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SENATE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
UNITED STATES SENATE

DEPARTMENT OF DEFENSE

WRITTEN TESTIMONY FOR THE
SENATE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
UNITED STATES SENATE

SUBJECT: Tactical Air Forces

WITNESS STATEMENT OF: Lt General Christopher C. Bogdan
Program Executive Officer F-35

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Chairman Manchin, Ranking Member Wicker, and distinguished Members of the Committee. Thank you for the opportunity to address this committee regarding the F-35 Joint Strike Fighter.

The F-35 Joint Strike Fighter is the Department of Defense`s largest acquisition program, and its importance to our national security is immense. The F-35 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, multirole, fifth-generation aircraft, capable of projecting U.S. power and deterring potential adversaries. For our international partners and foreign military sales customers who are participating in the program, the F-35 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 FY14 budget includes $8.4 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 allies, understanding that we live in a resource constrained world. The current F-35 program is focused on completing System Design and Development within the time and funding planned, producing aircraft that are affordable and achieve mission needs, and sustaining fielded aircraft in an effective and economical fashion. This plan, which has been in place since 2012, is already resulting in steady progress, however, I am pressing for faster and stronger performance in the upcoming year. There are 29 F-35s now deployed in operational and training squadrons at three locations and the program has started a slow shift of focus to production and long-term sustainment without losing the

momentum we see in the development and flight test programs. Affordability remains my number one priority. We must use all of our energy finishing development within the time and money we have, we must continue to drive the cost of producing F-35s down, and we must start today to attack the long term life cycle costs of the F-35 weapon system.

Program Accomplishments in the Last Year

The F-35 program team achieved a number of accomplishments in 2012, such as the delivery of 30 aircraft, including the last System Development and Demonstration (SDD) aircraft (CF-5, delivered to Patuxent River) and jets delivered to training squadrons at Eglin Air Force Base and the stand up of the first USMC operational squadron at Yuma.

F-35s flew 1,984 sorties for a total of 3,118 hours last year, bringing the total hours flown by F-35s to 5,487. We conducted the first in-flight weapons releases from the F-35A and B and enabled the first stand up of an operational F-35B squadron at Yuma Marine Corps Air Station. The F-35C has shown good progress in testing the modified tailhook, although we have more work to do. Additionally, the program began high angle of attack testing which has been successful to date, completed the Air Force's F-35A Operational Utility Evaluation, and enabled the start of pilot and maintenance training activities at Eglin Air Force Base for both the Air Force and US Marine Corps. From a business perspective, the F-35 program successfully closed negotiations on the Lockheed Martin Low Rate Initial Production (LRIP) lot 5 and modified SDD contracts. Additionally, negotiations for the Pratt & Whitney engine contracts for LRIP lot 5 and modifications for the SDD contract were completed in February, 2013.

Impacts of the Sequester

Sequestration, as well as congressionally directed reductions to the System Design and Development program in FY13, has the potential to either stretch the development program out or reduce the capabilities we can deliver to the warfighter. My first priority is to preserve the development of Block 2B and 3I capabilities. Block 2B is important because it is the initial warfighting capability of the F-35 and potentially the capability that could be used to declare USMC Initial Operating Capability. I have moderate confidence that Block 2B and 3I will be delivered on time with all the capability we have promised. However, I am less optimistic about Block 3F, our final capability. Without some form of payback of the SDD money we will lose to Congressional cuts and sequestration, we will not be able to deliver 3F on time with full capability. Additionally, if the Department and the Services decide to take reductions to procurement funding, fewer aircraft may be ordered in LRIP Lot 7 (FY13 budget) for Department of the Navy and the Air Force. While this would slightly lessen the cost burden imposed by concurrency, fewer aircraft in LRIP Lot 7 would increase the unit cost of the remaining aircraft in Lot 7. Our international partners are closely watching unit cost and are highly sensitive to cost increases. These increases may result in reduction of their aircraft quantities, which would in turn increase unit costs even more and cause them to relook their commitment to the program. Moreover, furloughing my government civilians will have immediate negative consequences. As one example, due to the reduction in personnel and base operating support, my test and evaluation program will be reduced from currently operating on a six-day a week schedule with extended hours to one that will likely be limited to four days a week and only eight hours a day. I

estimate that this could reduce the F-35 flight test program's productivity by nearly one-third, significantly slowing the program's forward momentum.

