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DEPARTMENT OF THE AIR FORCE

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

SUBJECT: Department of the Air Force Acquisition and Modernization Programs in the Fiscal Year 2020 National Defense Authorization President's Budget Request

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I Introduction

Chairman Norcross, Ranking Member Hartzler, and distinguished Members of the Subcommittee, thank you for the opportunity to discuss with you today how the F-35 has contributed to modernization of tactical aircraft in the Department of the Air Force. As adversaries across the globe continue to develop advanced capabilities of their own, this conversation serves as an opportunity to align programmatic expectations and goals while discussing the operational accomplishments that are redefining the battlespace through the acquisition of the world's most advanced fifth-generation strike fighter. This year's President's Budget enables the F-35 Air System and my team to fully support the National Defense Strategy through our role in building a more lethal joint force and through our work to strengthen our alliances and build new partnerships.

The F-35 Joint Program Office (JPO) is leading a continued transformation of the F-35 Enterprise by embracing true agile acquisition processes and transitioning from a developmental and initial production environment to a full-rate production and continuous modernization environment, while sustaining the substantial growth of global operations.

With more than 400 fielded aircraft operating from sixteen sites within the U.S. and abroad, F-35 warfighters are beginning to experience the true game changing capabilities the F-35 brings to bear as well as identifying challenges that need to be addressed. Through these efforts, along with the aggressive implementation of cost-saving initiatives, the F-35 will be more survivable, supportable, lethal, and affordable than ever before and will ensure our expectation for decades of continued U.S. air superiority is reaffirmed.

II Department of the Air Force Modernization

The F-35 is more than a fighter jet; it is the "quarterback for the joint force." The F-35's ability to collect, analyze and share data is a force multiplier that enhances all assets in the battlespace. With stealth technology, advanced sensors, weapons capacity and range, the F-35 is the most lethal, survivable, connected and interoperable fighter aircraft ever built. This is true for our U.S. Services, International Partners, and Foreign Military Sales (FMS) customers, and the U.S. Air Force is no exception.

The conventional takeoff and landing (CTOL) F-35A is the latest fifth-generation fighter of the U.S. Air Force and is planned to operate alongside the U.S. Air Force's other 5th Gen/4th Gen aviation capabilities. The F-35A offers unrivaled battlespace awareness and lethality and is ready to take the fight to the adversary and win. With advanced integrated avionics, the F-35A provides next-generation stealth, enhanced situational awareness, and reduced vulnerability for the U.S., its International Partners, and its FMS customers.

The advanced sensor package of the F-35A is designed to gather, fuse, and distribute more information than any legacy aircraft, giving operators decisive advantages over their adversaries. Its processing power, open architecture, sophisticated sensors, information fusion, and flexible communication links make the F-35A an indispensable tool for all who operate it.

III Program Successes and Accomplishments

Throughout 2018 and into 2019, the F-35 Program continued to progress across the lines of effort of Development, Production, and Sustainment. Of particular note in the area of development, the Program delivered Block 3F capability last June, completed a series of

successful pre-Initial Operational Test and Evaluation (IOT&E) events from January to September 2018 followed by a successful Operational Test and Readiness Review (OTRR) in early October 2018 all of which culminated with the start of IOT&E in December 2018. In parallel our Block 4 Modernization efforts continued to ensure that requirements for delivering new capabilities are focused on maintaining operational superiority and meet our Warfighter's needs. Our production team saw equal progress with the award of the Lot 11 engine contract in May, the award of the U.S. Services' Economic Order Quantity (EOQ) contract for Lots 12, 13, and 14 hardware in June 2018, and the award of Lot 11 Air Vehicle contract in October 2018. These efforts brought down the unit cost of the F-35A to $89 million, the lowest price to date for the program, and we continue to aggressively come down the cost curve. Ninety-one F-35s were delivered during calendar year 2018, a nearly 40% increase from the previous year. In the area of sustainment, the Enterprise has made great strides to support the F-35 fleet. Specifically, Reliability and Maintainability (R&M) improvements have increased Air Vehicle Availability (AVA) by [~3%] during calendar year 2018. Phase 2 of the Global Supply Solution (GSS) Capability and Capacity stand-up for 2020-2022 has been completed, and the Hybrid Product Support Integrator (HPSI) has supported the rapidly-growing fleet, driving improvements in availability, mission capability, and deployments. Additionally, the Program initiated stand-up of the first Outside-the-Continental-United-States (OCONUS) Air Vehicle Depot in Italy, which inducted its first aircraft in July 2018. These accomplishments, and more, are made possible by the strong partnerships that exist within the F-35 Program, both across the U.S. Services and among our International Partners and FMS customers.

