

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

TESTIMONY OF

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UNDER SECRETARY OF DEFENSE

(ACQUISITION, TECHNOLOGY & LOGISTICS)

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COMMITTEE ON ARMED SERVICES

AIR AND LAND FORCES SUBCOMMITTEE

AND

SEAPOWER AND EXPEDITIONARY FORCES SUBCOMMITTEE

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

Aviation Programs

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

Rebalancing the Force – the Wars We Are In

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

Rotary-Wing Aircraft

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

Intelligence, Surveillance, and Reconnaissance (ISR)

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

- \$2.2 billion for procurement of Predator-class aircraft to increase the Combat Air Patrols (CAPs) available to deployed forces from 37 to 65 by 2013.
- Doubling procurement of the MQ-9 Reaper over the next few years.

Electronic Warfare (EW)

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

Rebalancing the Force – Preparing for the Future

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

Mobility and Tanker Aircraft

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

The FY 2011 budget ends production of the C-17, supports shutdown activities for production of new aircraft, and continues the modification of existing C-17s. With the

completion of the program, the United States will have 223 of these aircraft, more than enough to meet current and projected requirements.

Tactical Aircraft

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

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

Joint Strike Fighter

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

strength of our security alliances.

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

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

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

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

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

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

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

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

JSF Development Program

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

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

The JET II team estimates that these three steps, taken together, can restore 17 months to the development schedule; that is, reverse what would have been a forecasted 30-month delay in

the completion of flight test to 13 months, meaning that it will complete in March 2015. This Revised JET II forecast, then, became the final basis for the Department's budget submission.

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

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

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

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

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

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

JSF Initial Production

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

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

First, it lowers risk by reducing concurrency.

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

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

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

JSF Full-Rate Production and Nunn-McCurdy Breach

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

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

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

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

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

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

The Way Forward

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

Looking ahead to the coming years, several management measures will be critical, and Secretary Gates has elevated the position of the JSF Program Executive Officer to three-star rank

to reflect a need for experienced, vigorous management. The JPO, with oversight from the Office of the Secretary of Defense, will need to take a number of critical steps in three areas:

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

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

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

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

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

F136 Alternate Engine

The Department carefully deliberated whether to request funding for the F136 alternate engine in the JSF program as part of the President’s FY 2011 budget. The Department has not

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

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

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

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

- It assumed that the competition would occur in 2014 rather than our current estimate of 2017. This allowed a direct comparison with the previous Congressionally-mandated analyses of the alternate engine from 2007.
- It assumed the second engine will proceed along a very accelerated learning curve. The assumption in the model is that the second engine developer will benefit from the learning of the lead engine developer even though it will produce fewer engines. Although this is possible, it is extremely difficult to achieve.
- The analysis assumed an efficient mix of engines in the competitive buy, a mix that is also unlikely to be achieved. Instead it is more likely that this competition will be a split or shared buy. JSF will be procured by a diverse set of customers, many of whom are unable or unwilling to purchase from two engine manufacturers. Split or shared buys, particularly those from only two production

sources, do not historically produce the purely competitive behaviors assumed in the analyses.

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

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

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

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