Command Brief

CAPT. SCOTT H. KRAFT
COMMANDING OFFICER

MR. ASHLEY JOHNSON
TECHNICAL DIRECTOR
Research, develop, test, evaluate (RDT&E), manufacture and provide in-service support of energetics and energetic systems. Provide Soldiers, Marines, Sailors and Airmen with information and technology to detect, locate, access, identify, render safe, recover, exploit and dispose of explosive threats.

**Energetics are:**
- Propellants
- Explosives
- Fuels
- Pyrotechnics
- Reactive materials
- Warheads
- Rocket motors
- Munitions

**MISSION**

*Distribution A: Approved for public release; distribution unlimited.*
Air Launched 2.75 inch Rockets

The command is the Warfighter’s source for production of the 2.75 inch rocket: from propellant manufacturing to production of the warhead. We make and deliver the tools to give our warfighter the winning edge.

**Cartridge Actuated Devices / Propellant Actuated Devices (CAD/PAD)**

NSWC IHEODTD manufactures CAD/PAD supply systems for aircrew escape ejection systems. Our Virtual Fleet Support facility allows the warfighter to obtain any component within one week from order request.
• Strengthen naval power
• Achieve high-velocity learning
• Strengthen our Navy team
• Expand, strengthen our network of partners
• Built on four core attributes: integrity, accountability, initiative and toughness

• On-time delivery of ships and submarines
• Culture of Affordability
• Cybersecurity

• Execute with excellence
• Shape and maintain technical and business capabilities
• Drive a culture of affordability
• Continuously build and shape a capable workforce

• Reshape Facilities and Utilities
• Establish Public-Private Partnerships
• Develop New Products and Services
• Sustain and Expand Core Product Lines
• Reinvigorate Naval Energetics
ORGANIZATIONAL STRUCTURE

CNO (Echelon I)

NAVSEA (Echelon II)

NSWC HQ (Echelon III)

NSWC IHEODTD (Echelon IV)

EXU-1 (Echelon V)

CO

TD

Comptroller Department

Contracts Department

Corporate Operations Department

EOD Department

Systems Engineering Department

Systems Integration Department *

Energetics Manufacturing Department

RDT&E Department

Expeditionary Exploitation Unit (EXU) 1

CAD / PAD Joint Program Office

CREW Program Management Office

EOD Program Management Office

* Also recognized as an Echelon 5 detachment
Only DoN activity delivering both energetics and EOD technology solutions from basic research through disposal.
Warfighting Impact

- Integrated signatures program helps warfighter diagnose threat “left of boom”
- IM programs develop safer warheads without sacrificing performance
- Chemical and biological agent defeat c-WMD programs interrupt enemy capabilities/capacity

Capabilities and Facilities

- Detonation science facility for controlled, dynamic research of energetic materials
- Material properties laboratory and ordnance dissection for health analysis and aging
- Non-destructive evaluation and analytical chemistry laboratories for in-house lot acceptance and quality assurance of products
- Condition-controlled laboratories for high-fidelity R&D

Lines of Operation

Research and Technology

- Experts in detonation science and spectroscopy develop new diagnostic tools for fundamental understanding and surveillance
- New molecules, fuels, oxidizers and concepts of energy release and diagnostics

Test and Evaluation

- Flexible, experienced personnel leading detonation/combustion performance and IM test and evaluation
Warfighting Impact

- STANDARD and Evolved Sea Sparrow Missile propulsion engineering
- Clandestine Delivered Mine
- IED Exploitation
- Countermeasure anti-torpedo warhead and fuzing
- Aircrew escape systems
- Ordnance assessments leading to service life extensions

Lines of Operation

- Energetics Technology
- MEMS, lethality, blast effects, insensitive munitions and savings-through-simulation
- Energetic Systems
- Engineering for all warfighter domains
- CAD/PAD support of more than 3,000 ejection system components

Capabilities and Facilities

- MEMS explosive-certified cleanroom, characterization and test
- Polymer and metal additive manufacturing capability (3D printing)
- CAD/PAD virtual fleet support
- Airguns for test rounds from 3”-21”
Warfighting Impact

• Gun weapon systems standardized pier-side maintenance and repair (SPMR)

• Mobile Ammunition Evaluation and Repair Unit (MARUE)

