, the MV-22B was able to transit over 130 nautical miles from the USS KEARSARGE to the objective area with unprecedented speed and agility. Twenty minutes from the time he was evading capture in hostile territory, the rescued pilot was safely back on American territory aboard the USS KEARSARGE.

An update on the efforts related to the V-22 program concerning the redesign, qualification, manufacturing and fielding of more reliable parts and subsystems and how it relates to planned goals for reducing current operations and maintenance costs;

Component/subsystem redesign is an integral part of the V-22 Program's plan for improving readiness and reducing operating costs. At the platform level, the V-22 continues to meet its KPP for reliability as set forth in the acquisition documentation, but continue aggressive efforts to improve component performance by analyzing inherent component reliability using the Critical Item Logistics Review (CILR) list. This disciplined, repeatable process has identified key components for improvement. Since July 2009, 27 component improvements have been incorporated and validated via on-aircraft performance with Mean Flight Hour Before Removal (MFHBR) improvements ranging from 50 percent to over 7000 percent improvement. At the aircraft level, this has translated into a 19 percent improvement in Mission Capable rates from Fiscal Year 2010 to Fiscal Year 2011. Eleven additional components with upgraded reliability are slated for incorporation/validation during 2012.

The V-22 Cost Per Flight Hour (CPFH) Reduction Team has been reducing costs through a four pillared approach targeted at improving Maintenance Practices, Maintenance Planning, Repair Capabilities and Contract Strategies and works closely with the R&M teams to incorporate the improved components noted above. These efforts yielded a 13 percent reduction in V-22 CPFH from Fiscal Year 2010 to Fiscal Year 2011 which will equate to billions of dollars in cost avoidance over the life cycle of the aircraft. This significant achievement in CPFH reduction was recognized by OSD awarding the V-22 CPFH Reduction Team with the prestigious David Packard Excellence in Acquisition Award.

An update on the E-2D Advanced Hawkeye program and whether the program is meeting current cost, schedule, risk and performance goals

The Fiscal Year 2013 President's Budget requests $119.1 million in RDT&E,N for continuation of SDD and $984.7 million in APN for five FRP Lot 1 aircraft and AP for Fiscal Year 2014 FRP Lot 2 aircraft. The E-2D Advanced Hawkeye is the Navy's carrier-based Airborne Early Warning and Battle Management Command and Control system. The E-2D provides Theater Air and Missile Defense and is capable of synthesizing information from multiple onboard and off-board sensors, making complex tactical decisions and then disseminating actionable information to Joint Forces in a distributed, open-architecture environment.

Utilizing the newly developed AN/APY-9 Mechanical Electronic Scan Array (MESA) radar and the Cooperative Engagement Capability (CEC) system, the E-2D works in concert with surface combatants equipped with the Aegis combat system to detect, track and defeat air and cruise missile threats at extended range and provide Battle Group Commanders required reaction time. This system-of-systems architecture, known as Naval Integrated Fire Control-Counter Air (NIFC-CA), provides vital force protection and allows the Navy to safely project forces into the littorals and overland to ensure access in contested areas.

The E-2D Advanced Hawkeye program is in the Production and Deployment phase after the DAB approved Milestone C in June 2009, at which time the program received authorization for procurement of the first two lots of LRIP aircraft [LRIP Lot 1 (two aircraft) and LRIP Lot 2 (three aircraft)]. The SDD flight test program is 100 percent complete and all KPP thresholds have been met. An Operational Test Readiness Review was successfully conducted on February 1, 2012, certifying entry into Initial Operational Test and Evaluation (IOT&E), and IOT&E will continue through August 2012. Both LRIP Lot 1 aircraft were delivered in 2011, and delivery of the three LRIP Lot 2 aircraft will be completed in 2013. A DAB for approval to procure the final two lots of LRIP aircraft, Lots 3 (five aircraft) and 4 (five aircraft), as well as AP for FRP Lot 1, was successfully held on in March 2011 and the respective contracts have been awarded. LRIP Lots 3 and 4 aircraft will be delivered in 2014 and 2015, respectively. From a cost standpoint, the Estimate at Complete (EAC) has been stable for over 54 months and the program is on schedule for an FRP decision in the first quarter of Fiscal Year 2013. All major acquisition milestones have been achieved on or ahead of schedule since program inception in 2003.

Update on A-12 Litigation

The dispute over the 1991 termination for default of the A-12 program has been in litigation since June 1991. On appeal for the third time, on June 2, 2009 the Court of Appeals for the Federal Circuit affirmed the May 2007 judgment of the Court of Federal Claims that the Navy had properly terminated the contract for default. Plaintiffs/appellants sought a rehearing before the full Court of Appeals, but their requests were denied on November 24, 2009. The contractors sought and obtained Supreme Court review. On January 18, 2011, the contractors presented their argument that the impact of a state secrets privilege assertion upon default termination of the A-12 contract precluded the proper presentation of the contractors' superior knowledge affirmative defense. On May 23, 2011, the Supreme Court held that when a contractor's defense to the government's allegations of contractual breach is dismissed to protect state secrets, the proper remedy is to leave the parties where they were on the day that the contractor filed suit. At that point the contractors continued to hold $1.3 billion in unliquidated progress payments which the government allowed based on McDonnell Douglas's financial weakness at the time of contract termination and the contractors' intention to dispute the default determination. Entitlement to the $1.3B plus interest remains in dispute as the case was remanded to the U.S. Court of Appeals for the Federal Circuit for consideration of the question of whether the government was required to disclose its superior knowledge of stealth technology to the contractors. The Federal Circuit further remanded the case to the Court of Federal Claims for factual documentation and to address the government's arguments that it does not have an obligation to share its superior knowledge "with respect to highly classified information" or "when (as was the case here) the agreement specifically identified information that must be shared." The trial court must also determine if the issues can safely be litigated. Due to administrative complications for the parties, a briefing and argument schedule has not been established.

A summary of all Class A, B and C aviation-related safety issues, including recent mishaps, trends, and analysis occurring within the past year

Naval Aviation Summary (Navy & Marine Corps) - The table below provides a summary of all Class A, B & C Flight mishaps from Oct 2010 through February 29, 2012. The rates are based on total Flight Hours of 1,689,330.

YEAR	Flight Hours	Class A	Class A Rate	Class B	Class B Rate	Class C	Class C Rate
FY 11	1,226,979	16	1.30	15	1.22	73	5.95
FY 12	462,351	6	1.30	8	1.73	22	4.76

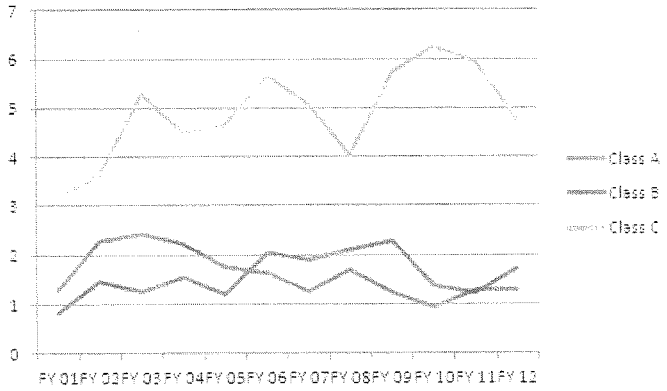
The most recent DON Flight Class A Mishaps include:

- 26 Feb 2012: (Bahrain) F/A-18C sustained dual bleed warning lights airborne. Aircraft recovered successfully.
- 24 Feb 2012: (Fallon, NV) F/A-18F crashed while on a routine training mission. Aircrew ejected. No injuries.
- 22 Feb 2012: (R-2507/Chocolate Mountains, CA) AH-1W and UH-1Y collided shortly after takeoff during night training mission. 7 fatalities.
- 19 Jan 2012: (Afghanistan) CH-53D crashed. 6 fatalities.
- 21 Dec 2011: (Bridgeport, CA) MH-60S crashed while conducting mountain flying in the Toiyabe National Forest. Crew sustained minor injuries.
- 02 Nov 2011: (NAS Kingsville) T-45C crew ejected during section takeoff. No fatalities.

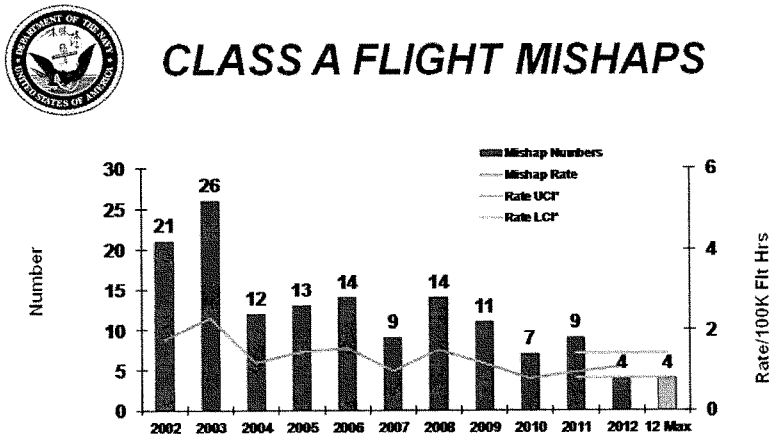
Recent DON Flight Related Mishaps (FRM) or Aviation Ground Mishaps (AGM) not included in above table or below Navy and Marine Corps charts:

- 29 Oct 2011: (Gulf of Aden) Post flight inspections on multiple AV-8B aircraft revealed impact damage to compressor blades. (AGM)

DON Historical Mishap Rate Trend per 100K Flight Hours
(as of February 29, 2012) per Mishap Class



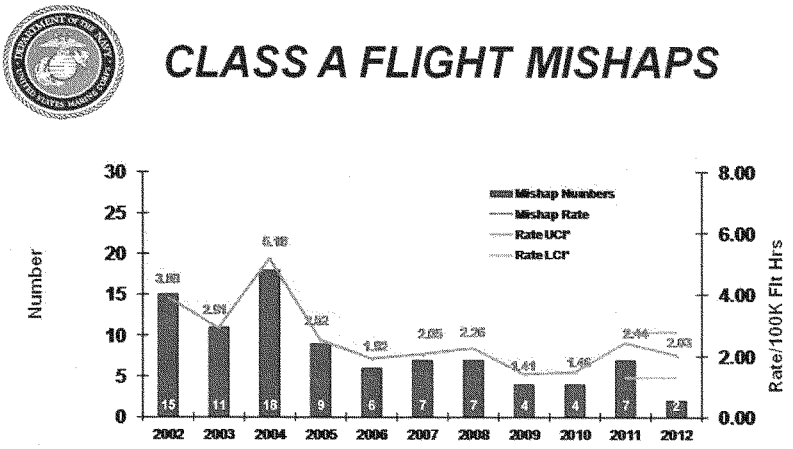
Class A Flight Mishap historical data for U.S. Navy



	29-Feb-12	28-Feb-11
CLASS A MISHAPS/MISHAP RATE FY COMPARISON:	4/1.09	2/0.55
FY11 MISHAPS/MISHAP RATE:	9/0.96	
10-YEAR AVERAGE (FY02-11) MISHAPS/MISHAP RATE:	13.60/1.36	

*see last slide for definition of UCI/LCI and FY12 Max explanation

Class A Flight Mishap historical data for U.S. Marine Corps



	29-Feb-12	28-Feb-11
CLASS A FM/FM RATE FY COMPARISON:	2/2.03	0/0.00
FY11 MISHAPS/MISHAP RATE:	7/2.44	
10-YEAR AVERAGE (FY02-11) MISHAPS/MISHAP RATE:	8.80/2.60	

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
U.S. HOUSE OF REPRESENTATIVES

SUBJECT: Air Force Tactical Aviation Programs

COMBINED STATEMENT OF: Major General James M. Holmes
Assistant Deputy Chief of Staff for Operations,
Plans and Requirements

Major General John D. Posner
Director of Global Power Programs, Office of the
Assistant Secretary of the Air Force (Acquisition)

March 20, 2012

NOT FOR PUBLICATION UNTIL RELEASED BY
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
U.S. HOUSE OF REPRESENTATIVES

I. Introduction

Chairmen Bartlett, Ranking Member Reyes and distinguished members of the subcommittee, thank you for the opportunity to provide you with an update on the Air Forces' tactical aviation, Intelligence, Surveillance and Reconnaissance (ISR), and Remotely Piloted Aircraft (RPA) programs. The Air Force remains fully engaged worldwide, supporting the Combatant Commanders requirements and executing our National Strategy.

Finding the proper balance between force structure, readiness and modernization is our guiding principle. While we will be smaller force, we will maintain the agility, flexibility and readiness required to meet our commitments to the Combatant Commander's as well as continue to modernize and grow more capable in the future. The service protected our distinctive capabilities fundamental to the priorities of the new strategic guidance: control of air, space and cyberspace; global intelligence, surveillance and reconnaissance; rapid global mobility and global strike -- all enabled by effective command and control.

II. Current Environment and Operations Update

Today, the Air Force flies and fights in air, space, and cyberspace--globally and reliably--as a valued member of our Joint and Coalition teams. Over 30,000 Airmen are deployed across the globe, including over 23,000 in the U.S. Central Command Area of Responsibility, with another 134,000 "committed in place" to defend the homeland, command and control our nuclear forces, operate remotely piloted aircraft, and support other Combatant Commander requirements. The Air Force is an active partner in Defense Department planning that will shift our emphasis from today's wars, to the broader range of challenges and opportunities posed by the President's strategic guidance, particularly in the Asia Pacific region. Be assured that Soldiers, Sailors, Airmen and Marines who deploy in support of our global commitments will do so with an Air Force that is agile, flexible, ready, and technologically advanced. Last fiscal year alone, Air Force global precision attack aircraft flew over 24,000 sorties and 110,000 hours in support of Overseas Contingency Operations,

Since September 11, 2001 your mobility air forces have executed more than 440,000 airlift sorties, moving more than 3.6 million tons of cargo and nearly 6.9 million passengers in support

of Operation ENDURING FREEDOM, Operation IRAQI FREEDOM and then NEW DAWN. Your combat air forces simultaneously provided top cover and weapons on target with another 162,000 sorties supporting those same operations. Aeromedical evacuation crews surged to complete nearly 180,000 patient movements, averaging 52 per day. On the home front, Air Force fighter, air refueling, and early warning aircraft have flown almost 62,000 total sorties supporting Operation NOBLE EAGLE. As a testament to the capability of our Total Force, the Air National Guard and Air Force Reserve have flown more than 65 percent of these sorties with the Air National Guard currently operating 17 of 18 Aerospace Control Alert sites across the United States.

As we transition to support the new Defense Strategy, we must carefully balance our force between the active and reserve components to maintain what will be a smaller Air Force at a higher state of readiness. One part of the solution will be to pursue Active Associations with many Air Reserve Component units, combining active duty and reserve component airmen on the same operational team.

We will also maintain readiness with our 4th generation fighter fleet while remaining committed to an events-based schedule to ready the F-35A fleet for training. Furthermore, we expect the high demand for Air Force ISR will remain firmly in place and we plan to meet this demand and sustain global operations with a combination of both manned and unmanned aircraft. We continue to rely heavily on the multi-intelligence, high-altitude capabilities of the U-2 which has averaged some 15 to 16 thousand flight hours per annum for more than 5 years. Although the FY13 PB divests the RQ-4 Global Hawk Block 30 fleet, the RQ-4 Block 40 will augment the U-2's multi-spectral imaging and other unique capabilities, by providing sustained, persistent intelligence, surveillance and reconnaissance with a robust Ground Moving Target Indication capability.

The MC-12W Project Liberty aircraft remain heavily engaged in Iraq and Afghanistan and flew over 17,000 missions in 2011. The Air Force is fulfilling the CENTCOM requirement for thirty deployed Project Liberty aircraft. An additional seven aircraft remain in CONUS as trainers at

Beale Air Force Base as we prepare to transition the majority of this important ISR mission to the Air National Guard starting in Fiscal Year 2014.

The Air Force continues to work towards meeting the current strategy laid out by the President and the Secretary of Defense, while operating in a more fiscally constrained environment. The FY13 PB retains critical core capabilities and maintains the Air Force's ability to rapidly respond to global mission demands. It requires the Air Force to balance risk, modernization and force structure reductions with a commitment to maintain readiness and take care of our people. We stand ready to support the Department's efforts to meet the demands of the U.S. National Security Strategy.

III. Force Structure and Modernization

Fighters

In 2011, Air Force analysis indicated a fighter force structure of 1,200 primary mission aircraft and 2,000 total aircraft were required to execute the National Military Strategy (NMS) with some risk. The new strategic guidance combined with new fiscal constraints required the Air Force to balance risk across its core functions. Current analysis estimates fighter force structure demand at approximately 1100 primary mission aircraft and approximately 1900 total fighter aircraft to carry out the NMS with increased risk. Additionally, the Air Force previously reported a fighter force shortfall in both the near and mid-term. We aggressively pursued mitigating efforts to meet force structure requirements. The most significant efforts involved closely monitoring F-35 production and increasing production as capability matures, and 4th generation sustainment and modernization. The F-35 program status remains the key variable in the fighter force structure as the Air Force transitions to a fifth generation fighter force. Current Air Force mitigation options preserve decision space as we carefully monitor program status and impending decision points.

As directed, to develop the FY13 PB the Air Force accepted risk in our Combat Air Forces by retiring or reclassifying aircraft from seven squadrons: five A-10 squadrons, one F-16 squadron, and one training/support coded F-15 Aggressor squadron. We chose to retire more A-10s as a result of guidance to size our forces for one large scale combined arms campaign with sufficient

combat power to also deny a second adversary, without conducting a large scale, prolonged stability operation. The A-10 remains essential for combined arms and stability operations and we retain enough A-10s to meet the requirements of the new strategic guidance, but multi-role platforms provide more utility across the range of the potential missions for which we are directed to prepare. After reductions, we retain 54 combat-coded fighter squadrons and maintain the capabilities and capacity required to meet the requirements of new strategic guidance at increased risk while providing a bridge to the Fifth Generation F-35.

A-10

The A-10 provides our Joint Force Commanders responsive, lethal, precise, and persistent firepower for close air support and combat search and rescue. It has been a steady, stellar performer in all recent conflicts. Notably, the A-10's very high operations tempo and advanced age present substantial sustainment challenges. Reflecting this, the A-10's FY11 aircraft availability rate was 59 percent.

The Air Force plans to retain 242 A-10s through 2030. The FY13 PB invests approximately $205M across the FYDP to fund A-10 modernization, sustainment, and life extension programs. Following completion of the Precision Engagement modification in FY11, all previously designated "A" model aircraft were designated as the A-10C. The Precision Engagement upgrade gives the venerable A-10 the ability to deliver the newest and greatest complement of weapons than was ever available before, through the integration of targeting pods, digital data links and global positioning systems. Installation of the Helmet Mounted Cueing System, beginning in FY12, will provide increased situational awareness to the pilot. Further, installation of the first of the new replacement wings began in FY11, an essential program for the long-term structural longevity of the airplane. Other updates include a replacement portable maintenance tester and improved turbine and aircraft monitoring systems used to monitor structural fatigues and stresses. Emphasis on the continued health and upgrades will ensure the A-10 excels at close air support for the next two decades.

F-16

Our primary multi-role F-16 comprises 50 percent of the current fighter fleet. The FY13 PB invests approximately $1.4 billion across the FYDP for F-16 modernization, life extension, and continued sustainment to meet critical warfighter needs to 2025 and beyond. The majority of the efforts to accomplish this across the FYDP will focus on the Legacy Service Life Extension Program (SLEP) and Combat Avionics Programmed Extension Suites (CAPES) modernization program for 300 aircraft, with the intent of reaching 350 aircraft. The requirement for the legacy SLEP is highlighted by bulkhead cracks found in approximately 73 percent of our Block 40/52 F-16 aircraft.

Legacy SLEP will extend airframe structural service life by approximately 25 percent from the current 8,000 hours to 10,000+ hours, adding about six to eight years. The FY13 PB request adds $8.8 million to continue design and development of structural modification kits for the Block 40-52 fleet to be responsive to the Air Force's total fighter requirement. Additionally, the Falcon Structural Augmentation Roadmap (STAR) program, which replaces known life-limited structural components and maintains the original design airframe life of 8,000 actual flight hours, has been rephrased to complete in FY15.

The FY13 PB adds $69.7 million in development, with a total of $526 million in development and procurement funding laid in across the FYDP for F-16 CAPES. This will allow for the development of capabilities for advanced electronically scanned array (AESA) radar, a new center cockpit display unit, data link enhancements and an improved electronic warfare defensive suite upgrades. These avionic upgrades will keep the F-16 Block 40-52s relevant in the threat environment beyond 2025 until replaced by the F-35 Joint Strike Fighter.

Currently the F-16 aircraft availability is 64.9 percent and in FY11was 66.1 percent. F-16 fleet aircraft availability dropped 4.9 percent since FY05. Drivers to the reduced availability include the Falcon STAR (all blocks) structural integrity program, engine inlet ram (all blocks), lower wing skin cracking (blocks 25/30/32), and aft cockpit corrosion for two seat aircraft. We expect these drivers to continue to impact aircraft availability through FY15.

