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THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT OF
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F-35 LIGHTNING II PROGRAM

BEFORE THE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE OF THE
HOUSE ARMED SERVICES COMMITTEE

ON
FISCAL YEAR 2024 BUDGET REQUEST OF THE DEPARTMENT OF DEFENSE FOR
FIXED-WING TACTICAL AND TRAINING AIRCRAFT PROGRAMS
MARCH 29, 2023

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Introduction

Chairman Wittman, Ranking Member Norcross, and distinguished Members of the Subcommittee, thank you for this opportunity to provide an update on the F-35 Lightning II Program. These capabilities are directly enabled by the trust, confidence, and oversight of this subcommittee. I'm grateful for your support in the Fiscal Year (FY) 2023 National Defense Authorization Act (NDAA), and I look forward to continued engagement with you and your staff as you execute the FY 2024 legislative cycle.

As the National Security Strategy notes, a powerful U.S. military is essential to safeguarding vital U.S. national interests. This includes the urgent need to sustain and strengthen deterrence – the emanating concept of the Department's National Defense Strategy. In support of this vision, the F-35 program remains focused on delivering the world's most capable, affordable, and available 5th Generation Air System. The F-35's nuclear certification is on schedule, which supports both U.S. and NATO countries, as part of a broader Department of Defense effort on integrated deterrence. Over the past year, we've made progress across each of these domains and have reached several significant milestones including delivery of the 900th F-35 aircraft and 1,000th F135 engine. Meanwhile, the program has logged over 625,000 flight hours while operating from numerous bases and warships around the world, all of which are made possible by the men and women of the F-35 Joint Program Office (JPO) including U.S. and international government, military, and industry personnel. Since becoming Program Executive Officer (PEO) in July 2022, I've been proud to witness these contributions firsthand while meeting with pilots, maintainers, software developers, production line workers, and personnel spanning every corner of this complex global enterprise.

Over the past eight months, I've listened to operators share spectacular stories about how the F-35 air system performs, senses, and communicates; and to maintainers who appreciate the ease of maintaining the aircraft when critical parts are available. In support of our operators, the Block 4 capabilities we are delivering are critical in deterring and defeating evolving threats. As we provide affordable and effective capability today, we are maturing sustainment capacity and processes to enable F-35 readiness for decades to come.

Progress across F-35 development, production, and sustainment is made evident daily through successful joint training and operations across the globe. In September 2022, the Royal Australian Air Force completed "Exercise Pitch Black" alongside twelve international allies. Two months later, I was proud to witness F-35s from the United States, Italy, and the Netherlands as they successfully conducted exercises during "Falcon Strike," where aircraft seamlessly operated among allied users at Amendola Air Base in Italy. Also in November, the U.K. declared the F-35 'Ready for Operations' on HMS Prince of Wales and Norway passed its 10,000th flight hour milestone operating a Norwegian F-35 at Luke Air Force Base. In December 2022, a new F-35 Operations and Maintenance campus was established at Skrydstrup Air Base in Denmark. In January 2023, Canada officially announced its selection of the F-35 to meet its defense needs, reaffirming its long-standing place as a valued F-35 Partner. Just last month, leaders from each of our F-35 Partner nations gathered in Australia for the semiannual JSF Executive Steering Board (JESB), our program's primary governance forum. In addition to continued collaboration with our International Partners, we are pleased to welcome Finland, Switzerland, and Germany as new FMS customers – with others expected to make decisions soon. These team members join existing FMS customers including Israel, Japan, Korea, Belgium, Poland, and Singapore, and will build upon the invaluable support of our broad multinational user base and enhance global interoperability.

While we have accomplished much over the past year, we have much work ahead of us. In recent years, the Tactical Air and Land Forces subcommittee has made its expectations clear with respect to key focus areas such as Tech Refresh 3 (TR-3) delivery and Block 4 capability development; Air System Modernization (ASM); depot stand-up and supply chain maturity; sustainment cost reduction; and other critical program activities. Since becoming F-35 PEO, I have carefully evaluated plans and progress across these lines of effort and look forward to providing you with a comprehensive update on our progress today. Alongside our colleagues at the Government Accountability Office (GAO), we are working aggressively to drive lasting results that will position the growing F-35 fleet for success – across *Capability, Availability, and Affordability* – today, and for decades to come.

CAPABILITY

Tech Refresh 3 and Block 4

We appreciate the House Armed Services Committee’s support of F-35 Follow-on Modernization in the FY23 NDAA. TR-3 provides computational horsepower to support Block 4 modernization capabilities. Block 4 upgrades add new and enhanced capabilities to ensure our platform remains relevant against rapidly evolving threats. The existing infrastructure relies on ten-year-old processing and memory, which cannot fully unlock the new capabilities needed for warfighter success. Much like a new mobile cell phone or personal computer, TR-3 will host new Block 4 capabilities and applications with significantly more computing power and memory than the legacy infrastructure.

