

RECORD VERSION

STATEMENT BY

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BEFORE THE

**SUBCOMMITTEE ON CYBER, INNOVATIVE TECHNOLOGIES, AND
INFORMATION SYSTEMS
HOUSE COMMITTEE ON ARMED SERVICES**

FIRST SESSION, 117TH CONGRESS

**ON REVIEWING DEPARTMENT OF DEFENSE SCIENCE AND TECHNOLOGY
STRATEGY, POLICY, AND PROGRAMS FOR FISCAL YEAR 2022: FOSTERING A
ROBUST ECOSYSTEM FOR OUR TECHNOLOGICAL EDGE**

MAY 20, 2021

**NOT FOR PUBLICATION UNTIL
RELEASED BY THE COMMITTEE ON ARMED SERVICES**

Chairman Langevin, Ranking Member Stefanik, and distinguished members of the Subcommittee, thank you for your continued support and for the opportunity to discuss Army Science and Technology (S&T) strategy, policy and programs—all designed to realize U.S. Army modernization priorities, founded on a robust S&T ecosystem, to enable our Soldier's technological edge. The Army's modernization enterprise, spearheaded by the Army Futures Command (AFC), includes a network of synchronized Laboratories and Engineering Centers, the major ones include: the AFC Combat Capabilities Development Command, the AFC Medical Research and Development Command (MRDC), the U.S. Army Corps of Engineers' Research and Development Center (ERDC), and the Space and Missile Defense Command's Technical Center (SMDTC).

Together with our partners sitting with me today, Army Labs and Centers are working with academia and industry to develop new technology that is driving near and mid-term modernization, and performing exciting research to discover and unlock knowledge that will enable yet to be imagined warfighting capabilities for the far-term.

Today, I will focus my remarks on how the Army is transforming the S&T business model, revitalizing the Army's Small Business Innovation Research (SBIR) program, increasing outreach to Historically Black Colleges and Universities/Minority Serving Institutions (HBCUs/MSIs), and cultivating exciting new basic research areas, and then I will briefly discuss our people and our laboratory infrastructure.

We are transforming the Army S&T business model—moving away from walled-off, "siloes-of-excellence" to a model that emphasizes the importance of early collaboration and frequent communication between the Requirements, S&T, Acquisition, Testing, Sustainment communities, our academic and industry partners, and most importantly our Soldiers. Under the joint leadership of the Assistant Secretary of the Army for Acquisition, Logistics and Technology (ASA(ALT)) and the Commanding General (CG) AFC, these communities are changing by collaborating in unprecedented ways: Army scientists and engineers are changing the way warfighting concepts and requirements are envisioned; which are, in turn, shaping longer term research projects and goals; Program Executive Offices are maturing an unprecedented number of

technologies emerging from S&T with reduced risk to performance, schedule and cost; and the AFC Cross Functional Teams (CFTs) are driving the entire enterprise to expediently deliver on our signature modernization programs to meet the demands of joint multi-domain operations.

Within the Army's S&T enterprise, we form partnerships using competitively awarded, cooperative research programs that maximize the exposure of our academic and industrial partners to the requirements and acquisition communities as soon as possible, driving innovation through increased understanding. We want Army scientists and engineers working side-by-side with the best and brightest scientists, engineers, and entrepreneurs from across the Nation as early as possible in the discovery and innovation cycle. Building upon the success of the Army Research Laboratory's (ARL) Regional labs, located in Los Angeles, Chicago, Boston, and Austin, the Army has created new innovation hubs focused on Research and Development (R&D) to support both well-defined and emerging Army priority areas. For example, the AFC Artificial Intelligence Center, located at Carnegie Mellon University's National Robotics Research Center in Pittsburgh, allows University and Army personnel to work closely together, focusing the brightest minds in the fields of Artificial Intelligence and Autonomy on Army problems. The Army is also partnering with Texas A&M and the University of Texas at Austin to conduct research and to develop unique laboratories for hypersonics, directed energy, and robotics.

I would be remiss if I didn't mention AFC's Project Convergence (PC), the Army's multi-year Campaign of Learning, where Army scientists and engineers stand side-by-side with industry partners, Army Acquisition professionals, and the AFC CFTs to evaluate new technologies using large-scale, Soldier-centered field experiments, seeking to integrate capabilities across the joint force to conduct Multi-Domain Operations. Under this project, the S&T community is given unprecedented access to our ultimate customers—Soldiers. PC is changing the model for conducting R&D in the Army—in a good way.

