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HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
US HOUSE OF REPRESENTATIVES

DEPARTMENT OF THE AIR FORCE

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

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SUBJECT: F-35 OPERATIONS UPDATE

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I. Introduction

Chairman Turner, Ranking Member Sanchez and distinguished members of the Tactical Air and Land Forces Subcommittee, thank you for the opportunity to provide an update on the United States Air Force's progress toward declaring initial operating capability (IOC) for the F-35A. The combination of F-35 lethality, survivability and adaptability make it our platform of choice for operations in a highly-contested threat environment. The aircraft's state-of-the-art sensor fusion, networked interoperability, and broad array of advanced air-to-air and air-to-surface munitions enables unmatched lethality well into the 21st century. The F-35's exceptional survivability is achieved through a combination of low-observable technologies, advanced electronic attack and electronic protection, and shared situational awareness. Its multi-role capabilities are optimized for Global Precision Attack while complementing our air superiority fleet. It will form the backbone of future joint and combined air operations – enabling future Joint force commander success.

The F-35 program has reached several milestones in 2015. Luke Air Force Base, Arizona, began training F-35 student pilots on January 23, 2015. The 31st Test and Evaluation Squadron's F-35As, from Edwards Air Force Base, California, flew as the close air support platform for the Green Flag 15-08 exercise. On 25 June, they worked with soldiers from the 1st Brigade Combat Team, Fort Bliss, Texas. Basic Close Air Support is one of the baseline missions for our IOC declaration. Also in June, two F-35As assigned to the 16th Weapons Squadron, Nellis Air Force Base, Nevada, were the first F-35s to participate in a capstone large-force employment exercise with the United States Air Force Weapons School. The 34th Fighter Squadron at Hill Air Force Base, Utah, the Air Force's IOC fighter squadron, took delivery of its first two F-35As on September 2, 2015 and expects to have 12 aircraft by the end of May 2016. On September 23, 2015 the Integrated Test Force at Edwards Air Force Base, California, completed developmental test of the Block 3i mission software, which will be the baseline for the Air Force IOC declaration. Finally, the first external weapons release tests, internal gun tests, and the first operational ordnance expenditures all occurred during 2015, showing clear progress towards operationalizing the F-35.

Ultimately, the F-35 program has turned the corner since the 2010 restructuring effort. Although it is by no means perfect, and there will certainly be more challenges uncovered as we

continue development, the program is progressing at a steady pace and making progress in critical areas to ensure we deliver the most combat capable aircraft to the warfighter. In order to fulfill that goal, we need continued support from this committee and the rest of Congress.

II. Air Force Initial Operational Capability Update

Today, the program is on the road to initial operational capability (IOC) for the Air Force, and we expect to declare IOC as planned in 2016. Going forward, we will continue to closely monitor progress. The Air Force is tracking 12 specific requirements to declare IOC. These requirements include the following:

1. Aircraft Available. As of September 2015 the Air Force is on track to receive 14 aircraft by 1 August 2016. The minimum required is 12. This is seen as low risk to IOC.

2. Block 3i capability. Block 3i software will allow the aircraft to perform basic Close Air Support (CAS), interdiction and limited Suppression of Enemy Air Defenses (SEAD)/ Destruction of Enemy Air Defenses (DEAD) operations in a contested environment. Block 3iR6.01 was released to the operation test fleet at Nellis AFB and Edwards AFB on 1 October 2015. This resulted from close coordination between the Air Force, the F-35 Joint Program Office (JPO) and Lockheed Martin. The final software version for Block 3i is 3iP6 and is expected to be released in February 2016 to the fleet. The Air Force sees this software development as a potential risk for IOC until it has been fully tested and explored by our operational testers; however, developmental ground testing results note improvements in stability. Operational testing began flying with the new software last week.

3. All jets modified with the required hardware for full 3i implementation. The Air Force IOC aircraft at Hill AFB will need modifications to bring them to full Block 3i configuration. The modifications are due to discoveries in developmental testing and are a direct result of concurrent weapons system development. These modifications will bring the aircraft up to the full 3i aircraft operating envelope, and adds airborne lightning protection and weapons employment capabilities. One major modification still under consideration for IOC is the fuel over-pressurization modification. The program engineers are still working to determine if this modification must be fixed immediately or if the Air Force can delay the work until the normal

depot rotation for each aircraft. The decision is expected in early December 2015. If required, the fuel overpressure modification will increase the Air Force's risk to declaring IOC by 1 August.