We successfully completed the first TR-3 test flight on 6 January 2023 at Edwards Air Force Base and we are on a path to execute almost 300 sorties in our TR-3 developmental flight

test program. We have also implemented the production cut-in of TR-3 hardware, starting with AF-392 in February of this year. That aircraft will ultimately be delivered to the USAF as the first TR-3 capable jet.

The TR-3 delivery schedule has been affected by delays associated with hardware and software development as well as testing of the Integrated Core Processor (ICP) – the brains of TR-3. The key risks ahead of us are centered around maturity and stability of the final integrated software, flight test execution with an aging fleet of test aircraft and infrastructure, and delivery of TR-3 hardware to the production line. We have mitigation plans in place to deal with these risk areas in order to meet our commitments to our U.S. Services, Partners, and other stakeholders by the end of this year. The Government and industry team is aligned in a surge posture towards TR-3 test execution, is taking advantage of opportunities to use additional test aircraft, is tailoring the flight test program, and is prioritizing TR-3 software content as necessary to deliver combat capable aircraft.

Our FY24 budget represents a transition of our main development focus from delivery of TR-3 to delivery of remaining Block 4 capabilities. Our industry counterparts across the country are hard at work developing major improvements in electromagnetic warfare, fusion, interoperability, sensors, navigation, and identification while integrating the latest 5th Generation weapons. These best-in-class capabilities will provide the warfighter a combat edge to identify, track, engage, and survive against peer adversaries well into the next decade. As we deliver advanced capabilities, we remain committed to ensuring the F-35 air system is well-suited to affordably meet evolving power and cooling requirements for decades to come.

The development of Block 4 capabilities includes the incremental addition of increasing capabilities from Lots 15 and beyond, and has been a recognized high-risk effort since initiation.

The F-35 program is working with industry teammates to solve complex challenges associated with the development of these advanced capabilities. Realization of several risks during execution has challenged our ability to meet original capability delivery requirements, but the program is focused on mitigating these risks and delivering hardware to the production line in calendar year 2024, while supporting delivery of operational software capabilities in time to meet warfighter requirements.

Air System Modernization

The original program engine specification allocated 15 kW of bleed air extraction to support system cooling requirements, and the F135 engine was designed, tested, and qualified to this specification with a level of margin available for future growth. During the final stages of initial aircraft development, air vehicle cooling requirements grew to exceed planned bleed air extraction. To provide the necessary bleed air, the engine is required to run hotter, and the program is realizing the effects of this through an increase in operating temperature, and a decrease in engine life, which is driving earlier depot inductions and an increase in lifecycle cost. Without upgrades, the addition of Block 4 capabilities will further degrade engine life and increase program lifecycle costs, because while the current TR-2 and TR-3 aircraft have sufficient cooling and power (while impacting the engine life as stated above), capabilities in Block 4 and beyond will increase cooling and power demands beyond current capabilities of the air system. To avoid this, upgrades to the engine, the Power and Thermal Management System (PTMS), and other vehicle systems may be required.

With this President's budget, the Department has selected an F135 Engine Core Upgrade (ECU) and a PTMS upgrade as the path forward to address these challenges. This Course of Action

(COA) was selected following a thorough Air System Modernization Business Case Analysis (BCA) completed in FY22. The BCA included the ECU COA, a COA for Adaptive Engine Transition Program (AETP) engines, and a COA for Tri-Variant Adaptive (TVA) Engines. The results of the BCA have been shared with your committee staff members. With the Department's selection of the ECU and PTMS upgrades as the way forward, my team is implementing the planning and design work to affect these upgrades.

The work for the ECU upgrade is already underway, thanks to congressional adds for that effort. Over the next few months, we will continue developing an acquisition strategy for air system modernization addressing all development, test, production, and sustainment risks and opportunities.

F135 Delivery Resumption

While air system modernization remains essential to enabling future F-35 capabilities, we are committed to ensuring the safety and effectiveness of today's engine as well. As a result of the BF-148 mishap on 15 December 2022, the program paused delivery acceptance and flight operations until the program could be assured that delivered engines were able to support safe F-35 operations. While the mishap is still under investigation, our team has identified a rare harmonic resonance phenomenon between the Main Fuel Throttle Valve (MFTV) and the CP12 fuel tube that causes the CP12 tube to fracture. Since the mishap, F-35 JPO, Pratt & Whitney, Lockheed Martin, Naval Air Systems Command (NAVAIR), and Air Force Lifecycle Management Center (AFLCMC) personnel have been working tirelessly to understand the root cause and develop mitigations for this harmonic resonance phenomenon, and to implement a path forward for safe flight operation of the F135. I'm extremely proud and grateful for the work this team accomplished – including working extensive hours on weekends and holidays. This Government and industry

collaboration will ensure incorporation of multi-stepped mitigation efforts that will fully address this rare phenomenon in F135 engines. Meanwhile, root cause identification and analysis of this failure mechanism will continue.