Across the F-35 Enterprise, these accomplishments demonstrate the Program's commitment to provide an affordable, lethal, supportable, and survivable air system to the warfighter. As the fleet continues to grow and the Air System's capabilities are enhanced, it is crucial that the Enterprise remains focused on fleet readiness to ensure these capabilities are available to the warfighter. In 2018, the F-35 program completed the most comprehensive, rigorous and safe developmental flight test program in aviation history. More than 9,200 sorties, 17,000 flight hours, and 65,000 test points were achieved to verify the design, durability, software, sensors, weapons capability, and performance for all three F-35 variants.

GOALS for 2019:

In 2019, F-35 flight tests will continue in support of phased capability improvements and modernization of the F-35 Air System. This agile framework, known as Continuous Capability Development and Delivery (C2D2), provides timely, affordable, incremental warfighting capability improvements to maintain air dominance against evolving threats to the United States and our allies.

More than 400 F-35s are currently in the global fleet, which will increase to nearly 500 by the end of 2019 with the planned delivery of 133 aircraft this year (131 for LRIP 11, and 2 from LRIP 10). Production ramp-up will continue as operational testing concludes in the fall of 2019, when the program will also enter full-rate production. To prepare for increased quantities, production experts from across the United States Government are working with our industry partners to deliver quality parts on time and at affordable costs. To achieve efficiencies, the Program has incorporated a number of performance initiatives and incentives across the entire

supply chain to support F-35 production lines in Italy, Japan, and the United States. The program is also targeting a threshold On-Time Delivery (OTD) rate of 95%, with an objective of 100% OTD of aircraft to contract. We also plan to award the Lot 12 Air System contract with options for Lots 13 and 14 in June 2019 and Lot 12 Engine contract in July 2019, in addition to working efforts to further streamline contract negotiations timelines.

Driving down cost is critical to the success of this program and, for the eleventh consecutive year, the average cost of an F-35 was lowered. As production ramps up, we are working with industry to implement additional cost saving initiatives. We are also on track to reduce the cost of the F-35A to less than $80 million by 2020—equal to or less than legacy aircraft—while providing 5th Generation warfighting capability.

In order to sustain such a growing fleet, the enterprise is targeting an 80 percent Mission Capable (80% MC) rate by the end of September 2019 for operational units. Additionally, the Program is working to achieve Full Operating Capability (FOC) of its Hybrid Product Support Integrator (HPSI) to sustain a future global fleet operating from twenty-one bases, six countries, four amphibious assault ships (LHDs), and one aircraft carrier (CVN) in 2020. Globally, the enterprise intends to achieve a minimum of eleven depot locations strategically positioned around the world, in order to be able to support a minimum demand rate of repairs as needed.

IV Development

While each line of effort is vital to the long-term success of our warfighter, our work to deliver the F-35 weapon system begins with Development. The F-35 continues to establish itself as a vital part of our nation's defense. The Program is currently undergoing Initial Operational

Test and Evaluation (IOT&E) and embracing an agile framework for the Continuous Capability Development and Delivery (C2D2) of Block 4 capabilities which will modernize how we rapidly and effectively deliver technically feasible and operationally relevant capability to the warfighter.

