



Title

Presented to:

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Presented by:

Xx XXXX XXXXXXX

Title

- 00 Month 2022 -

**Capt. Eric C. Correll, USN
Commanding Officer**

**Mr. Ashley G. Johnson, SES
Technical Director**

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Mission



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.



Range and Speed

- Propellants
- Explosives
- Fuels
- Reactive materials
- Rocket motors
- Conventional ammunition

Effects

- Novel explosives
- Reactive materials
- Warheads
- Casing
- Modeling and simulation (M&S)
- Conventional ammunition

Signatures

- Propellants
- Fuels
- Rocket motor design
- M&S
- Safe and arm (S&A) devices

Safety

- EOD
- S&A / Fuzing
- Aircrew escape
- Packaging Handling, Storage, and Transportation of Energetics
- Insensitive munitions
- Chem bio defeat

FLY FARTHER

HIT HARDER

SAVE LIVES

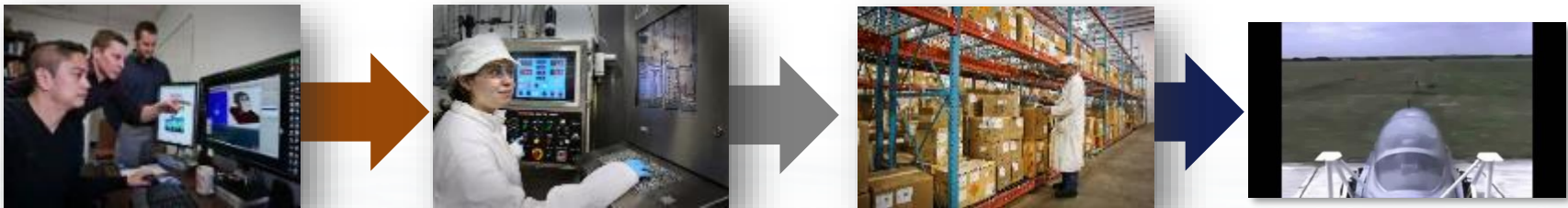
Molecule-to-Mission Across the DoD

Air Launched 2.75 inch Rockets

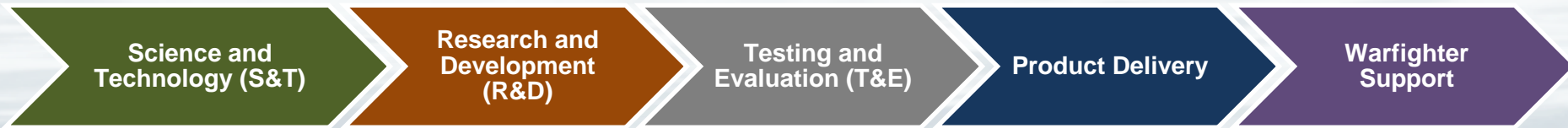


The command is the Warfighter's source for production of the 2.75 inch rocket: from propellant manufacturing to production of the warhead. We make and deliver the tools to give our Warfighter the winning edge.