One of the mitigation steps is the installation of an orifice which reduces the impact to loss of engine control if the CP12 tube fractures as a result of the harmonic phenomenon. In February 2023, Airworthiness Authorities from the U.S. Navy, Air Force, and industry approved and released orifice install instructions and updated flight operations manuals for the Joint and International fleet. Incorporation of the orifice, which is currently ongoing, reduces fleet risk. An immediate action Time Compliance Technical Directive (TCTD) for highest-risk assets, along with a ninety-day routine compliance TCTD for the rest of the fleet, has been approved and released. The orifice install is a simple process that can be accomplished at all maintenance locations and maintenance levels in four to eight hours for engines on-wing. The orifice mitigation enabled resumption of engine deliveries from Pratt & Whitney on 17 February 2023, and the resumption of aircraft deliveries from Lockheed Martin on 14 March 2023. We forecast all backlogged deliveries will complete by May 2023.

ALIS-to-ODIN Transition

As progress continues across air vehicle and engine hardware and software efforts, we are making headway in replacing our legacy enterprise logistics information system, the Autonomic Logistics Information System (ALIS), with a new, modernized system called the Operational Data Integrated Network (ODIN). As you heard last April, ALIS-to-ODIN (A2O) is a multi-year approach to address ALIS's most pressing hardware and software obsolescence challenges while simultaneously evolving to ODIN. A2O addresses multiple technical and functional elements

including software, hardware, data, and infrastructure. Each element matures at a different pace, providing value to users incrementally.

In 2022, we fielded two more ALIS software releases which addressed users' top requirements and strengthened our cybersecurity posture. One of those software releases included changes necessary to support air vehicle TR-3 flight testing and fielding. We also began the development of the final ALIS software release, in accordance with our cybersecurity risk burn-down plan, which updates several commercial software components that have reached end-of-life and are no longer supported by vendors. In parallel, we began work on the ODIN foundational software elements that will enable future application modernization and will continue development throughout 2023. We also began the modernization of select applications that were incompatible with the future architecture. Our modernization strategy adopts a microservices architecture where software components are smaller, loosely coupled, and can be deployed and scaled independently of one another. This enables faster and more frequent ODIN software updates to support user needs.

We continue to make significant progress in developing and fielding ODIN hardware. In 2022, we fielded new unclassified ODIN hardware for sixteen site activations including the first maritime deployment on the USS MAKIN ISLAND. This year we will continue fielding for both the fleet technical refresh and new site activations using increased production capacity. The first two hardware technical data packages and associated data rights have been delivered and we plan to receive two more in 2023. We will begin fielding the classified ODIN and mission planning hardware later this year by taking advantage of existing contracts that allow us to procure the hardware "more directly" from the commodity hardware suppliers. The hardware will then be provided as government furnished equipment to Lockheed Martin for final software installation

and fielding. This strategy is projected to accelerate deliveries by eight to ten months and cost less than historical approaches.

We have also made significant progress with data quality, transformation, and infrastructure. We continue the development of a Data Centralization Archive and Retrieval capability, which will improve the performance of unit hardware, provide easier access to data, and enable enhanced fleet analytics. We have designed an improved architecture and begun to define our infrastructure-as-code, which allows us to publish software independent of underlying hardware as we transition seamlessly into our developmental and production environments in Government-owned clouds. Initial efforts have started in Lockheed Martin's cloud and will transition into a JPO development cloud later this year. Lockheed Martin and the JPO have partnered with industry-leading software companies to explore and assess technical and software management practices that will be used to support our A2O approach.

In 2022, my predecessor testified about the standup of the National ALIS Support Center (NASC), which provides a centralized source of remote support for system administrators. Located at Eglin Air Force Base in Florida, the NASC's small team of experts are providing 24/7 support to operational units and significantly contributing to a projected \$1B lifecycle savings. The NASC resolves eighty percent of trouble tickets within sixty minutes; assists deployed shipboard admins with inoperable ALIS modules; and has assisted deployed units leveraging new commercial satellite communication systems. Last year, we reported that the Air Force approved an immediate reduction of twenty ALIS system administrators and reduced the requirement for all future training and test units, which led to a \$650M savings across the life of the program. The Air Force is evaluating another reduction of ALIS system administrators at Air National Guard and Air Force Reserve units that is projected to reduce lifecycle costs by another \$550M. Both the Air Force and

Department of the Navy are continuing to evaluate their current and future personnel requirements that may lead to even more lifecycle savings in the coming years. As you can see, we are making solid progress across the board improving the health of operational logistics capabilities for the warfighter.

Initial Operational Test & Evaluation and the Joint Simulation Environment

While modernized logistics information systems remain key to delivering F-35 readiness today, our Training Systems and Simulation (TSS) efforts are the key to unlocking F-35 capability tomorrow. The Joint Simulation Environment (JSE) is key to testing F-35 performance in a physics-based, high-fidelity, high-density threat environment against peer capabilities that cannot be represented in open-air flights against aggressor squadrons and integrated air defenses on test ranges. Over the last six months, the JPO has experienced unprecedented collaboration across the JSE stakeholder community to ensure Initial Operational Test and Evaluation (IOT&E) completion by August 2023. Strong cooperation from our developers; the Director, Operational Test and Evaluation (DOT&E); the JSF Operational Test Team (JOTT); the Air Force Operational Test and Evaluation Center (AFOTEC); Naval Air Warfare Center Aircraft Division (NAWCAD); and Lockheed Martin has resulted in remarkable progress towards streamlined data collection, analysis, accreditation processes, and test preparation events while ensuring test sufficiency for JSE accreditation.

