

**Vice Admiral Jon A. Hill, USN
Director, Missile Defense Agency
Before the
House Armed Services Committee
Strategic Forces Subcommittee
June 15, 2021**

Good morning, Chairman Cooper, Ranking Member Turner, and distinguished Members of the subcommittee. The Missile Defense Agency budget request of \$8.917 billion for Fiscal Year (FY) 2022 will enable the continued execution of the MDA mission to design, develop and deploy a layered Missile Defense System to defend the United States, deployed forces, allies, and friends from missile attacks in all phases of flight. I look forward to your continued support of this mission and this opportunity to testify before you today on Missile Defense Agency (MDA) programs and activities.

U.S. adversaries are developing more capable ballistic, hypersonic, and cruise missiles, systems with global reach, increased speed and maneuverability, greater accuracy, and improved countermeasures. North Korea is developing long-range ballistic missiles that threaten the United States and our allies in the Indo-Pacific region while also testing shorter-range maneuvering missiles. Iran continues to develop more sophisticated missiles with improved accuracy, range, and lethality. Iran is also fielding an array of increasingly accurate short- and medium-range ballistic missiles. Iran has demonstrated the ability to combine ballistic or cruise missiles with unmanned aerial vehicles in complex attacks. Russia and China operate advanced ballistic and cruise missile forces, and they are developing and deploying advanced air- and surface-launched long-range cruise and hypersonic missile capabilities.

Hypersonic missiles are being developed to bypass perceived U.S. missile defense capabilities. Regional hypersonic missiles are capable of holding deployed U.S. forces, allies, and partners at risk. Hypersonic glide vehicles delivered by ballistic missile boosters will pose new challenges to our regional missile defenses. Moreover, U.S. adversaries and strategic competitors will increasingly use cyber capabilities to seek political, economic, and military advantage over the United States and its allies and partners, including intelligence gathering on and disruption of U.S. missile defense systems.

Improving Warfighter Readiness

While the United States relies on nuclear deterrence to protect against large and technically sophisticated Russian and Chinese intercontinental missile threats to the U.S. homeland because defending against these missiles is cost-prohibitive and not technically feasible, MDA is developing and deploying homeland missile defense capabilities to address the limited but growing rogue-state offensive missile threats. At the same time, in order to address regional missile threats from any adversary, MDA is developing and deploying credible capabilities for regional defense. Rapidly advancing missile threats require MDA to employ streamlined and agile acquisition approaches to pace the threat. The Warfighter Involvement Process (WIP), led by U.S. Strategic Command, is essential for cross-coordination with all Combatant Commands and Services and results in a single set of prioritized Warfighter requirements to drive MDA investment. The WIP, coupled with the Department's missile-defense governance process, has enabled MDA's ongoing and collaborative relationships with Combatant Commands with strong partnerships across the Services and Military Departments.

Over the past year, MDA responded to and supported the Combatant Commanders and Services by delivering and sustaining sensors, battle management, engagement systems, and sustainment, all while adhering to DoD pandemic measures. MDA provides sustainment support to the Lead Services around the clock for virtually every individual component of the Missile Defense System, including testing, integration, system, and software certification, missile maintenance and recertification, and technical and logistics support.

MDA continues to make significant progress in cybersecurity by incorporating system-level requirements into system specifications and then implementing rigorous evaluation-based testing and assessments. We established a Defensive Cyberspace Operations organization, augmented the workforce with certified cyber teams to evaluate the effectiveness of cyber capabilities and implement structures to enhance our cybersecurity posture. MDA is building cybersecurity into next-generation software processes by leveraging proven secure software development, security, and operations, and establishing continuous integration. We are also closely collaborating with our Defense Industrial Base partners to protect MDA and supplier information.

Delivering Capability to Build Combatant Command and Service Capacity

MDA remains committed to developing, delivering, sustaining, and improving the nation's missile defenses and delivering capability to the Warfighter.

