NOT FOR PUBLICATION UNTIL RELEASED BY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

STATEMENT

OF

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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. Its ultimate goal is to develop and rapidly deliver 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 Laboratories and Warfare Centers.

The military dominance of the United States and U.S. Naval Forces in particular, is closely coupled to technical superiority of our military equipment and systems. With the future budget challenges we must continue to encourage the creativity of our scientists and engineers to meet the challenges of our adversaries while focusing on the affordability of our current and future weapon systems and platforms. I would like to thank 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 leadership our Sailors and Marines enjoy.

In the year since I last appeared before you the DoN has performed an extensive strategic review of our research, development, test, and evaluation (RDT&E) resources to move the possibilities offered by science and technology into practical applications executed through engineering to benefit our Navy and Marine Corps. This includes on-going reviews of the RDT&E accounts; focused efforts by DoN leadership to accelerate game-changer technologies into fieldable systems, collaboration with ASD(R&E) on efforts to improve communications and collaboration between the Industrial base and our technical community through the Defense Innovation Marketplace, and on-going efforts of the Naval Laboratory Center Coordinating Group (NLCCG) to invest in the technical capabilities of in-house technical workforce and their critical infrastructure. The technological threats to the Navy and Marine Corps are constantly changing. The anti-access/anti-denial (A2/AD) capabilities of our potential adversaries are one example of the constantly changing threat environment that impacts the ability of our forces to maintain technological superiority. The Navy has come a long way over the last few years in achieving balance in our technical workforce and infrastructure to ensure technical capabilities critical to the Navy are maintained in our Naval Laboratories and Warfare Centers. There still remain many significant challenges, including an examination of how best to utilize 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 game changing technologies to the DoN.

Strategic reviews

To ensure the future technological superiority of our Fleet and Force it is critical that prudent DoN RDT&E investments provide combat effectiveness, affordability and improved reliability and maintainability in our current and future weapon systems. With increasing fiscal pressure, it is imperative that the DoN ensure its RDT&E investments: target the correct warfighter

missions, are aligned across all RDT&E accounts, and expeditiously transition required technologies to Fleet and Force operators.

The RDT&E Corporate Board provides governance of the Department of the Navy's (DoN) RDT&E investments and activities of RDT&E (Budget Activity 1-7) portfolios, programs, and priorities. It will ensure the Department's RDT&E budget and execution decisions support near- and long-term acquisition programs. Additionally, the Corporate Board provides advice and assistance in developing policies for rapid technology transition by reviewing transition processes that move S&T projects into acquisition RDT&E programs of record, including Rapid Fielding Efforts (e.g., CNO Speed-to-Fleet).

We have recently initiated our second rounds of review of DoN RDT&E investments. Our focus 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 broader holistic approach where decisions are made at the appropriate level to ensure the wisest use of our resources and intellectual capital. Through the rigor of review, the DoN is looking for game changers. These are innovations that effectively integrate technology with policy and business to deliver real solutions for our Sailors and Marines. The basic concepts of Integration and Interoperability cause us to look across the kill-chain to see how systems really work together.

From these reviews, we will have some tactical course corrections that will properly align RDT&E projects in a more accurate budget activity. With the RDT&E investments properly characterized, the RDT&E Corporate Board can start to address the strategic direction of the appropriation to foster sharing of technological developments across warfare areas; orderly transition of innovation (e.g., disruptive technologies); and future business/policy/technology game changers like Open Architecture and Automatic Test and Re-Test. Two current areas of emphasis in the RDT&E portfolio are directed energy weapons and non-acoustic anti-submarine warfare.

Directed energy weapons offer the Navy game-changing capability in terms of speed-of-light engagement, deep magazines, multi-mission functionality and affordable solutions. High-energy laser weapons are extremely affordable due to their very low engagement costs (low cost per shot), which is critical in the current fiscal environment. High energy laser weapons are capable of deterring asymmetric threats, including swarming small boats, UAVs, and other low-cost, widely available weapons. The Navy continues to invest in rapid fielding initiatives and technical demonstrations to introduce these new technologies to the Fleet and develop future capabilities. The Navy maintains a broad portfolio of directed energy weapons programs comprising shipboard, airborne, and ground-based systems. Recent Navy investments in laser technology includes the first high-energy laser aboard a moving Navy surface combatant, the Maritime Laser Demonstration (MLD); the Mk38 Tactical Laser System also demonstrated against small boats as well as other targets; while the LaWS (Laser Weapon System) demonstration successfully countered remotely piloted drones from USS Dewey in 2012. As part of a CNO-directed demonstration program, the Navy intends to install a prototype LaWS aboard USS PONCE (AFSB 1), which is currently forward deployed to the 5th Fleet AOR. This

demonstration, which will begin in FY 2014, is the latest in a series of technical maturation efforts designed to provide an operational laser to the fleet.