The JSE development and integration phases are nearly complete. JSE has conducted numerous JOTT-assisted developmental test events since spring 2021 to assess simulation capabilities under test conditions and threat laydowns representative of IOT&E full mission thread test scenarios. JSE is demonstrating the stability required to support execution rates expected for

operational testing. The remaining known work includes correction of five IOT&E priority deficiencies, verification of the fixes for three prior deficiencies, and completion of the verification and validation (V&V) to support simulation accreditation. The joint team is aggressively working actions to ensure the data pedigree in all data packages results in a favorable accreditation decision. AFOTEC currently estimates a late May 2023 completion date for V&V data collection and data package development. Once the accreditation criteria are met and the Operational Test community completes their final test readiness assessments, sixty-four IOT&E operational mission trials will be conducted in the JSE. Runs-for-Score are scheduled to be completed by 31 August 2023. The operational test report identifying any limitations will be released following completion of the sixty-four trials. The report will support the program's Full Rate Production decision expected by the end of calendar year 2023, meeting the F-35 program's updated Acquisition Program Baseline (APB) schedule threshold.

While JSE was initially developed to meet IOT&E requirements for F-35 test and evaluation, JSE has demonstrated its value in providing unprecedented high-end combat and weapons training at a fidelity and rate that has never been possible through previously available methods. Over the course of the last twelve months, ten different weapons schools and operational squadrons have trained in JSE and used the capability for pre-deployment preparations for high-end threat engagement. Near-unanimous feedback from these operational squadrons indicates JSE is the most realistic, difficult threat environment they have seen for F-35 training. JSE is now a core component of the curriculum at U.S. Navy and Air Force Weapons Schools and is also delivering an extraordinary increase in the rate at which we train and increase pilot proficiency. For example, in a recent five-day workup period with TOPGUN, the staff and students completed 118 uninterrupted simulator periods, generating 334 total sorties and nearly 1,000 AIM-120

AMRAAM employments. TOPGUN completed more training in five days at the JSE than was previously possible in a twelve to eighteen-month period through normal squadron training. The JSE provides a high-fidelity environment that, if scaled, has the potential to provide the Fleet the ability to train effectively through extremely high repetitions to ensure success in a high-end fight.

These training detachments have given JSE high-value feedback from the operational community. Even with these successes in training, the JPO is not taking our focus and priority off IOT&E completion, which is of utmost priority, as well as JSE modernization for operational test and evaluation of Block 4 capabilities. Some modernization of the JSE environment for threats, weapons, and services is already underway. The development of the Block 4 F-35 In-A-Box, which provides rehosted F-35 aircraft software for the JSE simulator, is currently on contract. We anticipate delivery and integration of an updated Operational Flight Program for the JSE environment no later than June 2024. Ensuring JSE software releases are received concurrently or in advance of aircraft block upgrades is essential to keep realistic training aligned with aircraft capabilities.

JSE allows us to test new and existing aircraft capabilities digitally in the world's most competitive threat environments, which are continuously evolving. Acceleration of post-IOT&E modernization so that JSE paces the F-35's latest configuration is essential to accelerate discovery in the developmental pipeline for capability delivery to the Fleet.

Human Capital

Delivering the world's most capable 5th Generation Air System requires support of the world's most talented acquisition workforce; innovation requires continually reexamining the way things are done; and both require an organization that promotes the professional growth of its

people. **D**elivery, **I**nnovation, and **G**rowth have been a focus of mine across the programs I've led, as I seek to instill a *DIG In!* mentality among my teams. The F-35 JPO is a complex and dynamic organization that has progressed over multiple decades in response to U.S. Service and International Partner requirements and the addition of our FMS customers. As the program has evolved, its leaders have sought to optimize resources and maximize operational efficiency at reasonable cost. Nevertheless, there have been times when the magnitude and structure of the F-35 JPO's workforce has come under scrutiny. The JPO has a unique and proven governance structure as outlined in our Production, Sustainment, and Follow-on Development Memorandum of Understanding (MOU) between the Department of Defense and our Partner Nations, which differentiates the F-35 JPO from any other DoD acquisition programs.

To ensure the F-35 JPO is appropriately sized and equipped to meet existing and evolving U.S. Service and Partner capability requirements and in partnership with the Departments of the Navy and the Air Force – I am analyzing the program's work demands and workforce sizing. This analysis will capture data from other legacy DoD acquisition programs to inform the scaling and optimization efforts needed to deliver weapon system capabilities to U.S. and International stakeholders. Results are expected to identify an appropriately sized workforce to meet these demands relative to other DoD fixed-wing fighter acquisition programs, while considering the F-35 program's unique internal and external governance structure and requirements. Using the results of this analysis, I will continue to ensure the F-35 JPO is appropriately equipped to fulfill its obligations to the F-35 Partnership – with a focus on our *DIG In!* mentality.

