

RECORD VERSION

**STATEMENT BY
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BEFORE THE

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PROGRAMS AND ACTIVITIES**

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Chairman Rogers, Ranking Member Cooper, and distinguished Members of the Subcommittee, I am honored to appear before you to testify on Missile Defense and to thank you for your continued support of the more than 1,850 men and women who comprise Program Executive Office (PEO) Missiles and Space (MS).

Support to the Warfighters and their readiness remains our number one priority. It is driven by three core principles: 1) Develop, deliver, and sustain best value products and services to the Army, Joint, and International Partners; 2) Align and leverage investments in capabilities and technology developments; and 3) Continue to improve the efficiency, effectiveness, and agility of the acquisition process.

As the Program Executive Officer, it is my responsibility to lead the materiel development, production, fielding, and sustainment of assigned missile and space systems for U.S. Army, Joint, and Coalition Warfighters. This includes the centralized management of Army Air and Missile Defense (AMD), Long Range Fires, Close Combat, and Aviation missile systems, as well as designated space programs. We are responsible for the full life-cycle management of assigned systems, and we provide worldwide support of fielded weapon systems.

In today's complex, dynamic, and volatile security environment, AMD is a key strategic enabler. As such, our focus continues to be on providing warfighting solutions to the Army, Combatant Commands (CCMDs), and International Partners across the operational spectrum. We accomplish this by working closely with other Military Departments, the Missile Defense Agency (MDA), and Space and Missile Defense Command (SMDC) to provide Joint Integrated AMD capabilities.

To meet the Army's AMD materiel development needs, I lead a diverse, talented, and dedicated workforce that is committed to meeting the demands of our Warfighters and our taxpayers. Our ability to continue to meet the Army's AMD requirements and the needs of the Warfighter is only possible with the continued support of Congress.

As the operational environment evolves, PEO MS continues to provide the Army with multiple options, integrated with multiple partners, to operate across multiple domains in order to present multiple dilemmas to our nation's adversaries.

Specific AMD programs include: the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS); PATRIOT including the ground system, legacy missiles, PATRIOT Advanced Capability-3 (PAC-3), and PAC-3 Missile Segment Enhancement (MSE) missiles; the Lower Tier Air and Missile Defense Sensor (LTAMDS); the Indirect Fire Protection Capability (IFPC) System; Sentinel radars; Stinger and Avenger Short Range Air Defense (SHORAD) Systems; the Counter-Rocket, Artillery, and Mortar (C-RAM) Systems; Counter-Unmanned Aerial System (C-UAS) Capabilities; and the Joint Tactical Ground Station (JTAGS). Additionally, PEO MS continues to assess engineering level Electronic Warfare (EW) and Cybersecurity demonstrations to improve the Electronic Protection and Cybersecurity Posture of our weapon systems. By the end of 2017, we will:

- Conduct a series of IBCS Developmental Tests including Soldier Check-Out Events to demonstrate correction of deficiencies identified in the 2016 Limited User Test (LUT) on the path to another LUT prior to a Low Rate Initial Production Decision

- Deliver 155 PAC-3 MSE missiles, in addition to the over 1,400 PAC-3 Cost Reduction Initiative missiles already fielded

- Recapitalize one complete PATRIOT Battalion set of equipment

- Complete Initial Operational Test and Evaluation (IOT&E) of PATRIOT Software Version 8.0

- Modernize the PATRIOT capability in South Korea (35th Air Defense Artillery (ADA) Brigade) with the latest Software Version 8.0 and the new Radar Digital Processor, Modern Manstation, and Modern Adjunct Processor

- Produce and field the five Dismounted PATRIOT Information Coordination Central (D-PICC) systems

- Complete the IFPC Increment 2, Block 1 Critical Design Review and Technology Maturation and Risk Reduction (TMRR) phase

- Continue to field and support Fixed-Site, Expeditionary, and Mobile C-UAS capabilities in the U.S. Central Command (USCENTCOM) Area of Responsibility
- Release the Sentinel A4 radar Request for Proposals projected for 8 January 2018
- Conduct a demonstration of Maneuver SHORAD (M-SHORAD) Capability
- Field the latest upgrade to the JTAGS in Japan
- Continue to improve our resilience and ability to mitigate Cyber and EW attacks.

