

NOT FOR PUBLICATION UNTIL RELEASED
BY THE HOUSE ARMED SERVICES
SUBCOMMITTEES ON
READINESS AND TACTICAL AIR & LAND FORCES

STATEMENT OF
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BEFORE THE
READINESS AND TACTICAL AIR & LAND FORCES SUBCOMMITTEES
HOUSE ARMED SERVICES COMMITTEE
ON
F-35 PROGRAM UPDATE: SUSTAINMENT, PRODUCTION AND
AFFORDABILITY CHALLENGES

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I. INTRODUCTION

Delivering on the F-35 Value Proposition

On behalf of Lockheed Martin and the 220,000 men and women of the F-35 Industrial Team, thank you for the opportunity to speak with you today for the steadfast support of the F-35 program. To support today's hearing this testimony includes an update on the F-35 program, as well as additional information on our progress in production, sustainment, and modernization of the F-35.

When the Joint Strike Fighter program was initially envisioned in the 1990s, the value proposition centered on four main tenets: 1) design a multi-role fighter capable of replacing several legacy aircraft across the U.S. Services and our allies; 2) leverage collective investment from the U.S. and original partner nations to develop the most advanced technology; 3) deliver affordability through economies of scale; and 4) provide unmatched interoperability for increasing coalition operations.

Today, I am proud to report that the F-35 is delivering on all four tenets of this value proposition.

The F-35's stealth technology, supersonic speed, advanced sensors, weapons capacity and increased range make it the most lethal, survivable and connected aircraft operating in the world today. More than 455 F-35s are operating globally, serving as a powerful force multiplier – enhancing all airborne-, sea-, and ground-based assets in the battlespace. Wherever it operates, the F-35 has proved that it is a powerful force supporting the mission and protecting the lives of the U.S. Armed Forces as well as those of our allies.

All three U.S. Services – the Air Force, Navy and Marine Corps – and five international customers have declared initial operating capability (IOC) for their F-35 programs. This is a public declaration that their aircraft are mission ready and combat capable. In addition, the Israeli Air Force, the U.S. Marine Corps, the U.S. Air Force and the United Kingdom's Royal Air Force – have flown their F-35s in combat. The feedback from all of them is that the aircraft is a game-changing asset that performs exceptionally well.

The F-35 program will garner more successes in the years ahead, as it continues to expand. With the recent arrival of Royal Netherlands Air Force jets to Leeuwarden Air Base, F-35s now operate from 20 bases, and three ships, with nine countries in the program operating aircraft on their home soil. The global F-35 fleet recently surpassed 230,000 flight hours. And, in the U.S., the first F-35s were recently delivered to Burlington Air National Guard Base, ushering in a new era of capability and readiness for the Air National Guard.

The F-35 program has become a global example of cooperation and coordination. Although program management is highly complex, the Joint Program Office (JPO), U.S. Services, the international services, and industry have worked together to deliver a 5th Generation aircraft that far exceeds the capabilities of legacy platforms. Following completion of the safest and most comprehensive flight test program in aviation history, this partnership is now focused on maximizing the F-35 partners' continued investment to bring new capabilities that will increase the aircraft's impact and lethality.

And we're aligning these improvements across each aspect of the fully integrated Air System, which includes the air vehicle, full mission simulators, the Autonomic Logistics Information

System (ALIS), training systems, operational flight program (OFP), mission data files and other deliverables.

Today we're developing, leveraging and integrating new technology to ensure the F-35 stays ahead of ever-evolving threats, while widening the gap over 4th Generation aircraft. F-35 modernization comprises both software upgrades as well as hardware technology refreshes, which are funded and prioritized by the F-35 JPO, in agreement with the F-35's Joint Executive Steering Board which includes representatives from all partner nations.