AVAILABILITY

War on Readiness

The F-35 Enterprise is driving towards continued improvements to our sustainment system, with the objective to improve availability rates. As the FY22 Annual DOT&E Report indicates – the F-35 combat coded fleet achieved its 65% target for monthly average availability for the combined twelve months ending in September 2022. Still, readiness challenges remain, as indicated in multiple GAO findings. As of February 2023, the monthly average readiness rates for the U.S. F-35 Fleet were 53.1% Mission Capable and 29.3% Full Mission Capable. This is unacceptable, and maximizing readiness is my top priority as the F-35 PEO. I have set a target over the next twelve months to increase availability by at least 10%.

While our near-term objective is the resolution of key degraders, we will not lose sight of our long-term goal: an environment of comprehensive *Readiness* excellence. To achieve this, I have initiated a *War on Readiness*, gathering JPO personnel, U.S. and international users, industry, and international stakeholders on a bi-weekly basis with a focus on addressing near-term top degraders, while looking over the horizon to identify, mitigate, and eliminate future impacts to F-35 readiness. The War on Readiness is actively addressing sustainment issues including key processes, practices, expertise, information, data, and systems that enable the planning, management, and delivery of material to meet operational requirements. At a strategic level, we are also developing an ecosystem that supports the program's long-term sustainment goals. This includes initiatives to keep parts on-wing longer, maintain an appropriate spares posture, and enhance repair capability and velocity. We are also focused on ensuring we have the ability to provide surge support for contingency operations.

Thanks to congressional assistance, I'm pleased to say we have continued positive progress on F135 Power Modules (PMs) over the past year. This year, we implemented expanded limits for the High Pressure Turbine (HPT) section, along with new processes for borescope and triage of internal engine damage. This resulted in a removal rate reduction of fifty-seven percent from May to December 2022, for a total annual removal of eighty-four modules versus the one hundred twenty-seven forecasted. Our 2023 forecast removal rates are now reduced by thirty-three PMs.

Additionally, Tinker's Heavy Maintenance Center (HMC) produced seventy-three PMs in 2022, surpassing plans for sixty as presented in last year's testimony. The HMC remains on track to produce 120 PMs required to meet anticipated demand. HMC lessons learned are being communicated to Fleet Readiness Center Southeast (NAS Jacksonville, Florida) to ensure smooth depot production standup at that facility.

HMC's success has also helped grow our global propulsion maintenance nodes to meet current and future demands. Increasing HMC's production from the planned sixty to seventy-three PMs gave the global depot network bandwidth to manage OCONUS capacity growth to a realistic rate. OCONUS locations are now postured to complete eleven PMs each this year and are postured to meet future year demands.

While PM production has enhanced readiness throughout our fleet, we've also implemented engineering solutions to keep engines on-wing longer. During this process, our team has expanded wear limits on HPT blades, optimized eyes-on material disposition actions, and improved inspection criteria. Due to these initiatives, forecast removal demand has been remodeled to capture reduced removal rates and the associated cost savings are being incorporated into the program's Annual Cost Estimate.

The three-pronged PM recovery plan was implemented, and the PM availability degrader issue was resolved three years ahead of schedule. At the beginning of 2022, we had forty-eight holes in aircraft due to PMs; by the end of the year that number was down to three. As of February 2023, only one aircraft was awaiting a PM.

Finally, as a result of F-35 readiness efforts over the past five months, we've accelerated two of our top degrader return-to-green plans by three months and incorporated reliability improvements, which will have positive impacts on reducing failure rates and improving availability.

Reliability & Maintainability

Over the past twelve months, Reliability and Maintainability (R&M) performance improvement has occurred in fourteen of the twenty-four metrics specified in the Operational Requirements Document. The R&M team is working to continually identify and address root causes driving deficient reliability, and developing procedural and design improvements through the Reliability and Maintainability Improvement Program (RMIP).

RMIP is also working to identify and deliver component and process improvements to the production baseline and the fielded fleet. Since April 2022, RMIP completed eleven projects representing more than \$72M in total lifecycle cost avoidance and improved inherent availability of the fleet by 0.98%. While this may not sound like much, this effectively represents almost six additional aircraft ready for tasking at any point in time. RMIP awarded a contract for \$70M of new scope in July 2022. Projects authorized under this effort will enable more than \$2.9B in total lifecycle cost avoidance and increase fleet availability by an additional 0.94%.

Performance Based Logistics Contracting

Since 2016, the F-35 program has been transitioning from traditional, transactional-type cost-plus contracts to contracts that include limited Performance-Based Logistics (PBL) elements intended to drive desirable contractor behavior through performance-based incentives. PBL contracts offer a wide range of benefits, especially when combined with the upper price constraints of a Firm Fixed Price (FFP) contract. Under a properly structured PBL, Government and industry interests become aligned in improving performance throughout the supply chain.

In 2020, OSD chartered an independent team of Service and industry leads to assess the feasibility of an F-35 Air Vehicle enterprise-level PBL. The results of that evaluation were documented in a Memorandum of Understanding in March 2020, establishing the foundation of the Air Vehicle PBL strategy signed by the USAF Service Acquisition Executive (SAE), DoN SAE, F-35 PEO, and F-35 President for Lockheed Martin.

