



Naval Surface Warfare Center
Carderock Division

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STRATEGIC PLAN 2019-2024

AMERICA'S FLEET STARTS HERE

MISSION

Naval Surface Warfare Center, Carderock Division's (NSWCCD) mission is to provide full-spectrum research and development, test and evaluation, analysis, acquisition, and Fleet support for the Navy's ships, ship systems, and associated Navy logistics systems. Specific emphasis is to provide the core technical capabilities required for the integration of surface and undersea vehicles and associated systems, to develop and apply science and technology associated with naval architecture and marine engineering, and to provide support to the maritime industry.

*Deliver performance
at the speed of
relevance*

- National Defense Strategy

VISION

Our vision is to be the Navy's trusted partner for identifying and providing world-class, cost-effective, and innovative technical solutions for advanced ships and ship systems, enabling the warfighter to execute their missions and maintain their technological edge.

VALUES

We support the Navy warfighter and maintainer and make Navy programs successful. We achieve this through our execution of rigorous technical programs and effective business processes. We seek out the best practices and best solutions using collaboration and partnering. We advance science and technology in maritime mobility systems. We value our workforce and foster respect across the Command. We are responsive to sponsors and challenge the requirements when necessary to provide the best value to the Navy and the Nation.

*Drive budget
discipline and
affordability*

- National Defense Strategy

Foster a competitive mindset
- National Defense Strategy

INTRODUCTION

This Strategic Plan builds on our enduring, but changing, full-spectrum role spanning the entire life-cycle of the Fleet. Importantly, our Strategic Plan must also articulate our determination to rapidly create and adapt new technologies and processes that accelerate timely and affordable capabilities to the warfighter. We cannot just respond to future challenges; we must be more agile than our competitors.

The 2018 National Defense Strategy (NDS) articulates the urgency with which we have to deliver in order to succeed in our current security environment. As is discussed in the Strategic Environment section of this plan, the National defense priorities flow to the Navy and Naval Sea Systems Command (NAVSEA) through the CNO's "Design for Maintaining Maritime Superiority" and the NAVSEA Campaign Plan to Expand The Advantage.

A key part of delivering capability for the Fleet is affordability. Affordability is a priority of the NAVSEA strategic framework, but there is no precise formula on how we should get there. This is one we will have to grapple with every day. Carderock will be in a position to recognize and exploit affordable, innovative solutions when no one else can. Affordability is intertwined with our emphasis on advanced materials, manufacturing processes, our test and evaluation facilities, and business processes. We can't push off the challenge of affordability as a "someone higher-up's" problem.

The NDS specifically challenges us with cultivating workforce talent. For the Carderock Division this means embracing diversity and inclusion by removing barriers to fair and equitable treatment and by acknowledging the wealth of skills, diversity of thought, cultural and generational wisdom, knowledge, innovative ideas, and enthusiasm, where employees are able, ready, and willing to contribute. Identifying, attracting, recruiting, and retaining a highly skilled, fully engaged, resilient workforce, committed to maximum performance and sustainable and mission readiness, centers on creating a workforce through the integration of diversity and inclusion, which is a strategic imperative and goal of the Division. The global economy and changing demographics of the 21st Century population demand creative and innovative recruiting efforts to keep pace and ensure that the workforce reflects the best in service for the Nation. Strategic and sustainable diversity management of our workforce is critical to our path forward.

Cybersecurity is the underlying foundation that enables our total workforce, our business practices, and our ideas to remain digitally safe, and minimize capability gaps between what is available globally and what is within our power to effect as Carderock Division. Just as our adversaries continue to develop and adopt unprecedented cyber capabilities to deny, disrupt, disable or damage our ability to develop and project power; we must develop, identify and empower technologies and our supporting infrastructure to thwart our adversaries' efforts. Since this would be impractical to do with our supporting structure, we must ensure our infrastructure is reviewed on a regular basis and improved as budgets allow and capabilities demand. Helping to meet this challenge, our technologies can be collaboratively utilized to act as force multipliers using the principles of high-velocity learning. More details on empowering our workforce for the cyber challenges of today are outlined in our workforce pillar.

A common theme across the strategic landscape is the inter-related, complex dynamics of our work that is stressed by compressed timelines, budgets, and rapid technological change that affects the technical execution of our work. What we are really describing here is a complex "system-of-systems" that requires a balanced, focused systems-thinking approach in our cyber, business, technical work, and culture. Systems-thinking is the only way to manage the competing demands on our strategic and business planning.

Organize for innovation
- National Defense Strategy

Naval Surface Warfare Center, Carderock Division is recognized for its cost-effective and innovative technical solutions to develop and sustain the Navy the Nation needs. Truly, Carderock Division is where America's Fleet begins. These words are actionable only when given the appropriate attention and focus. To that end, we have organized our strategic thought into five strategic pillars and three foundational pillars:

STRATEGIC FRAMEWORK

The following plan lays out in more detail the challenges and goals of each area.

SHIP AND SUBMARINE DESIGN



Maintain and strengthen design capabilities and tools

Recruit, hire, develop, and sustain ship and submarine design workforce

Fully develop and implement use of digital design, including cross-discipline tools

Develop and implement world-class design processes and methods

Capture and transfer design knowledge and practices

Affordable advanced ship and submarine concepts

High-performance ships, boats, crafts, and vehicles

PLATFORM INTEGRITY AND PERFORMANCE



Increase platform performance and overall design space

Sustainment technologies to extend platform life and reduce life-cycle costs

Reduce production costs and cycle time

Enhance digital thread via advanced manufacturing and digital design

Improve distributed manufacturing capability

Recruit and develop a high-caliber workforce

Development of M&S tools

World-class sustainable facilities

DIGITAL ST



Data analytics

Navy digital twin

Supporting digital

Machine learning

Historical data ana
feature extraction

Automating data a

Live, virtual, const
training

Pervasive cyber

Model-based engi

Open standards

Virtualization and
architectures (Dev

WORKFORCE >> Communication, robust career-development pa

INNOVATION >> Carderock Innovation Board, Disruptive Technol

BUSINESS PROCESSES >> Robust corporate planning, continuous improv

CYBERSECURITY >> Integrate security engineering and resilience in

STRATEGY

l warfare
 alysis and
 analysis
 ructive (LVC)
 neering (MBE)
 cloud-based
 Ops)

