

RECORD VERSION

**STATEMENT BY
LIEUTENANT GENERAL JAMES H. DICKINSON, USA
COMMANDING GENERAL,
U.S. ARMY SPACE AND MISSILE DEFENSE COMMAND/
ARMY FORCES STRATEGIC COMMAND
AND
JOINT FUNCTIONAL COMPONENT COMMAND FOR
INTEGRATED MISSILE DEFENSE**

BEFORE THE

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FISCAL YEAR 2019 PRIORITIES FOR MISSILE DEFENSE

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Introduction

Chairman Rogers, Ranking Member Cooper, and distinguished Members of the Subcommittee, thank you for your continued support of our Service Members, Civilians, and Families. Let me express my appreciation to this Subcommittee for its continued support of the Army, the U.S. Strategic Command, the Department of Defense, and the missile defense community. I am honored to testify before this Subcommittee along with these distinguished witnesses who provide and utilize missile defense capabilities in defense of our Nation, forward deployed forces, partners, and allies.

I appear before you today bringing both a joint and Army perspective on effective missile defense capabilities. Within the Army and joint community, my responsibilities encompass several mission areas.

As the commander of the U.S. Army Space and Missile Defense Command and Army Forces Strategic Command (USASMDC/ARSTRAT) I have Title 10 responsibilities to organize, train, and equip Army space and global ballistic missile defense forces. I serve as the Army's force modernization proponent for space, global ballistic missile defense, and high altitude forces and capabilities. Further, I am the Army Service Component Commander (ASCC) to U.S. Strategic Command (USSTRATCOM). I am responsible for planning, integrating, coordinating, and providing Army space and missile defense forces and capabilities in support of USSTRATCOM missions.

I also serve as the Army's Air and Missile Defense (AMD) Enterprise Integrator. My responsibility in this role is to synchronize the balanced execution of the Army's AMD strategy across the functions of force planning and sourcing requirements, combat and materiel development, AMD acquisition, and life cycle management. I coordinate with the AMD community of interest to balance priorities, inform resourcing decisions, and pursue innovative approaches in order to enhance our strategic flexibility.

Finally, as the Commander of USSTRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC IMD), I am responsible for coordinating global missile defense planning, conducting missile defense operations support, recommending allocation of missile defense assets, and advocating for missile defense capabilities on behalf of the Combatant Commanders.

My first, second, and third major tasks within these roles can be summarized as providing forces and capabilities for current operations; preparing forces and capabilities for the future fight; and, research and development of Army technologies that will provide future advancements in air and missile defense capabilities. To achieve this, the organizations I command align their activities to these priorities:

- Protect our homeland
- Provide combat-ready forces and capabilities
- Plan and conduct synchronized global operations
- Prepare or adopt leap-ahead concepts and technologies
- Preserve and account for the Nation's critical resources
- Promote and foster a positive command climate

My intent today is to highlight the dedicated people who serve in the diverse and geographically dispersed organizations under my command; to briefly outline the strategic environment; to emphasize USASMDC/ARSTRAT's missile defense force provider responsibilities with respect to the Army and the geographic Combatant Commanders (GCCs); to outline JFCC IMD's role as a warfighter advocate and supporting USSTRATCOM's coordinating authority for global missile defense planning; and finally, to summarize a few key Army AMD developments in the context of a comprehensive approach to addressing the evolving air and missile threat.

The Workforce—Our Foundation

USASMDC/ARSTRAT and JFCC IMD cannot carry out our wide-ranging national security missions without the dedication of our greatest asset—our people. One of my most important messages to you today is that your continued support is critical to our ability to develop and retain a highly qualified and mission-ready workforce. The recent long-term budget uncertainty impacted our warfighters executing today's missions, as well as our ability to posture for the future. The Service Members, Civilians, and Contractors who make up these commands support the Army

***Soldiers, Civilians, and Contractors
Working Together Across 11 Time
Zones in 23 Locations to Protect Our
Nation, Allies, and Deployed Forces***

and joint warfighter each and every day, in the homeland and deployed across the globe. The budget agreement and the associated increase to the Department's top line budget is very helpful and will ensure we continue to provide trained and ready Service Members and Civilians to operate and pursue advancements in space and missile defense capabilities for our Nation. The extra resources will provide additional interceptor inventory capacity, modernize essential infrastructure, and enhance discrimination and assessment capabilities.

The Increasingly Complex Threat Environment

Current global trends indicate ballistic and cruise missiles are becoming more capable, due in part to the proliferation of advanced technologies, resulting in systems with global reach, increasing speed, and greater accuracy. Additionally, many foreign ballistic and cruise missile systems are progressively incorporating advanced countermeasures including maneuverable reentry vehicles, multiple independent reentry vehicles, and electromagnetic jamming, all intended to defeat our missile defense capabilities. Moreover, numbers of ballistic and cruise missile platforms are increasing. Many of these systems are mobile, which increases the difficulty in detecting, tracking, and engaging these weapons prior to launch.