As we continue to increase the F-35's capabilities, we're also reducing costs. On October 29, 2019, we announced the contract agreement for Lots 12 to 14, which supports 478 aircraft for the U.S, international partners and foreign military sales customers. In the agreement, the enterprise has met and accelerated its long-standing F-35 procurement cost-reduction goals, with the F-35A price dropping below \$80 million in both Lots 13 and 14, representing a more than 70 percent reduction since the first production contract. The sub \$80 million unit recurring flyaway cost, to include airframe and propulsion system, for an F-35 represents a significant milestone where we are now delivering 5th Generation capability below 4th Generation cost. With embedded integrated sensors and targeting pods, this F-35 unit price includes items that add additional procurement and sustainment costs to legacy 4th Generation aircraft.

The agreement also significantly reduces the costs of the F-35B and F-35C models, providing an average savings of 12.7 percent across all three variants from Lot 11 to Lot 14. Although the U.S. Services procurement profile has declined from original projections, we were able to deliver these costs savings through smart acquisition strategies, improving efficiencies and increasing automation.

As the F-35's affordability increases, we see rising global demand from both our existing customers as well as new potential foreign military sales opportunities and the program of record for the F-35 has grown from roughly 3,000 aircraft to nearly 3,500. Three of our international customers – Japan, The Netherlands and the Republic of Korea – have all announced their intent to expand their programs of record. We see strong interest from Poland on an accelerated purchase of 32 F-35A aircraft, with the potential for 32 additional aircraft, and the F-35 continues to be in active competitions in Canada, Finland and Switzerland.

The F-35 is quickly becoming a key discriminator in coalition operations, with users benefitting from common training, equipment and tactics, and participation in joint combat training exercises. Earlier this year the Norwegian Air Force and its F-35s participated alongside the U.S. Air Force in the biennial Arctic Challenge exercise; Exercise Tri-Lightning demonstrated the interoperability between the U.S., U.K. and Israel using the F-35A, F-35B, and F-35I respectively in a defensive counterair exercise over the Eastern Mediterranean; and recently the Italian Air Force conducted a NATO air-policing mission in Iceland with their F-35 fleet, demonstrating an average mission capable rate of greater than 90 percent.

The unmatched interoperability of the F-35, positions the aircraft at the heart of multi-domain operations for U.S. and allied nations. The F-35's ability to collect, analyze and share data, is a powerful Intelligence, Surveillance, and Reconnaissance (ISR) asset and force multiplier that enhances all airborne, surface and ground-based assets in the battlespace and will ensure coalition operations operate at an advantage for decades to come.

Alignment to the National Defense Strategy

At Lockheed Martin we believe the F-35 is the National Defense Strategy in action, aligning to the pillars of building a more lethal force, strengthening alliances and attracting new partners, as well as delivering greater affordability. The NDS makes clear that the modern battlespace requires stealth, advanced sensing capability, coalition interoperability, cyber security and an ability to connect in a multi-domain fight. The F-35 delivers on all of these capabilities above and beyond any other aircraft in the U.S. inventory or anywhere else around the globe.

For instance, the F-35 provides the mission flexibility to operate in stealth mode with more than 5,000 pounds of internal weapons. And this capability will soon be expanded. It also has the ability to load more than 18,000 pounds of weapons externally and internally, increasing its lethality. The F-35 could be configured to carry hypersonic weapons on its external F-35 heavy stores stations. The F-35 can conduct ISR, electronic attack, and targeted strike missions as means to maintain cross-domain superiority across the spectrum of military operations and enhance lethality for the U.S. Services and our allies.

The F-35's training and operational success, growing program of record, and sustained global interest means it is strengthening U.S. alliances across the globe. As we look at current geopolitical challenges, the F-35 will play a key role in maintaining stability in the Indo-Pacific region, deterring aggression against the Trans-Atlantic NATO Alliance, and degrading the threat of terrorism in the Middle East and Africa.

The Department of Defense's adoption of innovative programs like Blueprint for Affordability and the recent Block Buy acquisition strategy provide for greater affordability on the F-35 program. We will continue to partner with the F-35 JPO to identify ways we can bring more commercial business models into the program to reduce costs, acquisition risks and technological obsolescence issues on the F-35 program.