• Gun weapon system casualty report support

• Fleet liaison for guns and ammo (LANT FLEET / PACFLEET)

• PHST member of Board of Inspections and Survey, and Weapons System Explosive Safety Evaluation Board Member

Capabilities and Facilities

• 16,000 sq. ft. PHST test facility

• Gun stand complex

• 12,000 sq. ft. minor caliber lab

• Medium/minor caliber live fire range facility

Lines of Operation

• In-service engineering agent (ISEA) and acquisition engineering agent for guns and ammo

• Conventional ammunition commodity management

• Weapons and armament Packaging, Handling, Storage and Transportation (PHST) design agent and ISEA
Warfighting Impact

- Otto Fuel II/Agile Chemical Facility
- Sole-source provider of torpedo fuel for U.S. and our allies
- Manufacture 250K lbs. of fuel annually
- CAD/PAD centralized manufacturing and stock point
- Sole source of all Navy CAD/PADs
- Able to ship parts anywhere around the globe

Lines of Operation

- Energetic development, scale-up and qualification
- Design, development and low-rate initial production/full-scale production of energetic materials and ordnance end-items
- Flexibility to make products from mortars to rockets through the same processing line: from 5 grams to more than 1M lbs.
- Major contributor to Navy’s insensitive munitions (IM) program

Capabilities and Facilities

- Cast-composite propellant and polymer-bonded explosive mixing/casting
- Chemical manufacturing and scale up
- Pressed explosives and warheads
- Cartridge igniter and CAD/PAD assembly
- Develop and produce additive manufactured tooling for energetic materials
EXPLOSIVE ORDNANCE DISPOSAL (D) DEPARTMENT

Warfighting Impact

• EOD 60-Series Publications (AEODPS)
• Joint EOD Decision Support System
• Foreign Materiel Acquisition and Exploitation
• Advanced EOD Robotic System (AEODRS)
• EOD Counter Radio-Controlled Improvised Explosive Device Electronic Warfare (CREW)
• Explosives Detection Equipment (EDE) Program

• Demonstration and Assessment Team (DAT)

Lines of Operation

• Information Management
  o Collection, analysis, development and dissemination of procedures and countermeasures information to the Joint Service EOD (JEOD) community

• Acquisition and Technology
  o Responsible for the research and development of tools and equipment used by JEOD

• Logistics
  o Provides complete worldwide life-cycle logistics support to field and maintain JEOD tools and equipment

Capabilities and Facilities

• Co-located Service Detachments and Program Office
• 24-7 / 365 warfighter call-back ability to Technical Support Center
• Explosive test and robotics test ranges
• Magnetic Signature Test Facility
• Concept Realization, Innovation and Prototyping (CRIP) facilities to accelerate idea to prototype time/rapid support for 3D print jobs
EXPEDITIONARY EXPLOITATION UNIT ONE (EXU-1)

Mission
Combined Explosives Exploitation Cell (CEXC), Foreign Materiel Acquisition (FMA) Platoon and Advanced Exploitation Capability (AEC) collect, process, exploit and analyze conventional ordnance, improvised explosive devices and weapons, and their related components – on land and at sea – for the purpose of providing near real-time technical intelligence to tactical commanders, EOD community, service components, DoD, national level intelligence agencies, and allied and partner nations.

Organization and Manning
• Echelon 5, Type II Sea Duty Operational Detachment
• Type Commander: NSWC IHEODTD

• Globally deployable in support of Fleet Commander exploitation requirements
• Expeditionary Mine Countermeasures Exploitation
• Tactical Exploitation (field-based)
• Operational Exploitation (lab-based)
• Foreign Materiel Acquisition (ordnance, weapons)
• Intelligence Community & SOF Interoperability
• Surface and Underwater Post-Blast Analysis
• Advanced Electronic Exploitation Division
Indian Head, Md. (two sites): 1,680 civ., 3 mil. and 211 ctr.
- NAVSEA Center of Excellence (CoE) for Energetics
- DoD EOD program lead
  - Combined Explosives Exploitation Cell platoons

Ogden, Utah: 20 civ. and 4 ctr.
- Co-located at Hill Air Force Base
- CAD / PAD Air Force Integrated Product Team

Camp Pendleton, Calif.: 4 civ., 2 ctr.
- Demonstration and Assessment Team
- Assigned to D Department