Numerous countries are developing ground-, sea-, and air-launched land-attack cruise missiles (LACM) using a variety of unconventional and inexpensive launch platforms. Today, nearly 30 countries possess ballistic missile capability and some are actively pursuing hypersonic weapons. There are over 35 different variants of ballistic missiles in service across the globe today and a number of new intermediate-range and intercontinental ballistic missiles (IRBM and ICBM) are under development. North Korea has demonstrated rapid advances in range and overall missile performance. Since 2016, it has tested a submarine-launched ballistic missile, a new solid-fueled MRBM from a mobile launcher, a new IRBM, and its first ICBMs.

In the future, our missile defense systems will encounter more complex electronic and cyber-attacks, as well as directed energy threats that could significantly degrade U.S. missile defense operations. We expect cyber and electronic attacks will be increasingly relied upon in potential adversaries' anti-access/area-denial (A2/AD)

strategies. Our ability to successfully counter these continuously advancing threats will rely heavily on our increased use of space and space-enabled capabilities. Space sensors could expand our capacity to track, discriminate, and successfully engage ballistic, cruise, and hypersonic threats.

In summary, adversary air and missile threats are proliferating in number and advancing in complexity. Our evolution of capability advancements requires a holistic approach that effectively integrates alternative capabilities to defeat air and missile threats. The strategic missile defense environment is becoming more challenging. Implementing technological advances in a time of fiscal constraints requires more cost effective methods to integrate our current and future capabilities. We continue to prioritize integrated AMD resources to optimize our support of the warfighter and to partner with the Missile Defense Agency (MDA), Combatant Commands, and the Services in pursuit of fiscally responsible methods to address evolving threats.

Strategic Positioning to Counter the Threat

To counter the threat and meet the objectives of the 2018 National Defense Strategy, USSTRATCOM and the U.S. Army continue to provide and enhance homeland and regional missile defenses. We continue to work with our allies and partners in Europe, the Asia Pacific region, and the Middle East to increase integration and interoperability of missile defense systems and operations.

Integrated missile defense planning, force management, and operations emphasize global coordination with regional execution so that for any threat, we match the best interceptor with the best sensors. A holistic approach that integrates offense and defense will move the U.S. toward a more robust and flexible crisis response capability.

Over the last year, basing a Terminal High Altitude Area Defense (THAAD) battery in the Republic of Korea bolstered our regional defense capabilities to improve protection of U.S., allied forces, and critical infrastructure on the Peninsula. Additionally, during 2017, MDA completed the emplacement of 14 additional Ground-Based Interceptors (GBIs) at Fort Greely, Alaska to provide improved capacity to defend the Nation against an ICBM attack from North Korea, and potentially Iran in the future.

The Nation now has a total of 44 GBIs and planning is underway to emplace an additional 20 GBIs in a new missile field at Fort Greely, Alaska as is reflected in the Fiscal Year 2019 President's Budget Request.

The 2018 National Defense Strategy prioritizes a strong commitment to security and stability in the Indo Pacific region, Europe, and the Middle East. In conjunction with our allies and partners, the Department of Defense maintains forward-committed PATRIOT, THAAD, and

counter rocket, artillery and mortar (C-RAM) forces to enhance our AMD posture, sending a deterrence message to potential adversaries and assurance to our friends. We continue to work with regional partners and allies to increase

information and data sharing and we are developing a more robust global AMD force posture that leverages partner nations' growing capabilities. This will result in reducing the strain on our forces while enabling more timely modernization of our AMD assets.

The Army AMD Enterprise is developing a new AMD strategy based on the National Security Strategy, National Defense Strategy, the pending Missile Defense Review, Army Operating Concept, the changing operational and threat environments, and the rapid pace of technological advancement. This new strategy, to be published later this year will focus on the 2018-2028 timeframe and align with current Department and Army doctrine. The updated strategy will address our ability to balance today's operational requirements while shaping the force and modernization efforts to counter future challenges. In addition, the Army's Modernization Strategy will enable us to deliver advanced air and missile defense capabilities to our warfighters on a substantially decreased timeline. The Air and Missile Defense Cross Functional Team is key to rapidly developing requirements and ensuring these future capabilities transition

"I am confident the Ground-based Midcourse Defense system can currently defend the United States from the threats posted by North Korea, but we must take prudent steps to remain in a position of relative technological advantage."

***--USNORTHCOM SASC Posture Statement
February 2018***

quickly from concept, to prototyping, to fielding. We are focusing on capabilities that include Mobile Short-Range Air Defense, directed energy, and advanced energetics.

Providing and Enhancing Missile Defense Capabilities

USASMDC/ARSTRAT's first major task is carrying out its Title 10 responsibilities as a force provider of missile defense capabilities. This command is manned by multi-component Soldiers, Civilians, and Contractors, who contribute to operations, planning, integration, control, and coordination of Army forces and capabilities in support of USSTRATCOM's missile defense mission. Other commands around the world, including all GCCs, also leverage the capabilities we provide.