SIGNATURE MANAGEMENT



Integrated theater/stealth dominance
 Signature impacts of electromagnetic warfare
 Signature manipulation and control
 Sensor fusion technologies
 Automated measurement and range technologies
 Unmanned vehicle signatures
 Accurate and affordable data to guide forward-deployed platforms
 Train and hire the multispectral signatures workforce of the future

UNMANNED SYSTEMS



Platform-centric approach
 Strategic collaborative partnerships
 Integrated multi-domain maritime systems
 Full spectrum life-cycle systems engineering and integration
 Open-systems architecture
 Autonomous safe navigation
 Cyber resilience
 Reliability
 Stowage, handling, launch, recovery, tendering, and transport
 Human-machine interface and teaming

aths, leadership development, improved onboarding

ogies Lab, and prototyping

ement and high-velocity learning, analytics-driven decisions

to our products, protect our data, and train our workforce

THE STRATEGIC ENVIRONMENT

NATIONAL, DEFENSE AND NAVY GUIDANCE

The previous Strategic Plan for the Carderock Division was released in 2016 with the intention to cover the period of 2016-2020 (four years). While the priorities and values explicit in the plan are still valid, there have been numerous developments in the past two years that warrant a refresh of the Plan. A few of the most compelling are:

The January 2018 release of the **2018 National Defense Strategy: Sharpening the American Military's Competitive Edge** by the Secretary of Defense. The unclassified summary is at: <https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

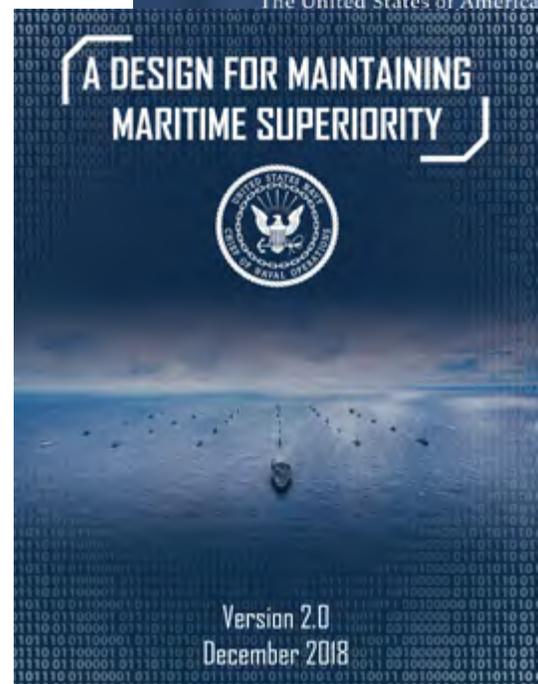
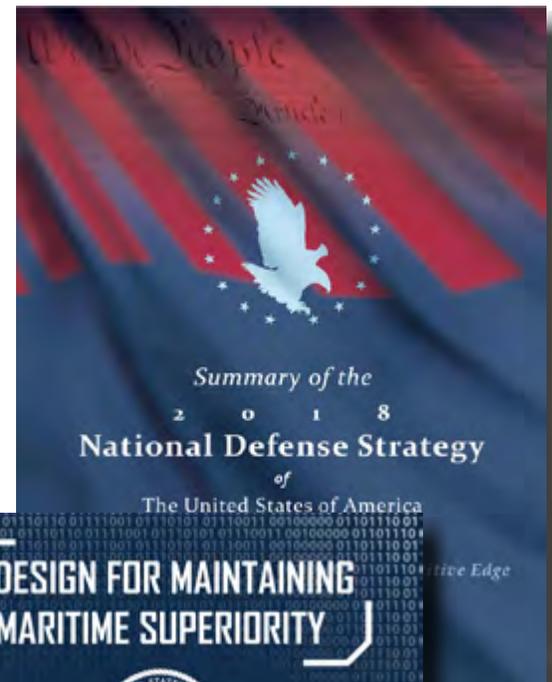
The Chief of Naval Operations' release of "A Design for Maintaining Maritime Superiority, Version 2.0" in December 2018 is an update to the earlier Design 1.0. As in version 1.0, version 2.0 is structured along four lines of effort (LOE):

- Strengthen Naval Power at and from the Sea (LOE Blue)
- Achieve High-Velocity Outcomes (LOE Green)
- Strengthen Our Navy Team for the Future
- Expand and Strengthen Our Network of Partners

The focus of this Strategic Plan supports the CNO LOEs in numerous areas and the Design gives Carderock Division guidance on where to accelerate our efforts. A few of the tasks described in the Design where Carderock is a key performer are:

- Deploy Columbia Class as quickly as possible
- Support distributed maritime operations and logistics
- Realization of the future surface combatant and future frigate
- Deliver unmanned surface vehicles and the family of unmanned underwater vehicles
- Focus Navy efforts on fielding artificial intelligence algorithms and machine learning
- Maximize use of additive manufacturing to fabricate obsolete or hard-to-source parts
- Encourage collaboration with industry and academia and research institutions
- Advance the Navy's partnership with industry and improve our business practices.

