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THE HOUSE ARMED SERVICES COMMITTEE

STATEMENT OF

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F-35 LIGHTNING II PROGRAM

BEFORE THE

TACTICAL AIR LAND FORCES AND READINESS SUBCOMMITTEES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

F-35 PROGRAM ACCOMPLISHMENTS, ISSUES, AND RISKS

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Introduction

Chairmen Garamendi and Norcross, Ranking Members Lamborn and Hartzler, and distinguished Members of the Subcommittees, thank you for this opportunity to discuss the status and future of the F-35 Lightning II Program.

The F-35 Lightning II is the Department of Defense`s largest acquisition program and is of vital importance to our Nation's security. The F-35 we have today has shown exceptional performance in operations around the globe. Tomorrow's engagements; however, featuring Chinese and Russian warfighting environments, must be supported by novel operational concepts and rapid weapons development and capability delivery timelines. Consequently, we need a capable, available, and affordable F-35 to outpace these key competitors and win the high-end fight. As we move forward with these three mandates as our guiding lights, the F-35 will increasingly serve as the backbone of U.S. and International Partner air combat superiority for decades to come. The F-35 is replacing, and will continue to replace, the legacy tactical fighter fleets of the Air Force, Navy, and Marine Corps with a dominant, multirole, fifth generation aircraft, projecting U.S. power and deterring potential adversaries.

The F-35 program embodies the U.S. National Defense Strategy as it strengthens alliances and attracts new partners. Seven international partners are invested with the United States in the development, production and sustainment of F-35 via senior diplomatic agreement: the United Kingdom, Italy, the Netherlands, Canada, Australia, Denmark and Norway. F-35 partners contribute to program costs and are vital to the F-35 industrial base and global sustainment strategy. In 2021, F-35 partners will support NATO Arctic air policing missions, and will participate in joint and combined exercises around the world with the U.S. Air Force, U.S.

Navy and U.S. Marine Corps. The F-35 also has a long and growing list of Foreign Military Sales customers, including: Israel, Japan, South Korea, Belgium, Poland, and Singapore.

The F-35 program executes across the entire spectrum of acquisition, to include development and design, flight test, production, fielding and base stand-up, sustainment of fielded aircraft, and building a global sustainment enterprise. It is indeed a large, complex, rapidly growing and accelerating program that is moving in the right direction. My overall assessment is that the program is making solid and steady progress on all aspects and we are improving each day. With that said, the program also has known risks and challenges, but I am confident the F-35 enterprise will be able to overcome these issues and deliver on our commitments. Today I will give you a detailed update on current progress, providing a balanced look at where the program stands, pointing out both the accomplishments and the challenges.

Capability

The F-35 is delivering high-end, game-changing capabilities today. Lauded by pilots and operational commanders alike, the F-35 currently performs operations from land and from the sea. More than 625 aircraft have been delivered to date; 11 services in nine countries have declared initial operational capability; and six services from five countries have conducted F-35 operational missions. The F-35 is being fielded into a dynamic, ever-advancing threat environment. In order to continue to provide the capability our warfighters need, the F-35 program continues to focus on software development and Air System modernization and sustainment.

We understand today's threats, deliberately engage with our warfighting customers to understand future threats, and actively assess the additional capabilities required to meet them as part of a rigorous and continuous process. From a modernization perspective, Block 4 is the key set of capabilities that are required to ensure the F-35 stays dominant in the late 2020s and

beyond. We are diligently working and incrementally delivering it today. Simply put, Block 4 capabilities, enabled by the Technical Refresh-3 (TR-3) hardware suite, ensure F-35 relevance in the high-end fight. Full Block 4 capability will increase our ability to prosecute targets in contested environments, increase survivability, advance interoperability, and improve sustainment. The development foundation established as part of our Block 4 efforts will provide the bedrock for the continuous delivery of these future capabilities.