The JPO plans to award a 5-year PBL contract that is compliant with both the MOU and the NDAA Section 356 provision. This PBL contract will increase fleet readiness by focusing on improving supply chain performance. The scope of the PBL includes repair and replenishment of approximately 60,000 parts. The long-term nature of the contract has enabled unprecedented data access and cost transparency between the Government and industry. This collaborative approach is expected to yield better forecasts and lead to improved supply chain health and sustained cost reductions.

Technical Data Rights

As the program matures, we continue to look for ways to reduce sustainment operating costs. Securing technical data to enable organic maintenance and repair of aircraft, assemblies, and

components remains critical to this effort. For example, we have government software depot personnel at industry locations actively engaging in software sustainment activities. We are developing strategies to address the activation of software depots to enable organic software sustainment capability and we anticipate activation of software depots in FY24. Terms negotiated as part of the Lot 15-17 Air Vehicle Production contract with Lockheed Martin will enable the Government to place orders for data that were developed on older contracts. Specifically, Lockheed Martin is obligated to deliver noncommercial technical data and computer software developed under prior contracts without schedule restrictions that would otherwise apply. Under this term, the Government is no longer restricted by such time frames which increases Government ability to order data to support depot functions. The F-35 program is currently evaluating data necessary to support organic maintenance and repair including software sustainment, and we will be utilizing the extended ordering authority to secure such data. We have seen successes in deferred ordered delivery of Component Maintenance Manuals (CMM) to expand the Government's ability to perform repairs. Finally, we are committed to improving the data contracting processes to support enterprise objectives. As such, we have established a Data Requirement Review Board (DRRB) to review contracted data requirements within the program. The board evaluates and authenticates requirements and reduces redundancy of data deliverables by reviewing contract data packages. While we've made significant progress on technical data rights, there is more work to be done. We're appreciative of the House Armed Services Committee's continued focus on this topic, and will do our part as we work alongside industry teammates, ensuring fair and reasonable contracts lead directly to enhanced warfighter readiness.

Depot Stand-Up Activities and Capacity

Depot stand-up efforts remain critical to the long-term affordability and availability of the F-35 Air System. Through the execution of our Global Support Solution (GSS), the F-35 Enterprise has established Air Vehicle, Propulsion, and Component repair facilities in the U.S., Europe, and Asia-Pacific regions. Appreciating the criticality of organic depot repair capacity to fleet readiness, \$761M has been allocated towards depot capacity establishment in Lots 15-17. This commitment to readiness will enable the F-35 JPO to accelerate reduction of the current repair work in progress (WIP) backlog, and for the first time in the program's history, deliver organic depot repair capacity in parallel with the deployment of essential TR-3 and Block 4 capabilities to the fleet.

In December 2022, Ogden Air Logistics Complex (OO-ALC) declared repair capability for the Canopy Actuator. This marks the forty-fourth workload established across six organic U.S. depots. For those activated workloads, U.S. depots are executing fifty-five percent of component repairs. In 2023, we will activate eleven additional workloads while adding additional repair capability to five already active workloads. We anticipate final activations (for a total sixty-eight core activations) will complete in 2028. While this progress greatly enhances capacity, we're building velocity through these depots as well, with thirteen activated workloads currently beating our targeted thirty-day repair time. These successes are critical to minimizing our repair WIP and enabling procurement of additional spares inventory. In 2022, our organic depots completed 3,109 component repairs. In calendar year 2023 to date, we have already delivered 587 repaired components to the operational fleet. This expanding organic industrial base is a key lever to achieving affordability and readiness targets for the program.

Partnerships with our global allies continue to add strength and resilience to the F-35 global repair network. For example, in September 2022 the European Regional Repair Center for wheels and brakes in the Netherlands was certified. In 2023, we will activate three additional OCONUS component workloads: PTMS in the Netherlands, and wheels & brakes and life support in Australia. This additional capacity and shared knowledge will help the enterprise aggressively drive down repair WIP and support a resilient global supply chain.

On the Air Vehicle front, F-35 modification operations at OO-ALC and Fleet Readiness Center East (FRC-East) continue to bring fleet aircraft up to the latest configurations, delivering decisive capability and improved reliability. Ogden is on track to activate twelve additional docks by 2024, adding to their twenty active docks, while FRC-East is planning to add seven docks to their nine active docks in 2025. This accelerated build-up, together with deployed field teams, will enable the CONUS F-35 modification network to meet customer needs for Block 4 capability and Life Limiting Structural upgrades. In Europe, the Regional Air Vehicle Maintenance, Repair, Overhaul and Upgrade (MRO&U) facility located in Cameri, Italy declared full operational capability in June 2022 and has since completed modifications on aircraft from both Norway and the Netherlands. U.S. Air Force F-35s based at Lakenheath Air Force Base, United Kingdom will begin utilizing the Cameri modification docks in 2026, alleviating the need to send these aircraft back to the CONUS to complete TR-3 upgrades.

