

**HOLD UNTIL RELEASED
BY THE COMMITTEE**

RECORD VERSION

STATEMENT TESTIMONY OF

MS. MARY J. MILLER

PRINCIPAL DEPUTY, ASSISTANT SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

**BEFORE THE UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON ARMED SERVICES**

SUBCOMMITTEE ON EMERGING THREATS AND CAPABILITIES

MARCH 14, 2018

Chairwoman Stefanik, Ranking Member Langevin, and distinguished members of the Subcommittee, I am pleased to come before you today to testify about the state of the Department of Defense's science and technology (S&T) program for Fiscal Year 2019 (FY19). I am proud to be here representing the scientists and engineers within the S&T enterprise.

The United States Military remains the best fighting force in the world. We are proud of our men and women who are willing to make the ultimate sacrifice for our country, and we do everything possible to provide them the absolute best training, equipment, and medical care possible. However, one area where we are losing our lead on the global stage, is science and technology.

Technology Transforming the Battlespace

For decades, our adversaries have watched how we conduct warfare. They know how we fight. They've seen our equipment, watched our tactics, techniques and procedures, and determined our concepts of operation. They've had time to assess both our strengths and our weaknesses, and have invested in technology and capabilities that exploit our way of doing business. They don't go against our areas of strengths, they take advantage of our perceived weaknesses.

We live in a time of global access to technology and scientific talent. This easy access is part of the reason we can no longer claim clear U.S. technological superiority within the world. In a world with near equal access to technology, speed is becoming a discriminator. Not just speed of discovery, but speed of delivery. How fast we can develop, adopt, or leverage technology to meet the warfighter's needs and get it into their hands, will determine our ability to outpace our adversaries.

Rapid technological change being exploited includes developments in advanced computing, big data analytics, artificial intelligence, autonomy, miniaturization, additive manufacturing, meta-materials, directed energy, and hypersonics, the very technologies that ensure we will be able to fight and win the wars of the future.

Many of these advances are driven by commercial sector demands, as well as research and development. New commercial technologies will change society, and will ultimately change the character of war. The fact that many of these technological developments will come from the commercial sector means that state competitors and non-state actors will also have equal access. We must accept the reality that we will no longer be able to sustain decades of overmatch like that enjoyed with the First and Second Offset strategies. We need to be adaptive and flexible, and continue to modify our methods so that we remains an unpredictable force to our adversaries. This will become our advantage.

In this competitive environment, the Department must pay much more attention to future readiness, and regaining our Joint Force conventional overmatch over time. We must be willing and able to tap into commercial research, recognize its military potential, and develop new

capabilities and the operational and organizational constructs to employ them faster than our competitors.

Now more than ever is the time to look at ourselves in the same way our adversaries look at us. We are and must remain open-minded to new ways of executing missions. Key DoD laboratory research coupled with industry and academic partnerships, stable budgets, sound investment decisions, and effective acquisition processes are all critical to sustain US technical superiority. The DoD is pushing the envelope with innovative and cutting edge research coupled with new approaches to solving problems in order to ensure U.S. technical dominance.

Threats Exist Across All Domains

Adversaries are moving to next generation capabilities across all domains: air, land, maritime, space and cyber. China and Russia are at parity or surpassing the US in the range, speed, and lethality of some of our weapons and platforms. We are now on-par or outranged by Russian and Chinese rocket and artillery capabilities. Russian and China continue to develop and modernize their extensive nuclear forces and long range precision-guided conventional weapons systems.

China and Russia can hold U.S. and allied positions at risk – amplifying capabilities to detect, track, and target threats in varying conditions, larger volumes, and at greater distances, extend China’s integrated air defense systems.

Determining Strategic Priorities in a Global Context

At the beginning of the year, President Trump released the National Security Strategy (NSS) and Secretary Mattis released the National Defense Strategy (NDS). These are two very important documents for the safety and security of the country, and there are strong ties between them and where the innovation enterprise is heading. The common theme in the NSS, NDS, and Defense Science and Technology Enterprise strategy is a strong focus on threat-based mission scenarios.

The risk of conflict is higher now than at any time since the end of the Cold War. Immediate threats in the next year are apparent as our adversaries and malignant actors use all instruments of power, including information and cyber means, to shape societies, markets, international rules and institutions, and international hot spots to their advantage. We must develop new lethal capabilities and accelerate the pace in which we get that capability to the warfighter.