4. Proper Joint Technical Data and Flight Series Directives. The Air Force requires all of the electronic checklists, work orders and operating instructions associated with the new F-35 equipment to ensure maintainability and weapon system support. The Air Force considers this requirement on track and not a risk to IOC.

5. Autonomic Logistics Information System (ALIS) 2.0.2 software with Squadron Operating Unit (SOU) v2. This is a high risk item. ALIS 2.0.2 software is focused on deployed operations and will allow a flying unit to deploy aircraft forward while continuing to report metrics data back to the home station. It also allows for the lateral transfer of pilots and support equipment between squadrons. The new software is scheduled for delivery on July 29, 2016 just prior to IOC; however, there is high risk in the program's ability to train and familiarize our maintainers with the new software. As a result, the Air Force has partnered with Lockheed Martin to provide training on the new software during testing. Further, the JPO is establishing a parallel software testing network with the aircraft test fleet at Edwards to provide a realistic operational environment that will ensure earlier operational testing.

6. Mission Data File delivery. The mission data file loads enable the aircraft's sensors to identify and categorize threat radio frequency emissions, a capability critical to the aircraft's combat effectiveness. The loads are produced by a government laboratory, the U.S. Reprogramming Lab (USRL) at Eglin AFB. The lab is tasked with delivering 4 different Areas of Responsibility (AOR) for specific geographic regions of the world. Currently, the lab is on track to provide 3 of the AORs prior to the Air Force IOC objective date. The fourth AOR is forecast to deliver one month later, within the IOC window.

7. Pilots and maintenance personnel trained. Mission qualification pilot training and maintenance scheduling is impacted by the aircraft modification decision on potential fuel overpressurization mentioned earlier. If the aircraft need the fuel overpressure modification prior to IOC the number of aircraft available for pilot training is reduced and increases the risk to IOC. However, the Air Force is working to mitigate this risk by temporarily transferring Hill AFB operational pilots to other F-35 units to accomplish the required training. Maintenance training is not affected by the pending modification decision; there are sufficient numbers of experienced

F-35 maintenance personnel in place to support IOC requirements but still project a 1,500 maintenance manning shortfall to meet F-35 requirements between FY17-19.

8. GEN III helmets fielded. The Generation III (GEN III) helmet improves on the Generation II helmet that is currently fielded. These improvements include an improved night vision camera, reduced helmet jitter, and fixes to the “green glow” associated with the Gen II helmet. As of October 5, 2015, there are 4 pilots flying with the GEN III helmets and 3 more are in the process of being fitted for the new helmet. Hill AFB will execute their first night flights later this month to verify the improved night vision system.

9. Weapons testing and certification complete. As of September 30, 2015 one Guided Bomb Unit (GBU)-12 inert laser guided weapons and two fully explosive GBU-31 weapons have been dropped by Air Force operational test aircraft during operational testing. Operational testing will continue throughout System Development and Demonstration. Operational unit clearance to employ weapons is expected with 3iP6 (production software release) in 1QCY16. Weapons testing and certification is on track and will minimally impact IOC.

10. Spares. The Air Vehicle spare package is funded and the deployable spares package is projected to be in place to meet IOC requirements.

11. Proper Support equipment and Alternate Mission Equipment. Not all of the contracted quantities of support equipment will be delivered in time for IOC; however, the program office has a plan to borrow the minimum Support Equipment required from the Depot to ensure enough equipment will be available. There is some risk to IOC.

12. Pilot and Maintainer Manning. Pilot Manning: The Air Force has sufficient pilot manning for our planned IOC. There are longer term issues related to AF enterprise-wide fighter pilot manning shortfalls that are being addressed. Specifically regarding the F-35A, we will carefully manage the fighter pilot inventory as the fighter force structure evolves. Our focus is to ensure the right balance of qualified pilots, with the correct experience levels, are assigned to our growing F-35A fleet in balance with other combat fighter platforms.