SDD Close out**:** The F-35 Joint Program Office is working towards closure of System Development and Demonstration (SDD) by the end of Calendar Year 2019. This milestone is defined as:

- Delivery of Block 3F capability – completed in June of 2018,
- Completion of IOT&E – projected for 4th Quarter of CY2019, and
- Full Rate Production approval – also projected for 4th Quarter of CY2019, shortly following completion of IOT&E.

Initial Operational Test and Evaluation: On 5 December 2018, following completion of Operational Test Readiness Review, the F-35 Program entered Initial Operational Test and Evaluation (IOT&E) with Block 3F configuration which provides full SDD warfighting capability. The cooperation between the Operational Test community and the F-35 Program has been very positive and productive. The Director, DOT&E has taken a prudent, phased approach to implementing the operationally representative IOT&E testing. As of April 2019, 199 trials have been completed, with 64 trials remaining. Operational Test Trials will continue through this summer and conclude with reporting in late 2019.

Continuous Capability Development and Delivery (C2D2) – F-35 Block 4: The F-35 Program is modernizing how it develops and delivers capability to the warfighter with the construct of C2D2. This approach is a departure from the traditional acquisition framework and delivery of large capability blocks, and implements select agile-based processes that will result in the predictable and timely delivery of software and hardware for rapid modernization,

enhancement, and improvement of F-35 capabilities. C2D2 is the method by which Block 4 capabilities will be delivered. Block 4 capabilities are delivered through software upgrades, enabling hardware modifications, integration of new weapons, and upgrades to off-board systems. Operational Flight Program (OFP) software updates will be developed on a 6 month cadence and will include incremental delivery of hardware development timelines. Block 4 capabilities will require new Electronic Warfare (EW) and Communications, Navigation, and Identification (CNI), hardware configurations, increased computing capacity provided by Tech Refresh 3 (TR-3) hardware, and Air Vehicle changes to the weapons bay and cooling system. Each of the Block 4 upgrades addresses advancing threats while expanding and improving mission capabilities.

Beginning in Calendar Year 2022, Block 4 capabilities will require modernization of existing development aircraft currently configured with TR-2 legacy hardware to TR-3. TR-3 replaces the legacy Integrated Core Processor (ICP), Panoramic Cockpit Display (PCD), and Aircraft Memory System (AMS) providing the necessary processing and storage capabilities to realize the full benefit of all Block 4 capabilities while allowing growth for added future capabilities. The production cut-in of TR-3 will occur during Lot 15 in Calendar Year 2023.

The F-35 Program is working to transition to C2D2 faster, more flexibly, and more affordably by breaking down and delivering in smaller increments, ultimately reducing our cost of doing business. There are three aspects to reducing this cost of doing business – agile delivery, capability verification, and open systems. Agile delivery utilizes smaller increments and capabilities so we improve the quality, understand more, earlier, and are able to deliver that

capability to the warfighter. Capability Verification utilizes a combined developmental test and operational test perspective in order to shorten cycle times and get the capability testing from flight test into modelling simulation and labs. Open Systems, specifically regarding TR-3, will allow earlier and easier integration in the near term to get new capabilities on the airplane, and benefit from additional competition. The desired outcome from the C2D2 approach, to Block 4 and into the future, is to deliver technically feasible and operationally relevant capability to the warfighter.

Physiological Events and Mitigation Strategy: Since May of 2017, the F-35 JPO has been conducting a multi-Service, multi-Partner investigation and resolution effort to mitigate Physiological Events (PE) in all variants of the F-35. As of April 2019, a total of thirty-eight PEs (thirty-one in flight and seven on-ground) have occurred across all variants of the F-35, resulting in an in-flight incident rate of approximately twenty PEs per 100,000 flight-hours, similar to other Department of Defense platforms.

