

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES SUBCOMMITTEE ON
CYBER, INNOVATIVE TECHNOLOGIES AND INFORMATION SYSTEMS

STATEMENT OF

MR. PAUL MANN

DEPUTY ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT,
TEST AND ENGINEERING (ACTING)

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Introduction

Chairman Langevin, Ranking Member Banks, and distinguished members of the Subcommittee, thank you for the opportunity to address the science and technology (S&T) investment strategy of the Department of the Navy (DON) and the Naval Research and Development Establishment (NR&DE). Since this nation's founding, the United States has been a maritime nation and the United States Navy, along with our allies and partners, has provided security and stability, maintained peace, and ensured free and open access to the world's oceans. As we continue to face rapid change in the global security environment, as evidenced by Russia's invasion of Ukraine and China's continuing challenges to United States influence in the Pacific, the NR&DE is uniquely positioned to explore, develop and systems engineer priority-driven technology that enable the DON to rapidly deliver operationally relevant advantages for the current force and the future force to preserve naval superiority.

SECNAV Enduring Priorities

We support the Secretary of Defense's vision of integrated deterrence, campaigning, and building enduring advantages with an agile and ready force. We also align with the Secretary of the Navy's (SECNAV) priorities of strengthening maritime dominance in defense of our nation, empowering our warfighters, and strengthening strategic partnerships. The SECNAV's enduring priorities underscore the key elements that help ensure the United States Navy maintains its dominance as the most powerful naval force, ready to meet today's operational demands and tomorrow's warfighting needs. Composed of the naval warfare centers and laboratories, industry, academic, and research partners, the NR&DE enables these priorities by delivering advanced capabilities to our naval forces to campaign, deter, and win conflicts and wars.

Strengthening Maritime Dominance in Defense of Our Nation

Our investment in S&T provides the strategic advantage that preserves our national security and delivers the future of naval warfare. To meet and overcome the threat, we pursue future naval capabilities in all warfare domains: from the bottom of the ocean to the open sea, from land into the air and space, through cyberspace and across the electromagnetic spectrum. Our deliberate DON investments over the past decades in artificial intelligence (AI), offensive and defensive cyber, autonomy for unmanned platforms, directed energy, hypersonic weapons,

quantum computing, and microelectronics are leading to technological breakthroughs. Authorities, such as Title 10 USC 2363, accelerate the pace of basic and applied research by allowing investments in our workforce and infrastructure to seed innovation, enhance technology transition, and expand technical knowledge. In FY 2021, DON Science and Technology Reinvention Laboratories (STRs) conducted 1,675 projects across basic and applied research, technology transition, workforce development, revitalization and recapitalization to address technical risk in the DON's future portfolio. We have and will continue to conduct more warfighter informed prototyping, experimentation, and demonstrations to understand how new technology and new concepts will change future conflict.

Empowering Our People

Our workforce is our strategic advantage. The scientists, engineers, business and administrative personnel across the NR&DE work together to discover, develop and deliver technology to our warfighters. The Navy continues to make extensive use of the valuable legal authorities provided by Congress to improve our workforce as these are a key element to our workforce improvement strategy. Some of the key authorities Navy looks to fully leverage are the direct hiring authorities granted in Title 5 USC 9905 as amended by FY 2020 National Defense Authorization Act (NDAA) Section 1109 and the Senior Scientific Technical Managers authority granted in Section 1108 of the NDAA for FY 2009, Public Law 110-417 as amended by FY 2017 NDAA Section 2358a. These authorities have significant impacts on hiring, pay, scholarships, contracting, and other areas of the STRs.

To attract more people into our pipeline and develop the next generation of scientists and engineers, we are reimagining the Naval Science, Technology, Engineering & Math (STEM) program. The workforce must reflect the diversity of American society. Through better STEM opportunities and research networks to Historically Black Colleges and Universities /Minority Institutions (HBCU/MI), the NR&DE is working to attract talent that is indispensable to the DON's success. In contrast to our near peer competitors, our broad and diverse workforce is a strategic advantage. Diversity enables the DON to reach its peak potential by generating ideas and solutions in a collaborative environment where individual contributions are visible and valued.

