Command Overview
Naval Surface Warfare Center Carderock Division

CAPT Mark Vandroff
Commanding Officer, NSWCCD

Dr. Joseph T. (Tim) Arcano, Jr.
Technical Director, NSWCCD

Industry Day
May 1, 2017
Mission

Provide full-spectrum research and development, test and evaluation, analyses, acquisition and Fleet support for the Navy’s ships, ship systems and associated Navy logistics systems.

- Provide technical capabilities for surface / undersea vehicles and associated systems
- Develop and apply S&T
- Support the maritime industry

Vision

Lead innovative and cost-effective solutions for advanced ships, ship systems and technical solutions to the warfighter to keep our Fleet at sea.
Naval Surface Warfare Center

Our History

1896: Experimental model basin established

1890s 1900s 1910s 1920s 1930s 1940s 1950s 1960s 1970s 1980s 1990s 2000s 2010s

HR 7542 June 10, 1896
"Established a model tank...for investigating and determining the most suitable and desirable shapes and forms...for U.S. naval vessels... (And)...for private ship builders...provided that the cost be defrayed..."

1937: Carderock site approved

HR 10135 Feb. 24, 1937
"...For U.S. vessels, including aircraft and the investigation of other problems of ship design..."

1967: Consolidation with Marine Engineering Lab (Annapolis)

2015: Realignment- NAVSSES becomes NSWC Philadelphia Division

1995: Consolidation with Naval Ship Systems Engineering Station (NAVSSES/Philadelphia)

2013: Maneuvering & Seakeeping basin renovated

Long history of supporting maritime RDT&E
Carderock Sites Where We Work

Puget Sound Detachment at Naval Submarine Base Bangor
BANGOR, WA

Acoustic Research Detachment
BAYVIEW, ID

Memphis Detachment
Dr. William B. Morgan
Large Cavitation Channel
MEMPHIS, TN

Norfolk Detachment
Combatant Craft Division
NORFOLK, VA

Acoustic Trials Detachment
CAPE CANAVERAL, FL

South Florida Ocean Measurement Facility
DANIA, FL

Southeast Alaska Acoustic Measurement Facility
KETCHIKAN, AK
Navy Working Capital Fund business model:

1. **Ensures full cost recovery**
   - 100% of WC costs are reimbursed/funded by customers
   - Funded orders must be received before work begins

2. **Ensures total cost visibility**
   - In-house labor billed at stabilized rates, allowing customers to budget for costs
   - Common costing template provides consistency in estimates
   - Tasking well defined, includes clear deliverables / milestones
   - All tasking screened through Work Acceptance and Assignment process

3. **Contractual in nature**
   - Published Technical Capabilities guide assignment of work to appropriate Division

4. **Ensures workforce size is determined by funded tasking**
SBIR / STTR Overview

• NAVSEA Small Business Innovation Research (SBIR) program uses small businesses to meet federal research needs, and enables participation by socially- and economically-disadvantaged businesses.

• NAVSEA Small Business Technology Transfer (STTR) program requires small business to partner with a university, a Federally-Funded Research and Development Center (FFRDC), or a qualified non-profit research institution.

• For more information on participating in NAVSEA SBIR / STTR, visit www.navysbir.com/, www.navsea.navy.mil/Business-Partnerships/SBIO/ or contact NAVSEA Small Business Office at 202-781-3965.

SBIR / STTR buy research & development, not parts or services
Technical Focus

Dr. Joseph T. (Tim) Arcano, Jr.

Technical Director, NSWCCD
Naval Surface Warfare Center

Strategic Alignment

Carderock

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

FORCE BEHIND THE FLEET
- On-time delivery of ships & submarines
- Culture of affordability
- Cybersecurity
- People

NSWC Carderock
STRATEGIC FOCUS AREAS
- Modern Knowledge Transfer
- Procurement Planning & Execution
- Workforce Development
- Unmanned Vehicles / Autonomous Systems
- Ship / Platform Design and Integration
- Additive Manufacturing
- Culture of Innovation
- Cybersecurity

One Team – Expanding the Advantage through Collaboration

Distribution Statement A: Approved for Public Release; distribution unlimited.
Quick Facts

- Diverse and highly educated workforce with 25,000 scientists, engineers, and technicians (with more than 2,000 Ph.D.s)
- 20 commands across the NAVAIR/NAVSEA Warfare Centers, SPAWAR Systems Centers, ONR and NRL

- Conducts RDT&E for the DoN to discover, develop, transition and field technologically superior naval warfighting capabilities.
  - Examples: prototype development, demonstrations and experimentation to accelerate the fielding of new operational concepts, technology and systems innovations.
- Unique RDT&E facilities and test ranges technologically superior naval warfighting capabilities.