A key to future Navy warfighting capabilities is the rapid development, prioritization, and deployment of Non-Acoustic Anti-Submarine Warfare (NAASW) capabilities. This can be accomplished through efficient technology transitions, acquisition, and management across the Navy Enterprise and coordination with the U.S. Intelligence Community. Aside from the development and fielding of Non-Acoustic Anti-Submarine Warfare capabilities and/or systems, the DoN must also plan for the employment of these same types of capabilities by our adversaries. The DoN must be cognizant of this emerging threat and must understand the operational vulnerabilities and thus guide the development of mitigation strategies and capabilities.

Workforce and Infrastructure

As the Deputy Assistant Secretary of the Navy for Research, Development, Test, and Evaluation I have oversight responsibility to the ASN (RD&A) for all RDT&E accounts, systems engineering and overall stewardship responsibilities for the Naval Laboratories and Warfare Centers. The DoN has fifteen (15) activities that compose the In-house research and development capacity. It is comprised of the Naval Research Laboratory (NRL) and fourteen (14) Warfare and Systems Centers aligned to three Systems Commands: Naval Sea Systems Command (NAVSEA), Naval Air Systems Command (NAVAIR), and Space and Naval Warfare Systems Command (SPAWAR). The Navy's principal Laboratory, the Naval Research Laboratory (NRL) was created by Congress 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, and government program offices. They too have long histories, some dating back to the 1800s, and were created to respond to a specific threat or technological challenge. The NLCCG is our principal coordinating body for our in-house activities. The group has been very active over the last year in meeting the challenges I set before them to define core technical capabilities and to determine how to optimally integrate all these capabilities to meet the affordability challenges of today's platform and systems acquisition while planning integrating and delivering transformational technologies for the Navy-After-Next. Their focus was to:

- Align processes for the work we accept from customers;
- Establish common processes for measuring the technical health of our workforce;
- Establish Department of Navy wide definitions for core capabilities and competencies; and
- Ensure consistency and transparency in program costing practices to ensure we make every dollar count within the Navy Working Capital Fund model.

The Naval Laboratories and Warfare Centers constitute a diverse, highly skilled workforce of over 43,000 employees with over 24,000 scientists and engineers. Among the scientists and engineers over 8,000 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 hiring over 2,000 technical personnel at the Warfare centers in the technical career fields of Systems Planning, Research, Development and Engineering (SPRDE), Test and Evaluation (T&E), Information Technology (IT) and Production, Quality, and Manufacturing (PQM).

The DoN DT&E Self-Assessment Report for 2012 showed that our T&E workforce continues to be adequately structured to support the needs and demands of our acquisition programs. Continuous process improvement efforts resulted in significant gains this past year for our T&E workforce with slight growth in numbers, continuation of organizational alignment efforts, enhanced T&E training opportunities and enhanced T&E awards. At the leadership level, DoN continues to use the Gate review process to monitor the activities and progress of acquisition programs, to include T&E. Naval Systems Commands and affiliated Program Executive Offices/Program Management Offices continue to structure their organizations to meet workload demands and provide for the overall T&E competency expertise. DoN continues to work close with OSD to address acquisition reform initiatives, workforce improvement efforts, and T&E efficiency and effectiveness mandates.

The Department of Navy was honored to receive the 2012 Top 100 Global Innovator Award from Thomson Reuters which identified the Navy as one of the world's most innovative organizations. The Navy was the top ranked government organization granted this award that is based on the objective criteria of overall patent volume, patent grant success rate, global reach of the portfolio and patent influence as evidenced by citations. In addition the Navy continues to be recognized by the Institute of Electrical and Electronics Engineers (IEEE) and the industry based Intellectual Property Intelligence Quotient (IPIQ) patent board as a top ten performer in innovation worldwide.