Our operational function in today's fight is to provide trained and ready missile defense forces and capabilities to the GCCs and the warfighter. For example, USASMDC/ARSTRAT Soldiers serving in the homeland and in remote and austere forward-deployed locations operate the Ground-based Midcourse Defense (GMD) system and the Army-Navy/Transportable Radar Surveillance Forward-Based Mode (AN/TPY-2 FBM) radars. Highlights of the capabilities provided to current operations and readiness by our missile defense professionals include:

Support to Global Ballistic Missile Defense: Soldiers from the 100th Missile Defense Brigade, headquartered in Colorado Springs, Colorado, and the 49th Missile Defense Battalion, headquartered at Fort Greely, Alaska, are ready to defend our Nation and its territories from an ICBM attack. In support of U.S. Northern Command (USNORTHCOM), Army National Guard and active component Soldiers operate the Ground-based Midcourse Defense Fire Control Systems located at the Fire Direction Center in Alaska, the Missile Defense Element in Colorado, and the GMD Detachment at Vandenberg Air Force Base, California. These Soldiers, in conjunction with USNORTHCOM, also oversee maintenance of GMD interceptors and ground system components. At the Missile Defense Complex at Fort Greely, a remote site with limited community support amenities, 49th Missile Defense Battalion military police secure the interceptors and command and control facilities from physical threats. Given their strategic mission in this remote location, the harsh environment and 20-hours per day of winter darkness, we must continuously review and enhance the Fort Greely Garrison

services and support to these Soldiers, Civilians, Contractors, and their Families. With the continued support of Congress, we have already realized substantial quality of life improvements for these remotely-stationed personnel and their families.

Support to GMD System Test and Development: Soldiers from the 100th Missile Defense Brigade participate in GMD test activities and work with MDA developers on future improvements to the GMD system. MDA's testing regime, conducted through a

“...develop a state-of-the-art missile defense system to protect against missile-based attacks. ...”

***-- POTUS Statement
Making Our Military Strong Again
January 2017***

series of ground-based and operational flight tests, and rigorously verified, validated, and accredited models and simulations, emphasizes operational realism during test design and execution. This realism enables Soldiers of the 100th Missile Defense Brigade to gain tremendous training value and validate operational employment of the system. This

contributes to readiness, by executing their actual operational tasks while providing warfighters with confidence the system will perform as designed.

Support to Regional Capabilities: The 100th Missile Defense Brigade also provides GCCs with trained and certified AN/TPY-2 Forward Based Mode (FBM) missile defense batteries (MDBs). These operational capabilities exist today at five strategic locations around the globe where they contribute to the early warning, cueing, tracking, and discrimination of threats to our allies and partners. These forward-based radars also represent a tangible contribution to both homeland and regional defense. Soldiers manning these radars, deployed to remote and austere locations across the globe, persistently demonstrate our Nation's commitment to defend deployed forces, allies, and partners from ballistic missile attacks. MDA is the materiel developer for the AN/TPY-2 radars and, in accordance with the 2018 National Defense Authorization Act, is developing plans to transfer the program of record to the Army for continued operational sustainment.

Space Support to Ballistic Missile Early Warning: Space-enabled capabilities are essential for missile defense operations, providing and enabling communications, positioning, navigation, timing, intelligence, surveillance, reconnaissance, and early

warning. We routinely coordinate and collaborate with USSTRATCOM's National Space Defense Center to ensure that the space assets are poised to support missile defense capabilities.

In support of the joint force commander, USASMDC/ARSTRAT continues to provide ballistic missile early warning within the U.S. European Command (USEUCOM), U.S. Central Command (USCENTCOM), and U.S. Pacific Command (USPACOM) theaters of operations. The 1st Space Brigade's Joint Tactical Ground Station (JTAGS) Detachments, which support the Joint Force Space Component Command (JFSCC), are operated by USASMDC/ARSTRAT space-professional Soldiers who monitor launch activity and other infrared events. They provide essential information to members of the air, missile defense, and operational communities. Our JTAGS Detachments are forward deployed around the globe, providing continuous, dedicated, assured missile warning to USSTRATCOM and GCCs in support of deployed and forward-based forces. We continue to optimize this capability, and this year we gained support from the Government of Italy to relocate the JTAGS in Europe to Sigonella Naval Air Station. This will increase operational missile warning capability.

Space—The Ultimate High Ground

USASMDC/ARSTRAT's second major task is to build and mature future missile defense forces and capabilities. A major component of this function is providing relevant and updated training for our global missile defense systems. During the past fiscal year, USASMDC/ARSTRAT trained approximately 200 Soldiers who execute the missile defense mission of the homeland and our missile defense training courses earned USASMDC/ARSTRAT recertification as an Army Learning Institution of Excellence.

USASMDC/ARSTRAT, as a recognized Army Center for Analysis, also conducts studies to determine how to best meet the Army's assigned missile defense responsibilities. Our analyses support the established and emerging processes the Army uses to document its missile defense needs and pursue joint and Army validation of its requirements. With insights from these studies, we develop and operationalize the

Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy (DOTMLPF-P) requirements to address evolving threats and

Provide Combat Ready Forces and Capabilities

potential vulnerabilities to the GMD and AN/TPY-2 FBM missile defense systems. This disciplined approach ensures limited resources are applied to achieve maximum operational utility.

USASMDC/ARSTRAT's third major task is to provide critical technologies to address future needs that will enhance warfighter effectiveness. Our technology development function is primarily focused on the space and high altitude domains. Additionally, although MDA is the principal materiel developer for missile defense capabilities, USASMDC/ARSTRAT carries out supporting missile defense-related materiel development efforts, to include supporting research, development, and testing of an Office of the Secretary of Defense (OSD) sponsored conventional prompt strike capability. In addition to offensive capability development, we are also supporting MDA's concept development for defense against hypersonic threats. These technical capabilities are at the forefront of developing holistic, cost-effective approaches to address the broadening missile defense challenge. The following are brief summaries of two of our research and development efforts, as well as an overview of the capabilities of an essential Army testing range.