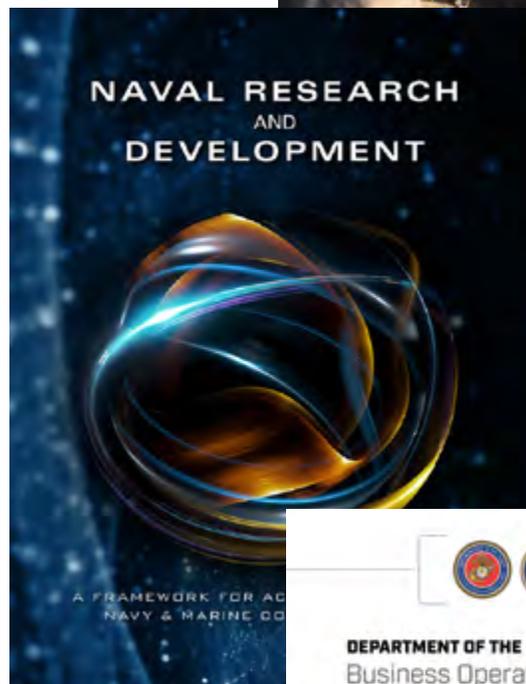
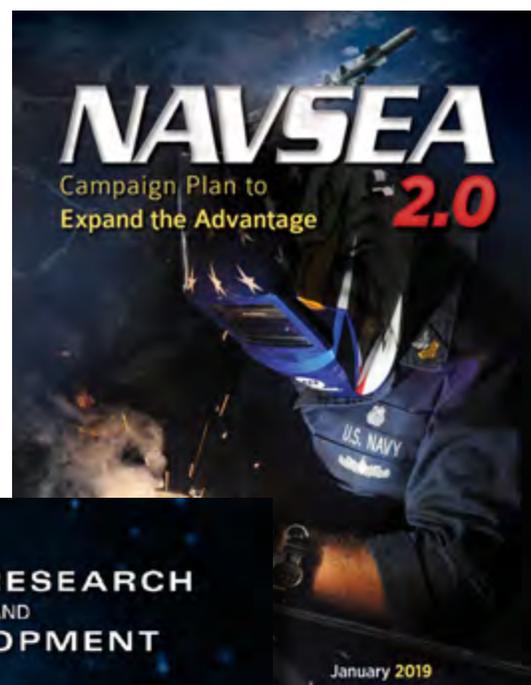
These efforts are integral parts of our strategic pillars and are enabled by our foundational pillars as declared in the following pages.



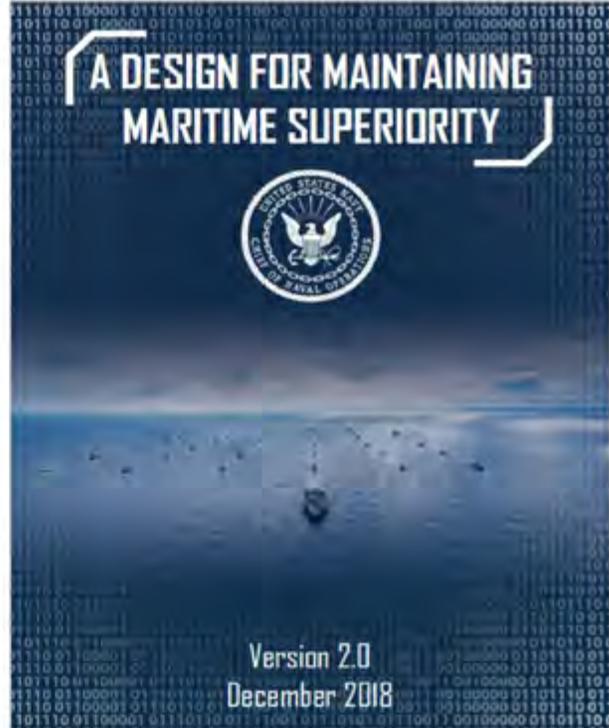
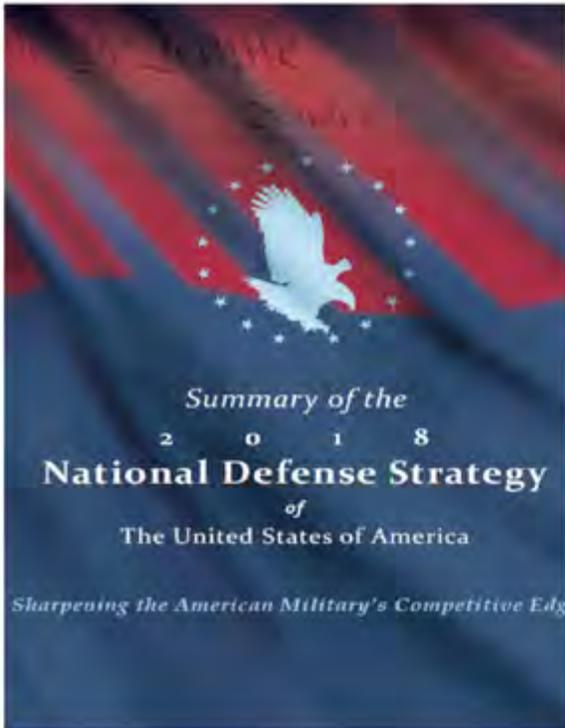
The **Naval Sea Systems Command Campaign Plan to Expand the Advantage 2.0**, which was released in early 2019. The NAVSEA plan outlines three mission priorities of: On-time Delivery of Ships and Submarines, Improve Warfighting Capability of Ships & Systems, and Cybersecurity. Although none of these concepts should be new to the Carderock Division and are part of the 2016 Strategic Plan, the clarity and purpose provided by the NAVSEA Campaign Plan as part of the CNO's Design was not fully expressed in the 2016 Carderock Strategic Plan. The NAVSEA foundational lines of effort of affordability, people, and high-velocity learning are emphasized in the workforce and business processes foundational pillars in this plan.

The **Naval Research and Development Establishment (NR&DE) Framework**, published and championed by the Office of Naval Research (ONR, <https://www.onr.navy.mil/en/our-research/naval-research-framework>). This framework replaces the Naval S&T Strategy and speaks to the science and technology investments across the Naval Research and Development Establishment (NR&DE) which includes the Carderock Division. This R&D framework directly speaks to the Design for Maintaining Maritime Superiority and emphasizes speed of delivery to the naval warfighter of decisive capabilities. High-velocity learning, agility and flexibility in business processes, prototyping, and demonstration are among the tools explicitly called out by the Chief of Naval Research to accelerate the delivery of needed technologies.

In October, 2018 the Secretary of the Navy released the **Department of the Navy Business Operations Plan** (<http://www.secnav.navy.mil/BOP/Pages/default.aspx>), which supports the National Defense Strategy and provides a framework to unifying strategic efforts across the Navy and Marine Corps to focus on greater speed, agility, and efficiency. The DON Business Plan builds on the SECNAV priorities of People, Capabilities, and Processes. For Carderock Division's role in the Navy and supporting the Business Plan, we have focused our vision on People, Tools and Facilities along with the Innovation, Workforce, and Business Processes needed to execute our mission. Overall, we must keep sight that the goal is to sharpen the Division's ability to support the warfighter and deliver capability through execution of rigorous technical programs and agile business processes. The business processes foundational pillar in this Strategic Plan expands on this vision.