Section 219

The DoN has historically made deliberate and measured investments to ensure stability within the organic workforce. During this period of refreshing our workforce, Section 219 of the FY 2009 NDAA has proven invaluable to maintaining the health of the Navy Labs, Warfare and Systems Centers. The Naval Innovative Science and Engineering (NISE) program grew to nearly $100M in FY 2012. The NISE investments have been critical in refreshing aging infrastructure through investments in updating and creating new technical facilities. The NISE program has allowed the Navy Labs, Warfare and Systems Centers to revitalize and refresh the technical capabilities of the workforce through 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. The 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 in support of the Fleet. We want to thank you for extending the sunset clause until 2016. We would encourage you to make this a permanent authorization.

Science, Technology, Engineering and Mathematics (STEM)

Our ability to support the warfighter depends on our ability to sustain a Science, Technology, Engineering and Mathematics (STEM) workforce – with Discovery and Innovation investments

supporting STEM outreach from kindergarten through post-doctoral education. One of our greatest challenges involves our concern that the number of U.S. citizen STEM graduates will not keep up with future U.S. demand or with international competition for the same talent.

Our investments seek to increase diversity and numbers of students pursuing STEM degrees. Areas of emphasis include: 1) freshman and sophomore STEM retention in college, 2) hands-on STEM programs in urban and rural middle schools, 3) teacher training in Naval-relevant fields of study, and 4) mission-critical graduate student and post-doctoral support. Programs incorporate Naval content, metrics to measure impact, and coordinate with other Federal STEM programs. Further, programs are selected based on potential for growth and geographic expansion, as well as ability to serve underrepresented student populations. We are in the process of developing a comprehensive metrics and evaluation plan for all STEM programs, which measures not only numbers of students and teachers, but assesses our ability to fulfill Naval requirements.

Our investment in our workforce is critical but so too is our investment in our infrastructure. The Naval Infrastructure Capabilities Assessment (NICAP) initiative started in FY 2010 at NAVAIR. Based on the direction of this subcommittee, DoN expanded it in FY 2012 to include all RDT&E capabilities at the Warfare Centers. The expanded NICAP initiative will collect a limited amount of readily available data and is expected to be complete by the end of this fiscal year. In March of this year, we began the initial collection of information at NAVAIR, NAVSEA and SPAWAR. Because each of the SYSCOMs use a different taxonomy to classify and manage their RDT&E capabilities, we believe that there will be some challenges in correlating the data and do not expect to be able to conduct a full comparative analysis across all of our mission areas. As such, there is a strong possibility that we will have to revisit the data in FY 2014 to address areas where there are disconnects in the data provided and to implement additional tools to make the data more consistent.

The NICAP review initiative captures the “AS-IS” capability baseline to enable the integrated assessment of the RDT&E capabilities across the Department of Navy. Initial areas of focus include capability distribution, capability integration, capability alignment, capability availability and capability sustainment requirements. The NICAP provides dynamically-generated assessment views, statistical and tabular reports supporting each of the five major objective areas. These views and reports enable the comparative assessment of the current Naval RDT&E capability baseline and relevant supporting analyses for emerging infrastructure reviews.

When completed, NICAP will have captured and base lined technical information on hundreds of buildings with more than 500 different capabilities spread across 68 different geographical locations of our 14 Laboratories and Warfare Centers. The depth and the breadth of their capabilities is exceptional; in spite of some of the less than ideal conditions our scientists and engineers must perform their work.

The authority for unspecified minor construction up to $4M, under 10 USC § 2805, continues to hold significant potential for the revitalization of Naval laboratories and warfare centers. We have initiated the review and approval process for our first use of this authority at NRL. As our program begins to gain strength, we anticipate it becoming a valuable resource.

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 to the revitalization of our technical infrastructure.

Improving processes to improve effectiveness

Similar to the challenge we face to maintain excellence in our technical workforce and infrastructure is the requirement to continue to push for technological innovation within the framework of affordability. The Navy's is aggressively pursuing Integration and Interoperability (I&I) with the goal of maintaining technical and operational cohesiveness across mission areas in a fiscally-constrained environment while increasing the overall capability for the warfighter.

Front end assessments based on operational evaluations that include the integration and interoperability of multiple systems ensure accuracy in determining capability gaps that will lead to better acquisition decisions to provide readiness of the Fleet. The overall objective is to produce a data informed Warfighting Capability Plan as part of the PPBS to eliminate financial waste, increase competition, and procure more relevant products. As part of this plan, the I&I initiative is not limited to just material solutions, but is evaluating probable solutions across the Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities and Policy (DOTMLPF-P) spectrum. This approach takes a holistic viewpoint across domains and functionalities to ensure coordination and collaboration. This is in part being accomplished by modifying the Systems Engineering Test Review (SETRs) and Gate Review Requirements to identify problems early in the development process and thus drive for better success in the production of integrated and interoperable systems while gaining more pre-Milestone B trade space. The I&I initiative is bringing to light the organizational requirements that must be satisfied to successfully implement this approach.