High Energy Laser Technology Development and Demonstration: The Army's high energy laser science and technology effort aims to develop ruggedized laser system components and subsystems, integrate them onto an Army vehicle, conduct demonstrations to characterize performance, and transition the technology to a Program Executive Office. A solid-state laser weapon system has the potential to be a low-cost and effective complement to kinetic capabilities in countering rockets, artillery, and mortars (RAM), unmanned aerial systems (UAS), and other threats. The effort builds upon earlier pathfinder demonstrations of a 10-kilowatt (kW) laser system by continuing to develop, integrate, and mature the technology at higher laser power outputs. The Robust Electric Laser Initiative (RELI) fiber laser was delivered to the Army in early 2017 and is being integrated into the High Energy Laser Mobile Test Truck (HELMTT) for a 50-kW laser demonstration against RAM and UAS threats later this year. This

demonstration will be a key knowledge point for the next major phase of high energy laser technology development, the High Energy Laser Tactical Vehicle Demonstrator (HEL TVD). The HEL TVD supports the Army's Indirect Fire Protection Capability Increment 2-Intercept (IFPC Inc 2-I) program, discussed later in this document. It is on schedule to conduct a C-RAM 100-kW demonstration in late 2022 to validate system performance against IFPC Inc 2-I requirements.

USASMD/ARSTRAT is also starting work this fiscal year on the Multi-Mission High Energy Laser (MMHEL) as an Army Technology Maturation Initiative (TMI). The TMI will integrate a 50-kW laser system on a Stryker platform and culminate in an operational demonstration that informs Maneuver-Short Range Air Defense (M-SHORAD) requirements. Supporting this effort is the Mobile Experimental High Energy Laser (MEHEL), a 5-kW laser on a Stryker. Over the past few years, MEHEL has participated in Maneuver Fires Integration Experiments and recently participated in a Joint Warfighting Assessment in Germany. MEHEL is helping warfighters develop tactics, techniques, and procedures, as well as concepts of operations for future high energy laser weapons.

***Adapt Leap
Ahead Concepts
and Technologies***

Low-Cost Target Development: The Army is engaged in a technology effort to develop a suite of threat-representative targets for lower tier missile defense testing at a substantially reduced cost. Over the past year, we completed three detailed target designs and successfully demonstrated two of the configurations, which leverage excess solid rocket motors. The first Sabre target was successfully launched and intercepted in June 2017, meeting all performance objectives. The second Sabre target was launched and successfully intercepted in November 2017. These missions were critical operational tests of the new PATRIOT interceptor. Development of a two-stage ballistic missile target, known as Black Dagger, continues with a risk reduction launch scheduled for mid-2018. The Black Dagger target is meant to mimic a broader range of short-range ballistic missile threats by achieving longer range, higher altitude, and increased velocity. The Zombie suite of targets has missions planned for PATRIOT and Integrated Air and Missile Defense (IAMD) over the next few years. The goal remains to reduce DoD's overall test execution costs.

Missile Defense Testing Range: USASMDC/ARSTRAT operates the Ronald Reagan Ballistic Missile Defense Test Site (RTS). RTS, located on the U.S. Army Garrison—Kwajalein Atoll in the Republic of the Marshall Islands provides critical testing support to both offensive and defensive missile testing requirements for programs such as GMD and U.S. Air Force strategic ballistic missile systems. RTS retains preeminent ballistic missile testing capabilities used in validating the Nation’s ability to sustain a strong, credible ballistic missile deterrent as a key element of national security and the security of U.S. allies and partners.

RTS supported 10 missile defense developmental flight tests in 2017. The Army conducted three of those tests with the Patriot system. MDA and the Army conducted two THAAD flight tests; MDA and the Navy conducted four test flights of the Standard Missile (SM-3 and SM-6); and MDA conducted one test of the Ground-Based Interceptor (GBI). Homeland and regional defense tests have grown ever more challenging and complex, providing a means to replicate missile defense architectures superimposed over this Pacific test site.

RTS also supports offensive ballistic missile testing for Air Force Global Strike Command. During Fiscal Year 2017, RTS supported four Minuteman III test launches to successfully validate and verify the effectiveness, readiness, and accuracy of the weapon system.

In concert with its testing mission, RTS conducts continuous deep space surveillance and space object identification operations to increase national capabilities and reduce expenditures for both mission sets. During the past year, the U.S. Air Force began construction of their most advanced surveillance system—Space Fence. In a few years, this improved surveillance capability will enable proactive space situational awareness while complementing existing systems at the RTS.