Due to the complexity of the TR-3 development, we have recently experienced cost and schedule challenges on this part of the program, and are implementing aggressive cost control and prioritization efforts to keep the most critical elements of the broader Block 4 program moving forward. These delays are due to the late completion of the final TR-3 developmental hardware configuration, which is delaying TR-3 software and system integration testing. The F-35 Joint Program Office (JPO), Lockheed Martin, and critical suppliers are aligned on our commitment to cost control and are focused on two critical priorities: the delivery of all Lot 15 aircraft in the TR-3 configuration, and the delivery of key elements of the Lot 17 hardware configuration to meet Block 4 capability requirements. Working together, the F-35 JPO and Lockheed Martin have put mitigation measures in place to ensure that delays in reaching some TR-3 milestones will not impact aircraft delivery. Thanks to these efforts – and even with these challenges – TR-3 will still deliver in Lot 15 in 2023 as required. The F-35 JPO is also implementing recent Software Independent Review Team (IRT) recommendations to improve our ability to deliver software-centric capabilities in support of TR-3 and Block 4. These IRT action plans support progress towards improved performance with the goal to break the fly-fix-fly culture and drive deficiency discovery and resolution earlier in the development cycle.

The drive to maintain U.S. advantage is propelling the Department forward, creating a suite of networked capabilities, anchored around F-35 integration. This integration provides

theater Commanders with improved interoperability amongst platforms in all domains, a more robust intelligence picture, and a wider range of options in support of targeting. We are seeing these benefits from F-35s deployed today and the impact of this aircraft will increase exponentially as additional capabilities are released to the fleet.

Affordability

We absolutely understand that all F-35 customers have limits on the resources available to the program. If we, the F-35 Enterprise, do not meet affordability requirements, our customers will be forced to choose between buying less, flying less, or pursuing alternative solutions to meet their fighter force needs.

The F-35 JPO, U.S. Services, and Partners are working together to identify ways to drive down costs. In the last year, we introduced a variety of affordability initiatives, designed to drive cost out of the program and ensure our warfighters have the capability they need. The JPO has established strategic Affordability Targets throughout the program aimed at reducing the total cost of ownership of the F-35. In development, the program's focus is on cost control of TR-3 and other Block 4 capabilities, as well as reducing the cost of the test enterprise and other fixed development costs. In production, the program continues to hone internal affordability objectives for unit costs of the engine and air vehicle for Lots 15-23, and in sustainment, the U.S. Services have provided affordability constraints for Cost per Flight Hour and Cost per Tail per Year to address life cycle cost drivers. From Fiscal Year (FY) 2014 to today, we have reduced the aircraft procurement cost by 26 percent – going from almost $108 million to $80 million for upcoming U.S. Air Force F-35A deliveries.

Despite that strong effort on production costs, we vividly understand that the largest share of program cost is in sustainment; in fact, sustainment costs are projected to constitute 80 percent of the program's lifecycle cost. The F-35 JPO recognizes the imperative to drive down the

sustainment cost of the platform for all of our stakeholders, and we are doing just that. In 2019 using then year dollars, the F-35 fleet average cost per flight hour was $42,400 and the cost per tail per year was $7.9 million. In constant year 2012 dollars, the most recent F-35 JPO actual cost per flight hour data is $38,300 and cost per tail per year is $7.5 million averaged across all F-35 variants. Furthermore, and also in constant year 2012 dollars, the U.S. Air Force's F-35A 2020 actuals show the cost per flight hour was $33,300 and cost per tail per year was $7.0 million. Though we have experienced challenges in reducing sustainment costs for the F-35, we project a decrease to sustainment costs over the life of the program as fleet size grows and the Department of Defense maximizes economies of scale. The remaining 2020 actuals are still in work.

But scale alone will be insufficient. Accordingly, we are aggressively pursuing Reliability and Maintainability initiatives and examining both organic and contract logistics support options to reduce sustainment costs over the life cycle. F-35 lifecycle costs include, but are not limited to: personnel, maintenance, fuel, ordinance, training and simulation systems, reprogramming laboratories, physical infrastructure, and a global supply network that will keep a fleet of more than 3,000 domestic and international aircraft fully-operating, and contributing to the fight for decades to come. We must leave no stone unturned in each and every one of these areas in order to drive improved life cycle affordability into the program.