The Department of Navy (DoN) acquisition leadership continues to promote the adoption of Open Systems Architecture (OSA) to support innovation, reduce the time needed to integrate improved technologies (cycle time), and lower systems' lifetime (total ownership) costs. On November 26, 2012, the Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN RDA), Mr. Sean Stackley signed out an updated Naval OSA Strategy. This strategy outlines an aggressive four-year plan for business and technical changes. The result of executing the strategy will be affordable, open platforms (ships, airplanes, submarines, etc.) which will readily accommodate OSA-crafted modular systems (weapons, sensors, control systems, etc.). The strategy update addresses tightly coupled legacy systems and includes time and tools to evolve those to an OSA. The Naval OSA Strategy complements Better Buying Power 2.0 (BBP 2.0), recently issued by the Under Secretary of Defense (Acquisition, Technology and Logistics) (USD AT&L), Mr. Frank Kendall. BBP 2.0 and Naval OSA continues the pursuit for greater efficiency and productivity in defense spending and are focused on total ownership costs across the lifecycle by emphasizing reuse, measurements, modularity, and reducing redundancy. Competition, using the Government's intellectual property and data rights, and breaking vendor-lock are key attributes of both Naval OSA and BBP 2.0.

With the ramp down of Urgent Operational Needs Statements (UONS) the Navy is incorporating the best of breed resources and techniques from exemplar programs such as OSD's Quick Reaction Fund (QRF) and Rapid Innovation Fund (RIF) as well as the Navy's CNO's Speed to Fleet, Tech Solutions, Technology Insertion for Program Savings (TIPS), SwampWorks, Future Naval Capability (FNC), and Rapid Technology Transition (RTT) into our core programs. Institutionalizing these techniques will result in more affordable, rapid fielding of innovative capability to the Fleet.

The defense industrial base is a critical component of the Navy's S&T strategy. As part of the Department's Better Buying Power's initiative to incentivize productivity and innovation in industry and government, the Navy is leveraging the OSD developed Defense Innovation Marketplace website (www.DefenseInnovationMarketplace.mil). The website allows for a one-stop-resource to keep industry and academia apprised of critical department and Navy S&T and acquisition information. These materials allow industry to better align their independent research & development (IR&D) efforts, providing Navy personnel stronger connection to projects with potential leverage for current programs and future planning. The Marketplace search functionality (now in Beta test phase) will enhance the continued communication between government and industry, as Navy acquisition community will be able to stay informed about industry's IR&D efforts. The Navy's continues to make good use of the DoD's Manufacturing Technology Program (ManTech) for industrial preparedness. As an example the Navy's ManTech portfolio contains 70 projects aimed at cost reduction efforts of the VIRGINIA Class Submarine with a potential for savings in of $25M/hull.

The DoN continues to pursue partnerships with academia and industry as a critical part of our strategy to provide a cutting technological edge to the fleet. Work for Private Parties (WFPP) authorities in conjunction with Other Transaction Authority (OTA) and other technology transfer authorities provide a variety of tools that the Navy has successfully applied for affordable and effective technology development and fielding. The DoN continues to utilize its Cooperative Research and Development Agreements (CRADAs) authority. A CRADA allows partners (government and non-federal) to save money and valuable time in achieving mutually desirable results. A non-federal partner can provide facilities, equipment, personnel, and funding to the CRADA. DoN uses its CRADA authority to strengthen the United States industrial base and the transfer and acceptance of commercial-off- the shelf (COTS) technology for government. DoN has entered into 3,262 CRADAs since 1989. These CRADAs directly support ongoing research projects at the DoN laboratories. There were 192 CRADAs signed in FY 2012 as well as modifications to a number of existing CRADAs.

Summary

With all the technological and budgetary challenges we face our goal remains the same: to ensure our Sailors and Marines are armed with technically superior capabilities. We can ensure this continues through disciplined processes focused on affordability, executed by a skilled workforce with technical capabilities second to none who perform state-of-the-art science and engineering in facilities that enable creativity and innovation. We have made great strides over this last year and we look forward to the continuing challenges. Thank you for your continued support and the opportunity to appear before you today.