THE STRATEGIC ALIGNMENT



NDS STRATEGIC APPROACH

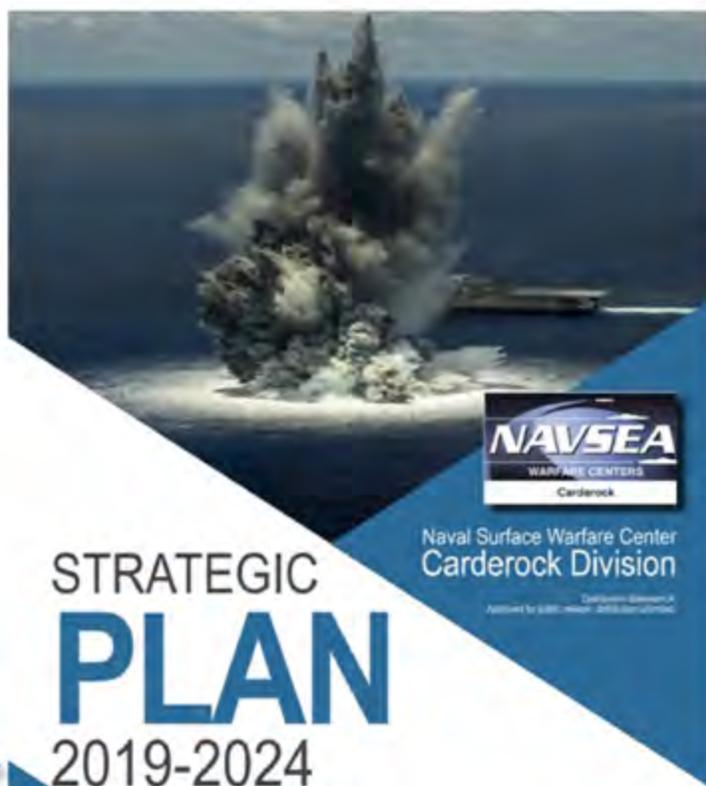
- Build a More Lethal Force
- Strengthen Alliances & Attract New Partners
- Reform the Department for Greater Performance & Affordability

FOUR LINES OF EFFORT

- Strengthen Naval Power
- Achieve High-Velocity Learning
- Strengthen our Navy Team
- Expand, Strengthen our Network of Partners



One Team – Expanding through Collaboration



FORCE BEHIND THE FLEET

- On-time delivery of ships & submarines
- Improve Warfighting Capability of Ships & Submarines
- Cybersecurity
- Affordability
- People
- High-Velocity Learning

**the Advantage
oration**

STRATEGIC
PLAN
2019-2024

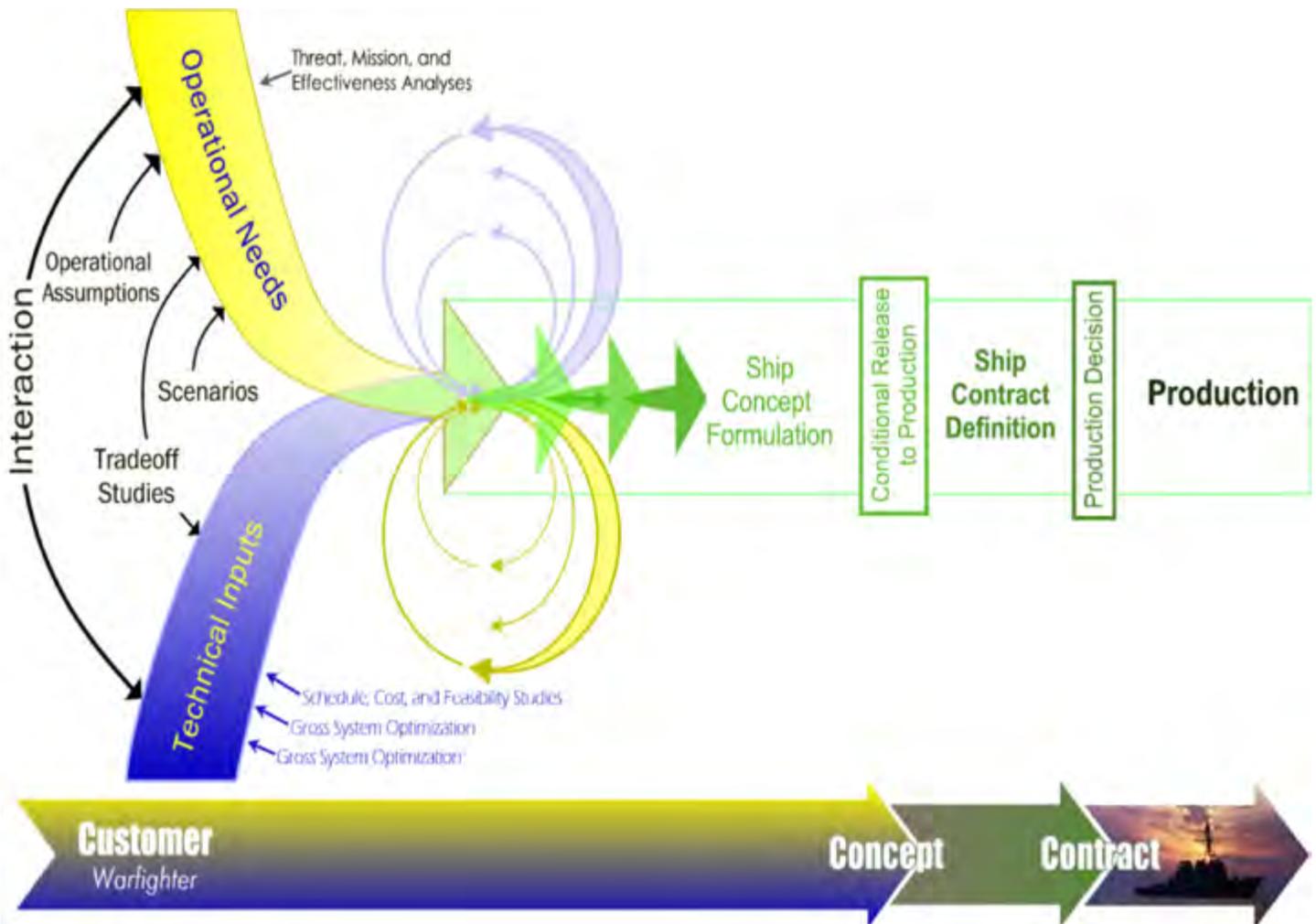
AMERICA'S FLEET STARTS HERE

STRATEGIC PILLARS

- Ship and Submarine Design
- Platform Integrity and Performance
- Digital Strategy
- Signature Management
- Unmanned Systems