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

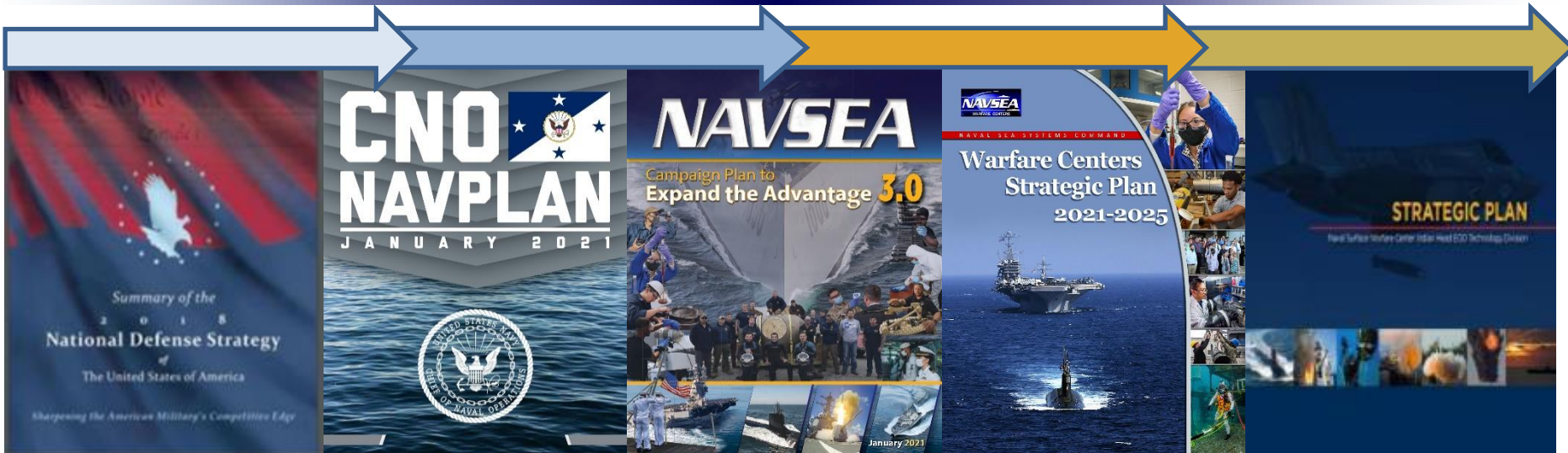


NSWC Indian Head Division manufactures CADs/PADs for aircrew escape ejection systems. Our Virtual Fleet Support facility allows the Warfighter to obtain any component within one week from order request.





Strategic Thrusts



- Build a More Lethal Force
- Strengthen alliances and attract new partners
- Reform the department for greater performance and affordability

- Readiness
- Capabilities
- Capacity
- Sailors

- Ships, submarines, systems - cost, schedule, performance
- Deliver combat power
- Transform Digital Capability
- Build a Team to Compete and Win

- Workforce and Leadership Development
- Mission-Aligned Strategies at the Division Level
- Technical Innovation and Excellence
- Business Excellence and Improvement
- Right Culture/Values

- Reshape facilities and utilities
- Establish public-private partnerships
- Develop new products and services
- Sustain and expand core product lines
- Reinvigorate naval energetics

NAVSEA Warfare Centers: 10 Divisions – 1 Team



Naval Surface Warfare Center

*NSWC Crane Division
Crane, Ind.*

*NSWC Carderock Division
West Bethesda, Md.*

*NSWC Panama City Division
Panama City, Fla.*

*NSWC Dahlgren Division
Dahlgren, Va.*

*NSWC Port Hueneme Division
Port Hueneme, Calif.*

*NSWC Philadelphia Division
Philadelphia, Penn.*

*NSWC Corona Division
Corona, Calif.*

*NSWC Indian Head Division
Indian Head, Md.*



Naval Undersea Warfare Center

*NUWC Keyport Division
Keyport, Wash.*

*NUWC Newport Division
Newport, R.I.*





NSWC IHD Strategic Locations



Ogden, Utah: 22 civ.

- Co-located at Hill Air Force Base
- CAD / PAD Air Force Integrated Product Team

Crane, Ind.: 4 civ.

- Design and construct portable armories
- Provide automation for front gates

Indian Head, Md. (two sites): 1,874 civ., 55 mil.

- NAVSEA Center of Excellence (CoE) for Energetics
- DoD EOD program lead
- Expeditionary Exploitation Unit 1 (EXU-1)

Camp Pendleton, Calif.: 6 civ.

- Demonstration and Assessment Team
- Assigned to EOD Department

Rock Island, Ill.: 7 civ.

- Quad-Cities Caliber Cartridge Case Facility
- Aligned with Systems Integration Department

McAlester, Okla.: 50 civ.

- McAlester Army Ammunition Plant
- Navy Special Weapons

Louisville, Ky.: 13 civ.

- Naval Guns

Norfolk, Va.: 27 civ.

- Demonstration and Assessment Team
- Assigned to EOD Department
- NWS Yorktown

Picatinny, N.J.: 268 civ., 3 mil.