F-15 C/D

The FY13 President's Budget (PB) invests approximately $1.7 billion across the Fiscal Year Defense Plan (FYDP) on modernization and sustainment programs for the F-15C/D fleet. We project the F-15C/D fleet will remain viable until 2030-2035 with potential for an airframe service life extension following full-scale fatigue testing. This test is underway and will conclude in 2014. The Air Force manages the fleet through scheduled field and depot inspections under an individual aircraft tracking program. In FY 2011, the F-15C/D's aircraft availability was 55.9 percent.

We continue to modernize our F-15C/D fleet with Active Electronically Scanned Array (AESA) radars, and a more capable aircraft mission computer. We expect these efforts to enable 175 F-15C/D aircraft to operate safely and effectively through at least 2035 as determined by the full-scale fatigue test. We may extend the long-term status to the entire 249 aircraft inventory based on requirements of the future force structure.

F-15E

The F-15E fleet continues to provide support for on-going operations. Aircraft availability for the F-15E in FY 2011 was 64.9 percent.

The FY 2013 President's Budget investment across the FYDP is approximately $2.1 billion for F-15E modernization and sustainment programs. This includes integrating the latest precision weapons to hit targets accurately and reduce collateral damage, and adding a helmet mounted cueing system for all front seat cockpits that will reduce the F-15E's time to engage a target. Finally, we are adding a state-of-the-art AESA radar system that advances capabilities to identify and engage targets. The Air Force expects the F-15E to be an integral part of the Nation's force through at least 2035. A full-scale fatigue test, due to be complete in 2015, will provide data regarding the feasibility of a service life extension.

Fifth Generation Fighters

Fifth generation fighters such as the F-22A and F-35 are key elements of our nation's defense and deterrent capability. These aircraft are necessary to maintain a margin of superiority which permits our air, sea, and ground forces freedom of maneuver and attack. They each possess unique, complimentary, and essential capabilities that provide synergistic effects across the spectrum of conflict. Legacy fourth generation aircraft simply cannot survive to operate and achieve the effects necessary to win in an integrated, anti-access and area denial (A2/AD) environment.

F22

The F-22 is the only fielded U.S. fighter capable of operating in A2/AD environments. F-22 attributes of stealth, super cruise, integrated avionics and sensors combine to deliver the Raptor's unique operational capability in A2/AD environments. F-22 modernization is required to counter threat advancement efforts that specifically target F-22 attributes. Accordingly, F-22 modernization is consistent with DoD Strategic Guidance to "invest as required to ensure [the] ability to operate effectively in A2/AD environments".

Focused on maintaining operational superiority against the advancing threat, the FY13 PB request for F-22 modernization investment includes $512M RDT&E plus $333M procurement in FY13. Modernization increment 2.0 is fielded now on the combat-coded F-22 fleet and will be the final (very capable war fighting) configuration of the F-22 training fleet at Tyndall AFB. Increment 3.1 initial operational capability (IOC) is scheduled to occur April 2012, delivering advanced air-ground capabilities including SAR ground mapping, threat geolocation, and SDB carriage. Increments 3.2A/B, fielding in 2014/2018 respectively, will deliver advanced electronic protection and combat ID, AIM-120D and AIM-9X missiles, and significantly-improved ground threat geolocation.

F-22 production is complete—the last Raptor is scheduled to be delivered in early May 2012, completing the program of record of 187 aircraft. The final F-22 fleet will include 139 combat coded Block 30/35s, 32 training Block 20s, 12 Developmental Test/Operational Test Block 20/30/35s, and 2 pre-block test aircraft. The production line is shut down with no plan for restart

at any time. Accordingly, all government-owned production tooling is being stored for F-22 sustainment purposes only.

The F-22 fleet stood down May-Sept 2011 while safety issues associated with delivery of adequate breathing oxygen to pilots were investigated. Purpose-built Safety Investigation and Science Advisory Board (SIB/SAB) investigations were not able to determine root cause but informed development of technical and procedural mitigations which enabled a safe return to flight (RTF). Over 7000 sorties have been flown since return to flight. RTF mitigations allowed 8 in-flight oxygen-related incidents to be resolved safely. Since the stand down, the F-22 fleet transition from production to sustainment has been marked by a solid improvement in operational availability (Ao)—growing from ~59% Ao for CY2011 to ~66% Ao in Jan 2012.

F-35

During FY12 the Air Force will continue the balanced approach across the global precision attack portfolio used in FY11 by prioritizing investment in fifth-generation aircraft while sustaining legacy platforms as a bridge to the F-35 Joint Strike Fighter.

The multi-role F-35A is the centerpiece of the Air Force's future precision attack capability. In addition to complementing the F-22's world class air superiority capabilities, the F-35A is designed to penetrate air defenses and deliver a wide range of precision munitions. This modern, fifth-generation aircraft brings the added benefit of increased allied interoperability and cost-sharing across Services and eight partner nations. The FY13 PB includes approximately $5 billion for continued development and procurement of 19 F-35A, conventional take-off and landing (CTOL) aircraft. In response to continued program cost growth, lagging production performance, and escalating concurrency modification costs, we reduced the program of record by 179 aircraft, 98 of those are USAF F-35A CTOL aircraft, over the FYDP in the FY13 PB. The reduction of F-35 quantities in the FYDP realigns the pace of production to balance the need for a stable industrial base with the realities of increasing concurrency modification costs and a resource-constrained fiscal environment. Finally, the FY13 PB suspended F-35 dual capable aircraft (DCA) funding until the program is mature enough to support DCA integration.

During calendar year 2011, the F-35 program team achieved a number of significant milestones, including: delivery of six training aircraft to Eglin AFB; achieving the 1,000th CTOL flight hour; performing the first successful fuel transfer from a KC-10 tanker; reaching over 450 CTOL flights for the year; rolling-out the first partner nation (UK) short take-off and vertical landing (STOVL) aircraft from the production line in November 2011; and completion of academic and simulator requirements by the first two U.S. Air Force pilots at the Academic Training Center (ATC). They performed instructor pilot monitored engine runs in AF-9 to become the first operational, engine run qualified CTOL pilots.

Intelligence, Surveillance and Reconnaissance

Recognizing the need for continued and improved ISR capabilities, and based on the 2011 ISR review, the Air Force is investing $7.1 billion in this core function in FY13. In our ISR aircraft fleet, we plan to divest all 18 RQ-4 Global Hawk Block 30 aircraft and retain the U-2S Dragon Lady program. Sustaining the U-2 fleet will ensure affordable and sustained high altitude ISR capabilities. Transferring the MC-12W Liberty from the Active Component to the Air National Guard (ANG) reflects the assessment that the ANG is the appropriate place for long-term, scalable support of medium altitude ISR. The Active Component will retain association with the ANG units. The MC-12W will also perform the mission of the divested RC-26 fleet. We are continuously improving the current suite of capabilities and will field the MQ-9 Reaper to meet delivery of 65 RPA combat air patrols (CAPs) by May 2014. We are actively managing our procurement rate of MQ-9s to efficiently increase RPA fleet size while allowing for necessary aircrew training.

U-2

The U-2S weapon system, consisting of the aircraft, sensors, data links, and ground stations, provides near real-time intelligence to support operations across the spectrum of conflict. The U-2S combines high-altitude over-flight and stand-off sensor capabilities with long endurance to provide deep look access, long dwell, and moderate survivability for penetration of defended airspace. Equipped with some of the most advanced sensors, the U-2S collects and reports photographic, electro-optical, infrared and radar imagery in addition to electronic and communications signals information. State-of-the-art data link systems enable U-2S reach back

operations from anywhere in the world. The FY13 PB maintains the U-2S, which is projected to remain viable until at least 2040.

RC-135

The RC-135 program provides rapid, adaptable, worldwide multi-intelligence collection, processing, and near-real-time reporting. The RC-135 is tasked across the full spectrum of military operations to monitor political, economic, and military actions of potential adversaries as part of Joint Task Force operations and JCS Sensitive Reconnaissance Operations (SRO). It can assess enemy intentions and determine technological capabilities by intercepting and exploiting vital intelligence information.

The RC-135 program consist of three unique models of 22 aircraft including 17 RC-135V/W RIVET JOINT , 2 RC-135U COMBAT SENT and 3 RC-135S COBRA BALL. The RIVET JOINT is a manned, medium-altitude, airborne SIGINT reconnaissance system, providing self-contained collection, processing, and near real-time dissemination via voice, text, and tactical data links. The COMBAT SENT is DoD's only Scientific and Technical ELINT collection airborne platform, while the COBRA BALL supports treaty verification and WMD proliferation.

The RC-135 program uses a spiral development process that results in a Baseline (BL) modernization strategy. This modernization strategy provides incremental improvements in capability to pace adversarial communication and weapons system technology advancements. A viability study conducted in 2008 concluded the RC-135 fleet was viable until at least 2040.

The newest baseline (BL10) delivers this month. BL10 represents the largest technological refreshment in the program's history. The main enhancement introduced by Baseline 10 will be the CORVUS system. CORVUS is a replacement of the RIVET JOINT's primary ELINT system.

The RC-135 program is in the process of integrating Wideband Global Satcom (WGS) onto the aircraft. WGS will provide a DoD dedicated, high-capacity, BLOS communications link; increasing near real-time PED capacity. The first WGS capable aircraft is scheduled to deliver in FY13.

The first of three United Kingdom RIVET JOINT aircraft are currently in depot undergoing conversion from a KC-135 to an RC-135. The aircraft is on schedule to deliver 1st quarter of FY14. The RIVET JOINT Cooperative Program strengthens our ISR partnership with our closest ally.

The RC-135's continue to be an integral part of the Air Force's commitment to provide ISR support to warfighters and COCOM's. RC-135's flew over 18,000 hours in 2011, including over 9,000 hours of tactical ISR support to Operations ENDURING FREEDOM and UNIFIED PROTECTOR. In addition to providing tactical ISR support the RC-135's continue to conduct strategic SRO missions across the globe.

MC-12

The MC-12W continues to be a major acquisition and operations success for the Air Force. The Liberty Project Aircraft were the result of the SECDEF's direction to surge more full motion video capability into Iraq and Afghanistan. The first MC-12W was delivered to the Air Force in June 2009, seven months after receipt of funding and deployed to Iraq less than 30 days later. Deployments to Afghanistan began in December 2009.

To date, 42 Liberty aircraft have been delivered to the Air Force. In 2011 alone, the MC-12W fleet amassed more than 13,000 combat sorties, providing critical full motion video and Signals Intelligence to the warfighter. The Air Force will continue fleet wide system upgrades to include high definition full motion video sensors and enhanced data links. The Liberty program is a true success story; the benchmark for rapid acquisition.

The Air Force FY 2013 budget retains core capabilities and maintains the Air Force's ability to rapidly respond to global mission demands. It requires the Air Force to balance modernization and force structure reductions with a commitment to maintain readiness and take care of our people. To align with the new defense strategy the Air Force will transfer MC-12W from the Active Component to the ANG and divest 11 RC-26 aircraft. Additionally, the Air Force will establish an Active Associate unit to conduct Formal Training Unit operations and to augment the ANG's deployed mission. Transferring the MC-12 to the ANG allows the Air Force to maintain state-of-the-art ISR capability and avoids heavy investment in a similar capability. This

change ensures continued deployed ISR capability as well as the viability of domestic response and DoD support to civil authorities and Homeland Defense missions.

Remotely Piloted Aircraft

Long-dwell RPAs, such as the Predator, Reaper, Global Hawk and other systems, have proven to be invaluable for monitoring activities in contested areas, enhancing situational awareness, protecting U.S. and friendly forces, and assisting in targeting enemy fighters. The Air Force is committed to continue growing the capacity of combat air patrols (CAPs) of Predator and Reaper RPAs. Due to their remote split operating concept of keeping the flight crews in the CONUS, these systems are currently providing 57 CAPs from forward locations while maintaining a minimum forward personnel footprint.

MQ-1

The MQ-1 Predator is a medium-altitude, long-endurance, remotely piloted aircraft for providing battle space awareness with the ability to provide modest armed over-watch and reconnaissance against critical, perishable targets. It carries two AGM-114 Hellfire missiles. MQ-1B production was completed in March 2011.

As the result of the decision to transition to an all MQ-9 RPA fleet, the Air Force elected to complete current modification efforts on the MQ-1B Predator system, but cease future development efforts. Current efforts will complete equipping the Predator with high definition video and hyper-spectral sensors, and install the capability to deliver the latest version of the AGM-114 Hellfire missiles.

Predator is an integral part of the Air Force's plan to provide 65 continuous CAPs, with further capability to surge to 85 CAPs. Today, Predator is providing 35 of 57 (MQ-1 / MQ-9) CAPs and will continue in this partnership role through FY23.

MQ-9

The MQ-9 Reaper is a multi-role remotely piloted aircraft capable of providing battle space awareness, armed over-watch and light strike against critical, emerging time sensitive targets with self- contained hard-kill capability.

The FY13 PB reduces the MQ-9 aircraft procurement rate from 48 in FY12 to 24 per year in FY13 and beyond to more effectively match MQ-9 aircraft force structure with aircrew force structure and training capacity. The FY13PB continues to fund development efforts for aircraft, ground control station, communication, and sensor system upgrades.

The current limiting factor to standing up and sustaining additional MQ-9 CAPs is trained aircrew personnel, not hardware. In past years, the Air Force utilized the instructor force to meet multiple operational CAP surge requirements. The AF is now reconstituting our training force structure and capacity over the next year in order to train the next round of aircrew personnel to enable continued growth and sustainment of MQ-9 CAP capability. Today, MQ-9 is providing 22 of 57 (MQ-1 / MQ-9) CAPs and will continue to grow in the percentage of CAPs as the trained MQ-9 aircrew force structure grows over the coming years. The Air Force plan is to begin growing the CAP capacity beyond 57 total in about a year with a glide path to reach 65 CAP capacity by 3Q 2014. There is currently no operational impact to the plan for the MQ-9 Reaper.

RQ-4

The Global Hawk Unmanned Aircraft System (UAS) provides high altitude, deep look, long endurance intelligence, surveillance, reconnaissance (ISR), and Battle Management Command & Control (BMC2) enabler capability that complements space and other airborne collectors during peacetime, crisis, and war-fighting scenarios.

In two related Acquisition Decision Memoranda signed by USD (AT&L) in January and June 2011, the Global Hawk program was directed to restructure into four major subprograms: (1) Global Hawk baseline, (2) Block 30, (3) Block 40, and (4) Ground station Re-Architecture

(GSRA)/Communications System Re-Architecture (CSRA). The FY13 PB retires the Block 30 and continues development for the Block 40 program and CSRA/GSRA efforts.

The Air Force is committed to maintaining the most effective mix of capability to ensure we meet joint requirements for high altitude ISR. With this in mind, the Air Force decided to divest the Global Hawk Block 30 fleet in the FY13 PB, and extend the U-2 program. The Air Force will continue to operate the Global Hawk Block 40 and the Block 20 BACN aircraft to support joint warfighter requirements.

CV-22

Air Force Special Operations Command (AFSOC) uses the CV-22 Osprey's unique long range, speed, and vertical take-off and landing (VTOL) characteristics to provide US Special Operations Command warfighters with specialized air mobility. The CV-22 is worldwide deployable and has deployed in support of OEF, OIF and other contingencies. One AFSOC squadron is currently supporting operations in Afghanistan. In order to successfully meet the CV-22 combat and training mission requirements, the Air Force continues to fully support the program of record. The current CV-22 fleet stands at 23 aircraft with the final buy scheduled in FY14. Declaration of full operational capability will be made following the delivery of the last CV-22 in FY16.

The Joint V-22 Program Office is developing improvements to CV-22's capabilities and is focused on improving the aircraft's reliability, availability, and reducing operating costs. Improvements are currently be implemented to increase aircraft readiness. Many of these efforts are promising mean time between failure improvements of 100% or more. Particular emphasis is being placed on improving CV-22 engine time-on-wing. These development efforts will address sand ingestion problems that severely degrade engine performance and necessitate costly engine removals and repairs, a particular problem for the CV-22 which has been operating and training in harsh desert environments.

Improvements to the CV-22 are being made in block increments and each block includes a number of modification upgrades installed as they become available. Block 10/B retrofit modifications are underway to bring the oldest CV-22s to the Block 10/B configuration. Production CV-22s are now beginning to include some of the upgrades associated with the Block

20/C configuration (e.g. line of site communications modification and the MV-22 Block C modifications). Initiated in FY 2011, the Block 20 retrofit modification program will begin retrofitting CV-22s with modifications that improve operational safety, suitability, and effectiveness; correct deficiencies identified in testing and operations; improve reliability/maintainability; and enhance self-deployment capabilities.

Future modifications and improvements to the CV-22 will make the aircraft even more reliable, productive, and cost-effective; ensuring AFSOC's long range VTOL capability is available and able to provide specialized air mobility when required.

IV. Conclusion

The Air Force stands ready to win today's Joint fight as we adjust to the challenges of tomorrow. While the environment we are in necessitated difficult choices, we remain committed to working together to manage risks and determine a fiscally sound procurement, sustainment and retirement strategy to remain prepared for the current fight as we posture for the new strategic guidance. The dominance of air, space and cyberspace continues to be requisite to the defense of the United States. We appreciate your continued support and look forward to working in concert to ensure our decisions enable us to strengthen our force.

DOCUMENTS SUBMITTED FOR THE RECORD

MARCH 20, 2012

ATTACHMENT 1: Prior GAO Reports and DOD Responses

GAO report	Est. dev. costs dev. length APUC[a]	Key program event	Primary GAO message	DOD response and actions
2001 GAO-02-39	$34.4 Billion 10 years $69 Million	Start of system development and demonstration approved.	Critical technologies needed for key aircraft performance elements are not mature. Program should delay start of system development until critical technologies are mature to acceptable levels.	DOD did not delay start of system development and demonstration stating technologies were at acceptable maturity levels and will manage risks in development.
2005 GAO-05-271	$44.8 Billion 12 years $82 Million	The program undergoes re-plan to address higher than expected design weight, which added $7 billion and 18 months to development schedule.	We recommend that the program reduce risks and establish executable business case that is knowledge-based with an evolutionary acquisition strategy.	DOD partially concurred but does not adjust strategy, believing that their approach is balanced between cost, schedule and technical risk.
2006 GAO-06-356	$45.7 Billion 12 years $86 Million	Program sets in motion plan to enter production in 2007 shortly after first flight of the non-production representative aircraft.	The program plans to enter production with less than 1 percent of testing complete. We recommend program delay investing in production until flight testing shows that JSF performs as expected.	DOD partially concurred but did not delay start of production because they believe the risk level was appropriate.
2007 GAO-07-360	$44.5 Billion 12 years $104 Million	Congress reduced funding for first two low-rate production buys thereby slowing the ramp up of production.	Progress is being made but concerns remain about undue overlap in testing and production. We recommend limits to annual production quantities to 24 a year until flying quantities are demonstrated.	DOD non-concurred and felt that the program had an acceptable level of concurrency and an appropriate acquisition strategy.
2008 GAO-08-388	$44.2 Billion 12 years $104 Million	DOD implemented a Mid-Course Risk Reduction Plan to replenish management reserves from about $400 million to about $1 billion by reducing test resources.	We believe new plan actually increases risks and that DOD should revise the plan to address concerns about testing, use of management reserves, and manufacturing. We determine that the cost estimate is not reliable and that a new cost estimate and schedule risk assessment is needed.	DOD did not revise risk plan nor restore testing resources, stating that they will monitor the new plan and adjust it if necessary. Consistent with a report recommendation, a new cost estimate was eventually prepared, but DOD refused to do a risk and uncertainty analysis that we felt was important to provide a range estimate of potential outcomes.