While a specific root cause for these events in the F-35 has yet to be identified, specific actions have been carried out in order to reduce and mitigate these PEs, including modifying and improving the On Board Oxygen Generation System (OBOGS), improving the breathing regulator, or Seat Portion Assembly (SPA), and developing a carbon monoxide filter. The first mitigation strategy, modification to the F-35 OBOGS, will provide a more consistent oxygen concentration to the pilot. Initial development has been completed and testing is being conducted. Starting in 2019, new production aircraft will include this capability and retrofit schedules are in work. The second mitigation strategy, improving the SPA, which controls the

pressure of pilot breathing air, will reduce Work of Breathing in back-up mode and fleet fielding schedules are in work at this time. The third mitigation strategy, incorporation of a Carbon Monoxide Catalyst (COCAT), will filter carbon monoxide from pilot breathing air and is slated to begin fielding in fleet aircraft in 2020.

In addition, the Program is making changes to aircrew education and training to better respond to these events. These training changes include updating check lists to identify and implement corrective actions and development of a physiological trainer that simulates the conditions (i.e. pressure, volume, Work of Breathing, etc.) that a pilot would experience with various failures in the F-35 Life Support System.

V Production

Aircraft production continues to accelerate while the Program aggressively drives costs out of the production line. Efforts such as economic order quantity (EOQ) contracting, and Government-direct purchasing continue to ensure the F-35 is not only lethal, survivable, and supportable, but affordable as well. With suppliers in forty-five states and eleven countries (Figure 1), these are truly global production efforts. Together, with each of our International Partners and FMS Customers, the F-35 Program continues to realize progress and achieve results in terms of delivery performance, pricing, and contracting.

Figure 1: F-35 International Global Supply Base

Delivery Performance: In order to meet increasing schedule demands, the Program will continue to ramp up production while focused on improving quality to support cost and delivery targets. During CY2018, the Program delivered 91 aircraft and achieved the planned delivery goal for the year. As of April 2019, more than 400 aircraft have been delivered and all LRIP Lot 10 deliveries are now complete. The Program continues to ramp up with the planned delivery of 131 aircraft. As of April 2019, 29 of the 131 aircraft for 2019 had been delivered. As for LRIP Lot 11 contract deliveries, 30 of the 141 Lot 11 aircraft have been delivered.

F-35 LRIP Pricing: The price of F-35 aircraft continues to decline. Specifically, the price (including airframe, engine, and contractor fee) of LRIP Lot 11 F-35A ($89.2 million) is approximately 5.4% less than a LRIP Lot 10 aircraft.

Over the course of the LRIP contracts, timeliness of aircraft deliveries has historically been a challenge. However, in recent years, while production quantities have increased, the Program has seen improvement in the timeliness of aircraft deliveries. Although getting better, the Program is not satisfied with any delays. To date in 2019, all but one of the LRIP Lot 11 aircraft have been delivered on time.

Air Vehicle Production Contracting: While the U.S. Services continue to contract annually for LRIP Lots 12, 13, and 14, some F-35 Partners and FMS customers have initiated a Block Buy contracting strategy for LRIP Lots 12, 13 and 14. This strategy gives F-35 International Partners and FMS customers the flexibility to purchase all aircraft in a single procurement for LRIP Lot 12 or to procure aircraft and engines in a multiple lot format for LRIP Lots 12 through 14. The U.S. Services are procuring LRIP Lots 12, 13, and 14 as single-year procurements and have requested congressional approval to award a single contract to procure two year advanced material and equipment for FY 2019 and FY 2020. There is no multi-year commitment for U.S. Services' aircraft and engines, which will continue to be bought on an annual basis for LRIP Lots 12 through 14 and preserves congressional annual discretion.

The risk of the Partners' and FMS customers' Block Buy for Lots 12, 13, and 14 is considered low, given the stability of the weapon system's design. All F-35 variants have completed second life (8,000 hours full life) durability testing. Additionally, 99.9% of all hardware and subsystems qualifications are completed, and Block 3F capability began delivery in 2018. For the U.S. Services and Congress, the risk is even lower as the commitment is limited to the purchase of a two-year supply of parts in a single EOQ procurement (FY 2019 and FY 2020).