Space and Terrestrial Sensors

We must continue to improve sensor, and discrimination capabilities. Space is a critical domain for addressing rapidly advancing missile threats across multiple regions. SKA uses a

network of infrared sensors hosted on commercial satellites to deliver a hit and kill assessment capability for homeland defense. On-orbit SKA sensors have participated successfully in a variety of MDA flight tests and engineering activities. SKA collected hit assessment data during the 2019 GMD salvo intercept test Flight Test GMD Weapon System (FTG)-11. The effectiveness of SKA during FTG-11 drove the decision to accelerate SKA as an operational asset. SKA is currently providing situational awareness to USNORTHCOM during declared Periods of Heightened Activity. In FY 2022, MDA plans to complete development of the operational hit-assessment software code, continue developing kill-assessment algorithms and threat models, and finalize integration of SKA into the C2BMC operational interface. This will deliver an operational hit assessment capability in 2023 and a follow-on kill assessment capability.

MDA is developing a Hypersonic and Ballistic Tracking Space Sensor (HBTSS) capability to meet critical Warfighter requirements in collaboration with industry partners, U.S Space Force, USNORTHCOM, USSTRATCOM, USSPACECOM, and the Space Development Agency. Once deployed, HBTSS will be a key missile defense element by providing a persistent, global capability to detect and track dim boosting ballistic missiles, hypersonic glide vehicles, including raids. HBTSS will be integrated into the Overhead Persistent Infrared (OPIR) Enterprise Architecture and provide increased sensitivity for missile warning. HBTSS will contribute to regional missile defense against stressing threats, providing fire-control quality tracking data on hypersonic and ballistic threats for hand-over to missile defense sensors for engagement. MDA awarded two agreements earlier this year to continue the design efforts initiated in previous phases of the HBTSS program. Each performer will build an on-orbit prototype-

demonstration satellite for a planned launch in 2023. In FY 2022, as we continue tracking algorithm maturation and commence flight infrared sensor payload assembly and integration, MDA also will acquire launch services through the United States Space Force's National Security Space Launch.

After over a decade of service, the Space Tracking and Surveillance System (STSS) satellites will be decommissioned in March 2022. STSS will have supported MDA Space Research and Development for over 12 years, eight years past its design life. The program surpassed all its technical objectives, demonstrating the value of space-based missile tracking and serving as the vanguard for the next generation of missile defense space systems.

MDA is developing, deploying, and sustaining ground-based radars to counter current and future missile threats, build Warfighter confidence, and increase force structure. We are also investing in a robust sensor architecture that supports missile defense weapon systems by providing highly accurate midcourse tracking, discrimination, and battle damage assessment. MDA continues to provide software updates to the fleet of TPY-2 radars, the Sea-Based X-band (SBX) radar, five Upgraded Early Warning Radars (UEWRs), the COBRA DANE radar, and mobile Aegis Integrated Air and Missile Defense ships equipped with the SPY-1 family of radars.

Construction continues on the most advanced ground-based radar in the world, the Long Range Discrimination Radar at Clear Air Force Station, Alaska. Construction continued this year, despite a work stoppage over several months and steps to mitigate the spread of the Coronavirus. We completed installation of the primary array panel on November 30, 2020 and the secondary array earlier last year, and work is ongoing to complete the integration of critical radar components. The programmatic impacts of the work stoppage have caused the

Congressional mandate of Initial Fielding to be delayed until first quarter FY 2022. Following operational acceptance in second quarter FY 2023, the radar will provide precision tracking, persistent long-range midcourse discrimination, and hit assessment to support a capability against long-range missile threats in the Pacific theater to the U.S. homeland and conserve the number of Ground Based Interceptors (GBIs) required for threat engagement. LRDR also supports space domain awareness.