Rock Island, Ill.: 2 civ.
- Quad-Cities Caliber Cartridge Case Facility
- Aligned with G Department

McAlester, Okla.: 25 civ. and 4 ctr.
- McAlester Army Ammunition Plant
- Navy Special Weapons

Louisville, Ky.: 12 civ.
- Naval Guns

- Located at Picatinny Arsenal
  - Joint CoE for Guns and Ammo
- Navy Package, Handling, Storage and Transportation, Guns and Ammo

Norfolk, Va.: 12 civ., 3 ctr.
- Demonstration and Assessment Team
- Assigned to D Department
INDUSTRIAL COMPLEXES

16 unique industrial facilities at
NSWC Indian Head EOD Technology Division

Agile Chemical Facility
Detonation Science Facility

Large Motor Test
Trident Missile Plant
1890: Ens. Robert Dashiell takes over construction and supervision of the new Naval Proving Ground upon its relocation to Indian Head.

1900: Indian Head begins producing smokeless powder. Dr. George Patterson is brought aboard as the station’s first chief chemist.

1907: The Explosive D plant opens

1917: Explosive Investigation Laboratory established at Stump Neck Annex.

1927: Indian Head begins work on torpedo fuzes, anti-submarine fuzes, signals and buoys.

1942: Indian Head establishes R&D Department.

1946: Navy WWII veterans employed at Indian Head’s extrusion plant pose for a photo.


1960: An overhead of the Polaris Plant.

1973: CAD/PAD work is assigned to Indian Head.

2007: Naval EOD Technology Division aligns under NAVSEA as a division of NSWC.

2013: NAVSEA announces the merger of NSWC Indian Head Division and Naval EOD Technology. NSWC IHEODTD is formed.

2015: Indian Head celebrates its 125th Anniversary.
## IHEODTD Numbers at a Glance

### FY16 Execution

- **$413.1M direct / $106.3M indirect**

### Total Contracting Effort

- **$357.9M**

### Buildings Occupied

- **896**

### Total Square Feet

- **2,006,402**

### Civilian Staffing

- **1,999 Employees**
  - Average Years of Service: **15**
  - Average Age of Workforce: **45**
  - Scientists and Engineers: **804**
  - Top S&E Disciplines:
    - Aerospace Engineering: **31**
    - Electrical Engineering: **36**
    - Electronics Engineering: **55**
    - Chemistry: **75**
    - General Engineering: **92**
    - Chemical Engineering: **95**
    - Mechanical Engineering: **336**

### Workforce Education

- **Bachelors: 762**
- **Masters: 336**
- **Ph. D.: 65**

*Does not include contractors*

Distribution A: Approved for public release; distribution unlimited.
### Workforce Diversity

#### Average Years of Service: 15
#### Average Age of Workforce: 45

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Current Workforce %</th>
<th>FY17 New Hire %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 25</td>
<td>5.26%</td>
<td>31.94%</td>
</tr>
<tr>
<td>25 to 29</td>
<td>7.26%</td>
<td>18.32%</td>
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<td>30 to 34</td>
<td>14.01%</td>
<td>13.61%</td>
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<tr>
<td>35 to 39</td>
<td>10.91%</td>
<td>11.52%</td>
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<tr>
<td>40 to 44</td>
<td>8.46%</td>
<td>6.81%</td>
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<tr>
<td>45 to 49</td>
<td>11.16%</td>
<td>6.28%</td>
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<tr>
<td>50 to 54</td>
<td>17.77%</td>
<td>2.62%</td>
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<tr>
<td>55 to 59</td>
<td>15.02%</td>
<td>1.05%</td>
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<tr>
<td>60 to 64</td>
<td>7.16%</td>
<td>7.33%</td>
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<tr>
<td>65 and Above</td>
<td>3.00%</td>
<td>0.52%</td>
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<table>
<thead>
<tr>
<th>Gender</th>
<th>Current Workforce %</th>
<th>FY17 New Hire %</th>
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<tbody>
<tr>
<td>Male</td>
<td>67%</td>
<td>64%</td>
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<tr>
<td>Female</td>
<td>33%</td>
<td>36%</td>
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<table>
<thead>
<tr>
<th>Race</th>
<th>Current Workforce %</th>
<th>FY17 New Hire %</th>
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</thead>
<tbody>
<tr>
<td>White</td>
<td>73.02%</td>
<td>67.54%</td>
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<tr>
<td>Black</td>
<td>16.37%</td>
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<tr>
<td>Asian</td>
<td>5.26%</td>
<td>4.19%</td>
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<tr>
<td>Hispanic</td>
<td>4.30%</td>
<td>4.19%</td>
</tr>
<tr>
<td>Amer Indian</td>
<td>0.65%</td>
<td>2.09%</td>
</tr>
<tr>
<td>2 or More</td>
<td>0.40%</td>
<td>1.05%</td>
</tr>
<tr>
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</tr>
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</table>