As you were briefed last April, our enterprise is incorporating year-over-year improvements to meet necessary F-35 Full Mission Capable (FMC) rates by executing the foundations of our Life Cycle Sustainment Plan and GSS. Power Modules (PM) have historically been a significant source of FMC degradation. We testified previously regarding the following three-pronged PM recovery plan. (1) The program focused on increasing production at the Air

Force Sustainment Center's Heavy Maintenance Center (HMC) at Tinker Air Force Base in Oklahoma. (2) We stood up additional capacity within the propulsion global repair network. (3) We've kept engines on-wing longer by maturing inspection procedures and damage tolerance limits. I'm proud that these initiatives were not just short-term fixes. Instead, the changes our program has implemented are translating to lasting readiness results.

Organic Warehousing and Transportation

The F-35 JPO continues to drive towards increased U.S. Service participation across our sustainment operations – not just in depot operations. For example, in January 2021, we established a Service Level Agreement (SLA) with the Defense Logistics Agency (DLA) for North American warehousing, and with the U.S. Transportation Command (USTRANSCOM) for Global Transportation and Distribution. DLA and USTRANSCOM are now responsible for booking and shipping functions in support of Government-owned F-35 global spares material to and from global locations as directed by the JPO. To date we have transitioned over five thousand part-numbers and two million parts out of Lockheed Martin warehouses and into DLA warehouses and have conducted over forty thousand CONUS parts shipments under the arrangement. We have also established an agreement with DLA for Demilitarization and Disposal Services, each of which are enablers of the F-35 global sustainment strategy and facilitate movement of materiel around the world during peacetime and, if needed, in a contested logistics environment. Utilization of Government-operated core logistics capabilities are essential to national defense, providing timely responses for mobilizations and contingency operations. This transition is critical to maintaining readiness in a fiscally responsible manner.

Electronic Equipment Logbook – Spare Parts Availability

Just a few years ago, the availability of spare parts and the associated data logbook was one of our top program issues, and a major focus area for the Congressional Defense Committees. Maintainers could not install spare parts if they were missing the corresponding Electronic Equipment Logbook (EEL), or digital record, which impacted mission capability rates. I am pleased to report that the F-35 JPO, in collaboration with our industry partners, have continued to maintain a high percentage of spare parts arriving “ready-for-issue” (RFI) by implementing numerous improvements in ALIS software updates and improving integration with industry business systems. As a result of these collaborative efforts, the EEL RFI performance metric for spare parts, which was at its lowest in February 2020 at forty-three percent, has consistently stayed in the high eighty percent range and achieved a rate of ninety percent in February 2023. These improvements increase availability of spare parts required to ensure F-35 mission capability.

AFFORDABILITY

War on Cost

As my predecessors have previously testified, cost is a significant threat to the F-35 program. My team remains laser-focused on enterprise affordability, and I remain personally committed to cost reduction across the acquisition lifecycle. Earlier this year, I established an F-35 *War on Cost* to shine the spotlight on F-35 Affordability in new and innovative ways. This War on Cost addresses three core elements: (1) Cost as a design and program requirement: affordability considered throughout the lifecycle to ensure cost conscious decision-making including trade-offs; (2) Cost estimating: clear decision-making processes to control costs that go into the program; and (3) Cost reduction: specific actions to reduce the cost of the F-35 and achieve affordability targets.

I understand the subcommittee remains particularly interested in F-35 procurement costs and the initiatives to drive down sustainment cost. I look forward to sharing our progress and plans with you today, along with some key focus areas below.

Block 4 Development Costs

Over the last year, we have continued to make progress building an improved F-35 development environment to reduce the cost of Block 4 and future capability development. Under our Systems Engineering Transformation initiative, we are digitizing our engineering process to include Model Based Systems Engineering, improving our Modeling and Simulation capabilities, and continuing to refine our agile DevSecOps approach to software development. We have finished implementation of sixteen Lockheed-Martin/JPO Software Independent Review team recommendations to transform the software development environment at Lockheed Martin. Leveraging modern agile software build processes, we have now automated over fifty percent of our core software regression testing, representing over twenty-six thousand test points, and are driving software bug findings earlier in integration and test timelines where they are less expensive to fix. We have moved onto Phase II of our software improvement initiatives and will continue to make investments along with Lockheed Martin to improve our software tools and processes to reduce capability costs. We will also continue to advance our simulation tools and have a non-airworthy F-35 aircraft dedicated to testing in an electronic environmental chamber at NAS Pax River in Maryland, where we can simulate and test our Block 4 sensor and electromagnetic warfare updates at a more rapid pace and in situations that cannot be replicated at air ranges. These initiatives are aimed at improving our development process so we can most efficiently field Block

4 and future capabilities at an affordable cost. In development, time is money, and we are focused on making improvements to drive down development timelines.

