

NOT FOR PUBLICATION UNTIL RELEASED BY
SENATE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON EMERGING THREATS AND CAPABILITIES

STATEMENT

OF

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BEFORE THE

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OF THE

SENATE ARMED SERVICES COMMITTEE

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Introduction

Madam Chairwoman and distinguished members of the subcommittee, it is an honor to appear before you today to report on the efforts of the Department of Navy (DoN) Science and Technology (S&T) Laboratory Enterprise. I would like to begin by thanking the Committee for your continued support of our nation's science and engineering base who continue to provide new and improved, affordable warfighting capabilities to sustain the technology superiority our Sailors and Marines enjoy. The Department remains committed to developing and rapidly delivering innovation to our warfighters more efficiently through the effective use of the technological resources of our nation within the commercial sector, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and our Naval Laboratory and Warfare/Systems Centers.

In the year since I last appeared before you, DoN has continued to actively manage our research, development, test, and evaluation (RDT&E) accounts, workforce, and infrastructure. We still have many significant challenges, including an examination of how best to use FFRDCs and UARCS to address the challenges ahead, but we continue to make strides in understanding the full strategic potential of our national resources to affordably deliver advanced technologies to Naval Forces.

The budget has offered its own set of challenges. Since 2008, the rate at which DoN's Budget is decreasing is at historical levels, equaling or exceeding the decreases we saw after the Reagan Build-up and Vietnam War. These kinds of reductions call for a new investment strategy. In the Fiscal Year (FY) 2015 budget request, DoN reduced a number of RDT&E programs, including Marine Corps Assault Vehicles and Airborne Mine Countermeasures. DoN continues to develop and expand the scope of its Business Transformation efforts, looking to the RDT&E portfolio for savings within programs, high pay-off technology transitions, or better product outcomes for ACAT programs.

Strategic Reviews

To ensure the future technological superiority of our Fleet and Force, DoN must make prudent RDT&E investments that provide combat effectiveness, affordability and improved reliability and maintainability of our current and future weapon systems. The inherent mismatch in timescales for our budget processes, operational needs and S&T development are amplified in this time of declining budgets. DoN must ensure RDT&E investments continue to target the correct warfighter missions, are aligned across all RDT&E accounts, and expeditiously transition required technologies to Fleet and Force operators. To answer these new challenges and ensure the right investments are being made, DoN has formed the Naval RDT&E Corporate Board consisting of the Undersecretary of the Navy; Assistant Secretary of the Navy for Research, Development and Acquisition (ASN-RDA); Vice Chief of Naval Operations (VCNO); and the Assistant Commandant of the Marine Corps (ACMC) to help guide our RDT&E strategy. These DoN RDT&E investment decisions could greatly influence the battlefield of our next conflict.

In 2013, we completed our second round of reviews of DoN RDT&E investments. Our focus during these reviews is to ensure we are effectively balancing tactical and strategic requirements

against our current and future technical capabilities. We want to shift our decisions from reactive and stove-piped to a proactive and holistic approach where decisions are made at the appropriate level and wisely use our resources and intellectual capital. As a result of these reviews, we have made some tactical course corrections that will better align RDT&E projects in a more accurate budget activity and allow for more orderly deployment of advanced technology from the bench to the fleet.

Our continuing efforts in Integration and Interoperability (I&I), looking across the “kill chains” to understand how systems really work together and where best to make our investments to maximize warfighting capabilities, are providing great insight. The Naval Integrated Fire Control Counter Air (NIFC-CA) project serves as a great example of the benefits of this approach. The objectives of this system-of-systems engineering, integration and test effort are to extend the Naval Theater Air and Missile Defense battlespace to the maximum kinematic range of our active missiles, increase tactical decision-making time, offer additional flexibility to platform operators and operational commanders, and to improve survivability and operational effectiveness of warfighting assets. The capability focuses on targets beyond the detection range of the shooter, enabling Engage-On-Remote at targets Over-the-Horizon, with the ultimate objective of improving performance against multiple simultaneous targets, and providing the fleet operator with maximum re-engagement capability. Formal scoping and structure were required based on detailed examinations using effects/kill chains, virtual simulation analysis, and operational test data to determine operational needs, develop integrated architectures, and validate System of Systems (SoS) Federated model performance predictions. A critical governance element of this formal integrated warfighting capability structure involved the decision to direct Program Executive Office – Integrated Warfare Systems (PEO IWS) to establish a NIFC-CA Systems Engineering, Integration and Test (SEI&T) Project Office to integrate across the elemental programs to develop and acquire a NIFC-CA capability. This instantiation of a formal NIFC-CA project began with the critical elements identified by the I&I activity, namely the determination of facts-based operational gaps and recommended solution sets that maintain alignment between pillar programs. The Department is proceeding in a “crawl, walk, run” approach to System of Systems engineering, integration and test to reduce test risk and cost, while maximizing efficiencies by leveraging pillar program test opportunities. As we do, we are capturing lessons learned to assist the Fleet in the future development of fully vetted and approved Concepts of Operations (CONOPS) and Training Tactics and Procedures (TTPs). This essential work relies on a collaborative Government/Industry team that includes government laboratories, academia, and engineering expertise within the pillar programs.