Availability

Last year, the overall Mission Capability rate for the F-35 Fleet continued its steady rise, increasing to an annual average of 68 percent through November, an improvement of 5.4 percent from calendar year 2019, while flying nearly 94,000 hours, which was over 18,000 more hours than in the year prior.

In October 2020, USAF F-35As completed 18 months of continuous Middle East combat, flying roughly 4,000 combat sorties and 20,000 combat hours, and employing just shy of 400 weapons while maintaining a 74 percent Fully Mission Capable rate.

At this stage in F-35 fleet maturity, our production line is stable, and aircraft rolling off the line are performing well. Many of our earlier lot aircraft require modifications, and we are working through retrofits with fleet customers to optimize the timing of these modifications to minimize operational impacts. Government and industry teams are working to accelerate an affordable long-term solution while maximizing near-term F-35 availability for training and operations. These changes are driving a steady increase in aircraft full-mission capable rates, and we anticipate fleet availability will continue to climb as F-35 maintenance systems and best practices mature.

The F-35 JPO is using four primary availability levers to achieve current and future readiness. First, we need to keep parts on the aircraft longer. Improving reliability and maintainability is therefore our first lever, and this critical work is progressing through our Reliability and Maintainability Improvement Program (RMIP) Projects. RMIP has validated 2.6 percent improvement to Mission Capable rates and we expect to achieve an additional 4.7 percent over the next three years. Second, we need to have parts "on the shelf" and available when required; we refer to this lever as improving our supply posture. We utilize strategic contracting and service level agreements to incentivize on time delivery of spares and to achieve target stock levels. The F-35 JPO appreciates the Congressional support we have received over the last few years in this area. We received a congressional plus up in funding in FY 2018 to procure four additional U.S. Marine Corps STOVL engines and those engines will continue to deliver through November 2021. Additionally, in FY 2019 and FY 2020 the JPO received congressional plus ups to increase the Global Spares Pool. Third, we must establish repair

capacity so that when those parts fail, they can be returned to service. We are actively accelerating depot standup to expand capacity, and are also incentivizing contractors to invest in and scale repair capacity. The final lever is repair velocity. While we accelerate depot standup we are also increasing process control and learning. We are incentivizing contractors to improve depot repair cycle time performance through service level and performance-based logistics agreements.

Corrective Actions in Place

Like many of its predecessor aircraft, the F-35 has experienced developmental challenges along the way; we are prepared to discuss the status of corrective measures so you have a clear picture of how we will meet our commitments to Congress, the men and women who operate this aircraft, and to the taxpayers who entrust us with their security.

As we recently informed the committees, the F135 Power Module repair in our depot enterprise has not been keeping pace with engine removals, resulting in degraded fleet availability. These production shortfalls have been driven by delays in delivering required support equipment and technical data, along with increased work scope of Power Module repairs. These factors impacted the ability of our sole heavy maintenance Power Module repair depot at the Oklahoma City Air Logistics Complex to scale production in order to meet demand and develop the proficiency of the depot workforce to support the required repair throughput. We, along with our industry partner Pratt and Whitney, have taken action to accelerate delivery and refinement of Technical Data and critical Support Equipment. We have worked with the depot to provide additional training to increase proficiency and improved process efficiency in support of standing up a second shift later this year in to reduce repair turnaround time. Further, we are leveraging internal funding in addition to the congressional increase to accelerate expanding our enterprise depot capacity through the addition of additional support equipment at

the Oklahoma City Air Logistics Complex to provide increased throughput. To further increase Power Module repair capacity we are working to accelerate the stand up of engine repair at the Fleet Repair Center South East in Jacksonville, FL. We are also leveraging excess commercial capacity, and are accelerating the standup of organic back shop repair to support a reduction in repair time at all of our CONUS and OCONUS depots. We are also focused on initiatives to reduce forecasted depot demand by leveraging the Component Improvement Program to improve reliability and availability of engine components. The actions we have taken to date have begun to show benefit, as power module production at the Oklahoma City Air Logistics Complex has increased significantly in the last year and the projected readiness impacts, while still above our requirement, have started to stabilize. As a result of the extensive nature of our F135 initial 2,000 hour overhaul inductions beginning in 2022, we anticipate cost growth in the propulsion enterprise through the Fiscal Year Defense Plan. We are continuing to work with Pratt and Whitney on steps to address the projected cost growth to ensure that the F135 Propulsion System remains affordable component of the F-35 Air System.

