STATEMENT OF
MATTHEW F. BROMBERG
PRESIDENT, PRATT & WHITNEY MILITARY ENGINES
BEFORE THE HOUSE ARMED SERVICES COMMITTEE
JOINT READINESS & TACTICAL AIR AND LAND FORCES
SUBCOMMITTE HEARING ON F-35 PROGRAM UPDATE: SUSTAINMENT,
PRODUCTION, AND AFFORDABILITY CHALLENGES
NOVEMBER 13, 2019

NOT FOR PUBLICATION UNTIL RELEASED BY
THE U.S. HOUSE OF REPRESENTATIVES

Chairman Garamendi, Chairman Norcross, Ranking Member Lamborn, Ranking Member Hartzler, and distinguished members of the House Armed Services Committee, thank you for the opportunity to appear before you today to share Pratt & Whitney's role in producing and sustaining the F135, the propulsion system for the F-35 Joint Strike Fighter (JSF). Let me say thank you for the consistent Congressional support for the program, which has enabled us to produce the world's most advanced, combat-proven 5th generation propulsion system. I also want to acknowledge Under Secretary Lord and Lieutenant General Fick for their support of the program. And, I wish to publicly recognize the Lockheed Martin team for their partnership with Pratt & Whitney.

A Legacy of Dependable Engines

For nearly a century, Pratt & Whitney has partnered with the Department of Defense, the warfighter, and our industry partners to provide game-changing propulsion for cutting-edge military aircraft. From the 369,000 Wasp engines produced in World War II, to the approximately 200 F135 engines we'll deliver in 2020, every one of our engines bears a Pratt & Whitney seal that proclaims two words: Dependable Engines. Today, 42,000 Pratt & Whitney associates treasure and live to uphold that legacy. Of our core values, safety, integrity, and innovation are evident in every engine we produce. Our commitments and culture remain informed and reinforced by our close personal ties with our warfighting customers -- nearly 25 percent of our employees are veterans or actively serving in the Reserve and National Guard. We recruit veterans because they share the values of Pratt & Whitney, they understand the warfighter, and because it's the right thing to do. Our focus today and tomorrow remains

squarely on supporting the warfighter, meeting critical mission requirements, and doing so in a manner that safeguards the best interests of the warfighter and the American taxpayer.

The F135 Today

The F135 propulsion system is the world's most advanced fighter engine, delivering more than 40,000 pounds of thrust and unmatched advances in safety, design, performance, and reliability. With 10 years of development and initial operating experience, the pilot and maintainer feedback is positive. We evolved the F135 from the proven F119 engine, which powers the F-22 Raptor. Together, the F135 and F119 represent the only combat-proven 5th generation engines in the world. Since powering the F-35's first flight in December of 2006, the F135 has maintained the highest levels of safety and readiness enabling the JSF program to meet flight test objectives and the declaration of Initial Operational Capability.

Today, we are proud that the F135 continues to set standards in terms of performance, reliability, maintainability, and cost. The F135 has demonstrated unmatched engineering achievements and performance capability. Moreover, the requirement to leverage a common engine and apply it to three variants has resulted in significant economies of scale in development, production, and sustainment. While we are proud of the F135 accomplishments to date, we are committed to continuous improvement in performance, production, sustainment, and life-cycle cost effectiveness.

Production and affordability are top program priorities. To date, we have produced over 500 F135 engines. In 2019, as we transition from low-rate initial production (LRIP) into full-rate lot production, we have a good opportunity to reflect on the progress to date, challenges faced, and opportunities to further improve. While the engine has been in production for 10 years, the

major production ramp has occurred only in the past 24 months. In 2019, we are on track to produce our contracted engines, which will represent a significant volume increase over the 2018 output. While we spent years preparing for the rate increase, the ramp was challenged by internal and external supply chain capacity constraints in light of significant aerospace market growth. In response, Pratt & Whitney and suppliers invested over $500 million in capital and process improvements to enable the increase in output and to create surge capacity in critical areas. In 2020, we aim to achieve a production rate of approximately 200 engines per year, which will remain steady for the program of record.