FOUNDATIONAL PILLARS

- Workforce
- Innovation
- Business Processes
- Cybersecurity



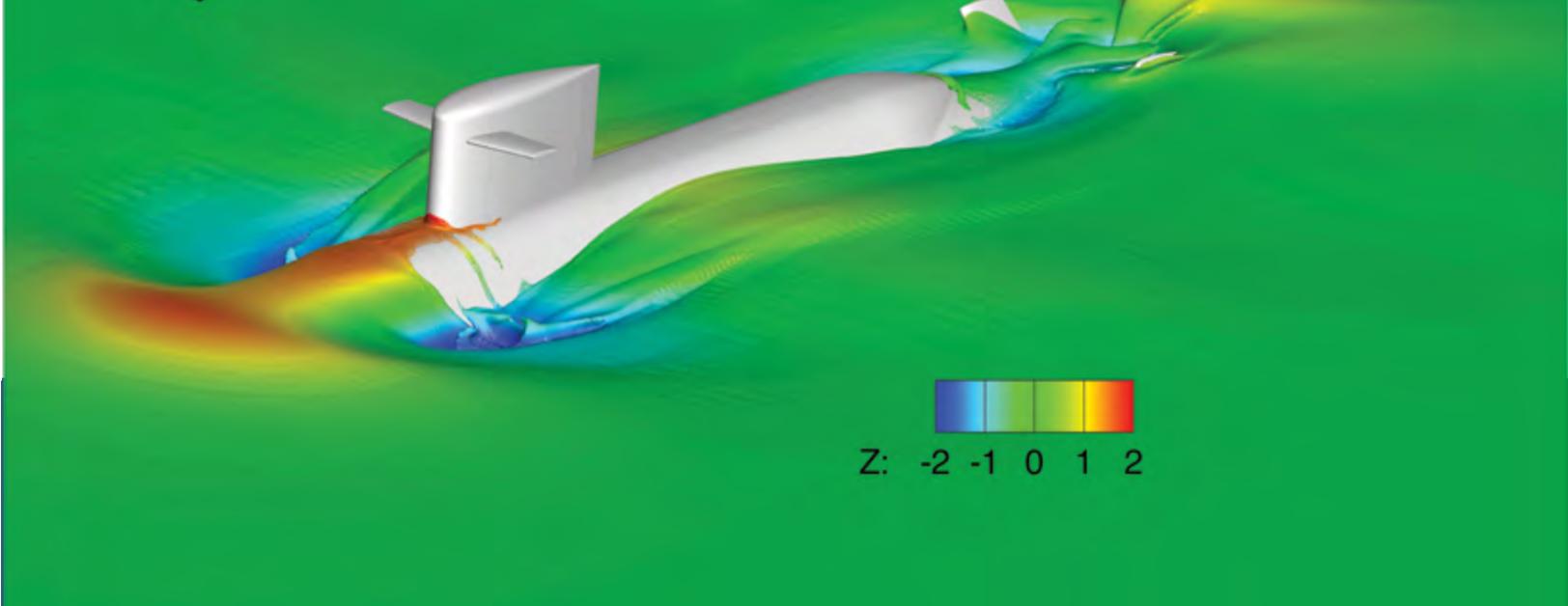
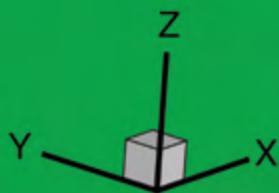
SHIP AND SUBMARINE DESIGN

GOAL

Strengthen ship and submarine design and integration competencies to maintain the Carderock Division's core equity of total ship systems design capability. This pillar includes early-stage concept development; exploratory and engineering ship and submarine design; total ship technology assessment; ship design management; cost estimation; military effectiveness analysis; and technology integration. The capability to do ship and submarine design requires an experienced ship design workforce; lean concurrent design processes; mature specifications and standards; integrated, validated design tools, and world-class design team facilities.

PEOPLE

People are the key to maintaining and enhancing NSWCCD's design capabilities. NSWCCD's focus should be on recruitment and development of design personnel. There is very limited commercial early-stage ship design capability outside of the Navy and its contractors, so the Navy must develop its own ship design personnel. Due to increasing demand for ship design personnel and attrition (from transfers to NAVSEA HQ, other Navy activities and industry, and other losses), NSWCCD should hire 15-20 recent college graduates with initial assignment and developmental assignments with the Center for Innovation in Ship Design (CISD). All NSWCCD technical departments should have their design personnel do at least one design team assignment in CISD. The ship design community at Carderock will work closely with the digital strategy pillar



to develop the next-generation digital design workforce. NSWCCD should develop and implement a formal early mid-career developmental program to develop and enhance the design skills of NSWCCD personnel. The developmental program will use a combination of learn-by-doing assignments, mentoring and training.

TOOLS AND TECHNOLOGY

Working with NAVSEA 05, NSWCCD should expand its design tools starting first with exploratory design, and then engineering design; expand capability to support increased use of high-performance computing to run full physics-based design and analysis tools; and develop design modeling and simulation (M&S) tool roadmaps similar to those developed under the CREATE-Ships program. These roadmaps should be for ship, submarine, and unmanned vehicle design and analysis activities and include synergies and commonality across the different types of maritime platforms. There

is also a need for cross-domain ship design tools that include structures, general arrangements, weights, stability, reliability, maintainability, availability, propulsors, signatures, hydrodynamics, and total ship concept design. It is critical that these early design tools include production and cost considerations.