Army Contributions to the Nation’s Missile Defense Capabilities

AMD is an enduring Army core function. AMD units serve as a key strategic enabler—an essential component of the Army mission to provide wide area security and support to joint campaigns. In addition to defense against ballistic missiles, the Army’s current AMD strategy seeks to develop a more comprehensive portfolio of Integrated Air

and Missile Defense (IAMD) capabilities. AMD is one of six Army modernization priorities and, as such, recent Army investments in missile defense have significantly increased. The Program Executive Office for Missiles and Space (PEO MS) is the Army's materiel developer for these capabilities and works closely with the other Services, the Joint Staff, and MDA toward joint IAMD capabilities. To ensure the mission of providing trained and ready Army AMD forces, we are engaged in developing an updated Army AMD strategy. A summary of the Army's AMD strategic direction and major programs follows:

Air and Missile Defense Readiness: Readiness is the Army's top priority, and the challenge to sustain the readiness of the total Army AMD force requires constant vigilance and senior leader focus. The operational demand to meet the requirements of joint warfighters continues to stress the Army AMD force, impacting both current and future readiness, as well as modernization initiatives. With over 50 percent of the AMD force either forward stationed or deployed, the Army continues to take action to mitigate this stress to the force and restore strategic flexibility. An Army Campaign Plan strategic effort to implement a Sustainable Readiness Model supports characterization of the challenge. A recent study on striking a balance between operational demand and modernization led to the activation of an AMD test detachment in Fiscal Year 2018. This study also supports normalization of AMD rotations to a 9-month cycle rather than the current 12-month cycle; we expect to achieve the shorter rotation cycle in the near future.

Mission Command: Closely linked to the challenge of sustaining AMD readiness is the ability to provide low density/high demand AMD mission command elements. The mission command elements are especially critical to support the integration of Army AMD forces into joint command and control architectures. Operationally, the Army recently activated a third National Guard air defense brigade headquarters assigned to the South Carolina Army National Guard to support mission command rotations for the National Capital Region integrated air defense mission. The Army completed the development and procurement of five Dismounted PATRIOT Information Coordination Centrals (DPICC) for the Army Air and Missile Defense Commands (AAMDC), which

mitigates the requirement to deploy a PATRIOT Battalion Headquarters element with each one- or two-battery deployment.

Army Integrated Air and Missile Defense (AIAMD): In addition to providing defense against ballistic missiles, the current AMD strategy continues to develop a more comprehensive portfolio of AIAMD capabilities to provide protection against other adversary threat systems and capabilities. The Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) integrates current and future AMD components into an Integrated Fire Control (IFC) system, provides a single integrated air picture, increases defended area, and provides flexibility in deployment. IBCS, the foundation for Army AMD modernization, is an Army priority. The program will field a common IFC system for Army AMD forces to defend against cruise missiles, manned and unmanned aircraft, air-to-ground missiles, tactical ballistic missiles, and RAM attacks. The IBCS network will operate with air surveillance and fire control capabilities across Services, and with coalition partners that provide joint warfighters with more decision space and lethality. When fielded, IBCS will enhance the lethality of the AMD force, breaking the current system-centric control paradigm, which will dramatically increase capability and also facilitate open industry competition in support of the AMD community. Additional efforts are currently underway to integrate the Army's IBCS and MDA's BMD System Command, Control, Battle Management, and Communications (C2BMC) to fully support IAMD interoperability with the ballistic missile defense system (BMDS).

As noted, the IBCS and indirect fire protection efforts will provide the future force with a capability to defend against a wide range of threats. Recent conflicts highlight the growing threat of UAS in support of tactical operations. They pose an increasing risk to the Army's combined arms team who are operating where the strategic and operational advantage of highly technical stand-off weapons have limited utility. Efforts are underway to close the risk gap to protect our maneuver forces with short range defense capability.

PATRIOT/PATRIOT Advanced Capability-3 (PAC-3) Missile Segment Enhancement (MSE): The Army PATRIOT force remains the cornerstone of AMD protection for our deployed forces, friends, and allies. GCCs' increasing AMD requirements drive the operational tempo and stress on the PATRIOT force. To meet

requirements, reduce stress, and avoid adversary overmatch, the Army is improving PATRIOT capability against the near-term evolving threat while we move toward the IBCS architecture including the IFPC Inc 2-1 and a new Lower Tier Air and Missile Defense Sensor (LTAMDS).

Lower Tier Air and Missile Defense Sensor (LTAMDS): The LTAMDS program will provide sensing capabilities in the lower tier portion of the ballistic missile defense battlespace. LTAMDS will expand MSE battlespace, serve as a sensor node on the IAMD battle command system network, address capability gaps, modernize technology, reduce operations and sustainment cost, mitigate obsolescence, and increase reliability and maintainability. To enable the development of LTAMDS, the Army is leveraging the competitive nature of the Other Transaction Authority (OTA) to mature and integrate technologies, reduce risk, and to manufacture the LTAMDS.

PATRIOT must continually modernize through software and hardware upgrades to avoid obsolescence and to take advantage of the expanded battlespace afforded by the PAC-3 MSE interceptor. To counter the near-term threat, the Army is in the process of delivering the next PATRIOT software build, Post Deployment Build - 8 (PDB-8). PDB-8 software provides combat identification enhancements, addresses upper tier debris mitigation, improves performance of the PAC-3 Missile Segment Enhancement (MSE) interceptor, and enhances PATRIOT and THAAD interoperability. To accelerate the modernization upgrades of the 35th Air Defense Artillery Brigade, the PDB-8 Urgent Materiel Release (UMR) was approved in July 2016. Initial Operational Test & Evaluation (IOT&E) was completed in September 2017, and the PDB-8 Full Materiel Release is planned for later this year.