GAO report	Est. dev. costs dev. length APUC*	Key program event	Primary GAO message	DOD response and actions
2009 GAO-09-303	$44.4 Billion 13 years $104 Million	The program increased the cost estimate and adds a year to development but accelerated the production ramp up. Independent DOD cost estimate (JET I) projects even higher costs and further delays.	Because of development problems, we stated that moving forward with an accelerated procurement plan and use of cost reimbursement contracts is very risky. We recommended the program report on the risks and mitigation strategy for this approach.	DOD agreed to report its contracting strategy and plans to Congress. In response to our report recommendation, DOD subsequently agreed to do a schedule risk analysis, but still had not done so as of February 2011. In February 2010, the Department announced a major restructuring of the JSF program, including reduced procurement and a planned move to fixed-price contracts.
2010 GAO-10-382	$49.3 Billion 15 years $112 Million	The program was restructured to reflect findings of recent independent cost team (JET II) and independent manufacturing review team. As a result, development funds increased, test aircraft were added, the schedule was extended, and the early production rate decreased.	Because of additional costs and schedule delays, the program's ability to meet warfighter requirements on time is at risk. We recommend the program complete a full comprehensive cost estimate and assess warfighter and IOC requirements. We suggest that Congress require DOD to prepare a "system maturity matrix"–a tool for tying annual procurement requests to demonstrated progress.	DOD continued restructuring actions and announced plans to increase test resources and lower the production rate. Independent review teams evaluated aircraft and engine manufacturing processes. As we projected in this report, cost increases later resulted in a Nunn-McCurdy breach. Military services are currently reviewing capability requirements as we recommended. The Department and Congress are working on a "system maturity matrix" tool, which we suggested to Congress for consideration, to improve oversight and inform budget deliberations.
2011 GAO-11-325	$51.8 Billion 16 years 133	Restructuring continued following the Nunn-McCurdy certification with additional development cost increases; schedule growth; further reduction in near-term procurement quantities; and decreased the rate of increase for future production. The Secretary of Defense placed the STOVL variant on a two-year probation; decoupled STOVL from the other variants in the testing program because of lingering technical issues ; and reduced STOVL production plans for fiscal years 2011 to 2013.	The restructuring actions are positive and if implemented properly, should lead to more achievable and predictable outcomes. Concurrency of development, test, and production is substantial and provides risk to the program. We recommend the program maintain funding levels as budgeted in the FY 2012-2016 future years' defense plan; establish criteria for STOVL probation; and conduct an independent review of software development, integration, and test processes.	DOD concurred with all three of the recommendations. In January 2012, the new Secretary of Defense lifted STOVL probation citing improved performance. Subsequently, the Secretary further reduced procurement quantities, decreasing funding requirements through 2016. The initial independent software assessment began in September 2011 and ongoing reviews are planned to continue through 2012.

WITNESS RESPONSES TO QUESTIONS ASKED DURING THE HEARING

MARCH 20, 2012

RESPONSE TO QUESTION SUBMITTED BY MR. TURNER

Mr. KENDALL. The Department of Defense (DOD) is developing standards and safety case analyses to develop and field ground and airborne unmanned aircraft system (UAS) sense-and-avoid technology. In the short term, the Department is actively engaged with the Federal Aviation Administration (FAA) to improve incrementally UAS access to the National Airspace System (NAS) through changes to policy and procedures. While the FAA has not articulated and documented sense-and-avoid requirements, the Department, as a public agency, has the authority and proven ability to self certify aircraft and systems for safe operations. The sense-and-avoid funding in the National Defense Authorization Act for Fiscal Year 2012 allows the Department to continue its Sense and Avoid (SAA) standards and technology development. The Department is sharing the results of its SAA standards and technology development with the FAA and other public agencies so that they can leverage our work while developing sense-and-avoid technology requirements for the civil community.

The Department has made measured progress in increasing public UAS access to the NAS through the UAS Executive Committee and changes to the FAA's policies and Certification of Waiver or Authorization processes. The Department is also working with the FAA on updating the DOD–FAA UAS Memorandum of Agreement for Operations of UAS Systems in the NAS to increase access for specific operations, particularly for small UAS which make up the predominance of DOD UAS. DOD is also currently working with the FAA through the UAS Aviation Rulemaking Committee and the Next Generation Air Transportation System Joint Planning and Development Office to develop the congressionally directed FAA Civil/Public UAS NAS Integration Roadmap and Comprehensive Plan to safely integrate civil UAS into the NAS. The roadmap and plan will provide a timeline for the phased in approach to UAS integration into the NAS. [See page 15.]

QUESTIONS SUBMITTED BY MEMBERS POST HEARING

MARCH 20, 2012

QUESTIONS SUBMITTED BY MR. BARTLETT

Mr. BARTLETT. Just 7 months ago, Deputy Secretary Carter certified in writing to the Congress that the Global Hawk system was "essential to national security," there was no other acceptable capability to meet the requirement, and the Global Hawk was $220M cheaper per year to operate than the U–2. Then the recommendation to terminate Block 30 is a complete reversal of the USAF position just 7 months ago. Please explain how an asset can be critical to national security and cost less than the alternative, but just 7 months later be terminated?

Mr. KENDALL. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220-million less expensive per year to operate that the U–2. However, the DOD Cost Assessment and Program Evaluation office based this analysis on a high-altitude orbit 1,200 miles from the launch base. During the most recent analysis done in support of the FY 2013 budget review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost-per-flying hour of the RQ–4 and U–2 is roughly equivalent at $32 thousand per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY 2013 budget review.

After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space-based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8-billion savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3 billion was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5 billion.

Mr. BARTLETT. Global Hawk was the first intelligence asset to the Japanese Earthquake/Tsunami Relief effort and first to Libya, and by all accounts it performed very well. In both of these cases, the Global Hawk was able to fly into areas too risky for manned aircraft (an active Surface to Air Missile site in Libya and a nuclear environment in Japan). How will the USAF compensate for losing this transformational capability?

Mr. KENDALL. The Air Force will continue to address the operational needs of the Combatant Commands through the Global Force Management Process. The Joint Requirements Oversight Council adjustment affirms the modified high-altitude Intelligence, Surveillance, and Reconnaissance requirement is sufficient to address most future contingencies.

Mr. BARTLETT. The Department's combatant commanders have an insatiable need for ISR. Intelligence data is routinely the number one unmet requirement. While budget pressures require tough choices, the decision to pull 18 Global Hawk Block 30 aircraft out of the active inventory seems short-sighted. I question the proposal to scrap aircraft currently providing intelligence support to our warfighters, including those purchased as recently as last year. Can you tell me why it is necessary to take these assets out of commanders' hands and instead send them to the desert to rust?

Mr. KENDALL. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space-based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given that the U–2 meets the new requirement and the significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8 billion savings, through the FYDP; $1.3 billion, however, was needed to continue to operate and sustain the U–2 through the FYDP, resulting in a net savings to the taxpayer of $2.5 billion. Finally, some of the $4 billion investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/Multi Platform Radar Technology Insertion Programs, as well as NASA Block 10, NATO Alliance Ground Surveillance, and Navy Broad Area Maritime Surveillance programs.

A modified requirement where the U–2 is sufficient and a reduced budget where the Department could no longer afford to keep investing in RQ–4 Global Hawk Block 30 drove the retirement decision.

Mr. BARTLETT. Congress has provided funds for 21 Global Hawk Block 30 aircraft at a cost of approximately $4 billion. Fourteen of these aircraft have been built and are flying operational missions. My understanding is that this budget proposes to eliminate the funding for future Global Hawk Block 30s and to mothball these relatively new aircraft in favor of a Cold War-era system. Can you explain why the DOD is poised to waste the $4 billion we have already spent on these aircraft that are currently providing valuable intelligence to the warfighter?

Mr. KENDALL. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space-based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8-billion savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3 billion was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5 billion.

Furthermore, the decision to sustain the U–2 leverages $1.7 billion that has been invested to modernize the weapon system. The U–2 f1eet in its current state has been certified to 75,000 flight hours (2040 and beyond at current utilization rates). In addition to the new engines in 1994–1998, the entire fleet has completed new power distribution (wiring), 21st century glass cockpit and modern avionics processor upgrades. The U–2s are currently on a 4000-hour programmed depot maintenance cycle included in the budgeted operating costs.

Finally, some of the $4-billion investment made in Block 30s will continue to benefit the Block 20 Battlefield Airborne Communication Node and Block 40/Multi-Platform-Radar Technology Insertion Programs, as well as NASA Block 10, NATO Alliance Ground Surveillance, and Navy Broad Area Maritime Surveillance programs.

Mr. BARTLETT. A recent CSBA report said that eight manned aircraft with otherwise identical characteristics to a Global Hawk would be necessary to maintain the same orbit as three unmanned Global Hawks. If this is the case, how can it be that you determined the manned aircraft to be the most cost-efficient solution? How does the Global Hawk Block 30 compare to the U–2 on a cost-per-ISR-hour basis?

Mr. KENDALL. The operating characteristics of the U–2 are not identical to those of the Global Hawk, including operating altitudes, sensor capabilities, stand-off ranges, and mission effectiveness. A nominal RQ–4 Combat Air Patrol (CAP) is four aircraft, and a nominal U–2 CAP is five aircraft.

The Global Hawk Block 30 has not matured to the point where a true comparison of operational costs is possible. Nevertheless, the Department conducted an analysis during the FY 2013 budget review using data from previous Air Force and Department efforts. The Air Force Total Ownership Cost database figures in FY 2011 show both the U–2 and RQ–4 at $32 thousand per hour. The Air Force did not begin flying the RQ–4 Block 30 until March 2011, so there is only 6 months of representative flying hour information in the database. Also, the Air Force did not fly the RQ–4 Block 30 with the signals intelligence (SIGINT) sensor in 2011. The Air Force began flying with this payload in April 2012, and updated costs including SIGINT are not currently available.

Given comparable flying hour costs and the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5 billion.

Mr. BARTLETT. How have the Department's decisions to reduce Block 30 quantities while at the same time increasing requirements (increasing the number of si-

multaneous sensors required) contributed to the increased system cost of Global Hawk?

Mr. KENDALL. The Air Force decision to terminate the Block 30 program was based upon a reduced requirement rather than an increased requirement. The requirement for the Global Hawk Block 30 aircraft is to simultaneously execute electro-optical/infrared, synthetic aperture radar, limited moving target indicator, and signals intelligence missions.

In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space-based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Continued investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. When my staff looks at the Air Force Total Ownership Cost data for U–2 and Global Hawk, we see that in 2011 the cost per operational hour (that is, the cost per hour executing missions) for Global Hawk is lower than U–2. This seems to be a much more relevant number than cost per flying hour. How does this square with your claim that Global Hawk operating costs are higher?

Mr. KENDALL. We have looked at costs per operational hour and still find the Global Hawk Block 30 and U–2 roughly equivalent. More importantly, the total cost of keeping the Global Hawk and continuing the investment was more expensive than keeping the U–2. As a result, the Department chose to save $2.5 billion across the Future Years Defense Program in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040.

Mr. BARTLETT. What is the cost comparison for operating U–2 compared to Global Hawk? What is the difference in the cost per mission for each? How much of the U–2 fleet is available to perform all ISR missions?

Mr. KENDALL. The cost per flight hour is the same. The U–2 costs $320 thousand per 10-hour multi-intelligence mission and the RQ–4 costs $640 thousand per 20-hour single-intelligence mission. There are 27 U–2 "single seaters" of which 3–5 are rotating through depot-level maintenance, and two utilized as test birds (capable of flying missions but not typically utilized for that purpose). Thus, there are typically 22 mission-capable U–2 aircraft at any given time.

Mr. BARTLETT. If the U–2 is extended until 2025, and the system that was slated to replace it is cancelled, what is your plan for replacing the U–2? How much will it cost to modernize and maintain the Cold War-era U–2 for another 15 years?

Mr. KENDALL. There is no projected U–2 retirement date. The U–2 weapon system, properly resourced, remains viable until 2040 and meets all sensor requirements currently tasked by the Combatant Commands. The Air Force will invest approximately $60–80 million per year in sustainment and enhancement modifications to ensure platform modernization and maintenance.

Mr. BARTLETT. I understand the Department's Cost Assessment and Program Evaluation (CAPE) performed a detailed cost analysis associated with the decision to terminate and mothball the Global Hawk Block 30 program. Please share this analysis with the Congress so it can better understand the analytical foundation of this decision. Provide a detailed cost assessment including the basis of costs for both sustainment and procurement through 2025.

Mr. KENDALL. CAPE has provided their analysis, covering the time of the Future Year Defense Program (FY 2013–FY 2017), to the House Armed Services Committee during a previous briefing in March of this year. This analysis is the most detailed and complete information available.

Mr. BARTLETT. Given our alarming and unsustainable national debt, American taxpayers expect and deserve that Congress will make the difficult decisions to restore fiscal responsibility. However, these decisions cannot be short-sighted or made at the expense of our long-term budget or national security needs. Please detail how terminating a new cutting-edge platform, Global Hawk Block 30, is less expensive than extending the life of an aging platform, U–2, which will require increased investments in coming years is a fiscally responsible decision over the next decade.

Mr. KENDALL. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain

viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement and the significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8-billion savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3 billion was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5 billion. Finally, some of the $4-billion investment made in Block 30s will continue to benefit the Block 20 Battlefield Airborne Communication Node and Block 40/ Multi-Platform-Radar Technology Insertion Programs, as well as NASA Block 10 aircraft, NATO Alliance Ground Surveillance, and Navy Broad Area Maritime Surveillance programs.

Mr. BARTLETT. Our budget crisis demands that we maximize the efficiency for every program. At a macro level it is clear that an unmanned system can fly longer and further than a manned system. A recent CSBA analysis showed in great detail how unmanned systems feature one-third the life cycle cost of manned systems. Explain how it is in the long-term budgetary and national security interests of our nation to abandon an unmanned system that by all accounts is performing exceptionally well in theater for a five-decade-old manned system.

Mr. KENDALL. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220-million less expensive per year to operate than the U–2. However, the DOD Cost Assessment Program Evaluation office based this analysis on a high-altitude orbit l,200 miles from the launch base. During the most recent analysis done in support of the FY 2013 budget review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32 thousand per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY 2013 budget review.

After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that, in the context of all space-based and airborne Intelligence, Surveillance, and Reconnaissance (ISR) capabilities, conventional high altitude ISR requirements could be reduced. The Air Force further determined the U–2, properly resourced, will remain viable until at least 2040 and is sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30, was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating 1ocations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8-billion savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3 billion was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5 billion.

Mr. BARTLETT. Can you please provide us details on how the Global Hawk has been used to support operations worldwide over the past year? Please provide both classified and unclassified details of how Global Hawk is being used

Mr. KENDALL. In Libya, Global Hawk provided electro-optical, infrared, and synthetic aperture radar data and was used in a traditional Intelligence, Surveillance, and Reconnaissance (ISR) role with dynamic responsiveness due to its enhanced duration/dwell time and the ability to fill gaps between other ISR collects. Overall, Global Hawk was successful in Operation ODYSSEY DAWN and in its continued support for Operation UNIFIED PROTECTOR. Assessment details can be made available at a higher classification.

In the U.S. Central Command (USCENTCOM) theater, Global Hawk continues to support the Combatant Command with both theater and tactical ISR. To date, RQ–4 has flown more than 50,000 combat hours in support of USCENTCOM operations.

In a humanitarian/disaster relief support role, Global Hawk leveraged its range and endurance as an ISR first-responder. Following the Haiti earthquake, Global Hawk executed a response mission in 12 hours, effectively providing initial situational awareness information, highlighting earthquake damage and the status of critical infrastructure, and identifying food/aid drop zones and indicators of mass population migrations. Eight missions were flown, satisfying 2,621 targets.

In Japan, Global Hawk capitalized on its range and endurance to be overhead in 21 hours. Imagery products were provided to the Secretary of State within 40 minutes of request. In addition to infrastructure damage assessment, supply route analysis, and real-time monitoring of evacuation support, Global Hawk collection focused

on the Fukushima nuclear power plant. Because it is a remotely piloted aircraft, Japan allowed the U.S. Pacific Command to use the Global Hawk within the 20-kilometer nuclear engagement zone. Infrared imagery taken directly over the top of the reactors allowed engineers to frequently monitor core temperature levels. In 21 missions and 300 on-station hours, Global Hawk collected more than 3,000 images.

Mr. BARTLETT. The Department based its Global Hawk Block 30 divestment decision on it being more expensive to operate than the U–2. Can you explain how the Department determined these costs?

Mr. KENDALL. The Department of Defense conducted an analysis during the FY 2013 budget review using data from previous Air Force and DOD efforts. The Air Force Total Ownership Cost database figures in FY 2011 show the U–2 at $32 thousand per hour and the RQ–4 also at $32 thousand per hour. However, costs for the U–2 included signals intelligence (SIGINT) sensors, but the Air Force did not fly the RQ–4 Block 30 with its SIGINT sensors in 2011. The Air Force began flying Global Hawk Block 30 with SIGINT sensors in April 2012. Data to determine long-term flying hour costs for Global Hawk have not yet been collected. Given comparable flying hour costs and the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5 billion.

Mr. BARTLETT. General Schwartz mentioned Operations and Support costs are issue for the Global Hawk program. When the decision was made to retire the U–2 a few years back, specific costs (base support, infrastructure and indirect support) were allocated to Global Hawk. As a result, these costs have inflated the Global Hawk cost per flight hour while the U–2's cost per flight hour has decreased. Did the USAF look at doing an apples-to-apples comparison of costs for both systems? If not, why not?

Mr. KENDALL. The Department of Defense (DOD) conducted an analysis during the FY 2013 budget review using data from previous Air Force and DOD efforts. The Air Force Total Ownership Cost database figures in FY 2011 show the U–2 at $32 thousand per hour and the RQ–4 also at $32 thousand per hour. However, costs for the U–2 included signals intelligence (SIGINT) sensors, but the Air Force did not fly the RQ–4 Block 30 with its SIGINT sensors in 2011. The Air Force began flying Global Hawk Block 30 with SIGINT sensors in April 2012. Given comparable flying hour costs and the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5 billion.

Mr. BARTLETT. The Department has committed a significant portion of its planned budget for aircraft procurement to the F–35 program. In the case of the Air Force, major expenditures are planned on the F–35 while at the same time the Air Force seeks to acquire a new airborne tanker and a bomber aircraft. Given the budget environment faced by the Department, are you at all concerned that what you are proposing is doable?

Mr. KENDALL. I am concerned that future budget projections will make much needed modernization efforts unaffordable. My job is to ensure that our acquisition programs are as affordable as possible so that the Services have the flexibility and available options to make the appropriate decisions in determining how to meet their requirements. Therefore, I have directed the incorporation of procurement and sustainment affordability targets for all programs. In the case of the F–35 program, we are actively addressing the costs due to concurrency. As the program completes more testing, we are progressively reducing concurrency risks. This is a direct result of a more mature design through incorporation of discovery based design changes. Earlier aircraft are open to a greater need for changes, and as succeeding Low-Rate Initial Production (LRIP) lots are built, their cumulative requirements for retrofit modifications decline. Additionally, the flattening of the production ramp in the coming years will minimize the cost of upgrading these early LRIP aircraft. The Department is also pursuing a strategy regarding LRIP 6 and 7 negotiations that incentivizes Lockheed Martin to reduce concurrency costs by holding back the purchase of six LRIP 6 jets until the contractor can prove performance. In addition, the program and the Department are working diligently to reduce F–35 life-cycle costs. Based on maturation of the technical baseline and focused affordability initiatives, the Department expects greater accuracy in the O&S portion of the cost estimate. Potential areas for reductions include: revised bed-down plans; improved spares pricing; detailed reviews of manpower requirements; technical refresh strategies; and future Service training requirements, such as the number of annual flight hours per aircraft. The cost risks in the tanker and bomber programs have also been addressed, in the case of the tanker, through use of a competitively-awarded fixed price contract.

Mr. BARTLETT. Earlier this year, you labeled the concurrency of the F–35 program as "acquisition malpractice." Why did you choose those words, and what action has been taken by the Department taken to address your concerns?

Mr. KENDALL. The decision to begin production well before testing began was a clear departure from well-established principles of sound program management. I have taken several steps to improve accountability in the acquisition system, encourage well-informed decisions, and improve the process in order to make sure we make better decisions moving forward. I chartered a Quick Look Review that assessed the risks in upcoming production decisions given the high degree of concurrency associated with the F–35 program. Those results aided the January 2012 Defense Acquisition Board (DAB) initial review of the post Nunn-McCurdy baseline. The DAB will continue to conduct annual Interim Progress Reviews to assess how risk is being mitigated and provide additional guidance. Additionally, the flattening of the production ramp in the coming years will minimize the cost of upgrading these early Low-Rate Initial Production (LRIP) aircraft. The Department is also pursuing a strategy regarding LRIP 6 and 7 negotiations that incentivizes Lockheed Martin to reduce concurrency costs by holding back the purchase of six LRIP 6 jets until the contractor can prove performance.

Mr. BARTLETT. Your predecessor, Dr. Carter, stated that the JSF program—both the government and contractor—lost its focus on affordability and that getting back that focus is paramount to improving the JSF program as it moves forward. From your perspective, did the program lose its focus on affordability? What were the main indicators of problems that were overlooked and what finally brought them to light? What are the key steps to regaining and sustaining a strong focus on affordability? What initiatives are underway to drive down JSF operations and support costs? Assuming the latest projections will show that the JSF will cost more to operate and maintain than legacy fighters, what implications does this have on future budgets and how the military services will pay this future bill?

Mr. KENDALL. I do believe that the F–35 Program—both Government and contractor—lost the focus on affordability. The program was initiated with a high degree of concurrency, and the risks and costs due to concurrency were not accurately predicted nor planned. The Department has taken steps to minimize the risks and reduce the costs associated with concurrency. We have done this through reduced procurement of aircraft while concurrent development and test continues. Additionally, we initiated the transition to fixed-price-type procurement contracts and are ensuring that costs associated with concurrency are shared more between the Government and contractor. The F–35 program and the Department are working diligently to reduce F–35 operations and support costs. Based on maturation of the technical baseline and focused affordability initiatives, the Department expects greater accuracy in the operations and support portion of the cost estimate. Potential areas for reductions include: revised bed-down plans; improved spares pricing; detailed reviews of manpower requirements; technical refresh strategies; and future Service training requirements, such as the number of annual flight hours per aircraft. Recently, I directed procurement affordability targets that will help ensure that, as the F–35 program reaches the point that it is ready for Full-Rate Production; the Department will be able to afford to procure the quantities it needs.