The Air Force has completed actions that have addressed the maintenance manning concerns to meet F-35 IOC in 2016. However, we still project a 1,500 maintenance manning shortfall to meet F-35 requirements between FY17-19. In order to mitigate this shortfall we are

evaluating several options to include increasing the active-duty end strength, leveraging more Total Force maintenance manning solutions, and contracting additional maintenance requirements.

III. Operators perspective of the progress on issues highlighted during 27 March 2015 visit to Eglin AFB

On March 27, 2015 a Tactical Air and Land Forces congressional delegation visited Eglin Air Force Base, Florida, to discuss the F-35 program and current state of training operations. There were numerous pilot and maintenance issues identified during that visit related to the F-35 air combat system. We will address each of the concern areas:

1. **Comment: F-35 personnel were uncomfortable with L-M's scale of control over the maintenance program due to ALIS and other policies in place that limit their ability to work on the aircraft. In particular, the inability to maintain an on-hand parts inventory and a prohibition on making parts on-site were noted.** The Air Force shares the concerns of the Eglin personnel, but the reason behind the current frustration is due to the concurrent development process of the program. There are going to be growing pains as the Air Force continues to operationalize the F-35. Although the operators want to move-out quickly and have the capability to perform functions similar to what they have done on legacy platforms, the F-35 is still in development and requires greater oversight on aircraft repairs and modifications. As the aircraft with its associated maintenance procedures and published guidance mature, more and more functions will be accomplished at the unit level.

2. **Comment: ALIS information, and L-M info, on parts status is still not always accurate. The 'just-in-time' parts system leads to significant wasted time and effort, and lower availability for training.** The Air Force concurs and we are working closely with the JPO, partner nations and other services to consolidate warfighter input on the deficiencies and are working to incorporate the appropriate fixes.

3. **Comment: Concerns about the international supply chain and the length of time it takes to get parts.** The Air Force concurs with this concern. As the F-35 matures, more historical maintenance data is collected, and better forecasting is subsequently available, it will be easier to ensure higher-use parts are on hand locally.

4. **Comment: Concerns about "false positives" with ALIS. Maintenance personnel said that the rate of false positives was around 80%.** Decreasing false positives are an objective inherent in every software version but will not wholly disappear. In the interim, significant effort has gone into creating Nuisance Fault Lists (NFLs) to reduce unproductive maintenance time.

5. **Comment: Debrief downloads take 2 hours, which significantly disrupts the normal debriefing cycle, resulting in a huge loss of training value. Needs to be 1 hour or less.** The JPO is acquiring the Generation III Ground Data Security Assembly Receptacle (GDR) to speed up the debrief download process thereby shortening the debrief cycle. The GDR is used to encrypt and decrypt the mission data carried on the Portable Memory device (PMD). The new Generation III GDR will significantly reduce the time required to decrypt the PMD and provide debrief video to the pilots quicker than the current GDR II. The Generation III GDR completed Critical Design Review in September 2015. Production Generation III GDRs will begin deliveries in June/July 2016 with the first ten units delivered to Hill AFB in August 2016.

6. **Comment: Flight gear is not comfortable or practical. Too constraining. Does not allow pilots to relieve themselves without unstrapping from the entire restraint system. Overall lack of comfort and suitability.** The Air Force shares this concern and is actively looking for alternatives to include alternate flight gear. However, full testing and approval will not occur until 2019 and depends on available funding. Although it is not uncommon to unstrap in legacy fighters for the pilot to relieve themselves, a redesign of the seat and flight equipment would be required to remove this limitation.

7. **Comment: Rear visibility very limited compared to F-15 and F-16. Made worse by the ejection seat configuration that is intended to protect against injuries.** The Air Force understood the design trade-offs made in the F-35 to preserve adequate neck and head support as well as provide the best stealth/low observable capability possible. Additionally, the Operational Test community is currently designing the tactics, techniques and procedures (TTPs) to best employ the F-35.

8. **Comment: IOC capability using 3i software will be very limited, and will only allow the use of "old" weapons, not the latest and greatest available. They are worried that the IOC won't be "for real" if they have to deploy and fight with 3i.** Yes, Air Force warfighting capabilities will be limited at IOC and will not achieve its full warfighting

configuration until the end of SDD. To that end, we are working with the program office to ensure an Operational Requirements Document (ORD) compliant aircraft is delivered by the end of SDD.