The IBCS remains the Army's number one air and missile developmental priority and serves as the foundation for Army AMD modernization. The program will field Engagement Operation Centers and an Integrated Fire Control Network to integrate Army AMD sensors and shooters through a common battle command system. When fielded, IBCS will enable a tailorable, flexible, task-organized Army AMD force, breaking the current stove-piped system construct. The IBCS will facilitate affordable, competitive modernization at the AMD component level through standardized government-controlled interfaces to the Integrated Fire Control Network. The IBCS will be fielded to all echelons of Army AMD battlefield forces to defend against close to medium range ballistic missiles; cruise missiles; manned and unmanned aircraft; air to ground missiles; and Rockets, Artillery, and Mortars (RAM).

In 2016, we completed the IBCS LUT that began in March and concluded in May. The LUT included three phases of tests: a flight test phase; a sustained operations phase; and a Hardware-in-the-Loop phase. The overall results were unsatisfactory due to software immaturity issues and instability, although Soldiers were able to destroy a ballistic missile target and a cruise missile target in a near-simultaneous engagement using IBCS and the Integrated Fire Control Network. Since the LUT, we have taken delivery of two new builds of IBCS software that have shown a marked improvement over what was tested. The latest software version will be tested at a Soldier-operated developmental test event later this year to demonstrate software deficiency corrections and capabilities not assessed at the LUT.

Ground test efforts to demonstrate IBCS interoperability with the Ballistic Missile Defense System via IBCS and MDA's Command, Control, Battle Management and Communications (C2BMC) system continue to be successful. We successfully demonstrated the ability of IBCS to serve as the fire control system for the IFPC system.

The Army's PATRIOT force continues to be the cornerstone of AMD protection for our deployed forces, friends, allies, and partner nations. PATRIOT is in high demand with almost half of the force deployed, forward-stationed, or on prepare-to-deploy orders. To maintain a high state of readiness, a number of significant PATRIOT capability enhancements have been accomplished this last year. We completed the planned fielding of Post Deployment Build-7 (PDB-7) software and the Modern Adjunct Processor to all 15 PATRIOT battalions. Last October, we achieved the PAC-3 MSE First Unit Equipped two months ahead of schedule. We achieved PAC-3 MSE Initial Operational Capability (IOC) in July 2016.

In Fiscal Year 2016 (FY16), part of developmental testing for the next configuration upgrade, the PATRIOT system successfully engaged ballistic missile and air breathing threats, demonstrating for the first time an intercept of a ballistic missile with a hit-to-kill PAC-3 MSE interceptor and a PATRIOT Guided Enhanced Missile, tactical ballistic missile (GEM-T) in a ripple method fire. IOT&E began in September 2016 and is scheduled to conclude in September 2017. The IOT&E consists of five phases including: sustained operations, air battle, joint interoperability, flight tests, and regression training. Successful testing and fielding of the upgraded PATRIOT configuration will support the PAC-3 MSE Full Rate Production decision scheduled for late in the second quarter of FY18.

In 2015, the Office of the Secretary of Defense directed the Army to conduct a study to explore the extreme stress on the PATRIOT force and find methods to relieve the stress. As a result of the study, three initiatives were approved: develop, procure, and field five D-PICC systems; modernize the 35th Air Defense Artillery (ADA) Brigade (BDE) in South Korea; and stand-up an AMD Test Detachment.

The D-PICC contains much of the existing capability found in the PATRIOT Information Coordination Central, which is an integral part of the PATRIOT command and control capability at the battalion level. Specifically, capabilities such as external communications, joint interoperability, and joint air picture through Link-16 are extended through the use of D-PICC, which results in increased operational flexibility to cover multiple geographically separated assets simultaneously. Further, D-PICC allows for split deployments of an operational PATRIOT battalion to meet multiple mission requirements by augmenting the battalion with 10 additional personnel and reducing the amount of equipment required to support Combatant Commanders' (CCDRs) requirements. We plan to deliver the five D-PICC systems by the end of December 2017.