In Fiscal Year (FY) 22, we will open a competition for three new Basic

Research Centers to acquire knowledge and to train the next generation of American students who might be called to Federal Service to perform R&D in emerging modernization priorities:

1. Ultra-wide Band-Gap Radio Frequency (RF) Electronics Center: To study synthetic diamond electronic materials that can withstand extreme operating conditions to establish spectrum dominance over every frequency, range and environment.

2. Army Energetics Basic Research Center: To accelerate discovery of energetic materials that allow for tailorable effects and provide more explosive power in smaller packages. And the:

3. Army Center for Synthetic Biology Center: To develop fundamental understanding of materials spanning genetics, metabolism and the environment, and to develop models for new synbio applications to solve Army problems.

Our university partnerships are highly attuned to the state of today's world-order, and our collaborations with university professors and students are protected to ensure development of diverse, best-in-class American Science, Technology, Engineering and Math (STEM) talent. America's strength is derived from its ability to bring together a diverse group of people, with their thoughts and their ideas. The Army simply cannot accomplish its mission without the skills, dedication, and contributions derived from providing access to all Americans. We use our Basic Research portfolio to the fullest extent possible to facilitate such access.

The Army is committed to expanded collaboration with the HBCU/MSI community. We've started two new initiatives to expand research capabilities and build lasting partnerships: an HBCU/MSI-focused prize competition for students and faculty, and an Army HBCU/MSI Faculty Immersion Program. The prize competition will feature an Army research grant accelerator, where winning faculty and students will be awarded research grants sponsored through the Army Research Office. The Faculty Immersion Program will allow HBCU/MSI faculty to work in Army labs, followed by a period of supported research at their home institution.

Like our Sister-Services, we are fundamentally reshaping the Army's interaction with small businesses with an emphasis on non-traditional vendors, using the SBIR

program. The AFC Army Applications Lab's Special Program Awards for Required Technology Needs (SPARTN) program and the Army's Applied SBIR program are reducing the barriers to entry for SBIR awards and prizes by connecting small businesses with Army Acquisition Professionals using cohort and transition broker team models to connect small businesses performing R&D to Army Program Managers with well-defined needs. These models reduce the barrier to entry through hands-on explanation of some of the more challenging aspects of working with the Army for proposal submission, which can often seem like an insurmountable bureaucratic process. More importantly, these models are yielding more predictable, reliable, and cost effective pathways for technology adoption by helping small businesses focus on PEO-identified capability gaps, and identifying tech insertion points and funding opportunities. Recent SBIR topics have seen a ten-fold increase in submissions, some with up to 200 firms per topic, using a simplified and more intuitive application process (according to the firms). Thank you in advance for your continued support of the SBIR program.

The xTech Program is the flagship Army-wide prize competition, designed to identify and assess technology solutions using rapid vetting of non-traditional small businesses, startups and innovators. The xTech Program eliminates the "pay-to-play" roadblock faced by many cash-strapped businesses by providing: rapid, non-equity dilutive seed prizes, comprehensive feedback from Army experts, and direct exposure to Army and commercial stakeholders through networking, education and mentorship. Since 2018, the program has vetted over 2,000 small business technologies for potential use in Army systems, provided feedback on 16,000 proposals by 1,800 Army Subject Matter Experts, and awarded \$11 million in seed prizes, that led to over \$40 million in follow-on contracts.

The Army has established a joint governance structure whereby the ASA(ALT) and the CG AFC co-chair the Equipping Program Evaluation Group (EE PEG) to provide resource-informed decision making during the planning,

programming, and budgeting phases. The Army's Acquisition Executive, the ASA(ALT) is responsible for all matters Army Acquisition, Logistics and Technology. The AFC CG has the lead in prioritizing, directing, and executing all S&T efforts, operations, and organizations.

As the Deputy Assistant Secretary for Research and Technology, I support the ASA(ALT) as the Army Chief Scientist and the Service S&T Executive. I work very closely with my AFC "Battle Buddies," to develop the Army's S&T strategy, to plan and program resources, and provide Army Headquarters oversight for a sub-set of the EE PEG's Research, Development, Test and Evaluation (RDT&E) accounts, including the S&T budget activities 6.1 thru 6.3, technology maturation funds (6.4), manufacturing technology (6.7) and the SBIR program.

Under the joint EE PEG governance model, the Army is building a balanced S&T portfolio for near and mid-term technology insertion, for technology breakthroughs and for Basic Research. Our S&T strategy pays careful attention to supporting the signature 31 + 4 modernization priority efforts, while simultaneously supporting research aimed at fundamental, long-term change by investing at least 25% of our applied research and advanced technology development and 100% of our basic research resources to support such projects.