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

*** Ctr. numbers not included**



Numbers at a Glance

FY21 Execution

\$600.2M direct / \$89.3M indirect

Total Contracting Effort

\$442.5M

Buildings Occupied

879

Total Square Feet

1,968,161

Civilian Staffing

Employees *

2,362

Top S&E Disciplines

**Scientists and Engineers:
907**

Average Years of Service

13

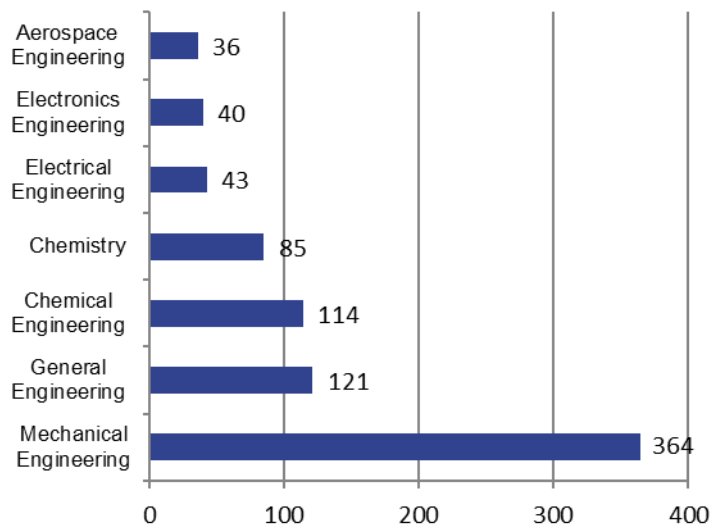
Top S&E Disciplines

Average Age of Workforce

45

Workforce Education (Technical)

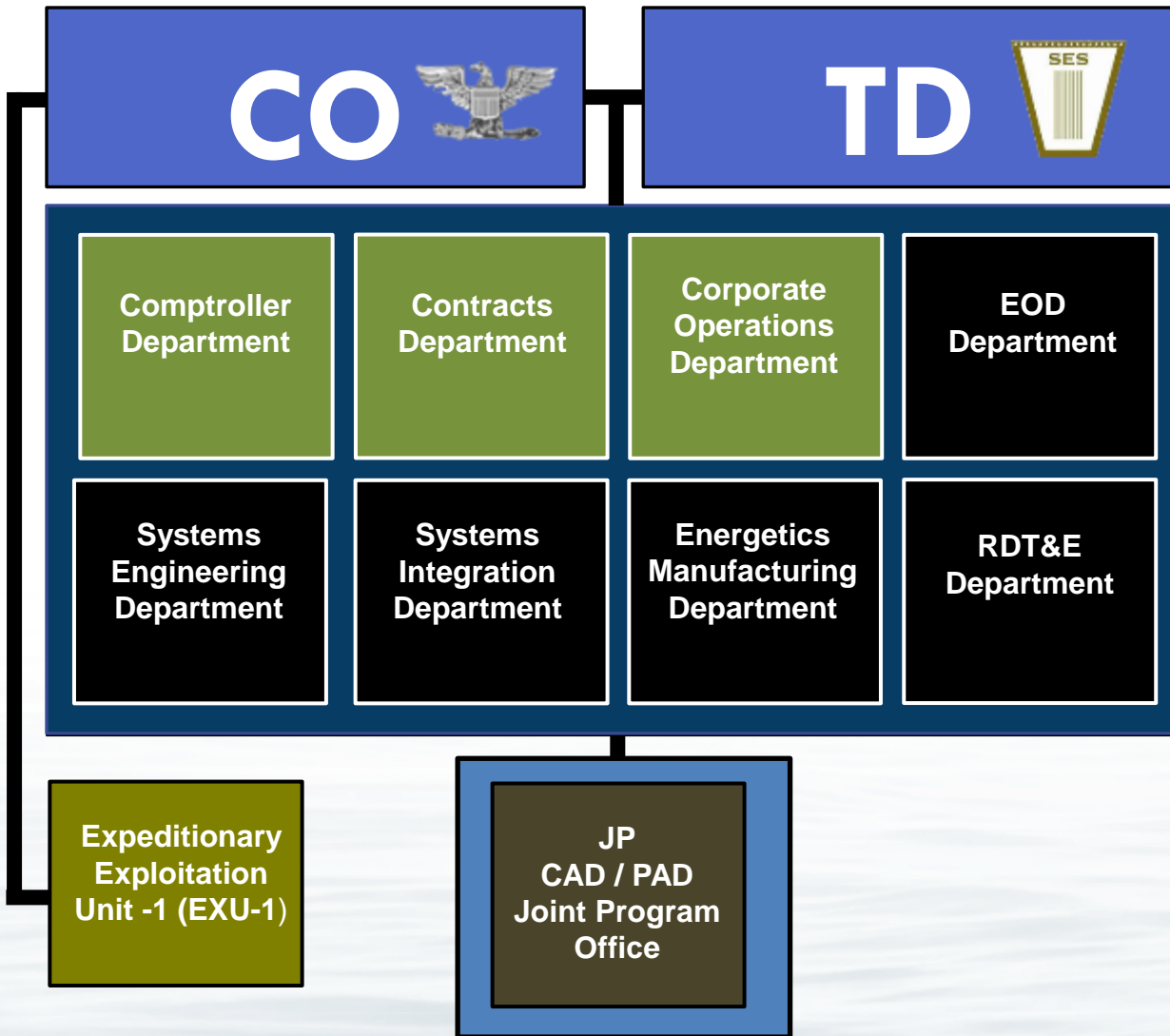
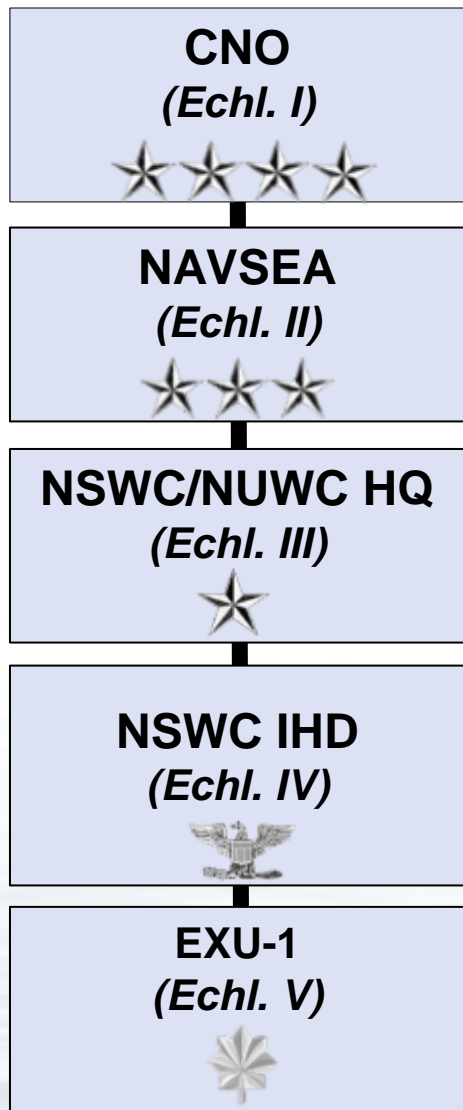
**Bachelors: 567
Masters: 246
Ph. D.: 79**