Continued Focus on Affordability and Readiness

Across the F-35 enterprise we're focused on delivering affordability throughout the production, sustainment and modernization lines of effort. We believe that with applied engineering discipline, focused investments, and updated contracting structures, we will deliver similar cost reductions and efficiencies in sustainment and modernization to what we have achieved on the production side of the program.

As operational deployments continue to increase, we're keenly focused on the need to reduce sustainment costs and improve mission readiness. Recently, we have seen evidence of sustainment cost reductions and expect that trend to continue as operational lessons learned are implemented, data-informed predictive health monitoring improves, spare parts availability increases, and a more robust repair capacity is realized.

Although the F-35 has not been without its share of development and technical challenges, the program progress outlined above demonstrates it is currently on a positive glide path and is solidifying its role as the backbone of the U.S. and our allies' future fleets. Further, the delivery of each successive production lot has brought improved reliability, and performance is up across the F-35 fleet.

In addition, the F-35 is showing tremendous flexibility, as it is deployed on operational missions and conducting advanced training exercises. In fact, users are deploying the aircraft in ways that were not initially envisioned, demonstrating that the full potential of the 5th Generation weapon system remains unknown. The integration of such a technologically advanced asset is defining a new concept of operations for our customer and expanding the mission profile set of the F-35.

We recognize that the continued support of Congress, and the House Armed Services Committee, is fundamental to the success of this program. On behalf of the F-35 Industrial team I offer our thanks for your efforts to ensure the program remains funded and your commitment to ensuring the men and women of the U.S. military have the most advanced equipment available. Your support of the F-35 program and recognition of its importance in national security is a driving force for our success.

II. Production Update

The F-35 Lightning II was designed to be an affordable 5th Generation fighter, taking advantage of economies of scale and commonalities between the three variants. Currently production spans three Final Assembly and Check Out Facilities – Fort Worth, Texas; Cameri, Italy; and Nagoya, Japan. F-35 production builds more aircraft per year than any other fighter line in the world and our goal for 2019 is to deliver 131 aircraft, up 40 percent from last year's 91 aircraft deliveries.

We anticipate that the F-35 production will continue to increase in volume year over year to hit peak production of approximately 165 aircraft in 2023 to support the current program plan. With additional supply chain capacity, we could deliver up to 189 aircraft per year, accommodating increased ramp rates for the U.S. Services, which we believe is essential to achieve the full program of record and deliver the capability needed for the U.S. to maintain its competitive advantage on the global stage while also replacing aging fighter fleets at home and abroad.

As we ramp up production, we remain focused on lowering cost, reducing build times, and improving on-time delivery and quality by incorporating lessons learned, process efficiencies, supply chain initiatives, facility and tooling upgrades and more. We continue to invest in and align our manpower, machines, materials and methods to ensure we meet the growing demand while achieving our cost, quality and schedule goals.

We have made significant progress reducing touch labor, or hands-on production, reducing the hours by 75 percent since the first Low Rate Initial Production (LRIP) contract saving thousands of hours in the build time for each F-35, and our final assembly span times have been reduced over 35 percent since 2016. Beginning in Lot 11, there are Performance Incentive Fees in place to track and measure our span times in specific areas of F-35 production, most notably Final Assembly.

We're working to improve performance across the board, including: reduce the top causes of scrap, rework, and repair (SRR) - or work that needs to be redone during production; ensure 100 percent parts availability to the production line; and identify the activities that take the most hours to complete and improve work processes accordingly. We have seen an SRR reduction by nearly 80 percent since LRIP 1 to LRIP 11 deliveries and expect to drive that to a more than 90 percent reduction from LRIP 1 to Lot 14 aircraft deliveries.

While we have successfully met our annual delivery targets two years in a row, each aircraft has a contractual delivery date, and we are working to improve performance so that we consistently meet our contractual delivery dates. In 2018, we delivered about 60 percent on or ahead of schedule, and we're averaging 85 percent on time delivery for aircraft this year.