Overall, the Army's S&T portfolio has been strongly supported by the EE PEG co-chairs and the Army Senior leadership, the Office of the Secretary of Defense (OSD), and Congress. So far, the Army continues to hold the S&T budget top-line at zero percent real growth. I, for one, hope this trend continues, and I am very grateful for this subcommittee's continued support. Predictable and consistent funding is absolutely essential for the Army to achieve persistent modernization, and Science and Technology is modernization's foundation.

As the Army S&T Executive, I serve as the interface to Under Secretary of Defense for Research and Engineering (USD(R&E)) representing Army S&T equities, and ensuring S&T alignment with our Sister-Service labs' to address existing and emerging OSD S&T priorities. For example, we are supporting the development of Climate Change plans focusing on research to reduce the emission of green-house

gases. The Army's major emerging contribution is technology to electrify military vehicles, enabling a significant reduction in fuel usage through efficiency, while reducing the need for vehicles to idle to generate electrical power.

Army S&T has faced the COVID-19 pandemic head-on, while still significantly contributing to the modernization of our force. Today, I'd like to highlight for the record a few recent accomplishments of three of our Army Labs.

1. The AFC MRDC supports Army Medicine as the Army's R&D voice in defending the force against COVID in this whole-of-government effort. In the recent past, Army Medicine responded to the Severe Acute Respiratory Syndrome (SARS), Ebola, and Zika outbreaks. Since the outbreak of this pandemic, MRDC labs have leveraged their previous experience to participate in developing a vaccine candidate, therapeutics, and diagnostics in government/private partnerships with significant impact.

2. ERDC supports the Army by providing civil and military engineering, geospatial sciences, water resources, and environmental sciences research and development. ERDC also manages the DoD's High Performance Computing Modernization Program (HPCMP). The HPCMP made important contributions to the Nation's COVID-19 response by providing subject matter experts and HP Computer time for massive simulations of airflow inside cargo aircraft, analysis of potential treatment compounds, and COVID-spread modeling in support of FEMA.

3. Even during COVID, SMDTC's work has provided essential support to the Army's Rapid Capabilities and Critical Technologies Office (RCCTO) mission to deliver Army Air & Missile Defense Directed Energy prototypes to provide additional protection against existing and emerging threats to maneuverable and fixed forces. SMDTC's technical contributions in high energy laser component testing, and system modeling and analysis has helped position for technical success the Directed Energy Maneuver Short Range Air Defense (DE-MSHORAD) and the Indirect Fires Protection Capability High Energy Laser (IFPC HEL) programs, in order to meet rapid fielding requirements by FY23.

Army labs are powered by an S&T workforce that is diverse, technically competent, and highly educated. It is vital for the health of the enterprise to develop and retain a knowledgeable, high performing S&T workforce through a robust recruiting program, timely onboarding (including clearances) of S&T employees, and the reshaping of skill sets to meet emerging challenges. The Congressionally provided special personnel hiring authorities have been critical for Army laboratories to remain agile and competitive with the private sector. In the past year, Direct Hiring Authority has allowed Army labs to hire approximately 600 civilian employees (58% of scientist and engineer hires) in critical fields such as neuroscience, electronics, computer science, materials and aerospace engineering, as well as hiring physicists, biologists, chemists, mathematicians, and social scientists. Thank you for your continued support of these direct-hiring authorities.

To attract and retain world-class scientists and engineers, Army labs must have world-class research facilities and equipment. Due to myriad contributing factors, many research and test facilities have become obsolete and would greatly benefit from revitalization and recapitalization. We are making slow, but steady progress by relying on a spectrum of Congressional authorities to resource and modernize facilities. Army laboratories have benefitted greatly from the authorities granted in sections 2363 and 2805(d) in Title 10 of the U.S. Code. Last year, the Army laboratories invested \$164 million in support of section 2363 projects. Of that total investment, \$74 million (45%) supported 82 infrastructure revitalization or recapitalization projects. This authority provides the Laboratory Directors greater flexibility in the allocation of resources for laboratory infrastructure construction and facilitates the Army to maintain world-class facilities; however, section 2363 infrastructure projects must comply with the \$6 million cost limitation in section 2805(d), Laboratory Revitalization. To enable Army laboratories to meet larger infrastructure, repair and sustainment projects an increase in this limitation should be considered.

In conclusion, I would like to thank the members for their time and oversight of Defense Laboratories and Engineering Centers. Your continued strong support of a world-class science and engineering workforce, modernized research lab and center

infrastructure, and innovative technology transition programs ensures that the Department has the tools for continued success. The acquisition and exploitation of new scientific knowledge is crucial to the of advancement warfighting capabilities and we must safeguard these endeavors as a critical National resource. Army S&T is at the forefront of acquiring knowledge essential to its land warfare mission and of developing technology-enabled capability that will transition to meet the Warfighter dominance needs of the future. Thank you.