Secretary Mattis is focused on strengthening military readiness by increasing lethality of the force, strengthening our alliances and collaborating with allies whenever and where possible, and forming the Department of Defense through budget discipline and increased accountability. He has said, “When it comes to security, no one goes their own way in this world alone. Security is always best when provided by a team.” The NDS, the first to be released in 10 years, is a

comprehensive strategy intended to pursue urgent change on a significant scale. His solution to strengthening the military (similar to his solution on reforming the DoD business model) is to increase the budget for military spending, repeal the Budget Control Act and make sure that the money is spent recruiting personnel, updating technology and weapons, and making sure we have the capability to fight in more than one realm at a time to the fullest of our ability.

The Need and Path to Modernization

Members of Congress, specifically this subcommittee, have received a lot of information on the current threats and where the U.S. stands on the technology spectrum. The creation of the Under Secretary of Defense for Research and Engineering (USD(R&E)) ensures U.S. technology dominance remains a priority within the Department of Defense. Building upon our strengths and pivoting to lethality, surprise, and continuous speed will help us become a mission-focused department that puts kill chains over systems, heterogeneity over uniformity, and adaptability over performance. In short, allows us to realize warfighting constructs like networked adaptive multi-domain joint battle. The enterprise continues under the USD(R&E) to assess capability gaps and needs by missions vice system or Service, and we remain committed to leveraging Service efforts for resourced integrated prototyping and experimentation activities with outcomes focused on mission effectiveness.

The nation faces a myriad of threats daily. With changing competition, we are forced to stay vigilant in our efforts from basic research to advanced capabilities. The DoD R&E enterprise provides the technological foundations that ensures our military of the future remains the most capable in the world.

We must establish a unifying goal within the Department: to align the Service efforts to ensure that we can achieve a Joint Force that dominates in Networked Adaptive Multi-Domain Joint Battle. In order to achieve this goal, we must establish resources for concepts that will be competitively selected and move to a mission-focused portfolio managed schema, vice individual platform approach. This will ensure that we focus on both new capabilities and operational constructs.

The Science and Technology Enterprise Vision

The Department is in the process of standing up the first Under Secretary of Defense for Research and Engineering. Dr. Mike Griffin, the recently confirmed USD (R&E) will operate with a mission focus. This means that we will move from Service oversight focus to Combatant Command (CCMD) enabling focus. We will assess capability gaps/needs by mission vice system or Service. We will also ensure resources are integrated via prototyping/experimentation activities to leverage Service efforts with outcomes focused on mission effectiveness. We will engage the CCMDs and operators in mission analysis and experimentation to develop new CONOPs.

One of the most important functions of the USD(R&E) is to set the technical direction for the Department of Defense. This is more than just recommending the path forward. To ensure warfighters have what they need, we have to continue to engage with them. The USD(R&E)'s mission is to work with operations personnel to develop new concepts of operations through mission analysis and experimentation, and pilot new acquisition pathways to speed and capability to the warfighter. It is important for our enterprise to utilize intelligence products, technology forecasting, and analysis to inform decisions on investment, prototyping, experimentation and emerging capabilities and concepts of operation. We will focus on driving effectiveness and affordability by addressing drivers in acquisition, testing, and sustainment into the system design phase, setting and adhering to open architectures and interface standards while implementing good systems engineering/cyber resiliency practices. The USD(R&E) will establish and embrace a collaborative culture focused and to pilot new acquisition pathways for speed in providing capability to the warfighter.

Leveraging the Entire R&E Ecosystem

The DoD Labs, Engineering and Warfare Centers and the Defense Advanced Research Projects Agency (DARPA) continue to engage with all partners – global, academia and industry, Federally Funded R&D Centers and University Affiliated Research Centers, , and all our nontraditional assets –Strategic Capabilities Office (SCO) and Defense Innovation Unit Experimental (DIUx). These assets ensure that we win today's fight, design and acquire for the next fight, and push acceleration of science and technology which results in driving ideas to capabilities.

The DoD has 63 laboratories and engineering/warfare centers that provide expertise and insight to enhance our warfighters capability. Those labs and centers are the foundation of the Department.