In November 2018, the F-35 JPO awarded a Contract Action to Lockheed Martin for LRIP Lot 12 F-35s for U.S. Services and several International customers. The contract action obligated $6 billion ($3.5 U.S., $2.5 billion International) in funding from the U.S. Services, our International Partners and our FMS customers for a total of 255 F-35 aircraft. F-35 aircraft

allocation includes:

- 106 F-35s for the U.S. Services
    - Includes Lot 12 program of record plus FY18/FY19 aircraft quantity congressional adds
- 89 F-35s for International Partners
- 60 F-35s for Foreign Military Sales Customers

This award established a $22.7 billon not-to-exceed contract threshold and contract framework to produce Lot 12 aircraft. This enables the continued production of F-35s while government and industry teams work to reach final contract agreement definitization targeted for mid-June 2019. Contract deliveries of LRIP 12 are scheduled to begin in January 2020.

This Lot 12 framework leveraged our Lot 11 agreement and includes targeted Production Line Performance and Supplier Cost incentive areas. These incentives, when realized, will position the Program to achieve the required increased production ramp and align industry performance to achieve our required outcomes in reducing costs, increasing quality and meeting delivery timelines.

Engine Production: In May 2018, the F-35 JPO awarded the Lot 11 Propulsion contract valued at $2.02 billion. This contract covers 135 propulsion systems for all three variants of the F-35 Lightning II, as well as production installs, tooling, program administrative labor, and Partner unique items. The Unit Recurring Flyaway (URF) price for the LRIP Lot 11 Conventional Take Off and Landing (CTOL) propulsion system is $12.66M, a reduction of less than half a percent from LRIP Lot 10 URF. This value is below Pratt & Whitney's *War on Cost* commitments. However, the JPO is not satisfied with the small percent decrease from Lot 10 and, as such, is engaging with Pratt & Whitney to review the next wave of *War on Cost*

initiatives to further drive cost out of these propulsion systems. Negotiations for LRIP Lot 12 are ongoing and are expected to complete in summer 2019.

Upcoming Actions: The F-35 JPO is on track to release a request for proposal for our Lot 15-17 production buys this summer using a base plus two-option years contracting strategy. We are continuing to look for ways to implement a Multi-Year procurement strategy based on the F-35's stable design and steady production rate. To date, the return-on-investment provided by our industry partner in regards to a Multi-Year procurement does not support proceeding with this acquisition approach. We fully believe such a multi-year strategy is ultimately the best way for industry to make long-term agreements with suppliers and bring down overall production costs while improving on-time deliveries. Therefore, we will continue to work with our industry partner and Department leadership to pursue a multi-year strategy as we move forward so that we can optimize our production program and continue the trend of reducing costs across all F-35 variants.

ALIS: The F-35 Autonomic Logistics Information System (ALIS) is the operations and maintenance infrastructure for the F-35. This complex system supports operations, mission planning, supply-chain management, and maintenance. These are all functions necessary to support flight operations. ALIS also supports the three U.S. Services, eight Partner Nations, and four FMS customers that have purchased the F-35 through the Foreign Military Sales program.

The current ALIS strategy includes three lines of effort: Current ALIS, ALIS Re-architecture (called ALIS-Next), and an Agile Development Operations (DEVOPS) software development pilot. The Current ALIS focus is to stabilize and enhance the current fielded ALIS

system, which supports all flight operations of the F-35 today. The F-35 JPO will sustain and continue to enhance the current system as well as maintain cyber security standards to meet warfighter needs.

The second line of effort includes modernizing the ALIS architecture to current industry standards. The F-35 JPO has teamed with MIT-Lincoln Labs and other government agencies to re-architect ALIS, (an effort known as ALIS-Next), to provide a government owned technical baseline of the ALIS system. The objective of this effort is to reduce cost, improve supportability, enhance cyber security, and provide additional wartime resiliency. ALIS-Next will be based on the latest industry Information Technology (IT) standards and principles. During 2019, the F-35 Enterprise will develop the ALIS-Next architecture prototype and establish a transition plan to begin the incremental transition to the modernized system in FY20.