FACILITIES

NSWCCD should build and outfit a ship and submarine design facility to fully integrate advanced design, analyses, high-performance computing, M&S, and rapid prototyping, along with the latest engineering process and collaboration technologies, to more rapidly and effectively provide affordable, state-of-the-art, mission-capable ships, submarines and unmanned vehicles to the U.S. Navy, and the maritime industry. This building will include collocated design and innovation team rooms.



PLATFORM INTEGRITY AND PERFORMANCE

GOAL

Create innovative and cost-effective solutions supporting Carderock Division's core equities in structures, materials and manufacturing, environmental quality systems, hydromechanics, vulnerability assessments, and survivable systems to more rapidly create, produce, and deliver the right products, whenever and wherever they are needed. In these core equities, this pillar sustains the full life-cycle of platform support: research and development, acquisition, sustainment, and in-service and modernization efforts.

The platform integrity pillar strives to meet these goals by working closely with the digital strategy pillar to advance digital design, digital manufacturing, and digital twin technologies. Significant coordination is also expected in major cross-cutting efforts such as data analytics; modeling and simulation (M&S); design tools;

ship and submarine design; unmanned systems; and technical excellence.

PEOPLE

The platform integrity pillar will focus on recruitment of high-caliber candidates with advanced degrees and development of current personnel via targeted assignments, mentoring, and investment in technical-training programs. Additionally, special emphasis will be placed on workforce development in technologies related to the digital strategy pillar and the major strategic cross-cutting efforts.

TOOLS AND TECHNOLOGY

Digital Design and Advanced Manufacturing – The Navy is widely exploring the concept of digital thread, which is high-



fidelity data that stretches from the initial design concept through a systems life-cycle. This thrust includes all aspects of the digital thread continuum, from digital design, structural analysis, digital manufacturing, including model-based design, digital manufacturing optimization, model-based qualification and certification, M&S of platform performance and behavior, and application of digital twin concepts.

Sustainment-based Technologies – This will enhance overall affordability and includes a family of technologies and activities critical to reducing life-cycle costs and extending service life. Such technologies include: corrosion-control, thermal-barrier, and anti-fouling coatings; novel repair methodologies and nondestructive evaluation; platform environmental, waste management, and radiation detection programs; and structural health monitoring / structural digital twin decision-making tools for repair and inspection.

Modeling and Simulation – The key is development and validation of M&S tools that support the myriad of platform and component assessments, digital processing and manufacturing, and design

work conducted within the platform integrity pillar. Ongoing development in weapon effects and structural M&S must be maintained as they are on the cusp of dramatically expanding user bases and moving into new innovative areas to support shock qualification via simulation, digital twin, incident response, and in-service engineering of the future technologies. Other M&S efforts in integrated computational materials engineering, advanced manufacturing, advanced survivability analyses, and battery performance need to be expanded.

FACILITIES

To provide world-class facilities that support the platform integrity pillar, the focus will be on reinvigorating facilities that are key to current and future Navy needs and repurposing facilities to support needs in M&S, rapid prototyping, additive manufacturing, power and energy, advanced materials and other growing needs by defining facility use metrics, developing a facilities roadmap, and communicating material and funding requirements to leadership.



DIGITAL STRATEGY

GOAL

Expand the application of data analytics and data-driven decision making; leverage these data to improve the Fleet decision maker's ability to utilize all available information; and apply data-driven analysis and decision making to rapid ship design and platform prototyping, digital twin, modeling and simulation of Fleet forces for training, increased situational awareness, and increased operational availability with feedback to support the in-service Fleet and improvements in future platform design.

To resource and execute the digital strategy, we need to work with the technical and business capability health assessment process to understand and plan the current and future needs for a "digital ready" workforce.

PEOPLE

Develop and maintain fundamental competencies in the areas of data science, data analytics, computer science, statistics, information science, and cybersecurity across the workforce. Utilize communities of practice, communities of interest to leverage knowledge management, sharing, and problem swarming. Adopt data science and analytic techniques and methodology best practices to ensure appropriate and valid results.

TOOLS AND TECHNOLOGY

Data Analytics and Digital Twin – Improve sensing, data collection, formatting, storage, and accessibility to facilitate use of data analytics and digital twin representations of Fleet platforms and



systems. Establish infrastructure for data storage and retrieval, and enable Navy networks for effective cross Warfare Center collaboration. Enable the use of data analytics and data science approaches by improving collection and coordination of data into common formats and accessible data storage methods.

Enhance historical data analysis and feature extraction in support of ship and ship systems design and operational data-driven decision making. Improve understanding and access to available historical data sets and identify data feature extraction for proactive maintenance for platform sustainment and maintaining a signatures advantage.

Develop machine-learning techniques and automation of data analysis with support for uncorrelated data and use of simulation for supplementing sparse data sets. Apply methods to support data-driven decision making through the use of in-situ through-the-sensor data analysis in operational platforms.

DevOps and cloud-based software architectures – Improve software and system design for utilization of data-driven

applications and architectures. Improve agile software and systems design and development, utilization and development of open-source software, and application of cloud-native architectures, micro-services, containers, virtualization, and pervasive cyber as part of the design and development through release and deployment of digital systems.

Modeling and Simulation – Extend modeling and simulation of signatures, platform performance, and real-world environmental conditions to support digital twin operations of ship and ship system representations afloat and ashore. Leverage model-centric approaches such as model-based systems engineering (MBSE) across the entire system life-cycle to more effectively exchange information and identify relationships between subsystems.

Expand use of virtual and augmented reality for Navy applications and enable support for collaborative live-virtual constructive (LVC) simulation for training and testing events.



SIGNATURE MANAGEMENT

GOAL

Signature management is the detailed knowledge and mitigation of underwater (acoustic radiated noise and target strength, underwater electromagnetic), topside (radar cross section, infrared, near-Infrared, electro-optical, radio-frequency emissions) and emergent signatures for all Navy surface and undersea platforms. Signature management is focused on the technologies required to achieve and utilize stealth dominance in the face of future advanced threats.