Aligning the F-35 Supply Chain

The F-35 is built by thousands of men and women in the U.S. and around the world. The F-35 program supports a broad industrial base of more than 1,400 suppliers in 45 states and Puerto Rico, contributing to more than 220,000 direct and indirect U.S. jobs and more than \$44.2 billion in total annual economic impact. The program also includes more than 100 international suppliers, creating or sustaining thousands of international jobs.

The program's global supply chain accounts for approximately 70 percent of the total costs of an F-35, and we're working to ensure that all suppliers understand their role in driving affordability throughout the program and producing quality, on-time materials at the rate required for full rate production (FRP) and the increasing operational tempo. We are looking at every link in the global supply chain to find opportunities to increase capacity, reduce production and O&S costs, improve parts reliability, and enhance capabilities.

The F-35 supply chain is based on best value for the program and Lockheed Martin is recompeting several major components of the aircraft to ensure we have the latest technology, at the best price and increased reliability for our customers. An example of this is the selection of Raytheon to provide the Next Generation Distributed Aperture System (DAS), which will be integrated into the aircraft in Lot 15 (delivery year 2023). Next Gen DAS is expected to generate more than \$3 billion in life cycle cost savings, approximately 45 percent reduction in unit recurring cost, and greater than 50 percent reduction in operations and sustainment costs, while providing five times more reliability and two times performance capability improvement.

In addition to recompeting components, we are transitioning several F-35 suppliers to longer term Performance Based Logistics (PBL) contracts to enhance parts availability and reduce sustainment costs. Previously under annual contracts, the new 5-year PBLs allow each supplier to make longer term investments and actions to reduce costs and improve efficiencies.

We have also worked with our suppliers to enhance performance and reduce costs. With Blueprint for Affordability (BFA) initiatives, supplier mentor-protégé programs, proactively sharing best practices across the supply chain and more, our supply chain is performing and prepared to ramp to FRP.

Lockheed Martin also pre-funded approximately \$1 billion upfront to acquire select materials in bulk in support of Lots 12-14. This upfront commitment provided stability to the industrial base and enabled our suppliers to buy parts on time and reduce costs through economies of scale.

III. Sustainment Update

With production costs decreasing and quality improving, the F-35 enterprise has set some clear goals for reducing sustainment costs and increasing mission readiness. We're committed to delivering DOD's goals of \$25K cost per flight hour by 2025 and 80 percent mission capable rates. To achieve those goals, we're supporting the 5th Generation F-35 with 5th Generation Sustainment, characterized by holistic fleet-level management, predictive health analytics, condition-based maintenance and a focus on the flight line.

Readiness rates continue to rise across the fleet, and today we see on average a mission capable rate of more than 70 percent on combat-coded aircraft. Earlier this year, the U.S. Air Force announced that its airmen and fleet of F-35As participating at Red Flag at Nellis Air Force Base delivered 90 percent mission capable rates during the exercise. The U.S. Marine Corps achieved greater than 75 percent readiness rates with their F-35Bs during the first combat deployment – and the newest F-35Bs in Lot 10 and 11 are averaging greater than 80 percent mission capable rates. The Navy’s F-35Cs are averaging 60 percent mission capable rates across the fleet.

A testament to the F-35’s increased availability is this summer’s multiple deployment activities by the 388th Fighter Wing from Hill Air Force Base. The Wing conducted operations from nine different countries on three separate continents involving nearly 70 F-35A aircraft, including a European Theater Support Package.

The increased cadence of F-35 operational and training missions is providing robust data and analysis shows the aircraft is exceeding reliability expectations, improving with each successive production lot. The data is also allowing us to improve our supply posture, align part stocking levels, improve depot capacity, reduce repair cycle times and speed up the logistics system to accelerate spares delivery for surge scenarios.

For example, recent U.S. Air Force deployments have shown that the original engineering predictions for deployable spares packages overpredicted the supply demand. We will partner with our customers to analyze the operational data and will decrease the requirements which will in turn reduce cost. Continually analyzing the data will ensure the Global Sustainment Solution has sufficient capacity and has the right parts in the right place at the right time to support combat surge rates.