Similarly, I established sustainment affordability targets that will allow us to communicate expectations to the contractor so we can control the cost to operate each aircraft, the annual costs to the Services, and how much investment will be required over the total lifecycle of the F–35 program. These affordability targets and, more importantly, the actual costs that we realize over the coming years will provide us a better understanding of whether we can afford to buy, fly, and sustain the current total requirement. An affordable F–35 program will allow the Department to replace legacy aircraft with fewer, more capable, multi-role strike fighter aircraft well suited to meet the leaner requirements of the new strategic guidance.

Mr. BARTLETT. The Department took the STOVL off probation after one year. Why do you think it was appropriate to end probation? What specifically did the STOVL accomplish in 2011 that gives you confidence about its future? What do you feel are the primary risks remaining with the STOVL development?

Mr. KENDALL. Based on the assessment that the F–35B had made sufficient progress in development, test, and production, such that no uniquely distinguishing issues required more scrutiny than the other two variants of F–35, I believe it was appropriate to remove the F–35B from "probation" status.

Successful F–35B performance ashore and at sea has very positively advanced the state of demonstrated capability in 2011. The F–35B is making good progress in flight test metrics, resolving technical issues, and meeting performance requirements.

In October 2011, the F–35B satisfactorily executed a limited demonstration of ship suitability when two aircraft completed the initial sea trials on the USS WASP. Testing included flight envelope expansion, airborne and deck handling qualities, and the aircraft effects on the shipboard environment. The sea trials were very suc-

cessful. Flight deck heating and exhaust jet blast velocity demonstrated satisfactory results.

In 2011, the F–35 System Development and Demonstration (SDD) program baseline was restructured and resourced with adequate margin to accommodate current known and future unknown technical challenges and changes across all variants. Anticipated developmental costs associated with unique F–35B technical challenges and changes have been addressed in the program restructure. In addition, the Department reduced F–35B production in FY12 to accommodate the time it takes to complete engineering solutions, produce the necessary hardware, and assess the operational impact of the changes. This reduction in quantity balances the risk of retrofit costs with the need to ensure continuity in the engineering workforce involved in assembly of the F–35B in Fort Worth; and to sustain the supplier base of F–35B unique parts.

F–35B weight has changed in very small amounts since January 2011 and remains essentially stable. In addition, engine performance data collected has allowed credit for better lift performance and the Vertical Landing Bring Back Key Performance Parameter has maintained consistent positive margin.

In 2011, the F–35B performed on or ahead of the test plan. Total flights planned versus actual were 293/333, and total test points planned versus actual were 2272/2636. Additionally, the F–35B accomplished 268 Vertical Landings, 395 Short Take Offs, and 156 Slow Landings.

The FS 496 bulkhead has been redesigned for production beginning with Low-Rate Initial Production Lot 4, with fixes identified for retrofit as needed. F–35B fatigue testing (also known as durability testing) resumed in the 1st quarter of 2012. The test was halted for new bulkhead fabrication and instrumentation and test article reconstruction in November 2010.

The redesigned upper auxiliary air inlet door hardware began flight testing in December 2011. Analyses of the results from early test flights are promising. Weather and the pace of flights will determine when this is complete. Additionally, ordering of modification kits for aircraft retrofit began in parallel with this testing in order to gain clearance for fleet STOVL mode operation as soon as possible.

Airworthiness concerns with the lift fan clutch heating issue have been mitigated by the incorporation of a temperature sensor that alerts the pilot to take corrective action if a clutch exceeds acceptable temperatures. At the same time, a detailed root cause investigation for a permanent fix to eliminate clutch heating is underway.

The vertical lift propulsion system driveshafts are being custom fitted with spacers to ensure the shaft can accommodate the airframe thermal expansion and contraction. While this is currently a maintenance burden, it eliminates the airworthiness concerns with the current driveshaft design. A new driveshaft that can meet the actual aircraft environmental requirements is in the early phases of the design process.

The airworthiness risk associated with roll post actuator heating has been mitigated by insulating the actuator with a thermal blanket. A new actuator design that will eliminate the need for a thermal blanket completed critical design review in January 2012.

Our observations and assessments over the past year give us reason to believe the basic aircraft designs are sound and will deliver. The remaining development is focused on testing and integration. Software development, coupled with flight test execution, will remain the major focus of the F–35B and the overall F–35 program execution in the coming year and through the completion of SDD.

Mr. BARTLETT. In the December 2011 F–35 Selected Acquisition Report, we noted that F–35 airframe and engine costs increased about $6.2 billion due to a slower near-term production ramp. How does this increase compare with the increase in costs for expected concurrency modifications if the production ramp were not changed from the Department's position for fiscal year 2012?

Mr. KENDALL. The $6.2 billion value quoted in the December 2011 F–35 Selected Acquisition Report reflects the increase across 30 years of production and inflation to include an additional 2 years of production. In the FY 2013–2017 Future Years Defense Program (FYDP), we are satisfied the recommended production rate is the best use of the Department's funding.

The concurrency costs for the Low Rate Initial Production (LRIP) Lot 7 aircraft in FY2013 range from $7 million per aircraft, if only the "must fix" changes are incorporated, up to $15 million per aircraft if all changes are incorporated. Importantly, while the deferment of aircraft did result in a unit recurring flyaway cost increase of approximately $10 million per aircraft in for LRIP 7, we believe the realignment of the pace of production balances the need for a stable industrial base with the realities of otherwise increasing concurrency modification costs and a resource-constrained fiscal environment.

Mr. BARTLETT. Just 7 months ago, Deputy Secretary Carter certified in writing to the Congress that the Global Hawk system was "essential to national security," there was no other acceptable capability to meet the requirement, and the Global Hawk was $220M cheaper per year to operate than the U–2. Then the recommendation to terminate Block 30 is a complete reversal of the USAF position just 7 months ago. Please explain how an asset can be critical to national security and cost less than the alternative, but just 7 months later be terminated?

Mr. VAN BUREN. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review.

After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

In September 2011 following the Nunn-McCurdy certification, the DOD Joint Requirements Oversight Committee modified the high-altitude ISR requirement where the U–2 was deemed sufficient to meet that amended requirement. Coupled with the austere budget environment, the Department decided it could no longer afford additional investment required for the RQ–4 Global Hawk Block 30.

- Requirement: The Air Force further determined the U–2 (which remains viable until at least 2040) was sufficient to meet the reduced force structure requirements. Continued increased investment in the RQ–4 is required to field a comparable capability to the U–2 and was determined to be unaffordable.
- Budget: The Budget Control Act was passed in August 2011. Additional investment in the RQ–4 is not warranted given a significant reduction in the Department's budget and because the U–2 remains operationally viable to satisfy the reduced JROC requirements at considerably lower total cost over the FYDP.

Mr. BARTLETT. Global Hawk was the first intelligence asset to the Japanese Earthquake/Tsunami Relief effort and first to Libya, and by all accounts it performed very well. In both of these cases, the Global Hawk was able to fly into areas too risky for manned aircraft (an active Surface to Air Missile site in Libya and a nuclear environment in Japan). How will the USAF compensate for losing this transformational capability?

Mr. VAN BUREN. The Air Force will continue to satisfy the operational needs of the Combatant Commands through the Global Force Management Process. The Joint Requirements Oversight Council adjustment affirms the modified high-altitude ISR requirement is sufficient to address any such future contingency.

Mr. BARTLETT. The Department's combatant commanders have an insatiable need for ISR. Intelligence data is routinely the number one unmet requirement. While budget pressures require tough choices, the decision to pull 18 Global Hawk Block 30 aircraft out of the active inventory seems short-sighted. I question the proposal to scrap aircraft currently providing intelligence support to our warfighters, including those purchased as recently as last year. Can you tell me why it is necessary to take these assets out of commanders' hands and instead send them to the desert to rust?

Mr. VAN BUREN. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given that the U–2 meets the new requirement significant reduction in

the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings where $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. A modified requirement where the U–2 is sufficient and a reduced budget where the Department could no longer afford to keep investing in RQ–4 Global Hawk Block 30 drove the retirement decision. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that the high-altitude ISR requirement structure could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. The Congress has provided funds for 21 Global Hawk Block 30 aircraft at a cost of approximately $4 billion. Fourteen of these aircraft have been built and are flying operational missions. My understanding is that this budget proposes to eliminate the funding for future Global Hawk Block 30s and to mothball these relatively new aircraft in favor of a Cold War-era system. Can you explain why the DOD is poised to waste the $4 billion we have already spent on these aircraft that are currently providing valuable intelligence to the warfighter?

Mr. VAN BUREN. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Furthermore, the decision to sustain the U–2 leverages $1.7B that was has been invested to modernize the weapon system. The U–2 fleet in its current state has been certified to 75,000 flight hours (2040 and beyond at current utilization rates). In addition to the new engines in 1994–1998, the entire fleet has completed new power distribution (wiring), 21st century glass cockpit and modern avionics processor upgrades. The U–2s are currently on a 4000-hour programmed depot maintenance (PDM) cycle included in the budgeted operating costs. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS.

Mr. BARTLETT. A recent CSBA report said that eight manned aircraft with otherwise identical characteristics to a Global Hawk would be necessary to maintain the same orbit as three unmanned Global Hawks. If this is the case, how can it be that you determined the manned aircraft to be the most cost-efficient solution? How does the Global Hawk Block 30 compare to the U–2 on a cost-per-ISR-hour basis?

Mr. VAN BUREN. The operating characteristics of the U–2 are vastly different than those of the Global Hawk including operating altitudes, sensor capabilities, standoff ranges and mission effectiveness. A nominal RQ–4 Combat Air Patrol (CAP) is four aircraft, and a nominal U–2 CAP is five aircraft. The Global Hawk Block 30 has not matured to the point where a true comparison of operational costs is possible. Nevertheless, the Department conducted an analysis during the FY13 budget review using data from previous Air Force and Department efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show both the U–2 and RQ–4 at $32K per hour. The Air Force did not begin flying the RQ–4 Block 30 until March 2011, so there is only six months of representative flying hour information in the database. Also, the Air Force did not fly the RQ–4 Block 30 with the SIGINT sensor in 2011. The Air Force will begin flying with this payload in April 2012 and expects the RQ–4 flying hour costs to be greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. How have the Department's decisions to reduce Block 30 quantities while at the same time increasing requirements (increasing the number of simultaneous sensors required) contributed to the increased system cost of Global Hawk?

Mr. VAN BUREN. The Air Force decision to terminate the Block 30 program was based upon a reduced requirement rather than an increased requirement. The requirement for the Global Hawk Block 30 aircraft is to execute electro-optical/infrared (EO/IR), synthetic aperture radar (SAR), limited moving target indicator (MTI) and signals intelligence (SIGINT) missions simultaneously. No change to the Block 30 requirement factored into the decision to terminate the program. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude intelligence, surveillance, and reconnaissance force structure could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced force structure requirements. Continued increased investment in RQ–4 would have been required to field a comparable capability to U–2 and therefore, the RQ–4 was determined to be unaffordable. Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2 is still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. When my staff looks at the Air Force Total Ownership Cost data for U–2 and Global Hawk, we see that in 2011 the cost per operational hour (that is, the cost per hour executing missions) for Global Hawk is lower than U–2. This seems to be a much more relevant number than cost per flying hour. How does this square with your claim that Global Hawk operating costs are higher?

Mr. VAN BUREN. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. What is the cost comparison for operating U–2 compared to Global Hawk? What is the difference in the cost per mission for each? How much of the U–2 fleet is available to perform all ISR missions?

Mr. VAN BUREN. The cost per flight hour is roughly the same. The U–2 costs $320K per 10-hour Multi-INT mission and the RQ–4 $640K per 20-hour Single-INT mission. There are 27 U–2 "single seaters" of which one is always rotating through depot level maintenance, and two utilized as test birds (capable of flying missions, but not typically utilized for that purpose). Thus, there are 24 mission-capable U–2 aircraft at any given time.

Mr. BARTLETT. If the U–2 is extended until 2025, and the system that was slated to replace it is cancelled, what is your plan for replacing the U–2? How much will it cost to modernize and maintain the Cold War-era U–2 for another 15 years?

Mr. VAN BUREN. There is no projected U–2 retirement date. The U–2 aircraft remains viable until 2040 and meets all sensor requirements currently tasked by the Combatant Commands. The Air Force will invest approximately $68 million per year in sustainment and enhancement modifications to ensure platform modernization and maintenance.

Mr. BARTLETT. I understand the Department's Cost Assessment and Program Evaluation (CAPE) performed a detailed cost analysis associated with the decision to terminate and mothball the Global Hawk Block 30 program. Please share this analysis with the Congress so it can better understand the analytical foundation of this decision. Provide a detailed cost assessment including the basis of costs for both sustainment and procurement through 2025.

Mr. VAN BUREN. In support of the FY13 President's Budget Request (PBR), the USAF analyzed the operational output of both the RQ–4 and the U–2 using existing CONOPS for both aircraft and determined that U–2 capability was sufficient for operational needs. When analyzed in this context, the U–2 and RQ–4 operating

costs were nearly equal. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B. The CAPE conducted their own independent cost analysis based on three scenarios to come to the conclusion that the U–2 was the more affordable option to meet the newly reduced requirement. The Air Force will defer to CAPE to provide Congress the details of their independent cost analysis.

Mr. BARTLETT. Given our alarming and unsustainable national debt, American taxpayers expect and deserve that Congress will make the difficult decisions to restore fiscal responsibility. However, these decisions cannot be short-sighted or made at the expense of our long-term budget or national security needs. Please detail how terminating a new cutting-edge platform, Global Hawk Block 30, is less expensive than extending the life of an aging platform, U–2, which will require increased investments in coming years is a fiscally responsible decision over the next decade.

Mr. VAN BUREN. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement and the significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. Our budget crisis demands that we maximize the efficiency for every program. At a macro level it is clear that an unmanned system can fly longer and further than a manned system. A recent CSBA analysis showed in great detail how unmanned systems feature one-third the life cycle cost of manned systems. Explain how it is in the long-term budgetary and national security interests of our nation to abandon an unmanned system that by all accounts is performing exceptionally well in theater for a five-decade-old manned system.

Mr. VAN BUREN. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review. After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30,

which still needed approximately $800M in investment to achieve sensor parity with the U–2, was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

Mr. BARTLETT. Can you please provide us details on how the Global Hawk has been used to support operations worldwide over the past year? Please provide both classified and unclassified details of how Global Hawk is being used

Mr. VAN BUREN. In Libya, Global Hawk provided electro-optical, infrared, and synthetic aperture radar and was used in a traditional ISR role with dynamic responsiveness due to its enhanced duration/dwell time and the ability to fill gaps between other ISR collects. Overall, Global Hawk was successful in Operation Odyssey Dawn and in its continued support for Operation Unified Protector. Assessment details can be made available at a higher classification. In the CENTCOM theater, Global Hawk continues to support the combatant command with both theater and tactical ISR. To date, RQ–4 has flown over 50,000 combat hours in support of CENTCOM operations. In a humanitarian/disaster relief support role, Global Hawk leveraged its range and endurance as an ISR first-responder. Following the Haiti earthquake, Global Hawk executed a response mission in 12 hours effectively providing initial situational awareness information, highlighting earthquake damage, status of critical infrastructure and identifying food/aid drop zones and indicators of mass population migrations. Eight missions were flown, satisfying 2,621 targets. In Japan, Global Hawk capitalized on its range and endurance to be overhead in 21 hours. Imagery products were provided to the Secretary of State within 40 minutes of request. In addition to infrastructure damage assessment, supply route analysis, and real-time monitoring of evacuation support, Global Hawk collection focused on the Fukushima nuclear power plant. Because it is a remotely piloted aircraft, Japan allowed PACOM to use the Global Hawk within the 20 km nuclear engagement zone. Infrared imagery taken directly over the top of the reactors allowed engineers to frequently monitor core temperature levels. In 21 missions and 300 on-station hours, Global Hawk collected more than 3,000 images.

Mr. BARTLETT. General Schwartz mentioned Operations and Support costs are issue for the Global Hawk program. When the decision was made to retire the U–2 a few years back, specific costs (base support, infrastructure and indirect support) were allocated to Global Hawk. As a result, these costs have inflated the Global Hawk cost per flight hour while the U–2's cost per flight hour has decreased. Did the USAF look at doing an apples-to-apples comparison of costs for both systems? If not, why not?

Mr. VAN BUREN. The Department of Defense conducted an analysis during the FY13 budget review using data from previous Air Force and DOD efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show the U–2 at $32K per hour and the RQ–4 also at $32K per hour. However, costs for the U–2 included SIGINT sensors, but the Air Force did not fly the RQ–4 Block 30 with its SIGINT sensors in 2011. The Air Force will begin flying Global Hawk with SIGINT sensors in April 2012 and expects the RQ–4 flying hour costs to become greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. You recently proposed a change in the contracting strategy for the fiscal year 2012 and 2013 procurement of F–35 procurement that would provide a means to have control on production that is based prime contractor demonstrated performance in developmental activities relative to the 2012 plan and concurrent risk reduction. Can you describe your proposal, why you think it is necessary, and the criteria you would use as a basis for executing the proposed contract strategy?

Mr. VAN BUREN. The Department is implementing an event based contracting strategy for low rate initial production (LRIP) Lots 6 and 7 that buys aircraft production quantities based upon development and test progress. This strategy provides a means to have control on production that is informed by demonstrated development performance against the 2012 plan and concurrency cost risk reduction. The Department will request Lockheed Martin provide a consolidated proposal for LRIP Lots 6 and 7 based on an innovative structure. First, we will award 25 aircraft in Lot 6, out of 31 authorized and appropriated in FY12. Second, we will provide a means to procure from 0 to 6 of the remaining FY12-funded Lot 6 aircraft concurrent with the Lot 7 contract award in 2013. Lastly, we will link the total aircraft quantity ultimately procured in Lot 6 to Lockheed Martin's development perform-

ance and concurrency cost risk reduction efforts. The Department will decide to award the additional aircraft based on progress expected in 2012, as planned and resourced in the development program Integrated Master Schedule. This schedule is executable, appropriately resourced, includes sufficient margin for issues that are normal in a development program, and has been agreed to by both Lockheed Martin and the F–35 program office. Specific decision criteria include, but are not limited to, the following: 1) Planned 2012 System Engineering Technical Reviews for Block 3 software 2) Lockheed Martin progress improving concurrency change incorporation, both forward into production and back it post delivery modification engineering 3) Planned 2012 progress in F–35A, F–35B, and F–35C durability testing 4) Planned 2012 progress in flight test 5) Planned 2012 line replaceable units (LRU) qualification Currently appropriated FY12 funding is necessary to implement this contracting strategy. The variable quantity of up to 6 additional Lot 6 aircraft will be paid for with the FY12 funds originally authorized and appropriated for their purchase; however, these funds will not be obligated on contract until FY13. The Department intends to award Lot 7 aircraft and the Lot 6 variable quantity aircraft through fully definitized contract actions in FY13. The initial Lot 6 contract award for 25 aircraft will require an Undefinitized Contract Action (UCA) to ensure production flow is not disrupted. However, the Department does not intend to award a UCA for the 25 aircraft in Lot 6 until essential agreement is reached for Lot 5. We believe our plan for negotiations for LRIP 6 and 7 will allow us to control production quantity based on the performance of the development program. It is important that Lockheed Martin demonstrate performance and help us to establish the confidence that the F–35 is a stable and capable platform.

Mr. BARTLETT. What is the status of the lot 5 negotiations for the fiscal year 2011 buy of F–35s? What are the major issues under negotiation?

Mr. VAN BUREN. The contract for the low rate initial production (LRIP) Lot 5 aircraft is still being negotiated. We expect the negotiations to be completed by late spring 2012. Due to the sensitive nature of the negotiations, we are not able to provide any details of the negotiations. The Government negotiators are working to find the right balance between best value for the taxpayers and adequate profit for Lockheed Martin and its shareholders.

Mr. BARTLETT. Mr. Secretary, the Congress has provided funds for 21 Global Hawk Block 30 aircraft at a cost of approximately $4 billion. Fourteen of these aircraft have been built and are flying operational missions. My understanding is that this budget proposes to eliminate the funding for future Global Hawk Block 30s and to mothball these relatively new aircraft, four right off the production line. The Global Hawk system was only declared operationally ready 8 months ago. Just 7 months ago, Deputy Secretary Carter certified in writing to the Congress that the Global Hawk system was "essential to national security." Can you explain why the DOD is poised to waste the $4 billion we have already spent on these aircraft that are currently providing valuable intelligence to the warfighter?

Mr. VAN BUREN. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Furthermore, the decision to sustain the U–2 leverages $1.7B that was has been invested to modernize the weapon system. The U–2 fleet in its current state has been certified to 75,000 flight hours (2040 and beyond at current utilization rates). In addition to the new engines in 1994–1998, the entire fleet has completed new power distribution (wiring), 21st century glass cockpit and modern avionics processor upgrades. The U–2s are currently on a 4000-hour programmed depot maintenance (PDM) cycle included in the budgeted operating costs. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS.