The F-35 JPO, in coordination with software experts from Hanscom Air Force Base in Massachusetts, is executing an Agile DEVOPS software development pilot on ALIS software. This pilot program is also known as the "Mad Hatter Project." The project is led by the U.S. Air Force in a software development cell called "Kessel Run." This team includes software developers from the 309th Software Engineering Group, Lockheed Martin, and leading industry IT contractors, and is working closely with the test squadron at Nellis Air Force Base in Nevada to rapidly address some of the most pressing issues affecting the operational maintainers. The goal of the pilot is to provide rapid, user centric improvements to the software and to identify specific acquisition and software development process improvements that will be transitioned to the JPO within the next twelve to eighteen months.

Planning is underway to merge the current ALIS effort, ALIS re-architecture, and Agile DEVOPS software development pilot into a unified long-term strategy. This plan will ensure we continue to provide the warfighters with necessary capabilities and support for current global F-35 operations, begin an incremental transition to the new architecture ensuring no disruptions to ongoing flight operations, and leverage lessons learned from the Agile DEVOPS software development pilot to provide a flexible, affordable, supportable, and secure ALIS environment to support the global F-35 fleet.

Ejection Seat Modernization: The F-35 program introduced the final standard of the US16E ejection seat in LRIP 10 in May of 2017. This configuration of ejection seat incorporates a pilot weight selection capability and a fabric panel on the parachute risers to control head motion. These features work together with a lightened helmet to allow the full weight range of 103 to 245 pound pilots to safely eject from the F-35. These most recent seat improvements join other state of the art technologies previously incorporated into the F-35 escape system, including:

- F-35B auto-eject system (the first use of an auto-eject system in U.S. aircraft)
- Arm restraint system (the first in the U.S. Navy)
- Leg restraint system (the first passive system used in the U.S. Navy and Air Force)
- Single point water activated parachute harness release system on the F-35 seat (the first of its kind used worldwide)
- Inflatable airbag head support (also the first of its kind used on any ejection seat worldwide)

The F- 35 program has used modern technology to meet safety requirements more stringent than those used on any preceding tactical aircraft program. Upgrade of the F-35 fleet to the final standard US16E seat is underway and is scheduled to complete in 2020.

VI Sustainment

While development and production efforts of the F-35 Program are central to the creation of the aircraft, they must be matched with equally robust capacity for aircraft sustainment. The F-35 Enterprise continues to work towards improving and maintaining a high-rate of mission capability across the fleet, and is radically pivoting our approach to software development and sustainment.

80 percent Mission Capable Rate: As the F-35 fleet grows, we must also modernize how we support such a fleet. In order to enable the F-35 Enterprise to achieve the mandated 80% MC rate by September 2019, the F-35 JPO, is working with the three U.S. Services and eight International Partners and has established a four phase plan to achieve and sustain the readiness rates listed in Table 2.

THE ROAD TO 80% MC				
	Phase 1 Sep 19	**Phase 2 Feb 20**	**Phase 3 Jun 20**	**Phase 4 Sep 20**
Operations	80%	80%	80%	80%
Training	15-18 UTE	60%	80%	
LRIP 5+	50%	60%	70%	

Table 2

Phase one is to achieve 80% MC of Combat Coded aircraft and improve training to a utilization rate (UTE) of 15-18 (monthly). Phase two will maintain Combat Coded aircraft at 80% MC and continue to improve training to 60% MC. Phase three will get all Lot 6 and follow aircraft to 80% MC. Phase four will be to achieve 80% MC across the entire fleet.

In order to achieve each of these phases the program has embarked on executing four Main Enablers, each with discrete actions. These enablers are in sync with the broader sustainment

plan to improve readiness and reduce costs laid out in the updated F-35 Life Cycle Sustainment Plan. Enabler one is to improve supply chain performance, which will be accomplished by increasing repair capability, accelerating depot repair capability, and accelerating material delivery. Enabler two is to return aircraft to MC status, which will be accomplished by reducing depot modification span times and eliminating long term down aircraft (31+ days since last flown). Enabler three is to accelerate modifications, which will be accomplished by completing Block 3F modifications and retrofits and accelerating reliability and maintainability retrofits. Enabler four is to optimize unit level maintenance, which will be accomplished with organization level maintenance plan changes.