SBX is an advanced sea-mobile radar that provides precision midcourse tracking and discrimination capabilities. This past year the vessel supported operations, testing, and data collection while receiving numerous resupply and refueling missions on-station in the Pacific Ocean. SBX collected critical data from MDA and Air Force flight tests, which we use to improve sensor discrimination and demonstrate debris mitigation improvements. This capability enables higher precision target viewing, especially in highly cluttered scenes. SBX remained at-sea for 350 consecutive days prior to entering a maintenance period at Pearl Harbor, Hawaii in September 2020. In FY 2022, plans are for SBX to spend approximately 305 days at-sea to collect flight test data and conduct contingency operations for defense of the homeland. We plan to replace the processors to address obsolescence and increase processing capabilities.

MDA will continue to sustain and provide updates to the Upgraded Early Warning Radars (UEWRs). This past year MDA completed upgrades at Clear Air Force Station (AFS), Alaska and Cape Cod AFS, Massachusetts, joining the UEWRs at Royal Air Force (RAF) Fylingdales, England, Thule Air Base, Greenland, and Beale Air Force Base, California. These radars support missile defense of the homeland, detection of ballistic missile attacks, and conduct general space surveillance and satellite tracking. U.S. Space Force operationally

accepted Cape Cod AFS on November 3, 2020, and Clear AFS is scheduled to be presented to U.S. Space Force for operational acceptance by May 2021. Additionally, we completed the Digital Signal Processor Upgrade operational testing at RAF Fylingdales in March 2021 and will complete the same at Thule Air Base in June 2021.

MDA supports operation of two TPY-2 (Forward Based Mode) radars in Japan and in Israel, Turkey, and USCENTCOM. We continue to support the TPY-2 radar (Terminal Mode) as part of forward-deployed Terminal High Altitude Area Defense (THAAD) batteries in USINDOPACOM. Plans in FY 2022 include developing TPY-2 advanced discrimination algorithms to identify and track advanced threats to support operations and ground testing.

Command and Control, Battle Management and Communications (C2BMC)

C2BMC integrates the Missile Defense System and provides multiple Combatant Commanders with global, persistent, space-based infrared, land-, and sea-sensor acquisition, tracking, cueing, discrimination, and fire-control quality data to support U.S. and coalition-partner missile defense operations. C2BMC supports homeland and regional missile defense operations as well as space domain awareness. As the “brain” of the integrated Missile Defense System, C2BMC operates in a joint, multi-domain environment, interfacing with Army, Navy, Air Force, Space Force, NATO, and international systems. C2BMC provides decision makers a common operating missile defense picture capable of distributing integrated fire control quality data for external launch- and engage-on-Remote sensor operations. This capability supports global missile defense situational awareness, coalition operations, weapons release authority for homeland defense, and provides the capability to control and task a variety of sensors.

In FY 2022, MDA will continue to sustain the C2BMC fielded capability in U.S. Northern Command (USNORTHCOM), U.S. Indo-Pacific Command (USINDOPACOM), U.S. European Command (USEUCOM), U.S. Central Command (USCENTCOM), U.S. Strategic Command (USSTRATCOM), and U.S. Space Command (USSPACECOM) Areas of Responsibility. The next C2BMC upgrade, Spiral 8.2-5, builds on the currently fielded spiral to provide the integrated missile defense system and the U.S. Space Force the capability to command and control the Long Range Discrimination Radar (LRDR). LRDR enhances discrimination and fire control tracks for Ground-based Midcourse Defense (GMD). Additionally, this spiral upgrade to C2BMC adds advanced threat tracking and reporting while providing an initial space sensor tasking capability by tasking TPY-2 radars, Aegis SPY radars, and the LRDR for the critical space domain awareness mission. Our plans for future C2BMC spiral upgrades will provide initial integration with the Army's Integrated Battle Command System (IBCS), a Space-based Kill Assessment (SKA) hit assessment feature, and a debris-filtering feature from external sensors. C2BMC is also expanding support to space domain awareness by partnering with the U.S. Space Force to integrate key Space Surveillance Network sensors with missile defense sensors and communications architecture, providing USSPACECOM with an enhanced, near-real time, satellite tracking capability. We will continue risk assessments to identify and mitigate vulnerabilities.