9. **Comment: The cycle time on software fixes is too long. Things get fixed, but it takes months after the problem is identified.** The program office has been responsive to Air Force prioritized inputs for deficiency corrections, especially those required for IOC. Unfortunately, there are limits on the time and funds available to correct all deficiencies.

10. **Comment: Concerns about quality of the gun aiming system. When combined with very small ammo load they think it might be a step backwards from legacy aircraft.** Internal gun tests recently completed at Edwards Air Force Base, California, indicate that the F-35's gun accuracy should be similar to legacy aircraft. There are also Air-to-Air and Air-to-Ground gun tests scheduled through late summer 2016, and we should have a better understanding of the total system's accuracy at that time.

11. **Comment: Electro-Optical Targeting System (EOTS) limitations compared to external targeting pods, especially for CAS.** The Air Force looks forward to improving the EOTS during Block 4 upgrades. The Air Force concurs with the F-35 PEO memorandum dated September 9, 2015 to the Honorable Michael Turner, Chairman, Tactical Air and Land Force Subcommittee reference the March 27, 2015 CODEL visit to Eglin Air Force Base, Florida, quoted here for convenience: "The F-35's EOTS performance requirements were established as part of the development baseline in the mid-2000s. Meanwhile, development in external targeting pod capabilities has continued to progress, while F-35 has worked to integrate EOTS based on its unique requirement set. The F-35 will deliver an initial baseline warfighting capability that meets the warfighter's needs; however, it will not initially execute every mission with the same capability that exists in currently fielded/upgraded platforms that have benefitted from technology investment. The F-35 has significant growth potential and at the end of Development (end of CY2017) the Program will begin its Follow-on Development work which will include upgrades and technology insertion of its sensors. Improving EOTS to leverage the significant investment in targeting pod capabilities over the last 10 years is a high priority in Follow-on-Development (Block 4)."

12. **Comment: "Old weapons on 5th gen aircraft". Newer, better weapons won't be usable at IOC. Will come much later.** Air Force is working and will continue to work with

the program office to increase the number of certified weapons on the F-35. The Air Force concurs with the F-35 PEO memorandum dated September 9, 2015 to the Honorable Michael Turner, Chairman, Tactical Air and Land Force Subcommittee reference the March 27, 2015 CODEL visit to Eglin Air Force Base, Florida, quoted here for convenience: “The weapons planned for release with Block 2B in 2015 and Block 3F in 2017 are expected to meet Service requirements. The program must first complete development with the basic weapons in the Services current inventories before embarking on newer weapons. Newer weapons such as GBU-38/54 (500 pound Laser Joint Direct Attack Munition and Small Diameter Bomb-II (GBU-53) are planned for integration on the F-35 beginning with Follow-on-Development in the 2019-2021 timeframe.”

13. **Comment: IOC with only two air-to-air weapons max load, not four. Significant concern about going to combat with that limited load.** The Air Force concurs with the F-35 PEO memorandum dated September 9, 2015 to the Honorable Michael Turner, Chairman, Tactical Air and Land Force Subcommittee reference the March 27, 2015 CODEL visit to Eglin Air Force Base, Florida, quoted here for convenience: “It is true that in Block 2B/3i the aircraft will be capable of only two Advanced Medium Range Air-to-Air Missiles (AMRAAM) carried internally--but again this is a limited capability that will be improved with the full Block 3F capability in late 2017. With Block 3F the internal AMRAAM capability will double to four. Post SDD, the authorized AMRAAM Load outs can be increased to the maximum aircraft capability of 12 missiles, carried both internally and externally.”

14. **Comment: MADL is not currently compatible with IFDL (F-22) data link.** Multi-function Advanced Data Link (MADL) and Inflight Data Link (IFDL) were never meant to be compatible. However, there is a requirement for the F-35 and other Air Force platforms to interoperate in the joint combat environment. Link-16 allows for limited data sharing between the F-22 and F-35. There are potential options being investigated on both the F-22 and F-35 side to improve interoperability between the aircraft, but depending upon service priorities and available funding, those options may not be available for a number of years.