To prepare for the quickly expanding global F-35 fleet, we’re working to increase the funding of the Reliability and Maintainability Improvement Program to extend parts’ time on wing and further reduce the demand on spare parts while simultaneously accelerating government depot standup and advancing PBL and Master Repair Agreements to increase repair capacity.

We have established solid partnerships with the military service depots and are working with depot leaders and the JPO to accelerate component repair activations. Some of the recent activations have been achieved more than one year ahead of schedule, and the remaining 42 workloads, or support for major components, are on track to be completed within the next four years. Once completed there will be 68 workloads activated at the Air Force and Navy depots, greatly improving the overall repair capacity.

Additionally, contracting timelines for spares have been significantly improved, so that the majority of the parts are available for fleet maintainers upon the aircraft delivery.

We’re also seeing significant improvement on the service-driven aspects of sustainment costs, including an increasing velocity in maintenance throughput. As Airmen, Sailors and Marines become more experienced with servicing the F-35, their familiarity and proficiency will increase. This will enable reductions in manning for both contractor and military and an associated reduction in ownership costs.

ALIS Modernization

At Lockheed Martin, we want F-35 maintainers to feel the same pride and excitement as F-35 pilots, and we recognize that improving ALIS is foundational to changing their experience. In partnership with the JPO, our goal is to drastically improve speed, minimize hardware infrastructure, reduce required labor and enhance user experience and overall capability.

We continue to make incremental improvements with each ALIS software update. We recently fielded ALIS version 3.1.1. , which improves workflows and saves thousands of man-hours annually across the fleet. In flight test, users saved an average of about 35 minutes per flight in generation and pilot review; about 40 minutes per day in maintenance report generation and several hours per week in managing fleet directive reports. Extrapolated across the enterprise of more than 455 airplanes flying today, this saves more than 20,000 man-hours annually.

We are now fielding ALIS version 3.5 before year-end which will bring further improvements to the system, including improved Air Vehicle transfers, usage and aircraft component stabilization, Low Observable Health Assessment System (LOHAS) enhancements, Electronic Equipment Logbook (EEL) visibility with dashboard, and improved inventory accuracy.

The incremental enhancements to ALIS are directly improving performance on the production flight line. In August 2019, a newly delivered F-35A aircraft landed Code One and flew its first operational mission within five hours of landing at Hill AFB from Lockheed Martin's Fort Worth factory.

This latest release leverages Lockheed Martin's internal investment in 2018 of \$50 million, which will rise to approximately \$180 million through 2021 to modernize ALIS and enhance enterprise sustainment systems.

We are also partnering with the JPO and 309th Software Squadron from Hill AFB to make longer-term investments that take advantage of agile concepts and commercially available tools, and also account for unique warfighter operational needs like deploying to austere sites, supporting operations with no network connections, and upholding stringent security and cyber requirements. Lockheed Martin's goal is to deliver a modernized ALIS by 2020 that is driven by 4 key enhancements:

- **Agnostic cloud-native architecture:** As the ALIS integrator, Lockheed Martin is moving ALIS applications to a cloud-native, open architecture, we can rapidly develop and test pieces of ALIS for each upgrade. And instead of aggregating many fixes over a 12 to 18-month period into a single "big bang" upgrade, the new approach allows developers to create, test, receive feedback and implement incremental fixes every few weeks while reducing development and fielding costs. The important part of this modernized architecture is the cloud-enabled technology – which enables secure development operations (DevSecOps) and lower administration cost while allowing incorporation of 3rd party commercial off-the-shelf software modules, additional applications developed by others into ALIS.
- **Automated test and deployment:** The DevSecOps approach increases the ability to conduct automated test and deployment of software updates utilizing commercial best practices to improve velocity of updates and improvements to the field. A testament to

the DevSecOps approach was our recent ability to issue eight software upgrades in just one week.