Homeland Defense

The Department is committed to improving U.S. homeland missile defenses to counter limited missile threats from rogue states. The GMD system serves as the continuously available backbone of homeland missile defenses and is capable of defending against today's rogue state

ballistic missile threat to the homeland. We plan to upgrade and replace ground system infrastructure, fire control, and kill vehicle software to improve reliability, capability, availability, and cybersecurity. The entire GMD weapon system is currently undergoing a Service Life Extension Program (SLEP), with focus on GBI reliability and availability. We will incorporate flight-test lessons-learned in future GBI fleet upgrades while modernizing key components of the ground systems.

MDA also is developing the capability to provide the Warfighter the option of either flying the GBI using a 3-stage burn trajectory or not igniting the third-stage to provide performance similar to a 2-stage boost vehicle. This approach will improve homeland defense performance by optimizing engagement times. We plan to demonstrate this capability in the next GMD flight test, GM Booster Vehicle Test (BVT)-03, in fourth quarter FY 2021, and subsequently field it on all boost vehicle configurations. The initiation of the Next Generation Interceptor (NGI) program and SLEP activities will extend the existing GBI fleet service life beyond 2030.

MDA will improve the interceptor fleet with NGI development, with deliveries starting no later than 2028. The program will leverage the valuable technical information developed under previous MDA technology initiatives. NGI development allows trades between boost vehicle and payload, improves system survivability, and increases performance against projected rogue-state threats. Pursuing two industry approaches through Critical Design Review will reduce technical risk, secure competitive production pricing, and create incentives for early delivery to the Warfighter. MDA also is pursuing multiple contracts to support the growth and sustainment of the GMD Weapon System. As replacement for the current sole-

source Development and Sustainment Contract, MDA is pursuing a competitive acquisition strategy to satisfy future GMD weapon system requirements for future, integrated increments, enhancing GMD system engineering, integration, test, and readiness.

Regional Defense

We continue to develop new capabilities for regional missile defense.

Globally deployed and land-based Aegis BMD capabilities are critical to the nation's integrated defense for our deployed forces, allies, and partners. Aegis BMD is designed to intercept SRBMs and MRBMs in the midcourse and terminal phases of flight and IRBMs in midcourse. We will continue advancement of Aegis BMD, including continued delivery of Standard Missile (SM)-3 Block IB and Block IIA missiles, improved sea-based terminal defense, improvements in system and missile reliability, and increases in Aegis BMD engagement capacity and lethality in alignment with Navy requirements.

MDA will continue design, development, and integration of the Aegis Weapon System (AWS) with the SM-3 Block IB, Block IIA, and SM-6 missiles. This includes continued spiral development to pace increasingly complex threats in more stressing operational environments. Utilizing improved radar discrimination, we will increase Aegis performance against longer range and more sophisticated threats. We will continue adding advanced algorithms to increase lethality to our air and missile defense capabilities and developing Aegis BMD weapon system software to enhance functionality and leverage more-capable radars. MDA is also working with the U.S. Navy to refurbish existing shipboard SPY-1 radar arrays to provide increased radar sensitivity and discrimination improvements. We also plan to integrate missile

defense capability with delivery of the Navy's Air and Missile Defense Radar, the SPY-6, for enhanced engagement capability and increased raid capacity.

In November 2020, together with the U.S. Navy, MDA conducted Flight Test Aegis Weapon System (FTM)-44. During this test, the Aegis Weapons System launched a SM-3 Block IIA interceptor from the USS JOHN FINN (DDG-113) and successfully intercepted a simple rogue state threat-representative ICBM-class target. While the AWS and SM-3 Block IIA interceptors were not designed to defeat an ICBM-class target, this test demonstrated some potential limited capability. This Congressionally directed flight test leveraged residual capability in Aegis and SM-3 Block IIA using engage-on-remote sensor capabilities through the C2BMC network. We continue to improve layered defense robustness. MDA is testing Aegis BMD with all Standard Missile interceptor variants, THAAD weapon system improvements, and continued C2BMC spiral upgrades. Test results and upcoming Departmental decisions will inform the future of these assessments.