Mr. BARTLETT. Mr. Secretary, nine Global Hawk Block 30s are currently supporting counterterror operations in three combatant commands. While budget pressures require tough choices, the decision to pull 18 Global Hawk Block 30 aircraft out of the active inventory seems short-sighted, when they are being used to support the warfighter. Can you explain the rationale for grounding and storing these air-

craft when there is a demonstrated need by our combatant commanders for their capabilities?

Mr. VAN BUREN. It is understood by the Air Force that this hearing question was directly posed to Maj Gen Posner, Director of Global Power Programs Office of the Assistant Secretary of the Air Force for Acquisition. The Witness Panel did not include the Secretary of Defense or the Secretary of the Air Force. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR force structure could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced force structure requirements. Approximately $800M is required to field 18 Global Hawk Block 30 aircraft with comparable sensor capability to the U–2. Additionally, some of the $4B investment made in the Block 30 program will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS.

Mr. BARTLETT. Can you describe the scope of the F–35 software program relative to other currently fielded fighter aircraft, whether the software schedule, based on the new technical baseline review schedule, is being met, and whether needed capabilities are being included in software deliveries?

Admiral VENLET. The scope of F–35 software is unprecedented. Taken solely in terms of quantity, it is a large departure from previous fighter aircraft. The F–35 is projected to utilize 9.3 million source lines of code (MSLOC) on board the aircraft in its final configuration. By comparison, the FA–18E/F (Block II with AESA radar) has approximately 6.6 MSLOC onboard, and the F–22 has approximately 5.5 MSLOC. The main differences in F–35 scope compared to legacy aircraft are tri-variant commonality, fully integrated software suite (FA–18 is federated), Helmet Mounted Display System complexity, broader mission capability (compared to F–22), increased number of data links, and multi-level security. Additionally, the F–35 significantly expands on the capabilities of legacy aircraft. In addition to on-board software, the F–35 will have approximately 14.8 MSLOC of ground-based software to support training systems, off-board mission planning, autonomic logistics and ground based support equipment, and another 4.5 MSLOC of non-deliverable software to operate labs, test stations, trainers, simulators, and flight test support.

Relative to the 2011 re-baseline, Block 1B (supporting Low-Rate Initial Production (LRIP) 3 aircraft) software delivery to verification test is approximately 3 months behind schedule with only 75 percent of the fully planned content across the air system being provided. LRIP 4 software content (Block 2A) is currently estimated to be 3 months behind plan. Recommendations for the F–35 software program put forward by the 2010 Technical Baseline Review have been implemented (e.g. additional lab testing capacity, added resources for software rework and integration). In addition, over the past 6 months, Lockheed Martin has introduced several process and organizational initiatives to improve its software development and address current schedule pressure. Some of these initiatives have long-term implementation paths requiring deep changes, although we are already seeing positive indications from the efforts to date.

Prompted by the program office, Lockheed Martin initiated action to track software development by capability to facilitate early warnings on capability at risk. Block 2A is being closely monitored on a capability by capability basis, with assigned JPO counterparts to ensure government input on prioritizing needed capabilities. These teams are actively working through all contracted Block 1B and 2A capabilities to support the final Block 2A release to flight test.

Mr. BARTLETT. What is the status of the software for the logistics system to support F–35 maintenance so that the desired operational capabilities can be achieved?

Admiral VENLET. The current Autonomic Logistics Information System (ALIS) software release (1.0.2E3) provides basic aircraft maintenance and mission planning capabilities for both System Development and Demonstration (SDD) and Low-Rate Initial Production aircraft. The follow-on release (1.0.3), which is already developed and laboratory tested with Independent Verification and Validation (IV&V) testing completed, constitutes the first instance of the integrated sustainment support solution. This release has been delayed and changes are being incorporated to address the findings from the IV&V. Introduction of the updated ALIS release to SDD flight test sites is projected for the third quarter of CY 2012 and to operational sites in the first quarter of CY 2013. After this release is fielded, the program has two additional major software releases (2.0 and 3.0) on schedule to bring ALIS to full requirements capability.

Mr. BARTLETT. Secretary Gates put the Marine Corps F–35B on probation due to concerns over deficiencies in development. Secretary has removed the probation. When will all of the recommended fixes to the F–35B be complete and tested?

Admiral VENLET. The principal STOVL issues of concern in January 2011 were:
- FS 496 Bulkhead Crack
- Auxiliary Air Inlet Buffet Door Vibration
- Lift Fan Drive Shaft
- Lift Fan Clutch Heating
- Roll Nozzle Actuator Heating

Fixes tested and implemented are as follows:
- FS 496 Bulkhead Crack
  - Redesigned for production beginning in Low Rate Initial Production (LRIP) Lot 4 for F–35B, with fixes identified for retrofits as needed
  - Fatigue test (AKA durability testing) resumed on January 19, 2012
  - Durability testing (2nd life) will be complete in December 2014
  - Depot retrofits are planned to begin in 2012 and conclude in 2016
- Auxiliary Air Inlet (AAI) Buffet Door Vibration
  - Redesigned upper AAI Door hardware began flight test in December 2011
  - Early test flight results are promising; testing will complete in 2012
  - New door design will be placed into production in October 2013, with a first delivery forecast for March 2014
  - Retrofits on existing aircraft are planned for 2012 through 2014
- Lift Fan Drive Shaft
  - Custom fitted spacers are being used to accommodate the airframe thermal expansion and contraction (interim solution)
  - Qualification testing of new design will be completed by January 2014
  - New design will be broken into production in LRIP Lot 7
  - Retrofits will be accomplished by attrition. The current driveshaft with class spacers as an interim solution allows safe operations throughout the flight envelope. The new driveshaft will save weight, cost, and maintenance workload, but does not warrant early replacement.
- Lift Fan Clutch Heating
  - Interim solution is heat monitoring sensor; alerts pilot when acceptable temperature is exceeded
  - Detailed root cause investigation for permanent fix is underway
  - Testing for optimal spacing will be complete in August 2012
  - JPO has not determined when the production break-in will occur (if required); retrofits will occur by attrition
- Roll Nozzle Actuator Heating
  - Airworthiness risks mitigated by insulating actuator with thermal blanket
  - Critical design review for new design was completed in January 2012
  - Quality testing of the improved actuator will be completed December 2012
  - New design will begin production break-in in LRIP Lot 7
  - Retrofits will be accomplished through attrition

Mr. BARTLETT. We understand that significant development problems occurred with the helmet mounted display, potentially affecting the concept of operation of the F–35. Will you be able to resolve the issue and when will the helmet mounted display be fully tested?

Admiral VENLET. There are three main technical issues identified affecting the operation of the GEN II Helmet Mounted Display System (HMDS). The technical issues are jitter, data latency, and acuity. The HMDS program has been modified to incorporate technical changes which are intended to solve these three issues. Accordingly, we are tracking a HMDS program risk which tracks the burn down of these issues. The program office plans to complete a Critical Design Review in late 2012 for these improvements. To further reduce risk, the program has developed a second helmet using legacy technology to ensure there is capability prior to Operational Testing.

Mr. BARTLETT. The November 2011 Quick Look Review of F–35 Joint Strike Fighter Concurrency recommended that further decisions about F–35 production be event driven, based on the achievement of sufficient test data demonstrating design maturity and well-controlled processes for executing and minimizing design changes across concurrent production. Going forward, what action does the program plan to take to minimize risks of flight test and production concurrency and the associated government exposure to additional costs on future procurement contracts?

Admiral VENLET. The program is taking several actions to minimize our exposure to additional costs on future procurement contracts. From a contracting perspective, we have introduced cost-sharing for concurrency changes that are discovered and known prior to a Low-Rate Initial Production (LRIP) period of performance. This applies initially to the LRIP 5 period of performance and is a 50–50 share ratio with

Lockheed Martin. In System Design and Development, we are implementing an incentive fee directly related to the reduction in span time between a declared deficiency and its corresponding implementation on the production line. By shortening the span time to implement a change, we will minimize the number of aircraft that will have to be modified in the future.

During the Quick Look Review, the flight testing remaining and those areas that exhibit potential for discovery (such as transonic roll-off, high angle-of-attack, and buffet) that might have concurrency impact if there is discovery were deeply analyzed. The test program is executing the plan of record and has capacity to add test points to allow for refly and discovery if additional test is necessary to resolve anomalies.

The program is proactively participating in the concurrency change process. JPO engineers participate with their Lockheed Martin counterparts in Engineering Review Boards, convened on a weekly basis to review and approve all change requests and culminating with the implementation of the change in the production line after final approval by the Configuration Control Board.

The program office is working with Lockheed Martin to improve the end-to-end change implementation process. The program office, working with Lockheed Martin, is collecting and tracking metrics to capture change attributes to gain visibility and transparency into the change process. Using data-driven metrics will allow a more in-depth understanding of how deficiencies are reported and the span time required to formally cut changes into production. This understanding will improve management control by identifying process anomalies that will become candidates for mitigation.

Mr. BARTLETT. Are the F–35 production aircraft currently being delivered by the contractor on schedule and with the capabilities prescribed in the respective Lot contract?

Admiral VENLET. No. The F–35 Low Rate Initial Production (LRIP) delivery schedule was re-baselined in September 2010. Current LRIP aircraft are being produced and delivered from the factory to the flight line in Forth Worth approximately 1 month behind the re-baselined schedule. Once delivered to the flight line there is an additional average 6-month delay to Government acceptance (DD–250). The additional 6-month delay is caused by:

- Maturation of the final finishes processes;
- Traveled work to field operations (including planned Block 1B modifications for the first six LRIP 3 aircraft);
- Quality issues;
- Maintenance and repair of aircraft subsystems, and
- Reconciliation and approval of major variances.

Since award of the LRIP contracts, the System Design and Development (SDD) program was also re-baselined. As a result of the re-baseline and the adjusted timing of capability delivery, some of the capabilities that were expected to be qualified in SDD and delivered to production aircraft are not available. This has prevented Lockheed Martin Aeronautics from delivering F–35 production aircraft to the originally contracted capabilities.

Mr. BARTLETT. In his acquisition decision memorandum of March 28, 2012, the Under Secretary of Defense for Acquisition, Technology and Logistics tasked the Director, Cost Assessment and Program Evaluation, in collaboration with the Navy, Air Force, Joint Program Office, and the Assistant Secretary of Defense (Logistics and Material Readiness) to develop a plan that identifies and quantifies opportunities to reduce operating and support costs. From your perspective, what are the primary drivers of F–35 support costs, and how is the F–35 development program addressing these issues?

Admiral VENLET. The largest sustainment cost drivers are Unit Level Consumption (primarily depot-level repairable and consumable) and Manpower. The Joint Strike Fighter Program Office (JSFPO) is performing a review of contractor manpower requirements to assess their reasonableness and realism relative to achievable ramp up, steady state scope, and appropriate skill mix. An additional area of investigation continues to be the ground rules and assumptions associated with how the Services plan to operate F–35 to ensure that the design of the F–35 air system and sustainment solution is maximized to drive efficiencies.

The JSFPO is currently implementing an affordability strategy that includes a formal F–35 Affordability Management Plan (AMP). The AMP is focused on: reducing the costs of support products such as support equipment, spare parts and training devices; baselining requirements with the Services and leveraging increased efficiency opportunities; and addressing reliability and maintainability.

The JSFPO is executing the second phase of a formal Business Case Analysis (BCA) and Targeted Affordability Program (TAP). Phase 1 of the BCA and TAP pro-

duced sustainment labor rates and labor mix recommendations that were captured in the FY11 annual estimate. Additionally, the analysis produced alternatives for aircraft utilization, deployment planning, and squadron manning that were included in the cost reductions.

The 2012 phase 2 BCA and TAP efforts will build on the FY11 work and focus on the following:

- BCA—ALIS, Depot Maintenance, Repair, Overhaul & Update (MRO&U) planning, support equipment, software management and training.
- TAP initiatives—Matching Life Cycle Cost Estimate fee assumptions and labor rates to the Phase 1 BCA findings, Manpower Basis of Estimate's, ALIS and Training labor rates, Spare Parts Unit Database deep dive, Global asset pooling, and contract structure/incentive fees (initial focus on Supply Chain Management).

Mr. BARTLETT. As you know, the JSF program has had a host of problems over the past years resulting in significant cost growth, schedule slips, and, most importantly, delays in fielding capabilities to the warfighter. From your observations, what have been the primary causes to the JSF's development problems and challenges to date? Has the F–35 Joint Program Office been receptive to your past advice and recommendations for establishing a knowledge-based acquisition process? What future steps can the Department take to ensure the JSF program does not repeat its mistakes from the past and achieve a more predictable and successful outcome? What steps can be taken to place bounds on the programs and to help improve management and oversight of the program?

Mr. SULLIVAN. JSF development problems and challenges can largely be traced to its extremely risky acquisition strategy, poor decisions at key junctures, and a management environment that was slow to acknowledge and address problems. JSF officials adopted a "single step" acquisition strategy to develop and acquire full combat capabilities on a very aggressive, risky schedule with substantial concurrency among development, testing, and production activities. The JSF program started system development before requisite technologies were ready, started manufacturing test aircraft before designs were stable, and moved to production before flight tests adequately demonstrated that the aircraft design met performance and operational suitability requirements. The late release of drawings—and continuing high rate of changes—resulted in a cascading of problems in establishing suppliers and manufacturing processes, which led to late parts deliveries, delayed the program schedule, and forced inefficient manufacturing processes to workaround problems. These issues are lessening now but the impacts are still felt in higher costs, late deliveries of test and production aircraft, and a much-delayed development test schedule.

As part of its June 2010 Nunn-McCurdy certification to the Congress, DOD provided a root cause analysis for cost and schedule growth that identified similar factors. Specifically, the analysis cites a very aggressive and concurrent development schedule, unrealistic cost and schedule estimates, flawed and over-optimistic assumptions, and management's reluctance to accept unfavorable information, slowing down the ability of the contractor and government to recognize and respond to problems.

For a number of years, the Department had not been very receptive to our findings and recommendations. Starting in 2001 with a debate about the initial business case for the F–35, defense officials have often non-concurred with our recommendations and, even when somewhat agreeable, did not usually fully implement them. For example, while officials generally acknowledged the merits of knowledge-based acquisitions and agreed that the JSF strategy was very risky, they chose to continue moving forward with the intent to manage the risks. They did not delay development start even though technologies were not ready and did not delay or reduce procurement when designs were not stable nor manufacturing processes mature. This attitude started changing ca. 2009 after internal reviews leading into 2010 restructuring. Attachment 1 provides a listing of our recommendations since 2001 and the department's response to those recommendations [see Appendix pages 131–132].

Over the last two years, JPO and OSD management have been significantly more receptive to our findings and recommendations than in previous years. This is a welcome change. Defense officials lately recognized numerous technical, financial, and management shortcomings and significantly restructured the program, making changes we support and, in quite a few cases, had earlier recommended. Restructuring actions were supported by a comprehensive, bottoms-up systems engineering review, which is a key knowledge-based practice. This recognized the need to spend more time and money to fix design and manufacturing processes and more thoroughly flight test aircraft before accelerating production further. Also, an OSD concurrency study corroborated our concerns about the immature design and the con-

currency costs DOD is incurring as a result of the highly risky acquisition strategy not in compliance with knowledge-based practices.

A new and sustained focus on affordability, effective implementation of restructuring actions, successful mitigation of design and manufacturing risks identified by independent panels, and more active and involved oversight by OSD and military services should lead to more predictable and achievable outcomes. Regaining and aggressively pursuing affordability—both in terms of the investment costs to acquire the JSF and the continuing costs to operate and maintain it over the life-cycle—will be very challenging, but is paramount to future success. Restructuring actions include the adoption of more realistic cost and schedule estimates, a more robust flight test program, and directed implementation of critical improvements needed in the aircraft and engine manufacturing and supplier management processes. Officials need to hold the line on annual procurement quantities and only ramp up production rates upon firm and confirming evidence from test results and performance indications that the production process is mature.

Implementing the "system maturity matrix" we recommended in March 2010 would provide a forcing tool to help senior defense officials and the Congress make annual budget and aircraft quantity decisions based on actual progress in building and testing the aircraft. The matrix is designed to provide criteria and conditions for comparing documented test and manufacturing results to expected progressive levels of demonstrated weapon system maturity in relationship to planned increases in future procurement quantities. This would help justify a ramp up of procurement quantities and corresponding funding levels leading up to full-rate procurement, now planned for 2019.

OSD's F–35 Joint Strike Fighter Concurrency Quick Look Review, dated Nov. 29, 2011, makes a similar recommendation. The report determined a lack of confidence in design stability and concurrency costs of required fixes supported serious reconsideration of procurement and production planning. It recommends that further decisions about F–35 concurrent production be event driven, based on the achievement of sufficient test data to support increased confidence in design maturity and of a well-controlled process for executing and minimizing design changes across concurrent production.

If the program's development costs continue to grow under the cascading effects of late drawings, design changes, and labor inefficiencies, the Department or Congress may need to consider, at some point, the idea of limiting any additional funding for development. The current funding levels of the F–35 are already testing the limits of realism. Any additional cost growth during development should be absorbed by the program, rather than add to the taxpayer's burden.

Mr. BARTLETT. DOD has been engaged in a comprehensive restructuring of the program for the past 2 years. In testimony last year before this Subcommittee, you said that GAO supports these actions. Do you still support the restructuring efforts, including the most recent ones added by the Secretary in January 2012? Have you seen concrete examples of improvements from these actions?

Mr. SULLIVAN. Yes, we still support the restructuring actions, although we continue to be concerned about the viability of future annual funding rates. Starting in January 2010, restructuring actions by the Department have placed the JSF on a more achievable course, albeit a lengthier and more expensive one. The Department has progressively lowered the production ramp-up rate and cut near term procurement quantities; fewer aircraft procured while testing is still ongoing lowers the risk of having to modify already produced aircraft. The new development flight test schedule is more realistic and better resourced, using more conservative assumptions about fly rates and test point achievements and providing for more flights and more test assets. This has paid off with relatively good test flight performance in 2010 and 2011. Undergirding restructuring actions was the technical baseline review done by the program office—a needed and comprehensive systems engineering review of the entire program that identified numerous disconnects in functions and information. In addition, several positive accomplishments by the prime contractor may spur improved future performance. Lockheed Martin implemented an improved and comprehensive integrated master schedule, loaded the new data from restructuring, and completed a schedule risk assessment, as we recommended several years ago. Also, DCMA and program officials believe that Lockheed has made a concerted effort to improve its earned value management system in compliance with federal standards. Initial reviews of the new procedures, tools, and training indicate that the company is on track to have its new system and processes approved in 2012.

Mr. BARTLETT. As you know, the JSF acquisition program is expected to still require over $300 billion to complete the acquisition.

How do you view affordability as a challenge for the program?

Mr. SULLIVAN. Overall program affordability—both in terms of the investment costs to acquire the JSF and the continuing costs to operate and maintain it over the life-cycle—remains a major risk. The long-stated intent that the JSF program would deliver an affordable, highly common fifth generation aircraft that could be acquired in large numbers could be in question. Total U.S. investment in the JSF is now estimated at $395.7 billion to develop and procure 2,457 aircraft over several decades and will require a long-term, sustained funding commitment. As the JSF program moves forward, unprecedented levels of funding will be required during a period of more constrained defense funding expectations overall. As the program continues to experience cost growth and delays, projected annual funding needs are unprecedented, averaging more than $12.5 billion a year through 2037. The Air Force alone needs to budget from $6 to $11 billion per year from fiscal year 2016 through 2037 for procurement. At the same time; the Air Force is committed to other big-dollar projects such as the KC–46 tanker and a new bomber program.

In addition, current JSF life-cycle cost estimates are considerably higher than the legacy aircraft it will replace; this has major implications for future demands on military operating support budgets and plans for recapitalizing fighter forces. The most recent estimate by the Director of Cost Assessment and Program Evaluation projects total U.S. operating and support (O&S) costs of $1.1 trillion for all three variants based on a 30-year service life and predicted usage and attrition rates. Defense leadership stated in 2011 that sustainment cost estimates of this magnitude were unaffordable and simply unacceptable in this fiscal environment. Our military services and the international partners have all expressed concerns about long-term affordability. The program has undertaken efforts to address this life-cycle affordability concern, however, until DOD can demonstrate that the program can perform against its cost projections, it will continue to be difficult for the U.S. and international partners to accurately set priorities, establish affordable procurement rates, retire aged aircraft, and establish supporting infrastructure.

Mr. BARTLETT. DOD has been engaged in a comprehensive restructuring of the program for the past 2 years. In testimony last year before this Subcommittee, you said that GAO supports these actions. Several actions seem the same or similar to GAO's recommendations from years ago. What are some of these and why did the Department not previously implement your recommendations?