PEOPLE

Train and hire the workforce of the future with skills in data analytics, structural acoustics, hydroacoustics, measurement science and technology, and systems thinking. Hiring in this pillar will focus on recruitment of candidates with advanced degrees

in specialized applications through leveraging of relationships with universities and University Affiliated Research Centers. Workforce development of current personnel will be conducted via targeted assignments, mentoring, and Naval Innovative Science & Engineering Program investments in technical-training and capability development projects. Continuous education and a learning culture, as well as deep knowledge in their expertise, will empower the Division with the culture to move quickly into new areas and respond to challenges in a fast-moving threat environment.

TOOLS AND TECHNOLOGY

Technologies that this pillar must address to achieve stealth dominance are: signature mitigation technologies; signatures impacts on electromagnetic maneuver warfare; signatures monitoring; modeling and simulation; sensor fusion susceptibility



and defeat strategies; and unmanned underwater vehicle (UUV) signatures are all key tools and technology focus areas for successful Signature Management.

Investigation of these subjects is required for the Navy to acquire the platforms and attendant technologies required to achieve stealth dominance; and, the Fleet and commanding officers to have the knowledge to understand remaining signature susceptibilities and best employ their platforms to maximize mission performance. With knowledge in the above disciplines, we can collaboratively and quickly apply solutions and processes for signature susceptibilities throughout the Fleet and then sustain the platform and Fleet performance and the gains achieved.

The technologies developed within the above subject areas provide much of the underlying physics basis, as well as specific technical capabilities required to implement digital twin for the future Fleet.

FACILITIES

Signature management relies on the use of advanced measurement technologies and facilities to research, develop, and achieve stealth dominance. This pillar will develop the signatures measurement capabilities and facilities required to provide enduring, affordable sources of accurate, decisionable, and actionable data to guide Navy platform signatures research and development and acquisition programs as well as in-service platforms. Accurate in-situ measurements are critical to the development, implementation, validation, and life-cycle management of any/all signatures digital twin capabilities. Advanced measurement capabilities should support emergent signatures requirements and, to the extent technically feasible, Navy forward-basing plans and/or organic platform-based measurement approaches.



UNMANNED SYSTEMS

GOAL

Advance Carderock's state-of-the-art capabilities in areas including: autonomy, power, energy and management, command, control and communication, safe navigation, perception, situational awareness, Fleet interoperability, systems reliability, cyber resiliency, and Fleet maneuver and control.

Drive greater integration in the unmanned systems (UxS) space by developing life-cycle engineering alliances in partnership with the Naval Research & Development Establishment (NR&DE), industry, and academia. The results will enhance Carderock's ability to collaboratively contribute in the vast unmanned systems business area.

PEOPLE

Enhance NAVSEA Warfare Center Unmanned Vehicle and Autonomous Systems (UVAS) Working Group as a vital collaboration mechanism across Navy leadership, NR&DE, academia, and industry through membership expansion and outreach efforts. Improve innovation and integration capabilities and engagement with UVAS Working Group activities. Design and execute a targeted effort to create and train the unmanned workforce of the future. Identify and integrate Division subject-matter expertise in critical enabling technology "action groups" to advance Carderock's UxS technical capabilities in autonomous and unmanned systems, power and energy, command and control, undersea constellation, situational awareness, Fleet interoperability, reliability, and cyber resilience. Actively target investment into areas of manned-unmanned teaming, preparing



the Navy of today to adapt to and excel with this new frontier of platforms.

TOOLS AND TECHNOLOGY

Continue UxS design-tool development to ensure robust inputs for advanced concepts exploration using set-based design and drive towards “digital-to-done” capabilities. Improve integrated air, surface, and undersea 3-D visualization and data collection of cooperative maneuvers at Carderock facilities. Develop modeling and simulation capabilities to support analysis and war gaming of man/machine teaming, swarm and counter swarm for all domains. Coordinate base-wide efforts in the areas of artificial intelligence and machine learning to develop data sets, analysis techniques, and application tools to lead the Navy NR&DE forward in support of UxS development.

FACILITIES

Fund systematic facility upgrades to support Carderock Division’s

unmanned maritime platform function, role and responsibility across surface, undersea and air system. Establish and sustain USV Lab Ashore and Lab Afloat and UUV Lab Ashore and Undersea. Establish and sustain UAV Hangar and Lab Aloft located in West Bethesda, Maryland, with capabilities including UAS flight operations at Carderock facilities and detachments.

Leverage and integrate results from big data, digital twin, live-virtual construct, advanced manufacturing and other infrastructure improvement communities of practice into Division UxS planned efforts.

Develop and sustain long-term in-service engineering agent (ISEA) and integrated logistics support (ILS) collaborations with NUWC Keyport UUV Home Port for large displacement UUVs and on the East Coast at South Florida Ocean Measurement Facility (SFOMF) and the pending USV Fleet.



INNOVATION

Carderock Division shall continue to sustain and grow a workplace environment that fosters innovation in science and technology, and in business and operations. Over the next five years, Carderock-led ventures will be broadened to include NAVSEA Warfare Center and potentially Naval Research & Development Establishment (NR&DE) membership.

OBJECTIVES

An innovation infrastructure with associated technologies and process portfolios shall be instituted. It will be comprised of activities and efforts including, but not be limited to:

- Establish a Carderock Innovation Board (CarIB). Comprised of Division nominated, acknowledged and empowered representatives, the Board will generate annual targeted
- Innovation thrusts, socializing same through the Division and across the Warfare Centers.
- The CarIB will be the principal liaison with the NR&DE, industry, and academic cells across the country. Execute annual Technical Director's Innovation Challenge (TDIC) events where a competitive call for innovative projects will be solicited. Selected principal investigators will be resourced 20 percent of their time to work their hypothesis with periodic and recurring peer and leadership level reviews. Long-term this would become a Carderock-led Warfare Centers-wide event
- The Division will lead and support innovation challenge event, with the intent being to spawn greater Warfare Centers and NR&DE innovative collaboration.



- The Division will lead an NR&DE-wide Disruptive Technologies Laboratory (DTL) Enterprise. This virtual DTL community of practice will host recurring outreach events from DON, DOD and other government agency experts, from industry and from academia. Promising, atypical research ventures will be recommended to a Carderock/Warfare Centers Board of Innovation for down-select and resourcing.