MDA supports the European Phased Adaptive Approach as the U.S. contribution NATO's missile defense capability, providing coverage and protection of NATO's European territory, populations, and forces against the ballistic missile threat from outside the Euro-Atlantic region. Currently, there is a fully operational Aegis Ashore site in Romania and a second and final European site under construction in Poland. With FY 2022 funding, MDA will continue to support operations at the site in Romania and completion of construction at the site in Poland.

Aegis Ashore Poland is currently over 90% complete site-wide and over 95% complete for the critical elements of military construction required for the Aegis Weapon System. Progress remains slow but steady despite the challenges that COVID-19 has presented. MDA

continues to work closely with the U.S. Army Corps of Engineers (USACE) to address the remaining challenges to complete the military construction and start the follow-on MDA efforts to deliver Aegis Ashore Poland to the Navy, European command, and NATO. In June 2020, we achieved the Beneficial Occupancy Date for the Naval Support Facility buildings, which we turned over to the Navy. Military construction of the Deckhouse Facility continues and the Aegis combat system installation efforts may begin as early as spring 2021. MDA and USACE continue to monitor site conditions and partner with industry to integrate portions of the combat system equipment installation with ongoing construction where possible. The combat system installation is the first in a series of events leading to operational acceptance of the Aegis Ashore Missile Defense System Complex in Poland in FY 2022.

MDA activities under the increase joint force lethality category include funding for initial development of survivable and operationally effective integrated air and missile defenses for Guam to defend Guam from ballistic, hypersonic, and cruise missile threats. Funding includes development activities, such as additional integration between Army and Navy assets, designed to support a range of architecture options, pending upcoming Departmental decisions.

MDA also is furthering the ability of partner nations to operate seamlessly with U.S. air and missile defense forces to augment our international cooperative and FMS efforts. In May 2021, MDA and the U.S. Navy will participate in Formidable Shield-21, a joint NATO exercise with multiple BMD and IAMD events at the U.K. Ministry of Defense Hebrides Test Range, along with allied participants from Belgium, Canada, Denmark, Germany, Spain, France, Italy, the Netherlands, Norway, and the United Kingdom. In the Indo-Pacific region, we continue to exercise strong bilateral alliances with Japan, South Korea, and Australia to improve our

collective security in the Indo-Pacific. MDA is continuing our longstanding cooperative efforts with Japan as it seek to improve its existing missile defense capabilities, including acquisition of the SM-3 Block IIA missile, the result of U.S.-Japan cooperative development. MDA continues to support Japan's decision to re-align the Aegis Ashore Japan FMS case to an Aegis Equipped Surface Vessel. In August 2022, MDA will participate in Pacific Dragon-22, a multilateral international exercise at the U.S. PMRF in Hawaii, along with allied participants from Japan, South Korea, and Australia.

The THAAD weapon system is a globally transportable, ground-based missile defense system that is highly effective against SRBM, MRBM, and IRBM threats inside and outside the atmosphere in the terminal phase of flight. MDA currently supports forward-deployment of two batteries stationed in the USINDOPACOM area of responsibility. THAAD has proven increasingly integral to the Defense Department's regional defense architecture. MDA received a congressional increase in FY21 for an additional THAAD battery and 30 Heavy Expanded Mobility Tactical Trucks. This congressional action expands the Army capacity to eight THAAD batteries. We will continue THAAD interceptor procurement, obsolescence mitigation efforts, production and training support, the THAAD Stockpile Reliability Program, and the initial procurement of required THAAD Battery Ground Component enhancement modifications to meet growing cybersecurity threats. MDA will continue development and integration of multiple, independent THAAD software builds to address the evolving threat, improve the Warfighter's defense planning, and improve system capability.