Mr. SULLIVAN. Several actions are similar:

Our March 2008 report criticized the "Mid-Course Risk Reduction" effort that cut flight test assets and reduced the number of development flights. We recommended that DOD revisit this effort to address our concerns about testing, use of management reserves, and manufacturing deficiencies. Instead, DOD replenished management reserves from within the program baseline and did not revise its plan, nor fix the problems. Consequently, management reserves were again depleted. Recent restructuring actions since 2010 added more test resources, increased the number of flight tests, and extended the schedule, effectively reversing the mid-course plan.

Also in 2008, we determined that the program cost estimate was not reliable and likely underestimated and recommended that a new comprehensive independent cost estimate and schedule risk assessment are needed. We reiterated these concerns in subsequent reports, including the need to make a better projection of life-cycle operating and support costs. DOD's joint estimating team did provide better cost estimates in the interim, but it was not until this year (and after a Nunn-McCurdy cost breach) that a comprehensive independent cost estimate for the program to completion were completed. The CAPE's independent cost estimate and a new estimate by the JPO supported a new acquisition program baseline that is substantially larger than the previous baseline and which delays key milestones. The CAPE also provided a new estimate of military construction costs and projected O&S costs of $1.1 trillion over 30 years given certain assumptions.

Since 2006, we have consistently warned against procuring quantities of aircraft much ahead of testing results and the demonstrated ability of the manufacturing process to produce at higher rates. For example, in 2009 we reported on the risks posed by DOD plans to further accelerate procurement and to do so on cost reimbursement contracts. DOD responded that planned procurement rates were efficient and feasible and also declined to establish a firm plan for transitioning to fixed-price contracts. We were gratified when Defense leadership substantially reduced near term procurement, decreased ramp rate from one year to the next, and awarded the first fixed-price production contract. DOD has now reduced near-term procurement 3 times in the last 3 years in recognition of the need to stabilize design and fix deficiencies found in testing before ramping up production.

More recently, we recommended comprehensive schedule risk assessments, independent software studies, and moving to fixed-price contracts for production. The

Department implemented the latter in its first stage of restructuring ca. February 2010 and recently completed the first two.

For years, program leadership was slow to recognize problems and was generally unresponsive to other DOD organizations as well as us. For example, the CAIG and DOT&E also warned against cutting flight test resources. Rather than implementing ours and other recommendations, defense officials usually acknowledge the concerns, but stated they were managing the risks.

Mr. BARTLETT. DOD has been engaged in a comprehensive restructuring of the program for the past 2 years. In testimony last year before this Subcommittee, you said that GAO supports these actions. Going forward, what critical challenges remain for the program from a cost and schedule standpoint?

Mr. SULLIVAN. As I stated at the hearing, I see 5 areas of concern moving forward. These are: software development; continued engineering changes emanating from flight test; funding assumptions that average about $12.5 billion per year through 2037; mission systems development, most significantly the helmet mounted display; and the contractor's ability to manage a large, global supply chain. Contract cost overruns, delayed aircraft deliveries, and continued concurrency costs are expected to continue for several more years. The program has not yet demonstrated a stable design and manufacturing processes capable of efficient production. Engineering changes are persisting at relatively high rates and additional changes are likely as testing continues. There is risk of future cost growth from test discoveries driving changes to design and manufacturing processes. Until manufacturing processes are in control and engineering design changes resulting from information gained during developmental testing are reduced, there is risk of more cost growth. Manufacturing processes and performance indicators show some progress for improved performance. Even with the substantial reductions in near-term procurement quantities, DOD is still investing billions of dollars on hundreds of aircraft while flight testing has years to go.

Software development and integration—essential to JSF capabilities—will continue to be major factors driving JSF costs and schedule. JSF software development is one of the largest and most complex projects in DOD history, and it has grown in size and complexity, and is taking longer to complete than expected. Developing, testing, and integrating software, mission systems, and logistics systems are critical for demonstrating the operational effectiveness and suitability of a fully integrated, capable aircraft and pose significant technical risks moving forward. In attempting to maintain schedule, the program has deferred some capabilities to later blocks. Deferring tasks to later phases of development adds more pressure and costs to future efforts and likely increases the probability of defects being realized later in the program, when the more complex capabilities in these later blocks are already expected to pose substantial technical challenges.

Going forward, Lockheed Martin's and Pratt & Whitney's abilities to manage an expanding global supplier network are fundamental to meeting future production rates and throughput expectations. DOD's Independent Manufacturing Review Team in 2009 identified global supply chain management as the most critical challenge for meeting production expectations. The cooperative aspect of the supply chain provides both benefits and challenges. The international program structure is based on a complex set of relationships involving both government and industry from the United States and eight other countries. Overseas suppliers are playing a major and increasing role in JSF manufacturing and logistics. For example, center fuselage and wings will be manufactured by Turkish and Italian suppliers, respectively, as second sources. In addition to ongoing supplier challenges—parts shortages, failed parts, and late deliveries—incorporating international suppliers presents additional challenges. In addition, the program must deal with exchange rate fluctuations, disagreements over work shares, technology transfer concerns, different accounting methods, and transportation requirements that have already caused some delays. Also, suppliers have sometimes struggled to develop critical and complex parts while others have had problems with limited production capacity.

Mr. BARTLETT. Regarding manned and unmanned intelligence, surveillance and reconnaissance programs, has the Navy completed a comparative analysis of life cycle cost and operational effectiveness of manned and unmanned systems like the P–3, P–8 and Broad Area Maritime Surveillance aircraft?

Admiral SKINNER. The P–3 aircraft has been flying for over 50 years and is the baseline for measuring Life Cycle Cost and Operational Effectiveness of Navy's new ASW/ISR platforms (P–8 and BAMS). Predicted cost and effectiveness was fully evaluated during the Analysis of Alternatives (AoA), completed for P–8 in 2002 and BAMS in 2003.

Mr. BARTLETT. The Navy's Broad Area Maritime Surveillance Program had assumed cost savings in production and operations and maintenance because of Global

Hawk program shared overhead, training, basing costs, and other operations and sustainment costs. In addition, there is the possibility of a break in the production line, with Global Hawk Block 30 termination, given the current BAMS production schedule. Do you know what these costs will be?

Admiral SKINNER. With regard to operations, maintenance, training, and basing costs, the BAMS UAS Program as reflected in the President's Budget request for FY13 accounts for the cost of continuing as a Navy-only acquisition. BAMS operations, maintenance, training, and basing are independent of the Global Hawk support structure. The procurement cost estimate is similarly based on proceeding without concurrent USAF Global Hawk production. At Milestone B, the BAMS Program was estimated forward without shared savings, assuming a transition of the Q4 production line from Air Force RQ–4 UAs in FY13 to Navy-only quantities of MQ–4C UAs in FY14. Since the estimate assumed stand-alone production, a decision to continue Global Hawk production beyond FY13 could have resulted in savings of up to $150M across the FYDP. Those savings did not materialize because Global Hawk Block 30 production was terminated. The estimate did assume savings based on reuse of existing tooling and special test equipment; these efficiencies will still be captured since the necessary equipment will transition to Navy custody as required to support the ongoing BAMS UAS acquisition. The residual risk to production continuity is related to terminating Global Hawk Block 30 after Lot 10, since this invalidates the BAMS UAS estimate of a seamless production transition from USAF RQ–4B Global Hawk to MQ–4C BAMS UAS. A production break created by Air Force Global Hawk Block 30 termination is estimated to cost approximately $42 million. This value assumes that NATO AGS awards as scheduled and the resulting gap requiring coverage is 3.5 months.

Mr. BARTLETT. Can you describe the Navy and Marine Corps program and funding of unmanned aircraft vehicle sense and avoid programs to further operation of unmanned aircraft systems in the National Airspace System?

General ROBLING. The Marine Corps' Ground Based Sense-And-Avoid (GBSAA) initiative is in direct support of Marine Unmanned Aerial Vehicle Squadron 2 (VMU–2) based at Marine Corps Air Station Cherry Point. Current Federal Aviation Administration (FAA) regulations limit DOD unmanned aircraft (UA) operations to Restricted Airspace unless the UA are operating under a Certificate of Authorization (COA) issued by the FAA. Currently, FAA internal guidance requires visual observers or chase planes as a condition for approving a COA for an 11 miles transit to the nearest Restricted Area. The result is reduced training opportunities due to the inability to directly access training areas from its home station. While ground embarkation and transport of VMU–2 aircraft and equipment into local Restricted Areas has been employed as an alternate solution, this method is costly, time consuming, and increases wear on all components. The Cherry Point GBSAA program was funded by the OSD (AT&L) UAS Task Force as a solution to VMU–2 training deficiencies, and as a charter initiative to demonstrate capabilities in support of DOD National Airspace System UAS integration efforts. If approved for use, the system will utilize an existing radar feed to sanitize narrow corridors of airspace between Cherry Point and local Restricted Areas to allow the safe airborne transit of VMU–2 unmanned aircraft. All GBSAA equipment has been installed at MCAS Cherry Point, certified by DOD for its intended use, and has been demonstrated in an operationally relevant environment using trained USMC operators. Discussions are ongoing with the FAA regarding this system providing a sense-and-avoid capability as a condition of FAA granting the required COA. OSD provided $3.1 million of RDT&E funding (FY 2012–FY 2012) for this effort. Formal requirements development based upon the demonstrated Cherry Point capability, other DOD airspace integration efforts, as well as anticipated USMC future operational needs are underway in support of resourcing decisions. Specific information on US Navy sense and avoid programs can be provided by appropriate Navy staff.

Mr. BARTLETT. In your statement you note that F–35B and F–35C initial operational capability (IOC) dates have not been determined by leadership but you describe capabilities for IOC such as 10 F–35B aircraft with software block 2B for the Marine Corps, and 10 F–35C aircraft with software block 3F for the Navy. Based on the current F–35 development and procurement schedule, can you estimate what year the F–35B and F–35C will be declared IOC?

General ROBLING. The IOC date for the F–35B and F–35C has not yet been determined by the CMC or CNO. The Navy and Marine Corps require Service specific operational capabilities as defined in the F–35 Operational Requirements Document (ORD) prior to considering declaration of IOC. Achieving these capabilities are event driven and dependent upon the progress of the re-baselined JSF Program. Based on the current JSF Program Office development plans we anticipate an F–35B IOC in

2015 and an F–35C IOC at the completion of Initial Operational Test and Evaluation in 2018.

Mr. BARTLETT. Can you describe the Navy and Marine Corps program and funding of unmanned aircraft vehicle sense and avoid programs to further operation of unmanned aircraft systems in the National Airspace System?

Admiral FLOYD. The Navy is funding on the order of $175M for development and hardware procurement efforts associated with integrating the Broad Area Maritime Surveillance (BAMS) aircraft into the National Airspace System (NAS). These efforts include the BAMS Program development of a Pilot-in-the-Loop Due Regard capability providing a first generation Sense-and-Avoid system to be deployed operationally in international airspace beginning in FY 2015. The Navy is also leading a Central Test Evaluation and Investment Program (CTEIP), developing a DOD-wide common Modeling and Simulation and Test & Evaluation infrastructure for UAS programs. Additionally, the Navy is working in coordination with NASA, the FAA, and other Services in the development of standards and procedures for integrating UAS into the NAS.

Mr. BARTLETT. In your statement you note that F–35B and F–35C initial operational capability (IOC) dates have not been determined by leadership but you describe capabilities for IOC such as 10 F–35B aircraft with software block 2B for the Marine Corps, and 10 F–35C aircraft with software block 3F for the Navy. Based on the current F–35 development and procurement schedule, can you estimate what year the F–35B and F–35C will be declared IOC?

Admiral FLOYD. Not at this time. F–35B and F–35C IOC will be based on the development and test program performance (in addition to how the Department of the Navy defines IOC as discussed in your question above). The Department is pleased with the F–35 progress in 2011, but we require more definition in the program schedule, to include operational test dates, before targeting a timeline with a specific IOC date.

Mr. BARTLETT. Just 7 months ago, Deputy Secretary Carter certified in writing to the Congress that the Global Hawk system was "essential to national security," there was no other acceptable capability to meet the requirement, and the Global Hawk was $220M cheaper per year to operate than the U–2. Then the recommendation to terminate Block 30 is a complete reversal of the USAF position just 7 months ago. Please explain how an asset can be critical to national security and cost less than the alternative, but just 7 months later be terminated?

General HOLMES. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review.

After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

In September 2011 following the Nunn-McCurdy certification, the DOD Joint Requirements Oversight Committee modified the high-altitude ISR requirement where the U–2 was deemed sufficient to meet that amended requirement. Coupled with the austere budget environment, the Department decided it could no longer afford additional investment required for the RQ–4 Global Hawk Block 30.

- Requirement: The Air Force further determined the U–2 (which remains viable until at least 2040) was sufficient to meet the reduced force structure requirements. Continued increased investment in the RQ–4 is required to field a comparable capability to the U–2 and was determined to be unaffordable.

- Budget: The Budget Control Act was passed in August 2011. Additional investment in the RQ–4 is not warranted given a significant reduction in the Department's budget and because the U–2 remains operationally viable to satisfy the reduced JROC requirements at considerably lower total cost over the FYDP.

Mr. BARTLETT. Global Hawk was the first intelligence asset to the Japanese Earthquake/Tsunami Relief effort and first to Libya, and by all accounts it performed very well. In both of these cases, the Global Hawk was able to fly into areas too risky for manned aircraft (an active Surface to Air Missile site in Libya and a nuclear environment in Japan). How will the USAF compensate for losing this transformational capability?

General HOLMES. The Air Force will continue to satisfy the operational needs of the Combatant Commands through the Global Force Management Process. The Joint Requirements Oversight Council adjustment affirms the modified high-altitude ISR requirement is sufficient to address any such future contingency.

Mr. BARTLETT. The Department's combatant commanders have an insatiable need for ISR. Intelligence data is routinely the number one unmet requirement. While budget pressures require tough choices, the decision to pull 18 Global Hawk Block 30 aircraft out of the active inventory seems short-sighted. I question the proposal to scrap aircraft currently providing intelligence support to our warfighters, including those purchased as recently as last year. Can you tell me why it is necessary to take these assets out of commanders' hands and instead send them to the desert to rust?

General HOLMES. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given that the U–2 meets the new requirement significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings where $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. A modified requirement where the U–2 is sufficient and a reduced budget where the Department could no longer afford to keep investing in RQ–4 Global Hawk Block 30 drove the retirement decision. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that the high-altitude ISR requirement structure could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. The Congress has provided funds for 21 Global Hawk Block 30 aircraft at a cost of approximately $4 billion. Fourteen of these aircraft have been built and are flying operational missions. My understanding is that this budget proposes to eliminate the funding for future Global Hawk Block 30s and to mothball these relatively new aircraft in favor of a Cold War-era system. Can you explain why the DOD is poised to waste the $4 billion we have already spent on these aircraft that are currently providing valuable intelligence to the warfighter?

General HOLMES. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Furthermore, the decision to sustain the U–2 leverages $1.7B that was has been invested to modernize the weapon system. The U–2 fleet in its current state has been certified to 75,000 flight hours (2040 and beyond at current utilization rates). In addition to the new engines in 1994–1998, the entire fleet has completed new power distribution (wiring), 21st century glass

cockpit and modern avionics processor upgrades. The U–2s are currently on a 4000-hour programmed depot maintenance (PDM) cycle included in the budgeted operating costs. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS.

Mr. BARTLETT. A recent CSBA report said that eight manned aircraft with otherwise identical characteristics to a Global Hawk would be necessary to maintain the same orbit as three unmanned Global Hawks. If this is the case, how can it be that you determined the manned aircraft to be the most cost-efficient solution? How does the Global Hawk Block 30 compare to the U–2 on a cost-per-ISR-hour basis?

General HOLMES. The operating characteristics of the U–2 are vastly different than those of the Global Hawk including operating altitudes, sensor capabilities, stand-off ranges and mission effectiveness. A nominal RQ–4 Combat Air Patrol (CAP) is four aircraft, and a nominal U–2 CAP is five aircraft. The Global Hawk Block 30 has not matured to the point where a true comparison of operational costs is possible. Nevertheless, the Department conducted an analysis during the FY13 budget review using data from previous Air Force and Department efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show both the U–2 and RQ–4 at $32K per hour. The Air Force did not begin flying the RQ–4 Block 30 until March 2011, so there is only six months of representative flying hour information in the database. Also, the Air Force did not fly the RQ–4 Block 30 with the SIGINT sensor in 2011. The Air Force will begin flying with this payload in April 2012 and expects the RQ–4 flying hour costs to be greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. How have the Department's decisions to reduce Block 30 quantities while at the same time increasing requirements (increasing the number of simultaneous sensors required) contributed to the increased system cost of Global Hawk?

General HOLMES. The Air Force decision to terminate the Block 30 program was based upon a reduced requirement rather than an increased requirement. The requirement for the Global Hawk Block 30 aircraft is to execute electro-optical/infrared (EO/IR), synthetic aperture radar (SAR), limited moving target indicator (MTI) and signals intelligence (SIGINT) missions simultaneously. No change to the Block 30 requirement factored into the decision to terminate the program. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude intelligence, surveillance, and reconnaissance force structure could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced force structure requirements. Continued increased investment in RQ–4 would have been required to field a comparable capability to U–2 and therefore, the RQ–4 was determined to be unaffordable. Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2 is still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. When my staff looks at the Air Force Total Ownership Cost data for U–2 and Global Hawk, we see that in 2011 the cost per operational hour (that is, the cost per hour executing missions) for Global Hawk is lower than U–2. This seems to be a much more relevant number than cost per flying hour. How does this square with your claim that Global Hawk operating costs are higher?

General HOLMES. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the

U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. What is the cost comparison for operating U–2 compared to Global Hawk? What is the difference in the cost per mission for each? How much of the U–2 fleet is available to perform all ISR missions?

General HOLMES. The cost per flight hour is roughly the same. The U–2 costs $320K per 10-hour Multi-INT mission and the RQ–4 $640K per 20-hour Single-INT mission. There are 27 U–2 "single seaters" of which one is always rotating through depot level maintenance, and two utilized as test birds (capable of flying missions, but not typically utilized for that purpose). Thus, there are 24 mission-capable U–2 aircraft at any given time.

Mr. BARTLETT. If the U–2 is extended until 2025, and the system that was slated to replace it is cancelled, what is your plan for replacing the U–2? How much will it cost to modernize and maintain the Cold War-era U–2 for another 15 years?

General HOLMES. There is no projected U–2 retirement date. The U–2 aircraft remains viable until 2040 and meets all sensor requirements currently tasked by the Combatant Commands. The Air Force will invest approximately $68 million per year in sustainment and enhancement modifications to ensure platform modernization and maintenance.

Mr. BARTLETT. I understand the Department's Cost Assessment and Program Evaluation (CAPE) performed a detailed cost analysis associated with the decision to terminate and mothball the Global Hawk Block 30 program. Please share this analysis with the Congress so it can better understand the analytical foundation of this decision. Provide a detailed cost assessment including the basis of costs for both sustainment and procurement through 2025.

General HOLMES. In support of the FY13 President's Budget Request (PBR), the USAF analyzed the operational output of both the RQ–4 and the U–2 using existing CONOPS for both aircraft and determined that U–2 capability was sufficient for operational needs. When analyzed in this context, the U–2 and RQ–4 operating costs were nearly equal. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B. The CAPE conducted their own independent cost analysis based on three scenarios to come to the conclusion that the U–2 was the more affordable option to meet the newly reduced requirement. The Air Force will defer to CAPE to provide Congress the details of their independent cost analysis.

Mr. BARTLETT. Given our alarming and unsustainable national debt, American taxpayers expect and deserve that Congress will make the difficult decisions to restore fiscal responsibility. However, these decisions cannot be short-sighted or made at the expense of our long-term budget or national security needs. Please detail how terminating a new cutting-edge platform, Global Hawk Block 30, is less expensive than extending the life of an aging platform, U–2, which will require increased investments in coming years is a fiscally responsible decision over the next decade.

General HOLMES. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement and the significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified re-

quirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. Our budget crisis demands that we maximize the efficiency for every program. At a macro level it is clear that an unmanned system can fly longer and further than a manned system. A recent CSBA analysis showed in great detail how unmanned systems feature one-third the life cycle cost of manned systems. Explain how it is in the long-term budgetary and national security interests of our nation to abandon an unmanned system that by all accounts is performing exceptionally well in theater for a five-decade-old manned system.