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. However, as stated above, they are all watching closely how the DoD deals with our budget cuts and the impact this has on the cost of the program.

In October 2010, Israel signed a letter of offer and acceptance to purchase 19 F-35A aircraft for $2.75 billion, with deliveries scheduled to begin in 2016. In June 2012, Japan signed an agreement to purchase the first four of a planned acquisition of 42 F-35A aircraft for $741M with deliveries scheduled to begin in 2016. The F-35 team developed a proposal to support the Republic of Korea's competitive Request for Proposal for acquisition of its future fighter. Selection is expected in the summer of 2013.

Development Program Performance

The F-35 development program continues to execute to the baseline approved at the March 2012 Milestone B recertification Defense Acquisition Board. My biggest concern in development is software. I am moderately confident that the program will successfully release the Block 2B and 3I capability by 2015and 2016, respectively. However, I see more risk to the delivery of Block 3F, our full warfighting, capability by

2017. I will have better information to assess if we can meet our Block 3F promises after the Block 3 Critical Design Review and after at least six months of flight test on our 2B software, both of which are currently scheduled for early summer, 2013.

In the past year, the F-35 program has implemented a major shift in the oversight and management of software development, which has resulted in reduced times to develop and integrate software, reduced errors in the software code developed, and a marked increase in the cooperation and understanding between the prime contractor and the program office. I have directed a Capability Block Plan that is an integrated roadmap that defines the incorporation of capabilities for the F-35 program. Additionally, I have instituted a Block Review Board which places the government in charge of all configuration, capability, and schedule changes to software development. We have also implemented robust systems engineering/technical review process for all development work to provide greater knowledge and defined decision gates to determine if the system configuration under consideration is mature enough to proceed to the next phase. This, coupled with automated tools and processes, has resulted in an almost tenfold reduction in software release build time, and we have seen corresponding improvements in configuration management, test automation and error detection and resolution. However, we still have challenges and the prime contractor and its subs still need to improve both the speed and quality of software development to be able to catch up from previous software delays.

In addition to software challenges, the three F-35 variants are encountering the types of development problems typically experienced on advanced state-of-the-art, high performance aircraft development programs at this stage of maturity. While we still have

technical risks on the program, I have confidence that the known technical issues we have will be solved and properly integrated into the F-35. The Helmet Mounted Display System (HMDS) for the F-35 is a major technological advance and a design challenge. Issues faced by the program office over the past year relative to the HMDS were "green glow" or insufficient helmet display contrast, latency of the displayed information, "jitter" or lack of stability of the displayed symbology, night vision acuity and alignment. We executed a short flight test program from November 2012 to March 2013 dedicated solely to exploring and understanding the helmet problems using developmental and operational test pilots flying a number of operationally representative missions. As a result of this testing, the program now understands and has mitigated the effects of "green glow", latency, jitter and alignment. Additional work still needs to be done to ensure that the program has a night vision camera that is effective for operations as our testing indicated that the current night vision camera is unsuitable for operational use. As risk reduction, the program continues to fund development of a night vision goggle-based alternative helmet solution. The goggle-based helmet development will continue until we see demonstrated improvement in all of the risk areas of the original helmet and until the government has secured a price agreement with the prime contractor showing significant cost reduction in the original helmet.

During land-based ship suitability testing in 2011, the F-35C tailhook did not catch the arresting wire at a rate considered to be acceptable. A Critical Design Review was completed in February 2013 on a redesigned arresting hook system and modeling and simulation involving the redesigned hook showed a marked improvement in performance. Ground test of this newly redesigned hook is scheduled at Lakehurst, NJ in

the 4th Quarter of 2013, followed by aircraft carrier qualifications in 3rd Quarter of 2014. Although work remains to be done, I am confident this new hook will meet our needs.