MDA is providing a more robust integrated air and missile defense capability, one that integrates THAAD, Patriot, and at-sea Aegis ships into a seamless network. One focus area is

the integration of THAAD and Patriot weapon systems. Patriot Launch-on-Remote (THAAD) capability will increase Patriot-defended area and engagement opportunities by allowing the Patriot Advanced Capability-3 Missile Segment Enhancement (MSE) interceptor to launch using the THAAD radar information, prior to the Patriot radar acquiring the threat. On February 20, 2020 we demonstrated, with the U.S. Army, functionality required for Patriot Launch-on-Remote (THAAD) capability in Flight Test Patriot Weapon System-27 (FTP)-27 Event (E)2. We executed FTP-27 E1 on October 1, 2020, at White Sands Missile Range, NM, demonstrating Patriot Launch-on-Remote engagement of a SRBM target using MSE interceptors and THAAD radar track and discrimination data. This improved integration demonstrated the ability to expand the Patriot battery defended area.

As the Foreign Military Sales (FMS) Implementing Agency for THAAD, MDA is executing FMS THAAD cases with the United Arab Emirates (UAE) and the Kingdom of Saudi Arabia (KSA). We continue to work the KSA FMS case, which includes seven THAAD batteries, 44 launchers, 360 interceptors, and associated equipment and support. MDA will work with the KSA to commence delivery of the THAAD capability by the middle of this decade. MDA also will continue work with the UAE to maintain and sustain its two THAAD batteries.

We have a valuable cooperative missile defense relationship with Israel. Not only can we help our partner develop systems to strengthen its missile defenses and increase interoperability with U.S. forces, but we also learn a great deal from a battle-hardened nation experienced in defeating missile threats. MDA and the Israel Missile Defense Organization (IMDO) continue to cooperate on engineering, development, co-production, testing, and fielding of the Arrow Weapon System (AWS), the David's Sling Weapon System (DSWS), and co-

production for the Iron Dome Defense System (IDDS). In 2020, MDA and IMDO cooperatively planned and successfully executed two critical flight tests. On August 12, 2020, Arrow System Test-18a (AST)-18a, an Arrow-2 interceptor flight test, demonstrated system processes, collected data for the next upgrades, and allowed for risk reduction testing of the DSWS through live intercept of the MRBM target. In December 2020, we successfully completed a series of DSWS intercept tests in an advanced system configuration against threats simulating cruise missiles and theater ballistic missiles. David's Sling Test 7 (DST)-7 proved DSWS capability against cruise and theater ballistic missiles, allowed for risk reduction testing of the AWS and IDDS, and was a key milestone in DSWS development. In FY 2022, MDA will support several flight tests across the Israeli portfolio.

Developing Technology for the Future

MDA is investing in innovative and disruptive technologies to address the emergence of new and more advanced threats. MDA's previous missile defense technology investments have transitioned into weapon systems and vastly improved interceptor seeker capability, increased the speed and range of intercept with advances in propulsion, and increased the probability of single-shot kill using multifaceted tracking and discrimination algorithms. To be responsive to evolving missile threats, we must continue to sustain, modernize, and expand missile defenses by pursuing rapid, yet measured, development of advanced missile defense concepts and technologies for homeland and regional defense.

Potential adversaries such as Russia and China continue to expand the capability and capacity of their regional offensive missile inventories, to include regional hypersonic missile

capabilities. The altitude at which these weapons fly, coupled with their aerodynamic maneuverability, make them a challenge for existing air and missile defense systems. We are investing in technology to counter these new and emerging threats by upgrading sensors and C2BMC for early warning, identification, and tracking of regional and strategic hypersonic threats, leveraging existing systems where possible to develop a layered defensive architecture against regional hypersonic threats, and making technology investments for increasing hypersonic defensive capabilities. Consistent with long-standing U.S. policy, MDA is not developing or deploying capabilities to defend the U.S. homeland against near-peer strategic hypersonic missile threats, as we rely on nuclear deterrence to address these more complex threats.