From a cost perspective, Pratt & Whitney has reduced the average cost of an F135 by 50 percent. While we are pleased with our progress to date, we recognize the imperative to drive further cost reduction. Through a 10-year combined Pratt & Whitney and U.S. Government funding program entitled Pratt's War on Cost, Pratt & Whitney delivered propulsion system contract costs consistent with targets while providing an estimated $7 billion in cumulative program savings. These efforts contributed directly to the F-35 unit fly-away cost of $80 million. To achieve these reductions, Pratt & Whitney executed over 2,000 cost-reduction initiatives focused on value-engineering, supplier long-term agreements (LTA) that leverage our commercial and military volume, and finding best-value suppliers in our domestic and international partner base. In addition, starting with LRIP 4, and continuing with our current contract, Pratt & Whitney operates under a fixed price incentive fee contract structure. This aligns incentives between Pratt & Whitney and the F-35 Joint Program Office (JPO). Lastly, to protect schedule and price, Pratt & Whitney has been ordering parts from the supply chain in advance of program funding -- this allows us to protect capacity and pricing in a constrained supply environment.

Looking forward, we recognize that our cost reduction strategy needs to continue to adapt to several challenges. Because a significant portion of the F135 is sourced from domestic and international suppliers, the bulk of our opportunity resides in the supply base. The global aerospace supply base is experiencing the most significant demand increase in a generation. In addition, many of the F135 parts are specialized value streams leveraging exotic materials and manufacturing techniques unique to the high-performance F135 engine. Given that environment, we have launched a multifaceted strategy. First, we will continue the value-engineering tasks and supply chain leverage that have been successful to date. Second, we will continue to develop domestic and international alternatives to existing suppliers. This is a multi-year effort, but will serve the industry well in terms of capacity and competition. Third, there are unique parts in the F135 that will benefit from advances in digital engineering, automation, additive manufacturing and process certification. Many of these initiatives will require flexibility in contracting as the pay-back for cost reduction may not be achieved in short-term contract cycles. As we have done in the past, Pratt & Whitney will work with the Joint Program Office to identify new strategies to further reduce cost. It is important, however, that this be a shared responsibility. U.S. Government support is needed as we work together to continue down the path of cost reduction and savings. To that end, it is important for Congress to provide budget stability and certainty by passing both the defense authorization and appropriations bills. This is required so that we can plan and execute long-term cost reduction programs, and Pratt & Whitney can continue to secure capacity and favorable pricing in the supply base.

With a worldwide fleet of approximately 500 F135 engines that is expanding rapidly, Pratt & Whitney is laser-focused on executing world-class sustainment to maintain mission capability and to achieve cost performance targets. The first and most important element of

effective sustainment is engine reliability. In this regard, the F135's initial performance is setting a high benchmark in terms of mission capability and reliability. In surpassing over 200,000 flight hours across the global fleet of all three U.S. Services, three partner countries, and two allied FMS customers, Pratt & Whitney and the F135 have maintained mission capability rates consistently exceeding 94 percent. For reliability, the F135 is 10 times more reliable in service than the F100 was when it achieved the same 200,000 engine flight hour milestone. In addition, the dependable F135 has demonstrated an over 250 percent improvement in Unscheduled Engine Removals rate (UER) over 4th generation engines. However, our legacy engine experience has taught us that even the most sophisticated engines must continue to adapt. As a matter of standard practice, Pratt & Whitney continuously monitors the fleet and performance, and its world-class team of engineers develops improvement projects to ensure we maintain the highest levels of reliability. These projects need funding with a long-term vision. We support, and have requested full funding of the Component Improvement Program (CIP) as a key enabler of continued safe and dependable operation. These investment dollars are critical to resolving reliability issues early and cost effectively.

The second key driver in cost effective sustainment is program-managed operational and depot maintenance. The F135 engine is designed with supportability features to ease operational maintenance while achieving unprecedented engine reliability and sustainability. These features include the most advanced engine health monitoring systems, advanced prognostics capabilities, specially designed inspection and maintenance features, and a well-stocked sustainment pool of parts. The F135 program is equally focused on effective depot maintenance through work scope management, part consumption and maintenance cost. Pratt & Whitney, through its Public-Private Partnership with Tinker Air Force Base, has a strong track record in working depot

efficiencies. We need to jointly fund the continued development of an F135 engineering team at Tinker Air Force Base to work engine and repair line process enhancements. This model has been very successful in the past, and will serve as a key enabler for the F135. As material costs are a major driver of sustainment costs, our engine cost reduction program mentioned above will pay huge dividends in the lifecycle cost as parts are replaced during normal scheduled maintenance. Lastly, and unique to the F135, is the positive impact the global Performance Based Logistics (PBL) will have in terms of economies of scale in tooling, parts, modules and maintenance burden.