### Civilian Workforce Diversity - RACE

- **Current Workforce %**
- **FY17 New Hire %**

### Civilian Workforce Diversity - AGE

- **Current Workforce %**
- **FY17 New Hire %**

### Civilian Workforce Diversity - GENDER

- **Current Workforce %**
- **FY17 New Hire %**

*Current as of August 2017*
FY16 Customer Base

<table>
<thead>
<tr>
<th>Customer</th>
<th>Reimbursable $</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>NAVSEA</td>
<td>$229.6</td>
<td>55%</td>
</tr>
<tr>
<td>NAVAIR</td>
<td>$56.2</td>
<td>13%</td>
</tr>
<tr>
<td>ONR</td>
<td>$23.5</td>
<td>6%</td>
</tr>
<tr>
<td>SSP</td>
<td>$2.8</td>
<td>1%</td>
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<tr>
<td>OTHER NAVY</td>
<td>$14.2</td>
<td>3%</td>
</tr>
<tr>
<td>AIRFORCE</td>
<td>$24.7</td>
<td>6%</td>
</tr>
<tr>
<td>MARINE CORPS</td>
<td>$12.2</td>
<td>3%</td>
</tr>
<tr>
<td>OTHER DOD</td>
<td>$17.4</td>
<td>4%</td>
</tr>
<tr>
<td>ARMY</td>
<td>$23.8</td>
<td>6%</td>
</tr>
<tr>
<td>ONR</td>
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<tr>
<td>NAVAIR</td>
<td>$56.2</td>
<td>13%</td>
</tr>
<tr>
<td>OTHER GOV'T</td>
<td>$4.1</td>
<td>1%</td>
</tr>
<tr>
<td>PRIVATE PARTY</td>
<td>$6.7</td>
<td>2%</td>
</tr>
<tr>
<td>OTHER</td>
<td>$3.9</td>
<td>1%</td>
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</tbody>
</table>
| IHEODTD $419.1 million in FY 16 reimbursable

NAVSEA: 55%
- PEO (IWS): 20%
- NSWC: 4%
- PEO (Sub): 8%
- PEO (LCS): 4%
- PMS 408: 15%
- Other NAVSEA: 3%

NAVAIR: 13%
- PEO (U&W): 12%
- PEO (T): 0.6%
- PEO (A): 0.3%
- Other NAVAIR: 0.5%
Vision: Ten years from now, NSWC IHEODTD will have grown 400 work-years stronger by
- reshaping its industrial complex,
- aggressively capturing RDT&E opportunities in energetic systems, and
- consistently providing reliable, quality and affordable products and services.

Strategic Plan Diagram:

- **Reshape**
  - 1. Reshape facilities and utilities
    - Modernize and Maintain Utilities
    - Optimize Facilities, Equipment & Capabilities
    - Optimize NAVFAC Relationship
    - Identify Requirements-Pull Opportunities
    - Facilitate P3 Negotiation & Establishment
    - Manage P3 Execution
  - 2. Establish public-private partnerships
    - Identify and Pursue the “Right” P3s
    - Reduce Execution Lead Times
    - Protect Energetics Knowledge Base
  - 3. Develop new products and services
    - Identify Technology-Push Opportunities
    - Identify Strategy Opportunities
    - Protect Energetics Knowledge Base
  - 4. Sustain and expand core product lines
    - Prioritize & Resource Investments
    - Capture Selected Opportunities
    - Identify Expansion Opportunities
  - 5. Invigorate energetics interest
    - Develop Sponsorship for Energetics RDT&E
    - Establish an Energetic RDT&E Program
    - Establish an Innovation Laboratory