The modernization of the 35th ADA BDE is another stress-reduction initiative that simultaneously improves the capabilities of the PATRIOT fleet in U.S. Pacific Command (PACOM) while minimizing the stress on the PATRIOT operational force. The 35th ADA BDE, forward stationed in South Korea, operates in one of the most volatile areas of the world and is exposed to North Korea's frequent testing of advancements in missile technology. In order to provide the upgraded PATRIOT capability and reduce the deployment stress on the force, an Army Team, comprised of government and industry representatives, deployed to the region with all the equipment necessary to modernize the BDE, precluding the need to deploy a U.S.-based PATRIOT battalion. Previous overseas modernization efforts required the deployment of an additional battalion to provide "overwatch" while the designated unit underwent modernization. The modernization effort is projected to be completed by the end of December 2017.

The last initiative is the establishment of a dedicated Test Detachment in the first quarter of FY18 that will support AMD modernization, which will return a PATRIOT Battalion to the operational force pool.

The Army initiated a modernization strategy several years ago that will completely replace PATRIOT's command and control hardware with IBCS and enable future competitive developments of net-centric radar, launcher, and

interceptor components. The strategy is critical to our Nation's ability to provide our Combatant Commanders with flexibility, innovation, and capability in the face of evolving threats. We continue to execute two critical lines of effort for PATRIOT: near-term modification of existing components and long-term competitive system modernization.

Near-term PATRIOT ground system modifications are needed prior to the Department of Defense's LTAMDS decision because current threats have created critical performance gaps in today's PATRIOT system. These performance gaps are exploitable since a new LTAMDS is not expected to begin fielding in the near term. Until a new sensor is fielded in sufficient quantities, the Army must continue to incrementally modernize the existing PATRIOT capability to keep pace with the threat. Stable and sufficient funding is critical in order to enable the Army to modify existing systems in the near-term while new/improved IBCS-enabled components are developed.

Integration of Terminal High Altitude Area Defense (THAAD) and PATRIOT capabilities (such as Tactical Ballistic Missile engagement coordination) began in the 1990s. The concept of integration was initially implemented and fielded in PATRIOT Post Deployment Build – 5 software in 1999. Since then, PATRIOT and THAAD have participated in joint flight testing and we continue to look for opportunities to combine flight tests in the future. Currently, the Army and MDA are planning for PATRIOT to participate in MDA's Operational Flight Test-03 in 2018. Additionally, the Army and MDA are planning a PATRIOT and THAAD tracking exercise, FTX-36, in 2018. Fielding of PATRIOT Post Deployment Build 8.0 Software provides PATRIOT/THAAD automated engagement capability, upper tier debris mitigation, and interoperability with the Ballistic Missile Defense Link 16 requirement. Future efforts will continue to expand the PATRIOT/THAAD defended area. The IBCS and PATRIOT systems continue to participate in the MDA-sponsored ground test program to demonstrate interoperability among ballistic missile defense components.

PATRIOT's strong relationship with 12 international partners continues. Many of these partners are upgrading, modernizing, and/or procuring additional ground

equipment and interceptors. Additionally, Romania and Poland recently submitted requests to procure Army AMD capabilities including PATRIOT and/or IBCS. The cost estimates and documentation for Congressional Notification are being prepared.

The IFPC program is developing a mobile, ground-based weapon system designed to provide 360-degree protection against Cruise Missiles; Unmanned Aircraft Systems (UAS); and RAM threats for fixed and semi- fixed sites. An engineering demonstration of the IFPC system was successfully completed in March 2016 including the effective demonstration of four different interceptors launched from the Multi-Mission Launcher using the IBCS for integrated fire control. The IFPC Increment 2-Block 1 program will provide the first of three planned block capabilities (Counter-UAS and Cruise Missile Defense (CMD)). Current plans are to complete the System Critical Design Review and the TMRR phase of the program this summer. Additionally, as part of Block 1 program, a second missile will be added to provide a lower-cost CMD and C-UAS capability, as well as an initial Counter-RAM capability.

The Sentinel radar is employed in an air defense role against cruise missile, UAS, and fixed/rotary wing aircraft threats as well as an air surveillance role to prevent fratricide while in support of the C-RAM capability. It is a highly mobile radar system that provides 360 degree coverage at shorter ranges and lower altitudes than the PATRIOT radar. We are planning continued development and modification of the Sentinel radars to address capability gaps and obsolescence issues in target detection, tracking, net-readiness, electronic countermeasures, Identification Friend or Foe, and counter-UAS/counter-RAM capabilities. Fielding of the Sentinel A3 Common Platform Upgrade is on-going and will be completed in FY19.