A layered hypersonic defense architecture is the most effective way to address the regional hypersonic threat. As with ballistic missile threats, the more opportunities to neutralize hypersonic threats, the better. MDA is taking steps to deliver regional, layered hypersonic defense capability to the U.S. warfighter incrementally. We are working closely with the Department of the Navy to develop and field SBT to provide the U.S. Warfighter terminal phase defense against regional maneuvering and hypersonic threats. MDA demonstrated SBT capability at-sea utilizing the AWS with SM-6 for defense against advanced ballistic missile threats during FTM-27, demonstration events conducted in December 2016 and August 2017. Upcoming flight test FTM-31 Event 1 will further demonstrate this SBT capability. MDA is anticipating SBT Increment 3 upgrade and delivery in 2024, including terminal defense capability against some regional hypersonic threats. MDA also is augmenting data on

hypersonic threats provided by the intelligence community by collecting and analyzing data from various sensors participating in U.S. hypersonic flight-testing.

To complement this terminal capability, MDA is taking steps to develop an initial glide phase intercept capability leveraging the Aegis weapon system to provide the U.S. warfighter with increasingly capable and layered regional defensive capabilities over time. In FY 2022 MDA will accelerate the development of an operational demonstration of a glide phase defense capability against regional hypersonic threats using the Aegis Weapon System. We are also developing hypersonic target systems to support robust testing.

MDA is investing in the technology development necessary for the next increment of capability, including internally-cooled seeker technology, axial upper stage capability, robust and resilient materials for hypersonic flight, and novel guidance and control capability. We will continue to strengthen efforts to deter and counter these rapidly advancing missile threats.

In response to USNORTHCOM requirements, MDA will analyze the current systems architecture for cruise missile defense of the homeland and conduct a demonstration of cruise missile defense capabilities using the Joint Tactical Integrated Fire Control (JTIFC) capability within the National Capital Region. JTIFC enhances integrated fire control capabilities across the Services by connecting existing sensors, command and control systems, and weapons at the tactical level through real-time sensor networks.

MDA continually assesses emerging and disruptive technology for potential applications to missile defense utilization. We are pursuing efforts in artificial intelligence, machine learning, nanosat technology, Left-through-Right Integration, cybersecurity, and quantum science. Key to this assessment has been the development of testbeds that allow us to exercise

and demonstrate capabilities and test new concepts, algorithms, simulations, and software. We are also expanding technology opportunities through cooperative, collaborative engagements with DoD partners and our allies.

MDA Workforce

During this unprecedented global health crisis, the MDA workforce continues to execute the missile defense mission in spite of pandemic challenges and restrictions. We were able to ensure the health and safety of the workforce while providing tools and platforms enabling continued mission success. In line with the 2020 Federal Employee Viewpoint Survey results and our initiatives to improve our culture of excellence, the MDA workforce has become even more engaged, committed, satisfied and confident in our leadership and mission.

Conclusion

Chairman Cooper, Ranking Member Turner, Members of the Subcommittee, we will continue to increase the readiness as well as the capability and capacity of fielded homeland and regional missile defense systems while investing in advanced technology to counter adversary ballistic and non-ballistic missile threats. MDA will continue to execute a robust and aggressive test program critical to system development to outpace future offensive missile systems in order to defend the U.S. homeland, U.S. deployed forces, and our allies and international partners. We also will continue to work closely with the Intelligence Community, the Services, and the Combatant Commands to ensure MDA is meeting the demand of the Warfighter.

Finally, I would like to recognize the men and women who serve in our Armed Forces at home and abroad and who operate the integrated Missile Defense System. Our Nation benefits greatly from such a highly skilled and dedicated fighting force.

I appreciate your continued support for MDA and the missile defense mission, and I look forward to answering the committee's questions. Thank you.