* Does not include contractors

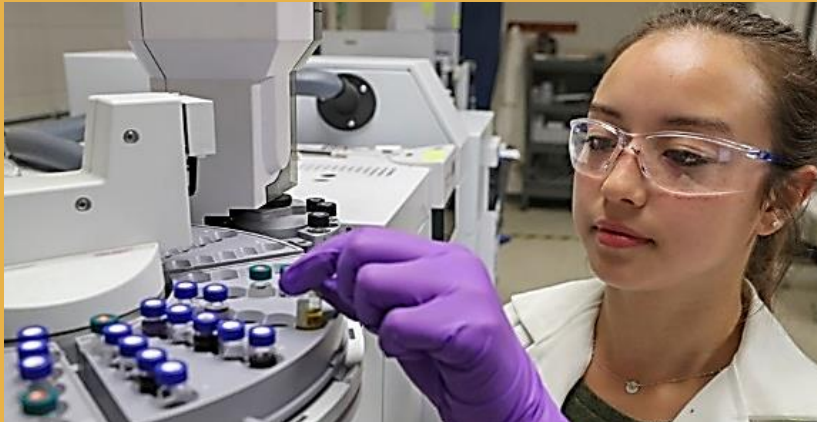


Organizational Structure





RDT&E (R) Department



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
- Chemistry and biology labs (up to BSL-3), collective protection prototypes and over-water range testing for CBRD

Warfighting Impact

- Integrated signatures program helps Warfighter diagnose threat to the “left of boom”
- Advanced propulsion R&D will lead to future advances in weapon range and flexibility
- Chemical, Biological, and Radiological Defense (CBRD) protects ships and facilities from attack and contamination