We have initiated efforts to develop an Active Electronically Scanned Array (AESA) modification to the Sentinel radar called the Sentinel A4. The Sentinel A4 will provide increased capability including extended range for ground-based surveillance and situational awareness, faster and more accurate Non-Cooperative Target Recognition, improved Fire Control quality track accuracy, and management of larger track loads. Sentinel A4 will detect and track small and slow targets at low altitude in

clutter. Sentinel A4 will support IBCS requirements and IFPC Increment 2, Block 2 requirements.

The Avenger Weapon System Modification - Service Life Extension Program (MOD-SLEP) addresses obsolescence and Information Assurance requirements by replacing key Line Replaceable Units (LRUs). The Avenger can autonomously detect airborne targets and has a slew-to-cue capability that improves performance by allowing cues from a radar system in reduced visibility, weather, and other environments. The Avenger maintains its complement of Stinger missiles which are capable against rotary wing, fixed wing, cruise missiles and some UASs. The Avenger MOD-SLEP is currently finalizing development of these key LRUs and is moving into system level testing. Fielding of these upgraded LRUs is planned in 2020. The MOD-SLEP will ensure Avenger retains operational capability until FY31. We are also conducting a Stinger SLEP, which will utilize expiring missiles from existing inventory and replace missile components susceptible to degradation due to aging. Production of the first lot of SLEP missiles began in February 2017. The addition of a target detection device to the current Stinger missile will provide improved effectiveness against low, slow, small UAS threats. This Stinger enhancement provides a rapid and low cost capability for C-UAS intercept while retaining existing capability against traditional air threats.

At present, the Army has a limited capability to protect armored and infantry maneuver formations from low altitude air attacks. There are multiple ongoing efforts that will inform Army leadership of an interim Maneuver-SHORAD (M-SHORAD) capability to address the gap until a program of record is initiated. We are working with industry to develop an interim capability and will conduct a demonstration of proposed concepts later this year. Results from this demonstration will inform the decision to conduct the integration and testing of an interim M-SHORAD solution for consideration to begin fielding in 2019.

The C-RAM system continues to save lives in multiple combat operations, providing warning and protection for U.S. and coalition personnel including critical assets. C-RAM's primary mission is to detect RAM launches with minimal false

detections, provide localized warning to only the affected area, intercept rounds in flight, and enhance response to defeat enemy forces. The capability is comprised of a combination of multi-service fielded and non-developmental sensors, command and control equipment, warning systems, and a modified U.S. Navy intercept system (Land-based Phalanx Weapon System [LPWS]). The C-RAM System has provided more than 6,600 successful Warns and more than 300 intercepts with no fratricides or injuries to friendly forces or civilians.

In June 2016, we were assigned as the Office of Primary Responsibility (OPR) to provide C-UAS capability to CENTCOM, with the mission of deploying tactically relevant systems to thwart the threat to U.S. forces posed by the proliferation of small UAS across the battlefield. We are employing a phased approach to meet this requirement, with initial efforts focused on fielding to fixed and semi-fixed sites with transition to mobile and dismounted solutions. We began fielding fixed and semi-fixed site C-UAS capabilities in October 2016. Since then, we have fielded several Expeditionary Low-Slow-Small-UAS Integrated Defeat Systems (E-LIDS) systems. Follow-on deployments will include additional E-LIDS and new Mobile-LIDS (M-LIDS) by the end of this fiscal year.

The JTAGS System provides ballistic missile launch warning and cueing information for the AMD architecture and Theater Combatant Commanders. Five JTAGS Systems are fielded: one in CENTCOM, one in U.S. European Command (EUCOM), two in U.S. Pacific Command (PACOM), and a training system in the United States. We will begin fielding the modernized JTAGS capability in 2017. The Phase 1 capability provides refreshed technology and a more effective environment for the Soldier operators. Enhanced warning and cueing capability is provided through incorporation of data from the Space Based Infrared System (SBIRS) scanning sensors. Development and testing of the Phase 2 capability is on-going to incorporate data from the SBIRS staring sensors.

Mr. Chairman, Ranking Member Cooper, and Members of this Subcommittee, thank you for the opportunity to provide insight into the AMD portion of the PEO MS portfolio. I look forward to addressing your questions.