In the next few years, DoN will expand I&I efforts to include new technologies into the kill chain analysis to enable mission planning for advanced technologies in development. One example of an advanced technology we are developing is the Large Displacement Unmanned Undersea Vehicle (LDUUV). The LDUUV will provide a reliable, fully autonomous, long-endurance UUV capable of extended operation (over 60 days) in cluttered littoral environments. The program is developing the energy, autonomy and core systems to operate in a complex ocean environment near harbors, shorelines, and other high-traffic locations. Key approaches include using open architecture to lower cost and enable full pier-to-pier autonomy in over-the-horizon operations. Achieving these goals will reduce platform vulnerability, enhance warfighter capability and safety, and close gaps in critical and complex mission areas by

extending the reach of the Navy into denied areas.

Another example of advanced technology development is the Electromagnetic Railgun. Fired by electric pulse, the Railgun eliminates gun propellant from magazines, resulting in greater survivability. The Railgun has multi-mission potential for long-range, land-attack Naval Surface Fire Support, ballistic and cruise missile defense, and anti-surface warfare against ships and small boats. The Naval Sea Systems Command (NAVSEA) and the Office of the Secretary of Defense (OSD) Strategic Capabilities Office are coordinating development efforts to ensure commonality and reduce the need for expensive redesign. OSD is sponsoring a land-based Railgun experiment to explore its potential to defend land bases. NAVSEA is executing this effort and also preparing for Railgun integration in navy war ships. The team will conduct key system demonstrations both at a land-based location and aboard a Joint High Speed Vessel in 2016.

Workforce

I have oversight of systems engineering and overall stewardship responsibilities for the Naval Laboratory and Warfare/Systems Centers. DoN has fifteen activities that compose the in-house research and development capacity. It is comprised of the Naval Research Laboratory (NRL) and Warfare/Systems Centers aligned to three Systems Commands (SYSCOMs): NAVSEA, Naval Air Systems Command (NAVAIR), and Space and Naval Warfare Systems Command (SPAWAR). The Navy's Corporate Laboratory, the Naval Research Laboratory (NRL), was established by an act of Congress in 1916 and began operation as the NRL in 1923. Over half of the work NRL performs is fundamental science and technology, nearly all in partnership or in collaboration with academia and researchers in other government laboratories and activities. The Warfare and Systems Centers, while being involved in basic science, play most strongly in technology and engineering, often in partnership with industry. They too have long histories, some dating back to the 1800s, and were created to respond to a specific threat or technological challenge. The Naval Laboratory and Centers Coordinating Group is our principal coordinating body for our in-house activities. This group has been very active over the last year in:

- Aligning processes for the work we accept from customers;
- Establishing common processes for measuring the technical core capabilities and capacity of our workforce; and
- Establishing DoN-wide definitions for technical core capabilities and competencies as a part of measuring and maintaining the ability to deliver the Navy after Next while ensuring today's is always ready to fight.

The Naval Laboratory and Warfare/System Centers constitute a diverse, highly skilled workforce of over 45,000 employees with over 23,000 scientists and engineers. Among the scientists and engineers over 40 percent hold advanced degrees in science, engineering, or mathematics. The Navy continues its efforts to revitalize and maintain the technical capabilities of the acquisition workforce by maintaining over 5,000 technical personnel at the Warfare/Systems Centers in the technical career fields of Systems Planning, Research, Development and Engineering, Test and Evaluation (T&E), Information Technology (IT) and Production, Quality, and Manufacturing. As procurements draw down, we fully expect that a technical workforce that is trained and

equipped to maintain and repair legacy systems will be more important than ever.

Investments in research and development as well as in our workforce and facilities to support the legacy systems and the systems of systems must be made. The Navy has taken several steps to achieve balance in our technical workforce and infrastructures to ensure technical capabilities critical to the Navy are maintained in our Naval Laboratory and Warfare/Systems Centers. While we place a priority on the Naval mission, clearly, non-Naval work is an important element of the overall workload at many of our Warfare/Systems Centers. The accomplishment of this work can contribute to both the strength of the technical workforce at the Warfare/Systems Centers and the reduction of the centers' overhead rates. However, if the overall workload at the individual Warfare Center or across the network of Warfare/Systems Centers is not properly aligned to capability and capacity, their mission performance will suffer. A series of failures in this regard gave cause to a review of work acceptance practices across our Warfare/Systems Centers and the determination that the Navy needed to increase standardization, visibility and accountability to ensure the Navy fulfills its responsibility to both the warfighter and the taxpayer.

Section 219

DoN is focused on the quality of our technical workforce's capability and capacity and ensuring stability within the organic workforce. Section 219 of the FY 2009 National Defense Authorization Act (NDAA) has proven invaluable to maintaining the health of the Navy Laboratory, Warfare and Systems Centers. Naval Innovative Science and Engineering (NISE) investments, \$105M in FY 2013, have been critical in refreshing aging infrastructure through investments in updating and creating new technical facilities. The NISE program has allowed the Navy Laboratory, Warfare and Systems Centers to revitalize and build new technical capabilities of the workforce through hands-on work as well as training and the support of advanced degrees and certifications. NISE programs have provided breakthrough research and been responsible for the maturation and transition of technology to the warfighter and programs of record. NISE has encouraged cross-organizational multi-disciplinary projects that include partnerships with academia and industry. Finally, the NISE program has allowed the Navy to recruit and retain top technical talent to support the Fleet. We want to thank you for extending the sunset clause until 2020. We encourage you to make this a permanent authorization.