Terminal High Altitude Area Defense System (THAAD): THAAD, a key component of the BMDS architecture, is designed for area defense of deployed and allied forces, population centers, and critical infrastructure against short-, medium-, and intermediate-range ballistic missiles. THAAD is a mobile and globally transportable, low density/high demand asset. A fully operational THAAD battery consists of 95 Soldiers, an AN/TPY-2 radar, six launchers, a fire control and communications element, a battery support center, and a support element. THAAD has a unique endo- and exo-atmospheric intercept capability using proven hit-to-kill technology. There are now six

available THAAD batteries, and a seventh will be operational by the end of 2018. As noted earlier, THAAD batteries are deployed to Guam and the Republic of Korea in response to the North Korean nuclear and missile threat.

Indirect Fire Protection Capability Increment 2 – Intercept Block 1 (IFPC Inc 2-I):

As the end of the operational lifecycle approaches for short-range AMD capabilities such as Avenger, the Army is developing new capabilities to defeat air threats. The IFPC Inc 2-I, currently under development, is a mobile, ground-based AMD weapon system designed to provide 360-degree protection against cruise missiles and UAS threats for fixed and semi-fixed sites, with the capability to launch multiple missile types. A block acquisition approach is being used to provide this essential capability. The Block 1 baseline system consists of a new launcher and the existing Sentinel A3 radar, integrated with IBCS. An engineering demonstration of the IFPC system was successfully completed in March 2016. The Block 1 baseline system, providing counter-UAS/cruise missile capability, is currently planned to begin fielding in Fiscal Year 2021. The addition of a second missile to provide an initial C-RAM capability is planned within the next five years. The Block 2 System is planned to provide a full C-RAM capability. The Army is pursuing a complementary mix of kinetic and directed energy weapons for this mission area.

Army Low-Cost Portable Surveillance (ALPS): The ALPS passive sensor will integrate into the IBCS network and provide continuous, 360-degree, long-range surveillance against fixed and rotary wing aircraft, UAS, and cruise missile threats.

Maneuver-Short Range Air Defense (M-SHORAD): The Army is increasing capabilities to address increasing short-range air threats to our deployed forces and allies. Plans are in execution to expand M-SHORAD capabilities, not only with additional forces but also with new equipment, especially in the European theater. Per Army Chief of Staff direction, we have fielded Stinger teams to protect maneuver forces and are on schedule to deliver two Avenger battalion equipment sets to USEUCOM this year in support of the European Deterrence Initiative. The equipment will be followed by personnel and infrastructure resulting in an active component Avenger Battalion next year. We are also exploring the feasibility of procuring an interim M-SHORAD capability. Fielding of four M-SHORAD battalions is slated to occur over Fiscal Years

2021 and 2022. While the current M-SHORAD systems, Avenger and Stinger missiles, provide capabilities today, we must develop and field more advanced systems to outpace the threat. Continued R&D investments in lasers, high-power microwaves, and electronic warfare are essential to increase M-SHORAD capabilities in support of the maneuver force.

Joint Functional Component Command for Integrated Missile Defense (JFCC IMD)—Integrating and Synchronizing Missile Defense

JFCC IMD is one of the geographically dispersed elements for which I serve as commander. It is USSTRATCOM's missile defense integrating element, formed to execute Strategic Command's Unified Command Plan (UCP) assigned missile defense mission and enable the headquarters to focus on integration and advocacy. Headquartered at Schriever Air Force Base in Colorado Springs, Colorado, JFCC IMD is manned by a cohesive team of Army, Navy, Air Force, Marine Corps, Government Civilians, and Contractor personnel.

As the Secretary of Defense and various Combatant Commanders have previously testified, warfighters remain confident in our ability to protect the Nation against missile attacks. However, as the global missile threat continues to evolve, we

“This request supports additional efforts to detect, defeat, and defend against any North Korean use of ballistic missiles...”

***-- POTUS Fiscal Year 2018
DoD Budget Amendment
November 2017***

must invest in holistic approaches to defeat adversary missiles before launch or while in flight, as well as implement mitigations should an attack succeed in penetrating our defenses. JFCC IMD's principal mission is to coordinate with and operationally support the joint warfighters at the GCCs, and advocate for their requirements with the materiel developers at MDA and the

Services. On behalf of the GCCs and USSTRATCOM, JFCC IMD champions warfighter priorities and capability needs, including continued development of a robust sensor network, integrated discrimination capabilities, resilient command and control

networks with enhanced cybersecurity defenses, and improved interceptors for both homeland and regional missile defenses.

Through JFCC IMD, we work across DoD and alongside key allies and partners to improve integration of existing capabilities, maximizing efficiency and effectiveness in global missile defense missions. The essential force multiplier is integration—a critically important mission enabler that JFCC IMD directly supports. As a functional component command of USSTRATCOM, JFCC IMD executes support to designated UCP responsibilities along four lines of effort:

- Synchronizing global missile defense planning, global force management and missile defense security cooperation activities.
- Conducting global missile defense operations support, to include: asset management, alternate execution authority, federated intelligence support, and network monitoring and protection.
- Executing above element joint and combined global missile defense training, exercises, and experimentation.
- Advocating for and recommending acceptance of global missile defense capabilities, conducting analysis and assessments of current and future capabilities, and supporting ground & flight tests.