IV. Budget Impact

As previously noted by our senior AF leaders, the current Continuing Resolution and any long-term CRA puts in jeopardy the Air Force's ability to meet defense strategy requirements for

current and emergent contingency operations and delays critical steps in recapitalizing aging fleets and infrastructure. An extended or year-long CR funds the AF at a constrained FY15 enacted level, or \$13.4B less than the requested FY16 PB. The F-35 is a significant part of this needed modernization and recapitalization. For the F-35A program specifically, a short term CRA delays the award of the LRIP 10 contract and limits the AF purchase to the FY15PB level of 28 aircraft, 16 aircraft less than requested in the President's budget. Any long-term CRA limits us to these FY15PB purchase levels with a likely result of an increased cost per aircraft to the AF and the taxpayer. This also limits some of our crucial RDT&E efforts necessary to meet our required capabilities for SDD, for example Band 2/5 funding, and our next Block of improvements for Follow-on Development. Lastly, a longer-term CRA affects our MILCON projects, more directly our F-35A bed down and facilities for Eielson AFB, Alaska, due for award in FY16.

V. Ejection Seat Issues

There were two sled test failures while qualifying the GEN III helmet in the F-35. These failures were in the low speed regime (approximately 160 KEAS) and light pilot weight (less than 136 lbs.). The pilot-seat center of gravity is offset from the thrust line, resulting in aft rotation of the seat for lower weights, and during parachute opening the neck experiences excessive extension or whiplash forces. Based on data analysis, the Air Force made the decision to ground F-35 pilots weighing below 136 pounds (high risk for debilitating injury). This policy only affected one pilot. The ejection seat contractor, Martin Baker, is currently working on permanent solutions that are expected to be available for Low Rate Initial Production (LRIP) 10 aircraft in late 2017. Ultimately, the Air Force wants a seat that meets ORD requirements without workarounds. While cost could be a factor in finding a solution, the performance of the ejection system is a priority to ensure the survivability of our pilots.

VI. Maneuverability Characteristics

Both operational and developmental testing continues for the F-35. The F-35 is designed to be comparable to current tactical fighters in terms of maneuverability, but the design is optimized for stealth and sensor superiority. News reports on the F-35's performance against an F-16 was an early look at the F-35's flight control authority software logic, and not an

assessment of its ability in a dogfight situation. The Operational Test Wing has just completed the first two phases of the within visual range (WVR) Tactics Investigation (TI) consisting of Aircraft Handling Characteristics and Basic Fighter Maneuver exercises. Comments from the operational testers state that the “Initial handling results are generally positive at this stage of tactics development and are comparable to current tactical fighters”. Operational units are just starting to train their pilots on these first two stages of WVR tactics.

The F-35's technology is designed to engage, shoot, and kill its enemy from long distances, not necessarily in visual "dogfighting" situations. There have been numerous occasions where a four-ship of F-35s has engaged a four-ship of F-16s in simulated combat scenarios and the F-35s had a clear operational advantage because of its sensors, weapons, and stealth technology. The F-35 has been optimized for the current trends in air warfare, where the enemy is engaged and defeated from long distances, but it will still be able to maneuver aggressively when required to defeat and kill threats.

VII. Conclusion

The F-35A is developing according to plan. IOC will be an event/capability based recommendation by the Commander of Air Combat Command to the Chief of Staff of the Air Force based on the performance of the entire weapons system.

In order to get to IOC the Air Force must keep pressure on the program managers and developers to deliver the capabilities defined in the ORD and by the Commander of Air Combat Command. This includes providing ALIS 2.0.2, a critical enabler to maintain and operate our fleet in a deployed environment. Development, testing and training is currently on track for a July 29, 2016 delivery so this item must be tracked and measured very closely to ensure it is ready for the warfighter.

Finally, while IOC is an important milestone for the program we must not lose sight of the ultimate goal of full war fighting capability. The program must develop and deliver 3F software on time and invest now in Block 4 follow on development to ensure that the warfighter has the most current and relevant capabilities our nation's warfighters require to meet the future fight. The capability advantage that the Air Force has enjoyed over potential adversaries is

closing fast. Modernization is critically important to our Air Force! Air Forces that fall behind the technology curve, fail, and in modern warfare, if the Air Force fails, the Joint force fails.

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