As you are also well aware, and as we discussed extensively in my last testimony, the F-35 Enterprise has historically struggled with the Autonomic Logistics Information System (ALIS) system. ALIS is a complex system with numerous documented shortfalls and technical challenges. You will recall last year that we announced the start of a new system, known as the Operational Data Integrated Network (ODIN), to replace ALIS. ODIN will incrementally provide a modern, user-friendly integrated information system for the F-35. It will be comprised of multiple elements to include modern hardware, architectures, software development methods, data environments, and platforms.

In 2020, we achieved several accomplishments to improve the warfighter experience while also beginning the migration to ODIN. With direct input from the users, we delivered

multiple ALIS software updates and capabilities that enhanced the user experience, increased system performance, and reduced cyber vulnerabilities. Further, we established multiple initiatives that are laying the foundation to drive down the number of ALIS administrators to sustain the system and reduce sustainment costs. In September 2020, we tested a modern ODIN hardware kit at U.S. Marine Corps Air Station (MCAS) Yuma, AZ running current ALIS software. The new kit is 75 percent smaller, weighs 90 percent less than the current hardware, and is projected to be 30 percent cheaper. In addition to the smaller footprint, we are seeing significant performance improvements in ALIS such as data processing and synchronization times 2-3 times faster than ever seen before as well as faster screen refresh and response times. According to the users, the new hardware is a "Grand Slam!" We have already procured multiple ODIN hardware kits that will begin to roll out to units later this summer.

Although these efforts have demonstrated positive outcomes with legacy ALIS software, the outdated ALIS system architecture, which is over 15 years old, prevents us from taking full advantage of modern technologies, modern software development practices, and improved cybersecurity. ODIN began its initial journey working with the U.S. Services and Partners to establish the Capability Needs Statement and User Agreement in late 2020. These two documents established the foundational requirements for the ALIS to ODIN migration and described how the users will stay engaged during development activities. The JPO and Lockheed Martin established a contract that captured data rights, frequent software deliveries, and proper data marking for modern software development. ODIN software was developed using modern tools, techniques, and standards. Additionally, Lockheed Martin developed software in a Government-provided environment and demonstrated data integration in a Government-managed data environment.

Despite all the positive activities, we underestimated the complexity of deprecating ALIS capabilities while migrating to ODIN and learned several important lessons. Our approach must maintain our existing, legacy business system (while operations continue to grow and scale) while simultaneously transitioning to a modern system – in other words, as we transition from ALIS to ODIN, it will be an evolution, not a switch. There is work underway to develop the overarching enterprise architecture to guide transition activities and maximize the use of commercial off the shelf and government off the shelf capabilities.

As our team laid the foundation for the ODIN strategy and worked to understand the implications of what we learned technically over the course of 2020, the appropriated ODIN Research, Development, Test, and Evaluation funding in FY 2021 was reduced to 42 percent less than requested and required. This reduction will serve as an opportunity to take a "strategic pause", while we use our 2020 accomplishments and lessons learned to inform and update the strategy for the ALIS to ODIN evolution. We will continue to field and leverage the modern ODIN hardware. For example, the processing power of the new hardware will allow us to host multiple squadrons on a single kit which will yield a drastic reduction in hardware procurement costs and administrators. We have initiated the development of an enterprise architecture leveraging commercial and government best practices to document the stakeholders, business processes, data, and technology to build the transformational roadmap to migrate from ALIS to ODIN. We are strengthening our partnership with industry Lockheed Martin since they have deep knowledge of the existing system, and also collaborating with the Navy and Air Force to leverage their ongoing development activities to maximize our alignment with their roadmaps. The JPO is currently updating its ODIN development plan based on the updated strategy, available resources, as well as inputs received from our users. We look forward to continuing to update you on ALIS and ODIN progress and milestones in the coming months.