DARPA focuses on making pivotal investments in breakthrough technologies for national security. DARPA explicitly reaches for transformational change instead of incremental advances in the development of emerging technologies for use by the military. Since its inception, the agency's mission is ensuring that the United States avoids further technological surprise.

SCO's mission is to create innovative ways of using existing military and commercial systems to win tomorrow's war surprisingly, and buy time for future technologies to emerge. These capabilities bolster our conventional deterrence advanced adversaries, while assuring allies and partners.

DIUx was established to accelerate commercial innovation to the warfighter in order to meet the changing demands of today's strategic and technological environment. Their mission is to pilot cultural change within the DoD – to break with past paradigms of military-technical advantage and to become fast adapters, as opposed to sole developers, of technology, integrating the advanced commercial capabilities necessary for strategic advantage.

Smaller programs such as the Small Business Research (SBIR) program and the Small Business Technology Transfer (STTR) are highly competitive programs that encourage domestic small businesses to engage in Federal Research and Development (R&D) that has the potential for commercialization. Through a competitive awards-based program, SBIR enables small businesses to explore their technological potential and provides the incentive to profit from its commercialization. By including qualified small businesses in the nation's R&D arena, high-tech innovation is stimulated and the United States gains entrepreneurial spirit as it meets its specific research and development needs.

In 2012, we established 17 cross-cutting technology working groups composed of Service/Agency Subject Matter Experts, called Communities of Interest (Col's), that sought to reduce perceived redundancy and synchronize the DoD research being done across three main focus areas: mission, systems/capabilities, and technology. These Col's not only provide invaluable capability gap insight, they have created stronger collaboration among the Services to address shared problems. This collaboration has increased the Enterprise's efficiency and effectiveness in addressing the Department's capability gaps.

Workforce

All of these efforts and programs are not possible without our scientists and engineers who are doing groundbreaking and innovative work. They are embracing the hard challenges our military faces every day, seeking to better understand the Warfighter's problems and working diligently on solutions. Our ability to continue to maintain our technological edge in the future depends on the next generation of DoD scientists and engineers. DoD has a responsibility and critical interest in the development of STEM-literate individuals to maintain and grow the talent pool to ensure technical dominance in the future.

The Department of Defense laboratories throughout the US where cutting edge research and development is occurring every day in support of our Nation's Warfighters. We employ nearly half (46 percent) of all scientists and engineers within the Federal Government (>100,000 as of December 2015).

But DoD has a growing need for increasing the number of Scientists and Engineers in their workforce. As I mentioned earlier, technology is global and accelerating at a rapid pace. New technical competence and expertise is required. It is incumbent upon us to help develop (and maintain) a STEM pipeline.

The Department recognizes that we need more than just the best technology. We need the best people too. That's both a challenge and an opportunity. A challenge because we require a STEM workforce made of predominately US citizens. An opportunity because we have tough problems to solve that allow for new approaches. Because we offer unique experiences like apprentice and intern programs that allow high school and college students to directly apply what they are learning in the classroom, to get a firsthand view of what it means to be a laboratory scientist. An example of one of these opportunities is our Science, Mathematics and Research for Transformation (SMART) scholarship-for-service-program.

We strive to provide the best STEM opportunities and education programs to help train, maintain, and retain the best STEM workforce available. For the Department of Defense, for our Defense Industrial Base, and for the Nation as a whole.

Conclusion

The U.S. military has long relied on high quality people, technological superiority, innovative operational and organizational constructs, and our unmatched ability to fight as a Joint Force. We are addressing the erosion of technological superiority by identifying and investing in innovative technologies and processes to sustain and advance America's military

As the Department looks to the future, we strive to ensure that the nation is the first to develop and adopt the novel capabilities made possible by bold, risk-tolerant investments in high impact technologies. The innovation enterprise remains committed to not only creating new potential technologies but also to help transition those technologies to the Services or other sectors where they can be implemented in support of national security.

Our goal must always be to ensure that our Soldiers, sailors, airman, and Marines always have the scientific knowledge, the decisive technology, the advanced systems and tools, and the material edge to succeed when called upon. Our Research and Engineering Enterprise measures its success in the security of the nation and the success of our warfighters.

Let me close by thanking the committee for its strong interest in and support of the Department's Research and Engineering efforts as we work to discover, design and deliver technology capabilities our warfighters will need in the future. Thank you.