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. We have designed improved seals within the wing to mitigate the migration issue and selected a new design of the fuel pump port on the underside of the wing which appears from initial prototype testing to resolve the fuel impingement issue.

The Autonomic Logistics Information System (ALIS) provides maintenance, reliability, logistics, and training information to support sustainment of F-35 aircraft. Currently, ALIS is exhibiting a level of unreliable data tracking within its health management system. Additionally, the software for ALIS requires development and time to mature. I continue to closely watch the progress of ALIS and have put in place a new systems engineering rigor and a new leadership structure that has improved performance. The program is delivering incremental software fixes to address problems more quickly and I have put into place a plan for a complete end-to-end test to ensure the aircraft and ALIS can operate together seamlessly.

In 2012, the F-35 SDD Flight Test program exceeded the number of planned flights, but fell slightly behind in overall test points. The ITF achieved 1,167 test flights, a 17% increase from the total flights in 2011. The ITF also executed 9,319 test points, which was roughly 2% shy of what was planned. This shortfall was largely due to restrictions levied on the flight envelope due to problems with the weapons bay flipper doors, as well as challenges due to software maturity.

Pratt & Whitney SDD F135 engines have completed a total of 25,296 operating

hours, 11,289 hours on flight-test engines, and a total of 4,566 hours of flying time on all three variants of F-35 aircraft. Pratt & Whitney is currently supporting flight test on all three variants at three locations. Various engine "firsts" were also achieved including the completion of air-start testing and acceleration to the F-35's maximum speed of 1.6 Mach.

The F-35 fleet experienced two fleet-wide groundings in January and February 2013 due to issues with the F135 engines. The first incident occurred in January 2013. An F-35B was forced to abort a take-off for what would later be understood to be an improperly crimped fueldraulic hose in the F135 engine. The F-35B fleet was grounded for 19 days, but was returned to flight after confirming the integrity of all similar hoses in the engines. The program office put in place activities to better monitor and improve the quality of the hoses being provided for the engine, and continues to track this closely. The second incident grounded all variants of the F-35 for approximately seven days and resulted from a crack discovered in the third stage engine turbine blade. The engine in question had been flying at the highest heat and most significant stresses of any of the jets in the test and operational fleets, which contributed to this crack. After confirming the source of the crack, the fleet was inspected and returned to flight. Engineering work continues to assess the long term implications of this turbine blade crack on the life of the F-35 engine.

Production Program Performance

Costs for production aircraft continue to come down for each successive lot put on contract. In 2012, Lockheed Martin delivered 30 aircraft, a 57% increase over 2011. Lockheed Martin in 2012 did not deliver all planned aircraft in large part due to a strike

by the International Association of Machinist and Aerospace Workers that lasted from April 28th until all members went back to work on July 9th. Since the strike, performance has been fairly stable and the program has seen marked improvements in design stability, parts availability, workforce stability, shop floor discipline and a reduction in scrap, rework and repair. Overall, production performance is tracking to the definitized baseline, with factory assembly performance only 2 days behind plan. With the demonstrated improvements in all production areas leading to delivery, my level of confidence in the program's ability to produce high quality F-35s and our ability to eventually ramp up production is strong.

Pratt & Whitney has delivered 85 engines and 38 lift fans to date. For 2012, Pratt & Whitney has improved their delivery rate, increasing from two per month average in 2011 to four per month average in 2012. Pratt & Whitney product deliveries were interrupted on several occasions due to technical issues and quality escapes resulting in product delivery holds and material deficiencies. Lot 4 spare engine modules and spare parts are tracking behind contract delivery dates and will not be delivered within the contract period of performance, an issue my team is addressing.