The Joint Simulation Environment (JSE) is a government-owned, state-of-the-art simulation facility designed to support operational testing of the F-35, and in the future, other U.S. weapons systems. The JSE allows operational testers to assess the F-35's mission effectiveness in battlespace scenarios that cannot be conducted on open-air test ranges, including stressing, high-density threat environments. The F-35 Initial Operational Test and Evaluation requires 64 mission trials to be conducted in the JSE and evaluated before the Director of Operational Test and Evaluation's Beyond Low-Rate Initial Production (BLRIP) report is written. The BLRIP report must be submitted to Congress before the Full Rate Production milestone can proceed. Development at the JSE has been delayed over the last year due to the combined effects of technical challenges and COVID-19. The challenges of the JSE include not only its unparalleled complexity and required fidelity, but also the technical challenges associated with the integration of high fidelity models from multiple external organizations to create a comprehensive, realistic threat environment. This development work is conducted in a classified, enclosed, close-quarters environment. Telework is not possible, and team size has been limited in the classified work spaces. The F-35 JPO and our Service teammates continue to forge forward to mitigate these challenges to ensure F-35 achieves its Full Rate Production milestone.

Progress Continues

The F-35 was designed to evolve at the speed of advancing threats. The capabilities we are delivering today are distinct from those conceptualized at the start of this program over 20 years ago. The F-35 is leveraging new concepts in the technology environment, to include digital twinning, agile software development, cloud-based collaboration, and a process we refer to as continuous capability development and delivery, or "C2D2." Through close work with the operational requirements and test communities, the C2D2 process will continue to mature and

deliver increments of capability over time to ensure our warfighting customers stay ahead of the threat well into the future.

We are at a strategic inflection point, moving from initial development and fielding to modernization, high-rate production, and global fleet sustainment as we partner with Lockheed Martin and Pratt and Whitney to deliver cost effective, war-winning capabilities. We are changing our contractual relationships with these industry partners, as well. Our production contracts today, including Lots 12 through 14, feature supplier incentives and performance incentives that drive cost reduction at the supplier level and improve production line velocity. Our sustainment contracts incentivize mission capability rates and supplier metrics that ensure our warfighters have the system they need when they need it.

We continue to look for ways to improve these business relationships, including potential multiple-year and multi-year contracts for production and performance-based logistics, or PBL, contracts for supply chain. In fact, we are working today with Lockheed Martin to define the parameters of a supply support and demand reduction PBL that meet our warfighters' operational demands, our taxpayers' best-value demands, and our enterprise's demands for greater organic sustainment to maximize use of organic industrial base planned capacity.

Conclusion

The F-35 is the premier multi-mission strike fighter of choice for three U.S. services, seven International Partners, and six Foreign Military Sales customers. The F-35 routinely demonstrates its unmatched capabilities at the hands of our joint and international warfighters, performing combat operations from land and from the sea. As the world's most widely proliferated strike fighter platform, the F-35 combines stealth, sensor fusion, and interoperability with joint and allied forces to dominate today's – and tomorrow's – advanced threats. The F-35 program team continues to execute Block 4 capability development and delivery, is aggressively

approaching full-rate production goals for new aircraft deliveries at reduced cost, and is sustaining the ever-growing global fleet.

As we work to retire remaining engineering and software issues, the whole of the F-35 enterprise is laser-focused on reduction of lifecycle costs. Cost is the common enemy on this program. Every F-35 stakeholder is aggressively engaged in identifying affordability initiatives. Our team is committed to continue working closely with Congress, our warfighting customers, and industry partners, and we take pride in developing, producing, and sustaining the world's most lethal aircraft. We will continue to demand the highest quality from our industry partners and to aggressively drive cost out of the production line. We will follow through on our commitments to improve Full Mission Capable Rates, particularly among our forward deployed squadrons, and drive down operating costs for the global fleet. We serve with the single-minded determination that the U.S. and its allies will have the capabilities they need to win the fight, that our warfighters will return home safely from every engagement, and that our taxpayers get the absolute best capability for their defense dollar.