General HOLMES. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review. After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30, which still needed approximately $800M in investment to achieve sensor parity with the U–2, was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

Mr. BARTLETT. Can you please provide us details on how the Global Hawk has been used to support operations worldwide over the past year? Please provide both classified and unclassified details of how Global Hawk is being used

General HOLMES. In Libya, Global Hawk provided electro-optical, infrared, and synthetic aperture radar and was used in a traditional ISR role with dynamic responsiveness due to its enhanced duration/dwell time and the ability to fill gaps between other ISR collects. Overall, Global Hawk was successful in Operation Odyssey Dawn and in its continued support for Operation Unified Protector. Assessment details can be made available at a higher classification. In the CENTCOM theater, Global Hawk continues to support the combatant command with both theater and tactical ISR. To date, RQ–4 has flown over 50,000 combat hours in support of CENTCOM operations. In a humanitarian/disaster relief support role, Global Hawk leveraged its range and endurance as an ISR first-responder. Following the Haiti earthquake, Global Hawk executed a response mission in 12 hours effectively providing initial situational awareness information, highlighting earthquake damage, status of critical infrastructure and identifying food/aid drop zones and indicators of mass population migrations. Eight missions were flown, satisfying 2,621 targets. In Japan, Global Hawk capitalized on its range and endurance to be overhead in 21 hours. Imagery products were provided to the Secretary of State within 40 minutes of request. In addition to infrastructure damage assessment, supply route analysis, and real-time monitoring of evacuation support, Global Hawk collection focused on the Fukushima nuclear power plant. Because it is a remotely piloted aircraft, Japan allowed PACOM to use the Global Hawk within the 20 km nuclear engagement zone. Infrared imagery taken directly over the top of the reactors allowed engineers to frequently monitor core temperature levels. In 21 missions and 300 on-station hours, Global Hawk collected more than 3,000 images.

Mr. BARTLETT. The Department based its Global Hawk Block 30 divestment decision on it being more expensive to operate than the U–2. Can you explain how the Department determined these costs?

General HOLMES. The Department of Defense conducted an analysis during the FY13 budget review using data from previous Air Force and DOD efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show the U–2 at $32K per hour and the RQ–4 also at $32K per hour. However, costs for the U–2 included SIGINT sensors, but the Air Force did not fly the RQ–4 Block 30 with its SIGINT sensors in 2011. The Air Force will begin flying Global Hawk with SIGINT sensors in April 2012 and expects the RQ–4 flying hour costs to become greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. General Schwartz mentioned Operations and Support costs are issue for the Global Hawk program. When the decision was made to retire the U–2 a few years back, specific costs (base support, infrastructure and indirect support) were allocated to Global Hawk. As a result, these costs have inflated the Global Hawk cost per flight hour while the U–2's cost per flight hour has decreased. Did the USAF look at doing an apples-to-apples comparison of costs for both systems? If not, why not?

General HOLMES. The Department of Defense conducted an analysis during the FY13 budget review using data from previous Air Force and DOD efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show the U–2 at $32K per hour and the RQ–4 also at $32K per hour. However, costs for the U–2 included SIGINT sensors, but the Air Force did not fly the RQ–4 Block 30 with its SIGINT sensors in 2011. The Air Force will begin flying Global Hawk with SIGINT sensors in April 2012 and expects the RQ–4 flying hour costs to become greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. Can you describe the Air Force's program and funding of unmanned aircraft vehicle sense and avoid programs to further operation of unmanned aircraft vehicles in the National Airspace System?

General HOLMES. The United States Air Force and Department of Defense (DOD) are developing near term Ground Based Sense and Avoid (GBSAA) and long term Airborne Sense and Avoid (ABSAA) solutions to further remotely piloted aircraft (RPA) access to the National Airspace System (NAS). However, the Federal Aviation Administration (FAA) has not yet defined performance parameters for critical flight safety aspects including FAA Part 91 Code of Federal Regulations requirements for "well clear" and "see and avoid". Currently, Air Force/DOD GBSAA and ABSAA solutions are being developed to meet DOD's interpretation of flight safety requirements. The Air Force is working prototypes of both systems and continuing research in human factors systems and terminal area operations.

Funding Summary: Required/Programmed ($M)

GBSAA funding data: FY09–FY11: $4.7/$4.7; FY12: $4.175/$4.175; FY13: $1.07/$1.07; FY14: $ .1/$ .1

The first prototype GBSAA system is expected to be operational by Fall 2012 and is currently being tested at Gray Butte range (near Edwards AFB) and Cannon AFB. Once the proof of concept and prototype are validated, the system will be fielded and installed at these RPA bases to facilitate access to the NAS: Grand Forks AFB, Ft Drum (Syracuse), Beale AFB, Anderson AFB Guam, and Southern California Logistics Airport.

Funding Summary: Required/Programmed ($M)

ABSAA funding data: FY09–FY11: $28/$28; FY12: $9/$9; FY13: $19/$19; FY14: $45/$45

ABSAA is a multiphase program. Common ABSAA Phase 1(a) provides the foundation for autonomous ABSAA capability for Global Hawk, Broad Area Maritime Surveillance (BAMS) and other medium altitude RPA. A program completion timeline is not yet available.

Mr. BARTLETT. In your statement you describe a decreased fighter force structure of 1,900 total fighter aircraft as "an increased risk" to carry out the National Military Strategy, compared to last year's 2,000 fighter aircraft inventory as "some risk." Please describe the increased risks in terms of meeting military objectives. What actions is the Air Force taking to reduce this risk? What actions can the Congress take to reduce this risk?

General HOLMES. The Budget Control act drove the Air Force to assume more risk to meet fiscal guidance. The new strategy states the force "will no longer be sized to conduct large-scale, prolonged stability operations." As a result, reduced demand on the force, combined with the assumption of increased risk, requires fewer aircraft. Increased risk means objectives may take longer to accomplish, and the force may have higher potential losses. The Air Force is constantly assessing how to bal-

ance risk across all of its portfolios so as to best utilize its resources and assets while optimizing needed combat capability. As far as actions Congress can take, fully funding the President's Budget helps reduce uncertainty and therefore risk.

Mr. BARTLETT. Just 7 months ago, Deputy Secretary Carter certified in writing to the Congress that the Global Hawk system was "essential to national security," there was no other acceptable capability to meet the requirement, and the Global Hawk was $220M cheaper per year to operate than the U–2. Then the recommendation to terminate Block 30 is a complete reversal of the USAF position just 7 months ago. Please explain how an asset can be critical to national security and cost less than the alternative, but just 7 months later be terminated?

General POSNER. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review.

After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure.

Ultimately, continued investment in the RQ–4 Block 30 was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

In September 2011 following the Nunn-McCurdy certification, the DOD Joint Requirements Oversight Committee modified the high-altitude ISR requirement where the U–2 was deemed sufficient to meet that amended requirement. Coupled with the austere budget environment, the Department decided it could no longer afford additional investment required for the RQ–4 Global Hawk Block 30.

- Requirement: The Air Force further determined the U–2 (which remains viable until at least 2040) was sufficient to meet the reduced force structure requirements. Continued increased investment in the RQ–4 is required to field a comparable capability to the U–2 and was determined to be unaffordable.
- Budget: The Budget Control Act was passed in August 2011. Additional investment in the RQ–4 is not warranted given a significant reduction in the Department's budget and because the U–2 remains operationally viable to satisfy the reduced JROC requirements at considerably lower total cost over the FYDP.

Mr. BARTLETT. Global Hawk was the first intelligence asset to the Japanese Earthquake/Tsunami Relief effort and first to Libya, and by all accounts it performed very well. In both of these cases, the Global Hawk was able to fly into areas too risky for manned aircraft (an active Surface to Air Missile site in Libya and a nuclear environment in Japan). How will the USAF compensate for losing this transformational capability?

General POSNER. The Air Force will continue to satisfy the operational needs of the Combatant Commands through the Global Force Management Process. The Joint Requirements Oversight Council adjustment affirms the modified high-altitude ISR requirement is sufficient to address any such future contingency.

Mr. BARTLETT. The Department's combatant commanders have an insatiable need for ISR. Intelligence data is routinely the number one unmet requirement. While budget pressures require tough choices, the decision to pull 18 Global Hawk Block 30 aircraft out of the active inventory seems short-sighted. I question the proposal to scrap aircraft currently providing intelligence support to our warfighters, including those purchased as recently as last year. Can you tell me why it is necessary to take these assets out of commanders' hands and instead send them to the desert to rust?

General POSNER. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to

meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given that the U–2 meets the new requirement significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings where $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. A modified requirement where the U–2 is sufficient and a reduced budget where the Department could no longer afford to keep investing in RQ–4 Global Hawk Block 30 drove the retirement decision. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that the high-altitude ISR requirement structure could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. The Congress has provided funds for 21 Global Hawk Block 30 aircraft at a cost of approximately $4 billion. Fourteen of these aircraft have been built and are flying operational missions. My understanding is that this budget proposes to eliminate the funding for future Global Hawk Block 30s and to mothball these relatively new aircraft in favor of a Cold War-era system. Can you explain why the DOD is poised to waste the $4 billion we have already spent on these aircraft that are currently providing valuable intelligence to the warfighter?

General POSNER. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Furthermore, the decision to sustain the U–2 leverages $1.7B that was has been invested to modernize the weapon system. The U–2 fleet in its current state has been certified to 75,000 flight hours (2040 and beyond at current utilization rates). In addition to the new engines in 1994–1998, the entire fleet has completed new power distribution (wiring), 21st century glass cockpit and modern avionics processor upgrades. The U–2s are currently on a 4000-hour programmed depot maintenance (PDM) cycle included in the budgeted operating costs. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS.

Mr. BARTLETT. A recent CSBA report said that eight manned aircraft with otherwise identical characteristics to a Global Hawk would be necessary to maintain the same orbit as three unmanned Global Hawks. If this is the case, how can it be that you determined the manned aircraft to be the most cost-efficient solution? How does the Global Hawk Block 30 compare to the U–2 on a cost-per-ISR-hour basis?

General POSNER. The operating characteristics of the U–2 are vastly different than those of the Global Hawk including operating altitudes, sensor capabilities, stand-off ranges and mission effectiveness. A nominal RQ–4 Combat Air Patrol (CAP) is four aircraft, and a nominal U–2 CAP is five aircraft. The Global Hawk Block 30 has not matured to the point where a true comparison of operational costs is possible. Nevertheless, the Department conducted an analysis during the FY13 budget review using data from previous Air Force and Department efforts. The Air Force Total Ownership Cost (AFTOC) database figures in FY11 show both the U–2 and RQ–4 at $32K per hour. The Air Force did not begin flying the RQ–4 Block 30 until March 2011, so there is only six months of representative flying hour information in the database. Also, the Air Force did not fly the RQ–4 Block 30 with the SIGINT sensor in 2011. The Air Force will begin flying with this payload in April 2012 and expects the RQ–4 flying hour costs to be greater than those for the U–2. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B.

Mr. BARTLETT. How have the Department's decisions to reduce Block 30 quantities while at the same time increasing requirements (increasing the number of simultaneous sensors required) contributed to the increased system cost of Global Hawk?

General POSNER. The Air Force decision to terminate the Block 30 program was based upon a reduced requirement rather than an increased requirement. The requirement for the Global Hawk Block 30 aircraft is to execute electro-optical/infrared (EO/IR), synthetic aperture radar (SAR), limited moving target indicator (MTI) and signals intelligence (SIGINT) missions simultaneously. No change to the Block 30 requirement factored into the decision to terminate the program. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude intelligence, surveillance, and reconnaissance force structure could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these reduced force structure requirements. Continued increased investment in RQ–4 would have been required to field a comparable capability to U–2 and therefore, the RQ–4 was determined to be unaffordable. Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2 is still operationally viable at considerably lower total cost over the FYDP.

Mr. BARTLETT. When my staff looks at the Air Force Total Ownership Cost data for U–2 and Global Hawk, we see that in 2011 the cost per operational hour (that is, the cost per hour executing missions) for Global Hawk is lower than U–2. This seems to be a much more relevant number than cost per flying hour. How does this square with your claim that Global Hawk operating costs are higher?

General POSNER. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. What is the cost comparison for operating U–2 compared to Global Hawk? What is the difference in the cost per mission for each? How much of the U–2 fleet is available to perform all ISR missions?

General POSNER. The cost per flight hour is roughly the same. The U–2 costs $320K per 10-hour Multi-INT mission and the RQ–4 $640K per 20-hour Single-INT mission. There are 27 U–2 "single seaters" of which one is always rotating through depot level maintenance, and two utilized as test birds (capable of flying missions, but not typically utilized for that purpose). Thus, there are 24 mission-capable U–2 aircraft at any given time.

Mr. BARTLETT. If the U–2 is extended until 2025, and the system that was slated to replace it is cancelled, what is your plan for replacing the U–2? How much will it cost to modernize and maintain the Cold War-era U–2 for another 15 years?

General POSNER. There is no projected U–2 retirement date. The U–2 aircraft remains viable until 2040 and meets all sensor requirements currently tasked by the Combatant Commands. The Air Force will invest approximately $68 million per year in sustainment and enhancement modifications to ensure platform modernization and maintenance.

Mr. BARTLETT. I understand the Department's Cost Assessment and Program Evaluation (CAPE) performed a detailed cost analysis associated with the decision to terminate and mothball the Global Hawk Block 30 program. Please share this analysis with the Congress so it can better understand the analytical foundation of this decision. Provide a detailed cost assessment including the basis of costs for both sustainment and procurement through 2025.

General POSNER. In support of the FY13 President's Budget Request (PBR), the USAF analyzed the operational output of both the RQ–4 and the U–2 using existing CONOPS for both aircraft and determined that U–2 capability was sufficient for operational needs. When analyzed in this context, the U–2 and RQ–4 operating costs were nearly equal. Given comparable flying hour costs, and given the large investment required for the RQ–4, the Air Force chose to divest the Block 30 program and save a net of $2.5B. The CAPE conducted their own independent cost analysis based on three scenarios to come to the conclusion that the U–2 was the more affordable option to meet the newly reduced requirement. The Air Force will defer to CAPE to provide Congress the details of their independent cost analysis.

Mr. BARTLETT. Given our alarming and unsustainable national debt, American taxpayers expect and deserve that Congress will make the difficult decisions to restore fiscal responsibility. However, these decisions cannot be short-sighted or made at the expense of our long-term budget or national security needs. Please detail how terminating a new cutting-edge platform, Global Hawk Block 30, is less expensive than extending the life of an aging platform, U–2, which will require increased investments in coming years is a fiscally responsible decision over the next decade.

General POSNER. In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30 was not prudent given the U–2 meets the new requirement and the significant reduction in the Department's budget. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B. Finally, some of the $4B investment made in Block 30s will continue to benefit the Block 20 BACN and Block 40/MP–RTIP programs, as well as NASA Block 10 aircraft, NATO AGS and Navy BAMS. The total cost of keeping the Global Hawk Block 30 and continuing the investment to improve the RQ–4 to reach a comparable capability with U–2 was more expensive than keeping the U–2. As a result, the Department chose to save $2.5B across the FYDP in a reduced budget environment since the U–2 is sufficient to meet the requirement and remains viable through 2040. The Joint Requirements Oversight Council reduced the high-altitude ISR requirement, and the AF budget reduced to where the Department could no longer afford to keep investing in the RQ–4 Global Hawk Block 30. Requirement: In September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that conventional high-altitude ISR requirements could be modified. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. Continued increased investment in RQ–4 was required to field a comparable capability to U–2 and was determined to be unaffordable. Budget: Continued, increased investment in RQ–4 was not warranted given a significant reduction in the Department's budget and an alternative system, the U–2, is still operationally viable at a considerably lower cost over the FYDP. Additionally, the actual cost per flying hour (CPFH) data, when the U–2 is employed at its normal operational distance, shows the U–2 cost is comparable to the RQ–4 cost. The latest actual CPFH data shows that both platforms are operating at $32K per hour.

Mr. BARTLETT. Our budget crisis demands that we maximize the efficiency for every program. At a macro level it is clear that an unmanned system can fly longer and further than a manned system. A recent CSBA analysis showed in great detail how unmanned systems feature one-third the life cycle cost of manned systems. Explain how it is in the long-term budgetary and national security interests of our nation to abandon an unmanned system that by all accounts is performing exceptionally well in theater for a five-decade-old manned system.

General POSNER. It is accurate that the RQ–4 can fly longer and further than the U–2, and in last year's Nunn-McCurdy certification, the RQ–4 was found to be $220M less expensive per year to operate than the U–2. However, OSD CAPE based this analysis on a High Altitude orbit 1,200 miles from the launch base. During the analysis done in the FY13 Budget Review, the launch base for the RQ–4 and U–2 was assumed to be from their normal operating locations. Coupled with the fact that the cost per flying hour of the RQ–4 and U–2 is roughly equivalent at $32K per hour, per information contained in the Air Force Total Ownership Costs Database, the RQ–4 did not offer a cost advantage over the U–2 in the FY13 Budget Review. After the Nunn-McCurdy Review, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that con-

ventional high-altitude ISR requirements could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet those national security requirements for high-altitude ISR with this newly reduced force structure. Ultimately, continued investment in the RQ–4 Block 30, which still needed approximately $800M in investment to achieve sensor parity with the U–2, was not prudent given there is no difference in the operating costs between the RQ–4 and U–2 when operating from their normal operating locations and the U–2 meets the new requirement. This drove the decision to divest the RQ–4 Global Hawk Block 30, resulting in a $3.8B savings. Although money was saved with the decision to divest Global Hawk Block 30, $1.3B was needed to continue to operate and sustain the U–2 through the FYDP. This resulted in a net savings to the taxpayer of $2.5B.

Mr. BARTLETT. Can you please provide us details on how the Global Hawk has been used to support operations worldwide over the past year? Please provide both classified and unclassified details of how Global Hawk is being used

General POSNER. In Libya, Global Hawk provided electro-optical, infrared, and synthetic aperture radar and was used in a traditional ISR role with dynamic responsiveness due to its enhanced duration/dwell time and the ability to fill gaps between other ISR collects. Overall, Global Hawk was successful in Operation Odyssey Dawn and in its continued support for Operation Unified Protector. Assessment details can be made available at a higher classification. In the CENTCOM theater, Global Hawk continues to support the combatant command with both theater and tactical ISR. To date, RQ–4 has flown over 50,000 combat hours in support of CENTCOM operations. In a humanitarian/disaster relief support role, Global Hawk leveraged its range and endurance as an ISR first-responder. Following the Haiti earthquake, Global Hawk executed a response mission in 12 hours effectively providing initial situational awareness information, highlighting earthquake damage, status of critical infrastructure and identifying food/aid drop zones and indicators of mass population migrations. Eight missions were flown, satisfying 2,621 targets. In Japan, Global Hawk capitalized on its range and endurance to be overhead in 21 hours. Imagery products were provided to the Secretary of State within 40 minutes of request. In addition to infrastructure damage assessment, supply route analysis, and real-time monitoring of evacuation support, Global Hawk collection focused on the Fukushima nuclear power plant. Because it is a remotely piloted aircraft, Japan allowed PACOM to use the Global Hawk within the 20 km nuclear engagement zone. Infrared imagery taken directly over the top of the reactors allowed engineers to frequently monitor core temperature levels. In 21 missions and 300 on-station hours, Global Hawk collected more than 3,000 images.

Mr. BARTLETT. Regarding medium altitude manned and unmanned intelligence, surveillance and reconnaissance programs, has your office completed a comparative analysis of life cycle cost and operational effectiveness of manned and unmanned systems such as the MC–12 aircraft and the Predator and Reaper UAVs?

General POSNER. Such a study has not been completed. The Air Force inventory of ISR assets is envisioned to be complementary. Although there is some degree of overlapping capability among these assets each one brings unique capabilities to the force mix. The ISR force includes the space based assets as well as the manned and unmanned airborne platforms. We are continually evaluating costs and capabilities in a constrained fiscal environment but there is not an effort to evaluate manned vs. unmanned platforms because each of these classes of assets brings complementary capabilities to the force mix.

Mr. BARTLETT. The cost savings estimates for termination of Global Hawk Block 30 did not fully consider additional costs to the Navy's Broad Area Maritime Surveillance program, which was going to benefit from a shared production line, training and common basing.

Further, in citing cost savings of $2.5 billion in termination of the Global Hawk Block 30 program, the Air Force doesn't provide comment on the loss of operational capability.

Global Hawk Block 30s are currently flying operational missions in Central, European, and Pacific Commands. These aircraft will be returned to the U.S. by the end of this year and stored. The Global Hawk has significant range and endurance advantages over the U–2. The Global Hawk has near real-time sensor relay on all its aircraft, versus a limited number of U–2 aircraft capable of beyond line-of-sight intelligence data relay. What operational costs and risks are assumed with the termination of the Global Hawk Block 30?

General POSNER. The Air Force has provided resources to cover the cost of the line closure. The actual cost increases are variable and dependent on the length of time the line is closed. The Department of Defense continues to work with the Air Force, the Navy, and the prime contractor to capture the impact of termination. In

September 2011, the DOD Joint Requirements Oversight Council reviewed recent adjustments in military strategy and determined that the high-altitude ISR requirement could be reduced. The Air Force further determined the U–2, which remains viable until at least 2040, was sufficient to meet these modified requirements. As a result, there will be no impact to warfighting capabilities and peacetime support will be managed by the current Global Force Management Process.

Mr. BARTLETT. The Air Force reduces its procurement in the budget request from 48 to 24 Reaper UAVs, from that projected last year. Why is this being done?