In September 2012, LM Aero notified the F-35 program office of the discovery of a specialty metals noncompliance. The Undersecretary of Defense for Acquisition, Technology and Logistics,(USD(AT&L)) approved a waiver to allow the program to accept lot 4 through 9 aircraft with noncompliant specialty metals (magnets) in the radar controller. USD(AT&L) subsequently approved an amendment to allow the acceptance of lot 4 aircraft with noncompliant specialty metals in the radar radio frequency isolators also. A subsequent amendment will extend the waiver to lot 5 aircraft. All lot 6 aircraft

will have compliant radar radio frequency isolators. I also directed a top-to-bottom assessment of all companies within the F-35 supply chain. As a result, an additional part procured from a non-qualifying country was identified. The subsequent waiver for target assemblies (proximity magnets) approved by USD(AT&L) was sent to you and the other Defense Committees earlier this month. The program office, the contractor and the Defense Contract Management Agency have jointly developed a corrective action plan to assess supply chain compliance with all legal requirements.

Concurrency

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. 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 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.

Concurrency costs are primarily driven by span time for incorporating changes; the program office and Lockheed Martin have implemented a concurrency management system to control and expedite the number of changes cut into production or requiring retrofits. Since 2011 the program has reduced average span times by five months, from 18 months to 13 months, as measured from engineering drawing releases to new parts available for installation into production aircraft. The continual reduction in span time

will significantly reduce the concurrency impact to the program.

Concurrency costs were originally estimated to be roughly 5% - 8% of recurring flyaway costs. Over the past year, the F-35 program has worked with Lockheed Martin to refine the estimate of concurrency costs based on actual F-35 discrete data results from qualification events. As a result of this approach, our concurrency estimate has decreased to 3% - 5% of recurring flyaway costs.

Operations and Sustainment Performance

2012 marked the first year of operational performance by F-35A and B models in the Air Force and Marine Corps. The program continues to address the various issues arising from operating an aircraft still in development and providing the operators improved technical data and solutions to emerging issues. Overall, the reliability of the weapon system is improving and the product support integrators are gradually resolving issues with spares and repair cycle times.

In 2012, the F-35 program began pilot and maintenance training for both F-35A and F-35B aircraft and as of today, has completed training for the transition of 3 7 pilots and 686 maintainers. In cooperation with the Joint Operational Test Team and Air Force Air Education and Training Command, the program successfully completed the Ready for Training Operational Utility Evaluation (OUE) which found that the training system is "sufficient to meet the relatively low student training sortie demand of the syllabus" for the training of experienced pilots.

In 2013, the focus will be on delivering sustainment capability as we stand up new bases and squadrons at Edwards Air Force Base, Nellis Air Force Base and Luke Air Force Base. Additionally, the program will stand up depot activities for aircraft

components at Jacksonville Naval Air Station, Naval Aviation Depot San Diego, and Warner-Robins Air Logistics Center, as well as modification lines at Cherry Point Marine Corps Air Station and Ogden Air Logistics Center.

F-35 Sustainment costs remain a concern across the Department and to me personally. While the F-35 Joint Program Office and the Services continued to make progress in 2012 toward reducing sustainment estimates, there is much more work to be done in this area, and it is one of my highest priorities. The Services and the Department will continue to support the F-35 JPO in its disciplined approach to analyzing and reducing sustainment costs. The program office continues to pursue a sustainment Business Case Analysis to identify areas for reduction. We conducted an Industry Day to foster competition in several areas of the sustainment program, including elements of the supply chain, support equipment, training operations support and Autonomic Logistics Information System administration. The program has instituted a robust Reliability and Maintainability program that is systematically identifying cost drivers and optimizing the maintenance approach for those components while continuing to institute tighter contract standards for suppliers to drive down repair turn times. Additionally, the program has instituted a Targeted Affordability Program that provides an increased emphasis on operations and sustainment and total ownership costs. We continue to work with the prime contractors to achieve an efficient Performance Based Logistics environment at the overarching weapon system level. The ultimate goal of all of this work is to produce a mutually beneficial sustainment enterprise that – with relevant metrics and incentives – operates, manages and supports the global system, while meeting warfighter-defined readiness and cost objectives.