To accomplish these efforts, we maintain close collaborative relationships with the GCCs, MDA, the Services, OSD, the Joint Staff, and our allies and partners. We continually seek to enhance our deployed forces' capabilities while gaining operational experience and confidence in our collective ability to defend the Nation, deployed forces, partners, and allies. Some of our key efforts to enhance missile defense planning and capabilities for both the homeland and regional architectures follow:

Expansion and Integration of the Missile Defense Architecture: In response to the evolving strategic environment, we continue to bolster homeland and regional missile defense capabilities. In development of the global missile defense mission, we are supporting the advancement of the new capabilities such as Aegis Ashore in Poland; the Standard Missile 3 Block IIA under co-development with Japan; Long Range Discrimination Radar at Clear Air Force Station, Alaska; 20 additional GBIs in a new missile field at Fort Greely, Alaska; Homeland Defense Radar–Hawaii; Homeland

Defense Radar–Pacific; Space-based Kill Assessment, and various other capabilities. Given the many challenges associated with implementation of these architectures, JFCC IMD, in support of USSTRATCOM’s coordinating role for global missile defense, collaborates with the GCCs to assess and address cross-regional gaps in the areas of planning, policy, capabilities, and operations.

Multi-Regional Missile Defense Asset Management: JFCC IMD, in coordination with USSTRATCOM and the GCCs, manages the availability of missile defense assets to balance operational readiness posture, coordinates the scheduling of missile defense system maintenance activities, and supports MDA and Service test requirements. The asset management process allows us to continually assess our readiness to defend against missile attacks and to recommend adjustments to optimize the overall MD architecture.

Cybersecurity of the Ballistic Missile Defense System: JFCC IMD, in coordination with USSTRATCOM and MDA, conducts the Cybersecurity Service Provider (CSSP) mission for the BMDS to ensure cyber defenses and operations are planned and executed across the globe. JFCC IMD works with key stakeholders to enhance the cyber defense posture of our missile defense operational architecture against malicious activity. We are collaborating with our mission partners to incorporate realistic cybersecurity testing in support of the warfighter capability acceptance process. JFCC IMD also works closely with the Joint Staff, Combatant Commanders, and MDA to educate, train, and exercise cybersecurity protocols to ensure the highest levels of readiness.

Global Planning and Assessment: As regional and global missile threats continue to increase in number and complexity, JFCC IMD works with the missile defense community to refine processes designed to synchronize trans-regional, global missile defense planning and operations. Codified in periodic revisions to the Global Missile Defense Concept of Operations, these processes ensure unity of effort and mitigate potential seams and gaps across geographic areas of responsibility. Consistent with the Department’s transition to planning based on adversary problem sets, we have continued to refine our process for adversary-centric plans assessment, and completed further objective analysis of missile defense risks across multiple GCC

plans. This assessment methodology identifies systemic risk, informs recommendations for shortfall mitigation, and increases effectiveness in future missile defense planning efforts. The output of this analysis will inform our biennial Global Integrated Air and Missile Defense Assessment (GIAMDA) which shapes recommendations for global force management and future capability advocacy efforts. Looking forward, we will focus our efforts with the warfighter community to establish approaches and processes necessary to enable increased integration and a more holistic approach to missile defense.

**Plan and Conduct
Synchronized
Global Operations**

Global Force Management: USSTRATCOM, as the designated Joint Functional Manager for missile defense, relies upon JFCC IMD to evaluate and recommend to the Joint Staff sourcing of missile defense requirements based on assessed risk. Due to the low density/high demand nature of missile defense assets, all sourcing decisions have a direct and significant impact on other Combatant Commanders' campaign and contingency plans. We continue to refine our approach to prioritize steady-state global missile defense requirements. This Global Prioritized Defended Asset List (Global PDAL) categorizes the GCCs' critical assets based on global risk. It informs our recommendations in the Global Force Management process, enabling senior leaders to make informed decisions on allocation of low density missile defense forces.

Allied and Partner Missile Defense Integration: Given that we will never have enough active defense capacity, integrating allies into a common and mutually supportive architecture is a critical warfighter priority. In support of those efforts, our Global Missile Defense CONOPS includes an International Engagement Framework which provides a common approach to identify potential partners, a model to identify a level of maturation, and an assessment mechanism. This approach formed the analytical basis for the Department's 2017 Report to Congress on Allied Integration. Another venue aimed at promoting increased cooperation is the NIMBLE TITAN campaign, a biennial series of multinational missile defense experiments. NIMBLE TITAN brings together policy and military subject matter experts from allies and partner nations to explore collaborative missile defense, synchronize policy and military initiatives, and identify potential future concepts. Today, ministries of foreign affairs and

defense representatives from 24 nations, NATO, three additional multinational organizations, as well as DoD, OSD, Joint Staff, Combatant Commands, and MDA convene quarterly to exchange views and insights, experimenting collectively with policy and operational concepts. The NIMBLE TITAN campaign provides a unique forum to

“We must strengthen our collaboration with our allies and explore further integration of our collective capabilities toward an effective mutual defense.”