Infrastructure

Our investment in our workforce is critical but so is our investment in our infrastructure. I am pleased to report we have completed our initial Naval Infrastructure Capabilities Assessment (NICAP) effort started in FY 2010 at NAVAIR, to include all RDT&E capabilities at the Warfare/Systems Centers. NICAP has captured and base lined technical information on more than 500 different capabilities spread across 68 different geographical locations of our 15 Laboratory and Warfare/Systems Centers. The depth and the breadth of their capabilities are exceptional in spite of some of the less-than-ideal facilities in which our scientists and engineers must perform their work. Because each of the SYSCOMs uses a different taxonomy to classify and manage their RDT&E capabilities, we have embarked on a strategy to make the data more consistent and comparable across the SYSCOMs. NICAP provides dynamically generated

assessment views, statistical and tabular, that enable the comparative assessment of current Naval RDT&E capability baseline and relevant supporting analyses for emerging infrastructure reviews.

The Assistant Secretary of the Navy for Energy, Installations, and Environment (ASN (EI&E)) has identified \$81 million in military construction funding for RDT&E projects:

- Atlantic Test Range Facility: \$9,860K (Patuxent River, MD)
- Advanced Energetics Research Lab, Phase 2: \$15,346K (Indian Head, MD)
- Ohio Replacement Power and Propulsion Facility: \$23,985K (Philadelphia, PA)
- Electronics Science and Technology Lab: \$31,735K (NRL, DC)

An additional challenge we face is the need for increasing maintenance on our facilities as they age. There needs to be balance between repairing and maintaining our infrastructure and the need to build new capability. Balancing the infrastructure needs of our Laboratories with the needs of the Fleet and our warfighters will always be a challenge. With the current constrained budget environment, the minor construction authority granted under Section 2805 becomes even more important and holds significant potential for the revitalization of Naval Laboratory and Warfare/Systems Centers' infrastructure.

Improving Processes to Improve Effectiveness

DoN is focused as well on achieving meaningful process improvements and striving to get these into the "DNA" of the DoN workforce to continue to push for technological innovation within the framework of affordability and information protection.

DoN is leading efforts for program protection planning in compliance with ASD AT&L/SE with policy and guidance. We are developing policy for the supply-chain risk management initiative required by Section 815 of the FY 2010 NDAA. We are also engaged with DoD in the development of the Concept of Operations and Implementation Plan for Section 941 of the FY 2013 NDAA, requiring cleared defense contractors to report cyber intrusion events occurring on their networks.

We continue to deploy Open Systems Architecture engineering and business approaches to improve our systems, increase competition, and speed technology insertion. Last summer we ran a business innovation war game using crowd sourcing to identify novel ways to expand the implementation of Open Systems Architecture in DoN. As part of the game, hundreds of participants from Government and Academia developed 15 action plans. We are currently in the process of considering these ideas for follow-on actions.

The defense industrial base is a critical component of the Navy's RDT&E strategy. As part of the Department's Better Buying Power initiative to incentivize productivity and innovation in industry and government, the Navy is leveraging the OSD-developed Defense Innovation Marketplace website. The Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) created the Defense Innovation Marketplace in 2011 as a resource for both the Department and industry to better align industry Independent Research & Development (IR&D)

efforts while providing DoN personnel stronger connection to IR&D projects for current programs and future planning. To enhance the impact of the Defense Innovation Marketplace on the DoN's RDT&E efforts, DASN(RDT&E) and ONR are undertaking pilot programs to provide feedback to ASD(R&E) on ways to increase the utility of the Marketplace.

Finally, I have initiated a Systems Engineering streamlining effort to identify cumbersome work practices, costs of doing systems engineering business, and to enhance our workforce capability and readiness. We are focused on delivering engineering excellence and lateral integration with program test and program support activities, reducing duplications, and linking requirement to test and support planning. We are also looking at inter-organizational responsibilities vertically so that organizational authorities and responsibilities at the Secretariat, SYSCOMs, and the Warfare/Systems Centers align appropriately. DoN addresses our Systems Engineering workforce qualifications and assignments through our Technical Authority qualification process at the SYSCOM level, with oversight by my office. We have aligned this process with DoD Acquisition Workforce Improvement Act goals for a highly qualified Systems Engineering workforce.

Summary

We have faced technological and budgetary challenges in the past year, but our goal remains the same: to ensure our Sailors and Marines are armed with technically superior capabilities. We can make certain this superiority continues through disciplined processes focused on affordability, executed by a skilled workforce with second-to-none technical capabilities, performing innovative state-of-the-art science and engineering in facilities. We have made great strides over this last year, and we look forward to continuing progress. Thank you for your support and the opportunity to appear before you today.