Improved user interface and user experience: Lockheed Martin partnered with Silicon Valley company UE Group to redesign the ALIS weapons loading user interface, driving complexity, time and cost out of maintenance workflows in ALIS. The JPO team validated a 60 percent improvement in the workflow for weapons loading using the newly designed user interface. We have not stopped there however, as we continue to modernize and re-engineer older code and data structures into improved performing applications fielded in a rapid manner – in fact striving for the “pace of war.” Lockheed Martin has done this although each of our U.S. Services, international partners and foreign military sales countries have different operating concepts, missions, and sovereign needs.

- **Strengthened cyber security and data resiliency:** With the transition to a cloud-native architecture we continue to improve the cyber security of ALIS and we’ve implemented several actions including automation and enhanced supplier accountability processes that are delivering improved data resiliency. In addition, offline key data is vetted and validated automatically versus manually, improving speed and ensuring accurate integrated data. With these new actions and related efforts, we’ve seen a 50 percent reduction in Electronic Equipment Logbooks and other action requests since 2017, which indicates software and data quality are steadily improving.

F-35 Performance Based Logistics (PBL) Concept

To achieve the goals outlined in the DOD’s Life Cycle Sustainment Plan (LCSP), Lockheed Martin is proposing to transition F-35 sustainment to a five-year fixed price PBL contract structure supported by \$1.5 billion company advanced funding, in addition to ongoing affordability projects being pre-funded by Lockheed Martin.

A five-year PBL, coupled with the advanced funding, will provide the stability and funds needed to accelerate costs savings and improve readiness rates for the F-35, while allowing the program to operate within its existing budget top line. The approach is estimated to net our customers’ \$1 billion in savings over the five-year period from 2021-2025, with \$600 million going to the USG and \$400 million to the F-35 partner nations. It will also enable the fleet to achieve its key 2025 readiness and cost targets.

We have identified more than 200 Product and Performance Initiatives (PPI) that will be enabled by the PBL. These projects will allow us to drive savings by reducing materials costs, manpower and Mean Time to Repair (MTTR); increasing automation; improving tools and processes, inventory control, supply capacity and reliability; and enhancing repair capacity.

The vast majority of F-35 sustainment work today is implemented through single year, transactional contracts negotiated annually and requiring more than 100 Contract Line Item Numbers (CLINs) that are not outcome based. The new contracting structure would be based on a five-year Indefinite Delivery Indefinite Quantity (IDIQ) contract framework that is Firm Fixed Price, thus shifting risk to industry.

The current state provides no long-term stability, adds administrative costs and minimizes the potential for significant industry investments, improvements and outcome-focused efforts. It also

reduces transparency and visibility for each customer to see how their funding is directly impacting readiness.

Transitioning from the current annual, transactional contracting approach for F-35 Sustainment to a five-year PBL contract can reduce the annual negotiation burden, improve government-industry partnerships, stabilize the supply chain and enable industry investments to achieve target outcomes.

A joint industry and government Quick Look Team is assessing the value of the PBL to the F-35 enterprise and is exploring ways to best implement a PBL strategy that will optimize performance, improve readiness and maximize cost savings.

IV. Modernization Update

The F-35 is designed to incorporate both software and hardware upgrades throughout its 50+ year life cycle and efforts to modernize the aircraft are already underway. We'll deliver F-35 modernization through the Department's Continuous Capability, Development and Delivery (C2D2) framework for timely, affordable, incremental warfighting capability improvements. This approach will deliver more agile, continuous modernization on shorter timelines while aligning and synchronizing capability delivery across the entire F-35 Air System.

In order to maximize the investment in the F-35 fleet, it's imperative that Congress continues to fund the F-35 modernization plan to leverage the full potential of the weapon system. Additionally, it's important to note that many of the partner countries have made investments in modernization activities as part of their national defense policies and have established the industrial base to support these activities.