Procurement Costs

As we negotiated the Lot 15-17 production contracts, our team was able to secure significant wins for the program. Even with the headwinds of supply chain disruptions, inflation, labor disruptions, lower production quantities and the removal of Turkey from the program, we negotiated and awarded a \$30B Lot 15-17 Air Vehicle and a \$5.3B Propulsion Production contract that will deliver 398 affordable aircraft and 20 spare engines. While this represents an average annual URF increase of approximately 1.2% from Lot 12-14 to Lot 15-17, it should be noted that Lot 15-17 aircraft also provide increased capability when compared to previous lots. Additionally, we secured the deferred ordering clause for tech data rights (previously discussed) at no additional cost. Finally, we are grateful for the Congress's support to restore aircraft quantities in FY23, enabling the program to secure this negotiated price.

Sustainment/Lifecycle Costs

In sustainment, my F-35 Product Support Manager (PSM) is leading multiple pathfinder initiatives intended to leverage U.S Services' capabilities to deliver improved outcomes and drive down costs. By integrating with U.S Services and leveraging their resources and skills, we are unlocking the door to supply chain delayering and cost-saving opportunities. Currently, we are working ten viable candidates for "transition to the Services" opportunities. For example, we have already begun transitioning Test Program Set (TPS) development from Lockheed Martin to the Services including software, hardware, and documentation required to deliver and sustain an

organic production-level TPS. Our sustainment strategy, inclusive of these types of initiatives, remains focused on reducing cost, improving readiness, and increasing U.S. Service participation.

Through November 2022, the JPO has captured \$21.0B (CY12\$) of sustainment cost reductions over the program lifecycle. These reductions reflect a collection of initiatives fielded through the JPO's Affordability Directorate and consist of various reliability and maintainability projects, propulsion component improvement projects, capability updates, and administrator headcount reductions. Historically, the F-35 JPO has driven down the CY12\$ cost per flight hour (USAF A-Variant: O&S less indirects & mods, plus production support) from \$87.3k in 2014 to \$36.1k in 2022 and cost per tail per year (CPTPY) from \$8.7M to \$6.4M over the same time-period. As the fleet continues to grow, sustainment cost reduction is more important than ever before. This is a primary focus for me – and the entire F-35 Enterprise.

Contracting Strategies

Since my early days as F-35 PEO, I've been working with my team to improve our contracting performance. It's no secret there is a tremendous amount of contracting work accomplished across the F-35 Enterprise, but it is critical that we execute contracts efficiently, rapidly, and judiciously. After carefully evaluating F-35 contract operations, I have tasked our team to reduce the overall quantity of contracting actions and streamline our procurements. Over this past year, we have held a series of acquisition summits with Lockheed Martin and Pratt & Whitney. The goal of these summits is to evaluate our acquisition strategies to increase acquisition effectiveness, ultimately leading to more effective ways to procure the services and capabilities needed by our warfighters. As a result of these summits, we are adopting more flexible strategies while grouping similar contracts together, and making it simpler to contract for the same items

year over year. Meanwhile, we are redoubling efforts to drive flexibility and speed in negotiations, reduce proposal updates, and limit repricing.

In addition to these efforts, we are consolidating negotiations for site activations and hardware to reduce workload with a goal of awarding contracts months earlier than previously projected. We have been able to break down some long-standing barriers and are working to require Lockheed Martin to code directly onto the Government-owned cloud, paving the way for future organic software development efforts. Additionally, our Maintenance Systems Team has identified paths to accelerate current ALIS, ODIN, and Mission Planning Environment (MPE) delivery timelines to support 2023 and 2024 site activation requirements. Our team is focused on rolling out a new strategy for the Block 4 Contract, awarded earlier this month, which will cover Block 4 capability development as well as future Lot insertion activities. This effort has accelerated baseline award by one year over our previous plans – and consolidates many Block 4 efforts into a single contract action. Through these and other sensible strategies, we will reduce bid and proposal work required by our industry partners, allowing them to focus on delivering capability and readiness at an affordable price.

Conclusion

Throughout its history, the F-35 program has fostered extraordinary joint aviation collaboration, delivered unmatched 5th Generation capability, and overcome unprecedented challenges. As we approach delivery of the 1,000th F-35 aircraft, it's clear that we're also approaching a programmatic inflection point. Years of dedication and commitment of the men and women across this multinational enterprise have laid a sturdy foundation on which decades of F-35 users and maintainers will undoubtedly rely. As we enter the next chapter of the F-35 story,

production stabilizes, our fleet grows and matures, the next generation of hardware and software capability is delivered, and robust organic sustainment capacity is aggressively pursued and achieved, it is clear we have our work cut out for us. However, the team we've assembled is up to the task. There will surely be new challenges in the year to come, and how we anticipate and react to them will determine our success. In continued coordination with the GAO, DoD, international stakeholders, and our U.S. Congress, we will implement programmatic and process improvements to achieve lasting results. Our nation, our International Partners, and their taxpayers, depend on it. While this is my first opportunity to brief you as the F-35 PEO, I fully own the challenges set forth above, and my team and I will deliver on our commitments. Our warfighters, and the men and women they defend, deserve nothing less. Thank you once again for the opportunity to share the story of the F-35 with you today – I look forward to keeping you and your staff apprised of our progress.