Airframe and Propulsion Contract Actions

The FY2011 lot 5 airframe contract was definitized in December 2012 following a "Should Cost" review and negotiations that lasted nearly 14 months. This FPIF contract with Lockheed Martin is valued at $3.8 billion and procures 32 aircraft (22 F-35A, 3 F-35B, and 7 F-35C) and ancillary equipment. Although negotiations were lengthy, the parties reached a fair, well-reasoned settlement that caps the government's liability at a ceiling price of 112%, as compared to 120% of the target cost in the prior lot buy. In addition, for the first time on this program, the government's cost risk is being mitigated by transferring 50% of the cost responsibility for concurrency to Lockheed Martin. The terms of the contract include a "cost-sharing/no fee" arrangement whereby the Government and Lockheed Martin share equally (50/50) in these costs with no fee for the known concurrency changes. Negotiations concluded on the FY 2011 FPIF engine contract in February 2013 at a value of $588M for 32 engines and spares. This contract reflects a 0/100 overrun shareline with the contractor assuming all cost overrun risk and capping the government's liability at the negotiated value of the contract, another first for the program.

An Undefinitized Contract Action (UCA) for lot 6 was awarded on December 28, 2012 for the procurement of up to a total of 31 aircraft (18 F-35A, 6 F-35B and 7 F-35C). Proposal evaluation is underway for both the lot 6 (FY12) and lot 7 (FY13) airframe procurements. We believe we can have a negotiation settlement for lots 6 and 7 by the end of May 2013, followed by final contract award in June 2013. By negotiating both lots 6 and 7 together, the program is striving to get out of the business of doing UCAs and attempting to align contracting actions with our budget and the actual production of

aircraft. Concurrency sharing and a 0/100 overrun share (contractor assumes all the risk) will also be part of these contracts. There is no UCA for the lot 6 (FY12) engine procurement and negotiations are expected to commence this month (April) with closure planned for summer 2013. The Engine FY12 and FY13 buys will similarly be combined to regain a more appropriate contracting cadence.

Fixed-price-type contracts are planned for future F-35 aircraft and F135 engines procurements. 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 FY12, 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."

An effective Earned Value Management System (EVMS) is critical to monitoring performance and controlling costs. In 2007, a Defense Contract Management Agency (DCMA) review found the Lockheed Martin Aeronautics (LM Aero) EVMS to be noncompliant with EVM guidelines. Although both DCMA and LM Aero engaged in a focused effort to bring the LM Aero EVMS into compliance, appropriate corrections were not completed and DCMA decertified the LM Aero EVMS in 2010. LM Aero created its EVMS Corrective Action Plan (CAP) during 2012; actions include development of new tools and processes as well as modifications to core management processes. This CAP was accepted by the DCMA in February 2013. After an 8-12 month timetable to complete elements of the CAP, DCMA will start its re-certification process. In accordance with DoD Federal Acquisition Regulations, the DCMA imposed

a 5% withhold against Progress Payments for new F-35 contracts, starting with LRIP 5. This 5% withhold is a result of the disapproved status of LM Aero's EVMS. The withhold will remain in place until LM Aero's EVMS deficiencies are corrected and the EVMS is compliant with EVM guidelines.

Conclusion

My observations and assessments since my arrival on the program give me reason to believe the basic aircraft design is sound and we can deliver on our promises to you, the taxpayers and warfighters. While there is still risk in the program, I 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 remains one of my key focus areas. I have observed past and current performance by industry on software that gives me concern about the ability to deliver full capability within the current schedule without improvement in software development and test performance. The changes implemented by the combined government/contractor team have improved this outlook, but more work still needs to be done. The previous PEO developed a solid program baseline, and I continue to refine the execution of this baseline. However, I need my industry partners to step up to the plate and execute at the high levels I know they are capable of.

As in any complex development program there are challenges, but I believe the enhanced capability of the F-35 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 is rising to the challenges of managing this complex system with discipline, transparency and accountability. Our progress continues at a slow

but steady pace. I intend on completing this program within the budget and schedule I have been given. I ask that you hold me, my team, our stakeholders and contractors accountable over the coming months and years to ensure that we develop and deliver the warfighting capability this country needs.

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