***-- USSTRATCOM HASC Posture Statement
March 2018***

advance U.S. missile defense policies and Combatant Commanders’ regional security objectives. As the free world’s premier strategic military and policy focused missile defense event, this campaign provides participating nations with critical opportunities for multinational and cross-regional discussions. The 28 member nations

and international organizations work collectively to produce practical missile defense concepts and solutions to policy-military challenges; many of which influence and inform real-world missile defense policies and multinational planning.

The NIMBLE TITAN 2018 campaign culminated in the Capstone Conflict Event this March. In September, NATO will host a subsequent senior leader forum. This campaign addressed IAMD, deterrence and de-escalation, left-of-launch actions, passive defense, advanced technologies, interoperability, regional defense planning, alliance and coalition cohesion, and harmonized strategic messaging—challenges of concern to all participants. NIMBLE TITAN has been a gateway for the U.S. to establish crucial relationships with allies and partners. It also informs the missile defense policies of the participating nations and international organizations. Events like NIMBLE TITAN foster greater confidence in combined missile defenses and provide a means to advance U.S. efforts in collaboration, integration, interoperability, and burden sharing with our allies and partners.

Additionally, we have successfully integrated allies directly into the JFCC IMD staff through the Foreign Liaison Officer (FLO) program. Our first FLO, a German Air Force officer, has been an integral player in NIMBLE TITAN, NATO BMD Training, and allied and partner modeling and simulation efforts. We are seeking to add additional

Foreign Liaison Officers to increase our understanding of allied missile defense policies, capabilities, and planning in order to optimize missile defense planning and force allocation.

Joint Missile Defense Training: In coordination with USSTRATCOM, the Joint Staff, Combatant Commands, and the Services, we continue to develop comprehensive and innovative training programs to close gaps between Service, joint, and regional missile defense training and education. JFCC IMD's Joint Ballistic Missile Defense Training and Education Center, or JBTEC, expanded its curriculum to meet warfighter demands. It now offers 15 mission-oriented resident and Mobile Training Team (MTT) courses, and online courses to include orientation, staff basic, and asset management training. Over the past year, JFCC IMD instructors executed 233 courses, training over 4,200 students worldwide. Additionally, in keeping with Joint Vision 2020, JFCC IMD provided training courses to our allies and partners through military-to-military and Foreign Military Sales training venues.

Warfighter Capability Acceptance and Integrated Master Test Plan: As missile defense architectures mature, warfighters require a credible, comprehensive assessment of new capabilities to inform operational acceptance into the global BMDS. The warfighter relies on a robust and operationally relevant test campaign to confidently field and integrate new capabilities into their existing IAMD architectures. As noted previously, warfighters supported the May 2017 FTG-15 GBI test which demonstrated the first ever Exo-atmospheric Kill Vehicle (EKV) intercept of an ICBM-class target. Also in 2017, JFCC IMD supported a successful intercept flight test of the U.S. and Japanese co-developed SM-3 Block IIA interceptor for Phase III of the European Phased Adaptive Approach (EPAA) architecture. In Fiscal Year 2019, the Department has an Aegis BMD and Aegis Ashore intercept test planned that will demonstrate the multiple simultaneous engagement of two IRBMs using the same EPAA Phase III architecture. The Navy and MDA will demonstrate fleet defense using a salvo of two SM-6 missiles. Additionally this year, we plan to demonstrate coordinated THAAD and Patriot interceptors in a simulated engagement using a live target.

In summary, JFCC IMD continues to expand our Nation's global missile defense architecture and explores future capabilities to maintain operational advantage against

current and future threats. Competitive edge is maintained through integrated planning and operational support, deliberate investments in our capability developments by MDA and the Services, investments in our warfighters through education and training, and expansion of collaboration with our allies and partners.

Conclusion

Chairman Rogers and Ranking Member Cooper, as a member of the joint missile defense community, the Army continues to pursue enhancements to the Nation's IAMD systems, from the tactical to the strategic levels of warfare. As outlined here, USASMDC/ARSTRAT and JFCC IMD perform a broad set of critical national security missions. These missions include providing professional warfighters and capabilities to support current operations, ensuring they are prepared for tomorrow's fight, and developing new technologies required to maintain a technological advantage against the adversary threat. Our trained and ready Soldiers, operating GMD elements in Colorado, Alaska, New York, California, and from remote, globally deployed locations, remain on point to defend the homeland against an ICBM attack. As a force provider to the GCCs, our Soldiers provide essential regional sensor capabilities, ballistic missile early warning, and satellite communications. Our regional forces continue to leverage allied collaboration and planning efforts in developing integrated and interoperable defenses against the various threat sets. USSTRATCOM, through the JFCC IMD, continues to integrate BMDS capabilities to counter global missile threats and to protect our Nation, deployed forces, allies, and partners.

While operational, doctrinal, and materiel developments are essential, our most important assets are the thousands of Soldiers, Sailors, Airmen, Marines, Civilians, and Contractors who deploy and operate our IAMD systems. As recognized by Department leadership, the strength behind our outstanding workforce is their Families. Their contributions and sacrifices are foundational to the dedication and performance of our workforce—the role and support of our Families empowers mission accomplishment.

I appreciate having the opportunity to address missile defense matters and look forward to addressing your questions.