Strengthening Strategic Partnerships

The days of United States government investment being the biggest force in the market and driving the research and development enterprise are in the past. Over two-thirds of global R&D investments are outside of the United States. To maintain awareness of the state of research for both partners and potential adversaries alike, the DON monitors research and technology trends from the Office of Naval Research Global. To counter the growing investments by our adversaries in the competition for international talent and remain the “partner of choice” for international collaboration, we ensure our policies, processes, and tools are easy to navigate, promote transparency, and build trust. We strive to simplify and streamline the partnering processes to fund and collaborate on international research while balancing research protection at home.

Capability Modernization and Acceleration

The NR&DE prioritizes the implementation of the Chief of Naval Operations’ (CNO) Navigation Plan (NAVPLAN) to expand our fleet capabilities for distributed operations along a number of lines of effort:

Long Range Fires (LRF)

With the increasing potential threats of our adversaries, the DON has initiated efforts to align programs and key activities related to further advancing LRF-enabling capabilities and capacities. LRF will remain a top priority for the DON to realize key objectives outlined in the NAVPLAN. Key to maritime warfare dominance across the great expanses of the world’s oceans requires advanced sensors, improvements in position navigation and time, and robust communications networks all of which are being created and developed. By synchronizing across the NR&DE, these efforts will play a critical role in delivering the needed capability as well as the associated enablers.

Counter-Command and Control, Communications, Computers, Cyber, Intelligence, Surveillance, Reconnaissance, and Targeting (Coimter-C5ISRT)

The DON continues to aggressively pursue counter-C5ISRT capabilities in order to fulfill our national responsibilities and naval missions. Counter-C5ISRT includes restricting, deterring,

and limiting our adversary's ability to conduct C5ISRT, which thereby limits the enemy's situational awareness and decision making. The DON continues to explore developing systems, emerging technology, and additional capabilities for fielded systems to help meet the counter-C5ISRT challenge. These emerging technologies are evaluated during large-scale exercises allowing for rapid demonstration for new technology and proposed systems.

Terminal Defense

The DON is advancing technologies focused on improving terminal defense of the Fleet. A concerted, enterprise-level effort is underway to identify the most lethal and sustainable combination of kinetic and non-kinetic effects to improve integrated defensive capabilities and offensive fires capacity to fight and win at sea. Using an analytical approach and a threat-informed capability gap assessment, we built the framework to analyze, assess, and advance emerging technologies and investments. This initiative endeavors to appropriately balance new capabilities to pace the threat while accelerating meaningful improvements where feasible.

Contested Logistics

The NAVPLAN identifies operational concepts like the Navy's Distributed Maritime Operations (DMO) and the Marine Corps' Expeditionary Advanced Base Operations (EABO) & Littoral Operations in a Contested Environment (LOCE) which require our naval forces to operate in a much more distributed manner and often within contested locations around the world. This increased complexity will require us to modify the way we sustain our disaggregated forces. We are focusing our R&D community on improving organic sustainment capabilities and more efficiently delivery mechanisms to maintain readiness and win the fight. By demonstrating a truly integrated naval force, our contested logistics capabilities will provide the warfighter agility and flexibility in employment considerations.

Project Overmatch

Success within the contested environment will require more than resilient logistics. It will also depend on a robust Naval Operational Architecture (NOA) that enables naval forces to integrate with the Joint Force, as well as allied partners, for Joint All-Domain Command and Control (JADC2). This will ensure that our platforms, sensors and weapons will be connected to

coordinate, maneuver effectively, and provide integrated effects as a distributed, forward-deployed force. Project Overmatch, established by the CNO in October 2020, is the acceleration of development & delivery of the requisite networks, tools & analytics, infrastructure, and data architecture for an enterprise-wide NOA. Coupled with an optimized software pipeline, Project Overmatch will provide the “connective tissue” for the NOA and the naval contribution to the JADC2, directly coordinating with the Army’s Project Convergence and Air Force’s Advanced Battle Management System. The NR&DE is the foundation of technical expertise powering Project Overmatch, particularly in the technology areas of software-defined networking, user-centered design of tools & analytics, enterprise mission modeling, and data services.