- **RDT&E Capture**
  - Good critical facilities
  - Fair enabling facilities
  - Reduce utility costs 25%
  - 100 Workyears Annually
  - Annual fixed P3 revenue to $5.25M
  - 100 Workyears Annually
  - 97% customer satisfaction
  - Decreased stabilized rate
  - 100 Workyear Increase
  - 2 Prototypes Annually

- **Products & Services**
  - 100 Workyears Annually
Main-side Infrastructure

- 803 Buildings and Structures
  - 268 Explosive Operating Bldgs.
  - 144 Magazines
  - 391 Office, Storage & Supt Bldgs.
  - 7 Shared Other Tenant Occupied Bldgs.
- 1,704k square footage
- 1,961 Total Acres

Other Area Infrastructure

Stump Neck/Rum Point
- 86 Buildings and Structures
- 327K square footage
- 1,224 Total Acres

McAlester
- 24 Buildings and Structures
- 183k square footage
- 10 Acres

Picatinny
- 8 Buildings and Structures
- 116k square footage
- 7 Acres
NSWC IHEODTD Technology Transfer initiatives look to jointly develop dual-use technologies with academic and private industry partners, develop collaborations with partners interested in access to our unique expertise and facilities, and assist in the commercialization and marketing of our intellectual property.

**Partnering Agreements**
- 43 Active CRADAs
- 1 Patent License Agreements
- 3 Educational Partnership Agreements
- 2 Partnership Intermediary Agreements

**10 Year Metrics**
- CRADAs
  - 102 Collaborations
  - $14 M
- Patents
  - 176 Patents Awarded
  - $164K in revenue

Most recent patent awarded to produce and distribute a bulk homemade explosives detection kit used by the warfighter.
Where We Live

Maryland 62%
Virginia 19%
Other States 18%

County-by-Country Breakdown

Charles County 72%
Saint Mary’s 10%
Prince George’s 10%
Calvert 3%
Anne Arundel 2%
Montgomery 2%

NSWC IHEODTD
Total MD Payroll
$205M

FY17 Maryland Contract Dollars
$33.9M
Problem: U.S. Navy has accepted Energetic Materials and Energetic Systems (EMS) risk for the past 15 years:

• We are experiencing “technological surprise” as confirmed by the intelligence community
• Our access to critical energetic materials is controlled by potential adversaries
• Technological advances of potential adversaries are outpacing our own
• S&T investment has significantly reduced
• Capabilities are not adapting or advancing to meet emerging Warfighter needs
• Our competency is jeopardized by a rapidly sun setting workforce

Solution: A Naval Energetics Renaissance will:

• Develop a 30-Year Naval EMS Technology Plan
• Execute a sustained EMS investment
• Re-establish a collaborative Naval EMS community
• Advance EMS state of the art
• Assure technical competency is sustained
• Allow for a graceful transition to electric naval weapons systems
• The Center of Industrial and Technical Excellence (CITE) designation grants statutory authority to enter into public/private partnerships.

• CITE allows private organizations to work with the government and allowing the Navy to be more efficient in maintaining its in-house energetics capabilities to address underutilized capabilities.

• IHEODTD receives payment for use of underutilized facilities and equipment and for any work performed.

• Partners can have IHEODTD perform work, team with us to perform work or arrange to use our facilities and equipment under our safety and security protocols.

• Partnerships are considered in areas of core capabilities where capacity exists, although DoD work receives priority status.

• Partnering organizations must use existing government facilities and may not build new facilities on government property.
IHEODTD TECHNICAL CAPABILITIES

1. EOD / improvised explosive device (IED) / counter radio-controlled IED electronic warfare (CREW) threat and countermeasure information development and dissemination

2. EOD / IED / CREW technology development and integration

3. Emergent and national-need requirement energetics, S&T, ordnance components and systems

4. Air warfare energetics, ordnance components and systems

5. Surface warfare energetics, ordnance components and systems

6. Expeditionary and undersea warfare energetics, ordnance components and systems
Occupational Demographics

1,999 Civilian Employees

- Professional: 44%
- Administrative: 34%
- Technical: 13%
- Blue Collar: 6%
- Clerical: 1%
- Other: 2%

Trades and technicians both unique and essential for explosive manufacture, scale-up, laboratory operations and energetic tests and evaluations.