Depot Activation: Two air vehicle depots have been stood up within the United States. One is located at the Ogden Air Logistics Complex, Hill Air Force Base (AFB) in Utah and the other is located at the Fleet Readiness Center East, Marine Corps Air Station Cherry Point in North Carolina. A third is located OCONUS in Cameri, Italy. In July 2018, the Cameri depot inducted its first F-35. In 2019, three additional OCONUS depots will activate, located in Williamtown, Australia; Nagoya, Japan; and Iwakuni, Japan.

In addition to the air vehicle depots, one propulsion depot has been stood up at the Oklahoma City Air Logistics Complex, Tinker AFB in Oklahoma and established initial repair capability in 2014. This depot has matured in both capability and capacity to meet the growing fleet demand, and now has capacity to meet U.S. Title 10 workload through 2028. The program is also actively engaged in standing up of five additional propulsion depots outside the United States. These

depots will be stood up in Australia, Turkey, and the Netherlands during 2020, Norway during 2021, and Japan during 2023.

In addition to the above depots, component depot capability is integral to the readiness of the fleet as it will support the F-35 global supply chain with ready-for-issue components at a rate on par with fleet demand. Currently, the F-35 Program has established Initial Depot Capability (IDC) for twenty-six of sixty-eight designated Line Replaceable Component (LRC) workloads at U.S. organic depots. IDC consists predominately of fault isolation and "repair by replacement" of subcomponents, and takes approximately four years to complete. Organic depot repair capability will continue to mature over the next eight to ten years until the JPO achieves "repair by repair of subcomponents" capability known as Full Depot Capability. By 2024, U.S. depots will have a “demand-rate” repair capability for all sixty-eight workloads to include adequate facilities, trained labor, current technical data, and repair material on hand to effect efficient repairs. Sequencing of workload activations has been prioritized to have the highest positive impact on known readiness issues, accounting for pending engineering changes and other reliability improvement initiatives.

In June 2018, the Program placed Lockheed Martin (LM) on contract to activate thirteen additional workloads at Military Service Depots (MSD) over the next three years. As more funding is made available within the Program, additional workloads currently scheduled for a 2020 contract action will be pulled into 2019. By the end of 2020, all identified F-35 component workloads will be on contract with LM to activate with an estimated IDC completion of 2024. In parallel to the LRC activation effort, the JPO is initiating activities to develop Shop Replaceable

Component (SRC) capability starting in 2019. It is estimated SRC capability establishment will take six to eight years. The JPO will then work with LM and the MSDs to ensure capacity is available to meet fleet demands. This analysis will occur on a two-year cycle beginning in 2019.

Software Modernization: The F-35 Program is pivoting how we view software, creating an effective hybrid of historically separate efforts for Software Development and Sustainment, that we are calling Software Modernization. Over the past few years, it has become clear that focusing on the traditional ways of supporting the software for the program was not supportable and would result in duplicative work and increased costs. The sustainment of the full air system, with its software intensive elements is the long-term Achilles heel of the sustainment effort. As the operational tempo has continued to increase, the requirements of the fleet have evolved, and the continuous update cycle for the Air System has driven the need for a strategy to stay ahead of the threat to our warfighters. We must embrace innovation in software modernization, which will result in continuous updates and provide a marked increase in capability, at speeds that have never been seen before.

The Program's goal is to use an affordable Integrated Software Delivery Capability, which combines government organic and industry best performers, creating an integrated partnership between government and industry. This partnership will avoid duplication of effort and resources across development and sustainment, bringing them together technically in order to reduce the amount of touch to software modules and get the capability to the warfighter. Ultimately, this new approach shifts towards viewing the development of software as a service rather than a product that is delivered.