Unmanned Systems

Many of our tactical edge NOA nodes will likely be unmanned and so the DON is focused on accelerating unmanned systems research and development. The Unmanned Campaign Framework, released in March 2021, outlines our strategy for integrating and balancing investment in both manned and unmanned capabilities across all domains. By focusing on common elements first such as networks, sensors, and enabling technologies, we seamlessly integrate these capabilities into today's Fleet while building the foundation for the future Hybrid Force Design. Further, we established a cross-functional Unmanned Task Force (UTF) to rapidly identify, experiment and solve operational problems with unmanned capabilities and we leverage and share with our partners and allies through events such as the NATO Maritime Unmanned Systems Initiative Exercises and International Maritime Exercise 2022.

Artificial Intelligence

Underpinning our manned and unmanned systems, the DON views AI as a competency. It is not a single technology or program, but rather a constellation of related technologies brought to the field through digital infrastructure and practices applied at speed and scale that paces industry (to maintain relevance) and adversaries (to maintain advantage). The potential applications of the AI competency to Navy warfighting are numerous and pervasive. The DON is implementing an AI Strategic Design that provides a means to achieve an AI-enabled Navy by 2025. The DON is tracking over one thousand AI and Machine Learning-related activities across the Service and are aligned by the Joint Capability Areas: Communications and Computers;

Corporate Management and Support; Battlespace Awareness; Logistics; Protection; Force Application; Command and Control; and Force Integration.

Live, Virtual, and Constructive (LVC) Training

In order to create, field, employ and maintain next generation capabilities, we endeavor to equip our technical professionals with modern tools and processes by leveraging our investments in digital engineering for specific programs and aggregating to Enterprise use cases. Our “aggregated” engineering tools are essential; especially for system-of-systems interdependencies, algorithm exploration and solving key operational problems significantly faster. These systems, and the environment in which they operate, encompass digital representations at varied levels of fidelity – ranging from static architecture models, to constructive simulations, to live-on-range test assets; full spectrum learning through fielding and sustainment. Fleet adoption can be accelerated, especially the learning with an added emphasis on digital tools and environments in addition to the traditional emphasis on live assets and venues. Our acquisition program managers and their Fleet customers benefit from these connections between innovators, industry, acquisition professionals, and fleet stakeholders.

Operational Energy

The DON has placed great emphasis on energy resilience in the R&D community. A resilient ship is one that is more efficient, providing improved persistence on station with the same fuel use. This can be accomplished through a number of technologies such as hybridization of our platforms. From ships, to trucks to unmanned systems, hybridization and improved propulsion are critical to making those systems go farther and stay longer, providing fires, ISR, and other capabilities to our forces, all while supporting climate mitigation.

Power and energy technology development not only supports climate mitigation but drives drastic improvements to combat capability. This is especially important on ships where power requirements are increasing quickly in support of advanced weapons systems and sensors. The Office of Naval Research, Naval Research Laboratory and the Naval Warfare Centers are essential to advancing technology such as silicon carbide inverters and solving the integrated power challenges unique to Naval Platforms; as is accomplished in the Land Based Test Sites in Philadelphia.

One of the critical technology development areas and a critical enablers to almost all future Navy and Marine Corps weapons systems is advanced batteries. The unique challenge for the DON with advanced batteries is that they must be safe across a broad range of environmental conditions to accomplish the warfighting mission. Efforts being performed at warfare centers in Crane, IN, and Carderock, MD, along with others within the R&D community, are fostering partnerships with industry to develop safer batteries for the warfighter while supporting the growing American battery industry.

Conclusion

In alignment with the SECNAV's enduring priorities, we continue to push technological boundaries, emphasize experimentation, partner with allies, and invest in our people. We are focused on learning and technical rigor to enable a ready, capable, and combat-credible fleet. With your support, our workforce of dedicated professionals will continue to focus on developing and delivering the most promising technologies to solve key operational challenges in the near and long-term. We will provide the warfighter with enduring asymmetric and technological advantages against adversaries in all environments and spectrums.