From Electronic Warfare, increased computing power, sensor capability, weapons capacity and more, we are actively enhancing all aspects of the F-35 to ensure it exceeds warfighter demands and outpaces evolving threats. Some key upgrades planned include:

- **Automatic Ground Collision Avoidance System (AutoGCAS):** AutoGCAS uses terrain mapping, geolocation and automation to detect and avoid potential ground collisions. When the program recognizes imminent impact, it will prompt the pilot to take action. If the pilot is unresponsive, AutoGCAS assumes temporary control to divert the aircraft out of harm's way, and then returns control of the aircraft to the pilot once on a safe trajectory. Leveraging a rapid, agile development, test and contracting approach, the joint government and industry team successfully fielded the life-saving technology seven years earlier than previously planned.
- **Technology Refresh 3 Upgrades:** Technology Refresh 3 takes advantage of fast evolving computing power and adds an Open Systems Architecture that will enable the flexibility for Lockheed Martin and our customers to add, upgrade and update future capabilities rapidly. In addition to the Next Generation Distributed Aperture System discussed previously, the F-35's Integrated Core Processor, Panoramic Cockpit Display and the Aircraft Memory System will all be upgraded beginning in Lot 15.
- **Multi-Domain Operations (MDO):** To increase the F-35's role in MDO, we're upgrading sensor fusion capability in Lot 13 and beyond, integrating enhanced voice and data interoperability in Lot 14 and continuing to conduct exercises to demonstrate MDO

teaming. To date, the F-35 has successfully integrated with the Aegis Missile Defense system, a High Mobility Artillery Rocket System, or HIMARS, the Integrated Air and Missile Defense Battle Command System (IBCS), and most recently in partnership with the Missile Defense Agency and U.S. Air Force, we successfully connected an F-35, U-2, and a multi-domain ground station. The advantages of the F-35 integrated and fused sensor suite now can be made available to other airborne, air, and even subsurface warfighters. We are active now in sharing the key benefits of our 5th Generation air system with other multi-domain parts of operations.

- **Unmanned Teaming:** The F-35 is ideally suited for manned / unmanned teaming operations, and we are working closely with our customers to realize a future where the F-35 can command and control unmanned aerial vehicles as wingmen as well as attritable assets in a joint fighting force. Through these and related efforts, this F-35 5th Generation weapon system serves as a force multiplier for our country and allies.
- **Missile Defense:** The F-35 offers inherent capabilities that can significantly enhance U.S. missile defense. The F-35's stealth and advanced sensor suite can help detect potential missile threats and provide 'Left of Launch' identification and engagement through entering contested airspace undetected. The F-35 can also serve as a sensor node to detect and track missile threats at a much closer distance – and connect sensor information to queue existing missile defense systems to engage an incoming threat. According to the Missile Defense Review, the Department of Defense is also building a technology roadmap to equip the F-35 with a new or modified interceptor capable of shooting down adversary ballistic missiles in their boost phase for direct engagement.
- **Extended Range:** While the F-35 as configured today, exceeds the specified range performance, we're engaged in an industry-funded study with Elbit Systems-Cyclone focused on a 600-gallon external tank and an associated jettison-able pylon for the F-35A to significantly increase range and loiter time.
- **Increased Lethality:** In addition to increasing the F-35A and F-35C's internal weapons capacity from four to six internal weapons, we're also working to integrate a series of new weapons to increase lethality. Additionally, the F-35 has the structural capacity on our inner wing stations to carry hypersonic weapons externally allowing the F-35 to execute deep strike missions while providing unmatched ISR capabilities. We also see a growth path in the future to add payload weight capacity and increase the total number of missiles the F-35 can carry.

As we integrate upgraded capabilities, our goal is to maintain or reduce both the unit cost to procure and the sustainment costs for F-35s across the enterprise.

V. Summary/Conclusion

At Lockheed Martin we understand the role the F-35 is playing in meeting the national security objectives of the U.S and our allies, enhancing interoperability and promoting regional stability. We are confident the F-35's transformational capability and growing role in multi-domain operations ensure it is an investment that strengthens our customers' entire Armed Forces. And we are committed to continually enhancing the F-35's advanced technology while driving

affordability through all aspects of the program to deliver the best value to the taxpayer and, most importantly, the warfighter.

On behalf of Lockheed Martin and the F-35 Industry Team, we're honored by our role in delivering this critical capability to our customers. Thank you for the opportunity to provide this program update. I look forward to your questions.