Although challenging, this is an exciting opportunity to deliver capability to the warfighter at a pace that has not yet been seen in other programs. The Program also recognizes the need to continue to consider new ways of working and is looking to have a vision for cloud-based global sustainment. The aim is not to reallocate work, or take work from one area to another, but to work together to maximize the strengths of all the players to bring corrections and new capability as rapidly as possible to our warfighters.

VII U.S. Services, International Partners and FMS Customer Operations

The U.S. Services, our International Partners, and FMS customers experienced numerous successes and major milestones throughout 2018, and have continued in 2019. Major accomplishments in 2018 for the U.S. Services included deployment of the first U.S. Marine Corps (USMC) F-35B aboard the USS WASP (LHD 1), deployment of F-35As in a Theatre Support Package to Kadena Air Base in Japan, deployment of F-35Cs aboard the USS ABRAHAM LINCOLN (CVN 72) and the first F-35B combat strike operations in support of Operation Freedom Sentinel in Afghanistan aboard the USS ESSEX (LHD 2).

Milestones for our International Partners in 2018 included: First Aircraft Arrivals (FAA) for the United Kingdom, Japan, and Australia; declarations of Initial Operating Capability (IOC) for the United Kingdom and Italy; declaration of Initial Depot Capability for the Heavy Airframe MRO&U in Italy; in addition to First of Class Flight Trials conducted aboard the HMS Queen Elizabeth with the F-35B. Also in 2018, training for both Turkish and Korean Maintenance personnel began in January at Eglin AFB in Florida; and training for Turkish pilots began in July at Luke AFB in Arizona. The Israeli Air Force conducted operations with the F-35A. And

Belgium became the fourth and newest FMS customer of the F-35 enterprise, signing its Letter of Offer and Acceptance in October 2018.

In 2019, the F-35 Enterprise has already achieved major milestones including declaration of IOC for the U.S. Navy in February 2019. Additionally, in March 2019, our Japanese Partners stood up their first operational squadron, the 302nd Tactical Fighter Squadron, and Korea received its first aircraft. Many more accomplishments and milestones are expected this year, including ship activation for the USS AMERICA (LHA 6) which will arrive in Japan later this year (2019); completion of the third U.S. Air Force (USAF) operational squadron standup at Hill AFB in Utah; and FAA and initial standup of USAF 158th Fighter Wing in Vermont.

Milestones for our International Partners in 2019 include: Denmark and Australia were selected in February as additional locations for MRO&U facilities for components; FAA in country for the Netherlands and Turkey; declaration of IOC for Norway and Korea; and Canada is expected to release the full Request for Proposal (RFP) for its Future Fighter in mid-2019. As mentioned, ship activations will increase, as well as depot expansions around the world. In evidence of this, the Netherlands will open their first multi-use Regional Warehouse, receive their first aircraft at Leeuwarden Air Base, and receive delivery of the first Netherlands aircraft assembled at the Italian FACO. Italy is also scheduled to begin pooled training of F-35Bs with the USMC. The F-35 FMS Team is also focused on responding to formal Requests for Proposals from both Finland and Switzerland, with U.S. Government response expected in August and November, respectively. In December 2018, the Government of Japan also formally announced its plans to purchase an additional 105 aircraft (63 F-35As, and 42 STOVL aircraft). With this

anticipated purchase, Japan will be the largest international customer of F-35s with 147 planned aircraft.

Future potential FMS customers include Singapore, Greece, Romania, Spain, and Poland with the JPO responding to all official inquiries. The coming year promises to be another of substantial growth and progress across the global F-35 Enterprise.

VIII Conclusion

Thus far, 2019 has already been, and will continue to be, another fast-paced and unrelenting year for the F-35 JPO. The Program continues to make steady and measured modernization, acceleration, and growth efforts across all three lines of effort – Development, Production, and Sustainment – and continues to aggressively tackle known challenges. We are ready for our shift from a development/low rate production environment to a full rate production/modernization-sustainment-full operations environment. Lastly, we will continue to remain focused, with a true sense of urgency, to solve challenges and provide a clear status and data needed to assist our Congressional stakeholders as well as senior DOD and International leadership with upcoming tough priority decisions.