Aggressive Research, Development, Test & Evaluation for reliable real world solutions
128 Technical Capabilities Define the Areas of Expertise for each Division
16 Technical Capabilities

- CD01  Ship and Submarine Design and Integration
- CD02  Ship and Submarine Acquisition Engineering
- CD03  Ship and Submarine Systems Concepts, Technologies, and Processes
- CD05  Combatant Craft and Expeditionary Vehicles
- CD06  Unmanned Vehicles Naval Architecture and Marine Engineering
- CD07  Hull Forms and Fluid Dynamics
- CD08  Propulsors
- CD14  Surface, Undersea, and Weapon Vehicle Materials
- CD15  Surface and Undersea Vehicle Structures
- CD16  Alternative Energy and Power Sources R&D
- CD17  Liquid Waste Management, Science and Systems
- CD20  Surface, Undersea and Expeditionary Vehicle Vulnerability Reduction and Protection
- CD22  Surface and Undersea Vehicle Underwater Signatures, Silencing Systems, and Susceptibility
- CD23  Surface and Undersea Vehicle Non-Acoustic Topside Signatures, Silencing Systems, and Susceptibility
- CD25  Radiation Detection Technology Research and Management
**Carderock Workforce**

As of 15 March 2017

<table>
<thead>
<tr>
<th>Administrative</th>
<th>Technicians/Wage Grade</th>
<th>Electrical Engineering</th>
<th>Electronics Engineering</th>
<th>Materials Engineering</th>
<th>Mechanical Engineering</th>
<th>Naval Architecture</th>
<th>General, Chemical, Aerospace, Industrial, Computer, Environmental, Civil Engineering and Scientists</th>
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<tbody>
<tr>
<td></td>
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<td>Doctorates: 167, Masters: 401, Bachelors: 984</td>
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</tbody>
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**TOTAL EMPLOYEES**
- 2,154

**SCIENTISTS & ENGINEERS**
- 1,427

**ADMINISTRATIVE**
- 506

**TECHNICIAN & WG**
- 221

**EDUCATION**

<table>
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<tr>
<th>Degree Level</th>
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<td>Bachelors</td>
<td>984</td>
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<tr>
<td>Masters</td>
<td>602</td>
</tr>
<tr>
<td>Doctorates</td>
<td>167</td>
</tr>
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*Non-Degree 401*
Survivability, Structures, Materials and Environmental Department

Signatures Department

Naval Architecture and Engineering Department
Naval Surface Warfare Center

Major Customers & Budget FY17

FY17: As of 1 Jan 2017

Business
Cost reimbursable and direct cite:

$708 Million

FY16: As of 1 Jan 2017

REIMBURSABLE
DIRECT CITE

$566 Million
$142 Million

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Naval Surface Warfare Center

Major Programs Supported

- **Columbia-Class**
  (formerly Ohio-class replacement)

- **Virginia-Class**

- **Littoral Combat Ships**
  (both variants)

- **Amphibious and Auxiliary ships**

- **DDG 1000 / DDG 51**

- **Carriers**

- **Stiletto**
  (Technology Demonstrations)

- **Unmanned Systems**

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NISE – Section 219 Funds

- Major innovation catalyst
- Technical Director’s Innovation Challenge; Disruptive technology Lab; High-Energy Weapon Integration; Digital Design; Digital Manufacturing; Power and Energy

Cooperative Research and Development Agreements (CRADAs)

- 136 active; 44 new in FY16
- Research areas include: energy storage & conversion; additive manufacturing; situational awareness and deep-submergence capabilities

11 active Educational Partnership Agreements

Patents (past 5 years)

- 2011-2015: 126 patents issued; 116 patent applications filed; 120 patent disclosures submitted
- Carderock has earned 8 Rear Adm. Harold Bowen “Navy Patent of the Year” awards (most in Navy)
Summary

- Support Our Deploying Forces
- Improving Acquisition Program Outcomes
- Cutting-edge Innovations

We envision the future Fleet, create it and help sustain it.

NSWC Carderock Division –

Where the Fleet Begins