BUSINESS PROCESSES

NSWC Carderock's business strategy centers around supporting our technical capabilities and providing agile, effective, and simple business solutions to enable our strategic direction and technical missions. As stewards of public trust and National security, we must establish and adhere to high ethical standards in finance, contracting, and business operations. We also place great emphasis on business innovation and responsive initiatives that anticipate future requirements of our customers as cost-effectiveness and speed of delivery remain critical drivers. In pursuit of these goals, governance must be transparent and facilitate

accountability, trust and empowerment to leverage the talent across the Division.

The three components of business operations will include corporate planning, process efficiency, and data analytics which rely on each other to effectively support the Division in its efficiency, investment decisions, and data utilization. Each component is a critical element which enables our business enterprise and ensures mission success.



Continuous Process Improvement (CPI) and High-Velocity Learning (HVL). CPI and HVL support process efficiency and reengineering to achieve greater effectiveness of all business and technical operations at Carderock. The Division must continuously strive to improve our processes and learn best practices from across and outside the naval enterprise.

Analytics-Driven Decision Making. Technical, business and organizational processes rely on accurate and timely information to facilitate data-driven decisions for successful mission delivery. Analytics-driven decision making is comprised of data collection through effective tools, effective management of data in enterprise business systems and analytics that support decision making by senior leadership, managers, and the deck-plate process owners.

Corporate Planning and Strategy Execution. The Technical Capability Health Assessment (TCHA) process is a cornerstone of our business-planning process which supports both near and long-range mission capabilities. We must align our Division plans with the Navy's Long-Range Research and Development Plan (LRRDP) and higher-level planning efforts to identify technologies and capabilities needed for the Navy after next. We also need to apply modern business strategies from the public and private sectors to conduct a comprehensive strategic analysis of our technical capabilities which takes into account the state of our workforce, facilities, and technological needed while creating an integrated plan to address technological and business gaps.



WORKFORCE

We must embrace and foster an environment conducive to cultivating an inclusive work culture in which the entire workforce feels appreciated, valued, included, empowered, and fully engaged with the belief that they can contribute to their maximum potential and enjoy full participation in our workforce. Attracting, retaining, and motivating the best and brightest workforce through innovative and affordable employee-development approaches, and mentoring their growth and development presents a greater return on investment with reduced costs resulting from attrition, absenteeism, and low productivity, all of which have a huge impact on sustainable mission readiness. We must also ensure we provide an environment that is safe, inclusive,

and professional where all who serve our Nation can feel they are valued and respected.

Our people are the key to our success. Carderock Division will continue to invest in its employees and ensure they have the opportunity to reach their full potential. We will provide robust training programs to include educational, technical, leadership and business courses that support our employees' development. We will also keep our employees informed and maximize methods to consistently communicate with our workforce and highlight training opportunities. Building an effective and successful workforce stems from ensuring employees are equipped with the



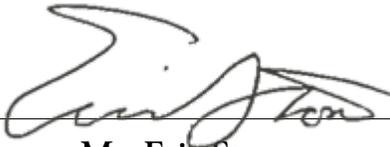
The “human” aspect of NSWCCD cybersecurity is approached via a defense in-depth strategy. This strategy provides a cost-effective, triaged approach with the first layer being every person with computer access. This “human firewall” approach is executed through ensuring all personnel receive training pertaining to the basics of cybersecurity; email handling, reporting spam, and where to receive help when it’s needed. Some of our strategic workforce goals are:

- Prioritizing talent management to facilitate the growth of personnel to succeed in their current roles and aspire to greater assignment and responsibility. Prepare and strengthen our branch-head human capital.
- Modernize and enhance technical and leadership development. Prepare the leaders of tomorrow.
- Foster knowledge stewardship from onboarding through retirement and resignation by accelerating the learning curve of Division employees in both technical and business career paths and creating a culture of expectation of continuous improvement and growth.
- Improving our competitive advantage through a fully inclusive workforce reflective of the Nation we serve that values diversity, coherence and collaboration.
- Bringing our personnel who deliver cyber-centric capabilities or protect our cyber systems into the cyber information technology / cybersecurity Work force. Just as cyber systems evolve, our workforce capability will evolve as well.

tools, resources, education, and skill sets to do the job. Carderock supports mentoring across the Division, whether it be formal or informal. A goal of mentoring is sharing known resources, values, skills, perspectives, and proficiencies. Carderock encourages mentoring relationships that foster an environment in which the employee is able to be skilled, agile, and flexible and continues to thrive.

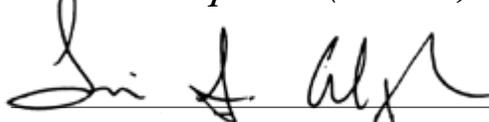
As the reliance on cyber capabilities continues to grow at an exponential rate across all mission capability sets, our personnel must keep pace in order to maintain our global strategic, operational and tactical advantages. Through the training of our personnel, we ensure the “human” aspect of cybersecurity can be baked into everything we do, as opposed to an afterthought where it must be “bolted” on.

Concur:



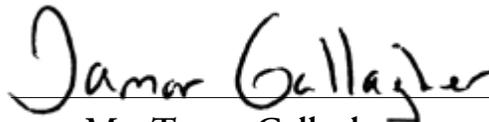
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Mr. Tariq S. Al-Agba

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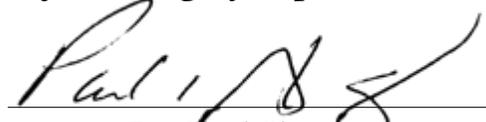
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Head, Signatures Department (Code 70)



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Head, Naval Architecture & Engineering Department (Code 80)



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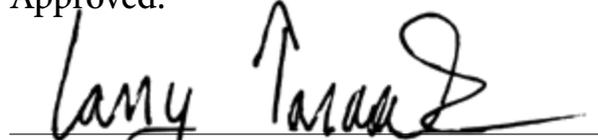
Deputy Division Technical Director (Acting)

Approved:



Captain Mark Vandroff, USN
Division Commanding Officer

Approved:



Mr. Larry Tarasek, SES
Division Technical Director



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