General POSNER. There are multiple planning factors that changed for the MQ–9 program between the FY12 PB and the FY 13 PB. First, the current attrition rates of both the MQ–1 and MQ–9 are lower than the Air Force originally estimated in FY12 PB. The original estimate was based on MQ–1 data. We have since accumulated significant flight hours on the MQ–9 system with significantly lower than forecast losses. The Air Force modeling experts have since applied actual MQ–9 data and updated the estimate. Specifically, the Air Force projected it would lose 77 MQ–9s across the FYDP but now projects it will only lose 11. Additionally, the MQ–1 fleet is now planned to be operational until at least FY23 instead of retiring in FY17. These factors, coupled with the FY12 MQ–9 buy which delivers 48 aircraft in FY14, enable the Air Force to achieve 65 combined MQ–1/9 Combat Air Patrol (CAPs) by 3QFY14 and sustain them with the production profile contained in the FY13 PB. The FY13 PB production profile eases the strain on the aircrew training pipeline and enables orderly and efficient aircrew force structure management as the Air Force transitions to an all-MQ–9 medium altitude RPA fleet. The lower attrition rate allows for a lower production rate of 24 aircraft per year while still reaching the 65 CAP capabilities on time, in FY14. Ultimately, the FY13 PB is the best way to meet Air Force requirements in this budget-constrained environment.

Mr. BARTLETT. In late February, the Air Force informed the committee that it planned to cancel the Light Air Support (LAS) contract effective March 2, 2012. What is the new way forward to meet the requirement of 20 LAS aircraft for the Afghanistan Air Force?

General POSNER. The Air Force decided to issue an amendment to the Light Air Support (LAS) Request for Proposal (RFP) to both offerors. Air Force officials have met with both original offerors, Sierra Nevada Corporation (SNC) and Hawker Beechcraft Defense Corporation (HBDC), individually to review the amended RFP changes line-by-line. Both will have time to submit comments on the draft RFP amendment, after which the Air Force expects to release the final amended RFP on approximately April 30. While the decision process will be event-driven, the Air Force targets a source selection decision in early calendar year 2013. This would allow first aircraft delivery to Afghanistan in third quarter 2014.

QUESTIONS SUBMITTED BY MR. JONES

Mr. JONES. When will the aircraft be able to send video to a ground station (e.g. JTAC with a video receiver)?

Mr. KENDALL. The F–35 Program of Record (POR) does not contain any capability to send video to a ground station. Video Down-Link, similar to the capability recently added to legacy platforms, is a candidate for Block 4 Follow-On Development. Within the F–35 POR, there is the capability to send an image over the three datalinks (Link 16, Variable Message Format and Multifunction Advanced DataLink). A ground station properly equipped to receive information over these datalinks could receive a still image from the F–35 in this manner.

Mr. JONES. When will the aircraft be able to Mark a target or Match Sparkle with Infra-Red energy?

Mr. KENDALL. Infrared pointer ("sparkle") capability is not an F–35 Program of Record capability. This capability is being considered as a Block 4 Follow-on Development candidate.

Mr. JONES. What is the field of view of the internal pod?

Why was the gun not put internally? With the gun attached, what affect does that have on carrying weapons?

What will it cost per hour to fly?

Besides cost, is there any limitations to the number of hours the aircraft can fly annually?

Mr. KENDALL. The internal targeting pod, known as the Electro-Optical Targeting System, has a field of view (FOV) of 3.54 degrees in Wide FOV and 1.49 degrees in Narrow FOV. It can provide an additional 4x virtual zoom through digital processing. The FOV can be slewed circularly around the aircraft's horizon and from 10 degrees above the relative horizon to 90 degrees below the horizon, providing visi-

bility throughout the lower hemisphere subject to airframe and external stores masking. The program of record for the F–35 includes an AN/A49 E–21 external missionized gun pod to be mounted on station 6 (centerline station) of the STOVL and CV variants. The external gun pod is a fixed, forward-firing system. The gun is not stored internally on the STOVL and CV variants (there is an internal gun on the CTOL variant) due to Service-specific mission requirements for increased fuel capacity and mission range. The missionized gun pod attaches to the centerline carriage location (station 6) which is currently only designed to carry the gun pod and therefore has no impact on the specified F–35B or F–35C weapons carriage capability.

Based on the December 2011 F–35 Selected Acquisition Report (SAR), the cost per flight hour is $31,923 (BY 2012). This cost is based on total system costs, such as mission personnel, contractor support, depot overhaul, training, etc. that cannot be allocated to specific subsystems. Consequently, the cost per flight hour of the gun cannot be specifically identified.

The cost per flight hour estimate for the Joint Strike Fighter is built upon a variety of mission profiles and weapons load configurations. Additional limitations to annual aircraft flight hours (other than cost) are the ability to generate sorties based on personnel, equipment, and aircraft availability.

The program is in the midst of a 2-year "should cost" effort on the O&S cost. This effort will continue through 2012. Over the next 12 months, the program will complete an F–35 Business Case Analysis (BCA) and the results from the BCA will assist the Program Executive Officer in refining the current F–35 support strategy. The BCA will also identify the best mix of existing Service/Partner Organic capabilities with that of the Industry team to develop the optimum long term best value F–35 support solution. The Services, working in concert with the program office, will continue to analyze options outside of the program office's purview to reduce operating costs, such as reviewing basing options and the sequencing of those actions, unit level manpower/squadron size and discrete sustainment requirements. In addition, the program has identified a number of Affordability Initiatives to help drive down sustainment costs.

Mr. JONES. When will the aircraft be able to send video to a ground station (e.g. JTAC with a video receiver)?

Mr. VAN BUREN. Full Motion Video is a candidate for inclusion in Block 4 follow-on development, approximately 2020.

Mr. JONES. When will the aircraft be able to Mark a target or Match Sparkle with Infra-Red energy?

Mr. VAN BUREN. An IR Marker is a candidate for inclusion in Block 4 follow-on development, approximately 2020.

Mr. JONES. What is the field of view of the internal pod?

Why was the gun not put internally? With the gun attached, what affect does that have on carrying weapons?

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Besides cost, is there any limitations to the number of hours the aircraft can fly annually?

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Admiral VENLET. The F–35 Program of Record (POR) does not contain any capability to send video to a ground station. Video Down-Link, similar to the capability recently added to legacy platforms, is a candidate for Block 4 Follow-On Development. Within the F–35 POR, there is the capability to send an image over the three datalinks (Link 16, Variable Message Format and Multifunction Advanced DataLink). A ground station properly equipped to receive information over these datalinks could receive a still image from the F–35 in this manner.

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QUESTIONS SUBMITTED BY MR. WILSON

Mr. WILSON. The Air Force has announced its intention to reduce the number of bases that will receive the Air Force variant of the F–35 in order to reduce sustainment costs. Does the Marine Corps intend to reduce the number of air stations that all will receive the F–35B? Has the announced list of Marine Corps Air Stations scheduled to receive F–35Bs changed in anyway?

General ROBLING. The Marine Corps completed the Environmental Impact Studies EIS for JSF East Coast and West Coast basing in December 2010. The EIS' optimized the Joint Strike Fighter beddown locations and validated the 4 CONUS air stations we currently have are sufficient and any decrease in the number of air stations would have a detrimental effect on the surrounding populations, operation, and mission readiness. In addition to participating in Joint JSF training at Eglin AFB, the Marine Corps plans to execute a rolling JSF transition of 4 air stations starting in 2012 with MCAS Yuma, AZ, followed in sequence with MCAS Beaufort, NC, MCAS Miramar, CA, and MCAS Cherry Point, NC. The transition is designed to retain operational capability of our legacy aircraft, optimize MilCon efficiencies, and distribute the F–35 aircraft to support the training and deployments of the Marine Air Ground Task Force.

QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. In your combined opening statements, you focused on the importance of the Legacy Service Life Extension Program (SLEP) and the Combat Avionics Programmed Extension Suites (CAPES) program for our F–16 Block 40s through 52s fleet. While I agree that these programs are key to keeping these aircraft relevant until the F–35 replaces them, my concern is on the Block 30 inventory in the Air National Guard, particularly those that maintain the Aerospace Control Alert (ACA) mission.

The 177th Fighter Wing in New Jersey is currently the only Air National Guard Fighter Wing flying "Little Inlet" Block 30s. I am sure you both know that I have consistently pushed the Air Force and Air National Guard to replace those aging aircraft with some next generation fighter.

With that said, my concern has to do with the issue of "fleet commonality."

Since the Air Force has proposed to re-classify or retire one entire Block 30 "Big Inlet" squadron, are there any plans to shuffle the Air National Guard fighter jet inventory with those F–16s to ensure "fleet commonality," specifically for the 177th so they are no longer the "odd man out"?

Additionally, can both or one of you commit to providing me and my staff with a briefing by the end of April 2012 to alleviate my concern that the 177th will not succumb to future combat AOR limitations based on their current iron inventory

and to address where the 177th fits into the roadmap to receive updated or next generation fighters?

General HOLMES and General POSNER. The Air Force addresses force structure holistically across all of its components and missions which include the Air National Guard. The Air Force's oldest F–16s remain viable through the end of this decade, and as airframes retire newer airframes will flow to support the Total Force. The Air National Guard leadership has been and will continue to be active participants to determine the best way forward and, as force structure and strategic basing decisions are made, the Air Force will be happy [to] brief you and your staff. Aircraft will be moved as necessary to ensure mission requirements are met to support the National Military Strategy.

QUESTIONS SUBMITTED BY MR. TURNER

Mr. TURNER. The Department of Defense (DOD) has been the catalyst in the development of the unmanned aircraft system (UAS) market. The volume of UAS flights for commercial and governmental non-military applications could equal those being flown for military operations. Future growth of the civil UAS market is dependent on the ability of non-military UAS proponents to operate their UAS' in the National Airspace System (NAS). As such, there is a strong innovative growth market for testing, research and development. Inability to adhere to FAA regulatory requirements is the major problem facing the military and the commercial UAS sector. More specifically, Flight Rule 14 requires sense and avoid. Manned aircraft systems operating with specified FAA control areas or with sense and avoid equipment are able to adhere to this rule. Since UAS' do not have pilots on board or collision and avoidance technologies, they are not currently able to adhere to FAA rules. Congress has levied the requirement on the FAA Administrator to develop plans to accelerate the integration of unmanned aerial systems into the National Airspace System. Currently the NDAA budget request contains $34.6 million for sense and avoid technology development to further UAS operations in the National Airspace System. Dr. Kendall, do you believe that the FAA has articulated and documented the sense and avoid technology requirements in sufficient detail to allow the DOD to develop a solution that will allow UAS operations in these new airspaces? In other words, is the $34.6M being spent on sense and avoid technologies going towards fulfilling a documented FAA requirement with a defined acceptable solution? Given the current FAA safety of flight requirements, sense and avoid requirements and our technological capabilities, how long do you anticipate it will take before we will be able to integrate UAS into the National Airspace System?

Mr. KENDALL. The Department of Defense (DOD) is developing standards and safety case analyses to develop and field ground and airborne unmanned aircraft system (UAS) sense-and-avoid technology. In the short term, the Department is actively engaged with the Federal Aviation Administration (FAA) to improve incrementally UAS access to the National Airspace System (NAS) through changes to policy and procedures. While the FAA has not articulated and documented sense-and-avoid requirements, the Department, as a public agency, has the authority and proven ability to self certify aircraft and systems for safe operations. The sense-and-avoid funding in the National Defense Authorization Act for Fiscal Year 2012 allows the Department to continue its Sense and Avoid (SAA) standards and technology development. The Department is sharing the results of its SAA standards and technology development with the FAA and other public agencies so that they can leverage our work while developing sense-and-avoid technology requirements for the civil community.

The Department has made measured progress in increasing public UAS access to the NAS through the UAS Executive Committee and changes to the FAA's policies and Certification of Waiver or Authorization processes. The Department is also working with the FAA on updating the DOD–FAA UAS Memorandum of Agreement for Operations of UAS Systems in the NAS to increase access for specific operations, particularly for small UAS which make up the predominance of DOD UAS. DOD is also currently working with the FAA through the UAS Aviation Rulemaking Committee and the Next Generation Air Transportation System Joint Planning and Development Office to develop the congressionally directed FAA Civil/Public UAS NAS Integration Roadmap and Comprehensive Plan to safely integrate civil UAS into the NAS. The roadmap and plan will provide a timeline for the phased in approach to UAS integration into the NAS.

Mr. TURNER. There is no doubt that 5th generation fighters are complex but critical to ensuring air dominance in any theater. In 1992, the F–22 program unit cost was estimated to be $125M. There are some estimates, including a GAO study to

suggest that the F–22 unit costs were $177M per aircraft. There are some in the aerospace industry who would suggest that one of the reasons the F–22 fly away costs were so high were due to the Air Force's ability to capture on economies of scale. Initially, the Air Force wanted to procure 750 advanced tactical fighters. The total number procured of which the last one being delivered this year was 187. In all manufacturing sector, there is an economy of scale to be achieved in the area of quantities of production. Currently, the F–35 is being built at a rate of 2 aircraft per month while the capacity is 18–20 aircraft per month. Based on the economies of scale, this would suggest that we are paying a higher capital per unit cost per aircraft. While I understand the significant budget constraints which have been placed on the services, I also have a responsibility to ensure that the American tax payer gets the best available weapon system at an affordable cost. We may not be able to afford a production schedule of 20 F–35s per month but there should be some "sweet spot" in defining yearly quantities produced. What actions is the Department currently taking to determine this "sweet spot" and ensuring this does not become another F–22? What production rate would you like to see to ensure we reduce the per unit cost of this airplane?

Mr. KENDALL. We have reduced Low-Rate Initial Production rates to reduce concurrency with development and test until the design maturity improves. While ramping to Full-Rate Production quickly would optimize the production learning curve, it would likely not lead to the lowest unit costs in the long-term due to required changes, modifications, and retrofits. The procurement rates for the next few years are a balance designed to continue to exercise the global supply chain and manufacturing processes while at the same time avoid procuring too many aircraft that will have to be retrofitted and modified following continued discovery of changes. I believe our current strategy provides that appropriate balance. As the program continues with testing, we are progressively reducing concurrency risks. Concurrency should begin to recede significantly in the 2015 timeframe, and we anticipate entering Full-Rate Production in the 2019 timeframe. At that time, we anticipate that the annual production rates, which will include U.S and foreign buys, to be at economies of scale that result in more affordable unit costs.

Mr. TURNER. Numerous GAO reports highlight that the Department of Defense continues to face a gap between its need to suppress enemy air defense and its capabilities to do so. There are not enough existing suppression aircraft to meet overall requirements. While the Navy is currently procuring the EA–18G Growler as the electronic attack variant of the F/A–18 services, the Growler is the only electronic attack aircraft being procured by any service at this time. If the Air Force is called to fight a peer competitor in the electronic warfare arena, do you believe there are sufficient resources available? What is the Air Force's plan to mitigate resource limitations on the electronic warfare arena?

Mr. KENDALL. The Department would utilize all the assets of the joint force in a conflict with a peer competitor, not just Air Force resources. As outlined in the Department's 30-Year Aviation Plan released in March 2012, DOD is acquiring 5th generation fighter/attack aircraft while maintaining sufficient legacy aircraft inventory capacity, in addition to investing in enabler capability and capacity such as electronic warfare. While the FY 2013–FY 2042 aviation plan meets the national military strategy of the United States, the Department continues to assess risk and the optimum investment strategy as part of the FY 2014 budgetary and capabilities review process.

The Department's joint Airborne Electronic Attack (AEA) forces, including EA–18G, are a portion of the Joint concept of operations to counter enemy air defenses. The Air Force's electronic attack contributions to joint AEA forces include EC–130H Compass Call, Miniature Air Launched Decoy Jammer, and self-protection capability for strike forces. The combination of electronic protection capability for airplanes, radars, and weapons systems that use the electromagnetic spectrum coupled with stealth capability—like those of the F–22, F–35, and the B–2—creates an effective integration of kinetic and non-kinetic capabilities that will help mitigate the challenges and enhance the joint effort in suppressing enemy air defenses.

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Mr. TURNER. It would appear as though the Air Force has a history of maintaining the integrity of source selection and have had a number of problems in this area. The selection of Boeing to build the next generation of Air Refueling tankers marked the end of a procurement process that dragged on for nearly a decade. More recently, the Air Force informed the committee that it planned to cancel the Light Air Support (LAS) contract. The Secretary of the Air Force said that the Service Acquisition Executive was not satisfied with the quality of the documentation supporting the award decision. This was after the Air Force had expressed confidence in the merits of the contract award. The Defense Business Board has also been critical of the Dept of Defense's acquisition corp. The board has suggested the Pentagon should either "professionalize" the acquisition corps or "civilianize" program leadership. What specific steps is the Air Force taking to ensure we don't have a repeat of the KC–X tanker procurement or the Light Air Support contact?

Mr. VAN BUREN. The Air Force continues its steadfast commitment to "Recapture Acquisition Excellence." In 2011 we completed the Acquisition Improvement Plan (AIP) chartered in 2009. This was the largest and most significant acquisition reform launched by the Air Force in the last decade. The AIP completed more than 170 process improvements and of particular interest to your question, concentrated on improving our source selection process by strengthening source selection governance, improving source selection training, requiring Multi-functional Independent Review Teams, establishing on-call source selection augmentation, identifying/tracking personnel with source selection experience, updating the acquisition planning process, and simplifying the source selection process. Success was evident in the fact that during 2011, the Air Force accomplished 209,500 contracting actions with only one sustained protest. Furthermore, in November 2011, Secretary Donley approved a follow-on effort to AIP called Acquisition Continuous Process Improvement (CPI) 2.0, which will further our efforts to improve the capabilities of our acquisition workforce. Among other efforts, CPI 2.0 continues improving our source selection process by re-engineering the competitive award process, implementing a more effective contract award process and increasing source selection experienced personnel. Once the LAS report is finalized and released, we will incorporate any lessons learned into our CPI 2.0 effort.

QUESTIONS SUBMITTED BY MR. CRITZ

Mr. CRITZ. The AF uses a mix of tactical aviation assets to meet both service specific goals and national goals and objectives. Many of the aircraft in the AF fleet are aging and require significant O&M investments. Increased O&M costs cut into the service's ability to procure new F–35. That is, reducing O&M costs will free up funds for the procurement of next generation aircraft like the F–35. For legacy tactical aviation aircraft, outdated materials and components must be replaced to sustain mission availability and reduce O&M costs. Rather than manufacturing replacement parts and components in a manner for which they were first fabricated, which now has become increasingly more expensive and sometimes not even possible, the AF should be looking to leverage advances from the commercial aviation world when it comes to maintaining its existing aging fleet of tactical aviation assets. For example, through their influence on platform weight and cost, materials are a key driver of legacy aircraft viability and the affordability of sustained operations of the aging aircraft fleet. The vast majority of material used in legacy air-

craft aerostructures is aluminum. Optimizing aluminum performance and affordability within the existing fleet of aircraft is critical to meeting readiness, sustainability, and affordability requirements.

1. Can you explain those efforts the AF is undertaking to leverage past investments made by the commercial aerospace industry and the domestic aluminum industry to sustain its fleet of aging tactical aviation aircraft?

2. Is the AF working directly with those elements of industry that have strong material expertise, strong design capabilities, and strong advanced manufacturing processes to sustain the AF's fleet of aging tactical aviation aircraft?

3. To what extent are elements such as the AF Research Laboratory and AF Air Logistics Centers working with industry to address platform costs, platform performance and life cycle costs?

Mr. KENDALL. [The information referred to was not available at the time of printing.]

Mr. CRITZ. The AIM–120D missile has experienced significant production delays, mostly due to rocket motor production. As a result, the budget request for Fiscal Year 2013 and beyond has been substantially reduced. However, the capability the AIM–120D will bring to the Air Force and Navy appears to be very important, given current air-to-air threats.

1. Can you provide an update on the status of AIM–120D production?

2. What steps are being taken to get production back on schedule?

3. When will the Air Force and Navy get this weapon in the field?

General POSNER. 1. As of 31 March 2012, 364 AIM–120D out of 552 contracted have been delivered (− 188 to contract). Deliveries of the Captive Air Training Missiles (CATMs) are on schedule with 209 delivered out of 200 contractually required. In addition, Raytheon Missile Systems is continuing to produce guidance sections (front end of missile; 95% of work content) at rate with 201 awaiting rocket motors. No AIM–120D All Up Rounds (AURs) have been delivered since November 2011, due to the current challenges with rocket motor production.

2. Rocket motors are the sole reason the AIM–120D program is experiencing production delays, but several promising actions are being taken to get production back on schedule. First, in 2009, a second rocket motor source (Nammo) started qualification for the AMRAAM program. Qualification is on track and the first rocket motors are expected in July 2013. Second, an ATK (casing) and Nammo (propellant) Limited Production Configuration (LPC) is being qualified as a near-term solution to the rocket motor production issue. Qualification is on track and rocket motors are expected in July 2012. Third, ATK (currently the sole-source provider of AMRAAM rocket motors) is continuing to investigate the root cause of the rocket motor failures and is implementing process improvements. ATK's goal is to resume rocket motor production in June/July. Raytheon is pursuing all three options at the same time, and the AIM–120D could return to the contracted delivery schedule as soon as February 2013.

3. The planned fielding date of the AIM–120D is 1QFY14. Dedicated operational testing is on track to begin in June 2012.

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