Sustainment execution will also benefit from digital technologies. Pratt & Whitney's Digital Depot and Fleet Command initiatives will bring advanced capabilities to the maintainer. For example, the Digital Depot will provide more accurate part inspections and digital records. Both will improve depot throughput, while enabling more rapid, accurate and cost-effective depot management. The Fleet Command program will centralize all key data points on the program to allow fleet managers visibility into depot modules and part status which will optimize fleet logistics.

The F-35 Joint Program Office has established cost per flight hour and cost per tail per year sustainment targets. As the fleet grows, we are committed to affordable sustainment for the F135, and are targeting a 50 percent reduction in cost per flight hour to meet a goal of $3,500 per flight hour. To this end, Pratt & Whitney is engaged in, and fully supports, the Joint Program Office led "180 Day Sprint" initiative. We are working closely with our program and industry partners to address a range of challenges, accelerate critical tasks, and drive early cost reduction actions.

As Pratt & Whitney strives to keep F135 sustainment affordable, it is critical that our contracting strategy is aligned with the mission. Our current sustainment contract, PBL 1, will expire in December 2020. As we look to its successor, we need to collaborate on organic and directed sourcing ideas. As mentioned above, Pratt & Whitney has a strong history of public-private partnerships and with working across all government agencies. To maximize the benefits of these partnerships, Pratt & Whitney would like to collaborate in sourcing decisions impacting the F135 to ensure they within the best interest of program objectives. Directed sources, if not executed flawlessly, can have unintended consequences in terms of readiness, cost and efficiency. Finally, sustainment execution and cost reduction is not a short-cycle business. We need to work collaboratively with the Joint Program Office to find creative, longer-term maintenance contracts to allow us to jointly plan for and execute sustainment readiness and cost reduction.

We know sustainment -- it is a core competency. We support more than 100,000 engines around the world between our commercial and military franchises. Based on Pratt & Whitney's broad experience and long history with service contracts across our military and commercial product lines, we believe that key sustainment elements such as supply chain management, forecasting and maintenance planning, and sustaining engineering should fall under the engine integrator. We look forward to collaborating with the Joint Program Office and our warfighting customers to optimize our sustainment relationship and develop a flexible contracting approach to meet readiness and affordability objectives.

F135 Modernization

With development of the baseline JSF program complete, the program is now focused on modernization. These initial efforts are collectively known as Block 4. It is important to assure

that the growth in aircraft capability is met with matched propulsion modernization. Fortunately for our customers, the F135 is amply designed to serve as the foundation for any growth in aircraft capability. Pratt & Whitney is working closely with the Joint Program Office and Lockheed Martin to develop a propulsion roadmap to support defined and undefined Block 4 capability requirements. Our Enhanced Engine Program approach enables us to insert next-generation propulsion technologies into current platforms as they become available. This will provide our customers with a full range of performance improvement options to keep them ahead of evolving threats. Our aim is to get mature technologies into the hands of the warfighter quickly -- from development to fielding -- through rapid, iterative upgrades. We have a good track record of such upgrades, and support funding for F135 enhancements.

Conclusion

In conclusion, the current and future success of the F135 engine program depends on collaboration and partnership between Pratt & Whitney and the U.S. Government. The F135 is important both to our national security and to our economic strength. As noted, the F-35 and F135 supports, aligns, and plays an integral role in the Defense Department's National Defense Strategy, with its 5th generation capabilities providing the warfighter with a vital advantage over our adversaries. In addition, the F135 is supporting more than 33,000 jobs, across 31 states. We remain laser-focused on meeting our production commitments, achieving sustainment affordability, and investing in propulsion growth initiatives, while providing the best value to the taxpayer and the most effective and reliable systems to the warfighter.

Thank you again for the opportunity to appear before your subcommittees.