Lines of Operation

Research and Development (Code R1)

- Energetic materials science and technology to develop new chemicals, explosives, propellants and performance measurement concepts

CBRD (Code R2)

- Full lifecycle support for CBRD in a maritime environment

Test and Evaluation (Code R3)

- Detonation and combustion test and evaluation for performance, lifecycle analysis and lot acceptance



Systems Engineering (E) Department



Lines of Operation

- Energetics technology
- Micro-electrical mechanical systems, 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

Warfighting Impact

- STANDARD and Evolved SeaSparrow Missile propulsion engineering
- Clandestine Delivered Mine
- Improvised Explosive Device Exploitation
- Countermeasure anti-torpedo warhead and fuzing
- Aircrew escape systems
- Ordnance assessments leading to service life extensions

Capabilities and Facilities

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



Systems Integration (G) Department



Lines of Operation

- In-service engineering agent and acquisition engineering agent for guns and ammo
- Conventional ammunition commodity management
- Weapons and armament PHST design agent and ISEA



Warfighting Impact

- Gun weapon systems standardized pier-side maintenance and repair
- Mobile Ammunition Evaluation and Repair Unit
- Gun weapon system casualty report support
- Fleet liaison for guns and ammo (LANTFLT / PACFLEET)
- PHST member of Board of Inspections and Survey, and Weapons System Explosive Safety Evaluation Board member

Capabilities and Facilities

- 16,000 sq. ft. Packaging, Handling, Storage and Transportation test facility
- Gun stand complex
- 12,000 sq. ft. minor caliber lab
- Medium/minor caliber live fire range facility
- Quad City Cartridge Case Facility



Energetics Manufacturing (M) Department



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 1 million pounds
- Maintains in-house energetics processing capabilities and engineering expertise to:
 - Act as sole source, second source and emergency supplier
 - Provide expertise allowing program offices to act as “smart buyers” for the DoD, foreign military sales and other customers



Warfighting Impact

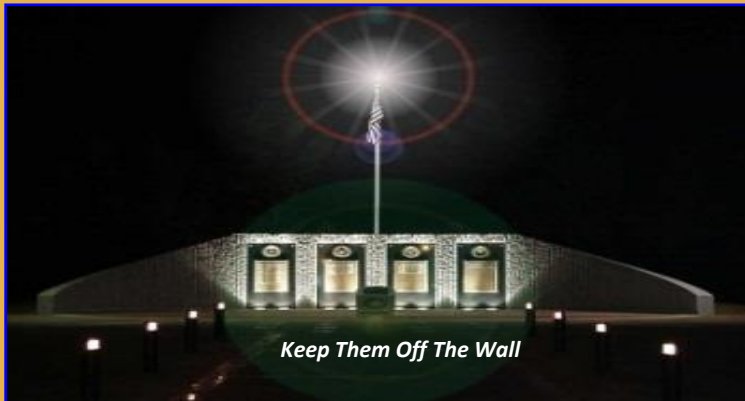
- Provider of Otto Fuel II torpedo fuel
- CAD/PAD manufacturing and centralized stock point
 - Sole stock point of all Navy CAD/PADs
 - Able to ship parts anywhere around the globe

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
- Solventless extrusion
- Decon and disposal



Explosive Ordnance Disposal (D) Department



Lines of Operation

- **EOD Information Management**
 - Collection, analysis, development and dissemination of procedures and countermeasures information to the Joint Service EOD community
- **EOD Systems**
 - Provides EOD support across the Development and Acquisition Spectrum: S&T, prototyping, POR development, T&E, engineering agent/ISEA, support/sustainment, disposal
- **Battle Lab**
 - Provides a cycle of equipment review and evaluation to feed capability gap assessment, COTS/MCOTS buying decisions, requirements development, and technology implementation at the speed of relevance

Warfighting Impact

- Technical Data and Procedures
- Foreign Materiel Acquisition and Exploitation
- Explosives Detection Equipment Program
- Demonstration and Assessment Team and EOD Technology Assessment Team
- Underwater EOD
- EOD Unmanned Systems
- Ordnance Disrupt/Modeling & Simulation
- Anti-Terrorism/Force Protection

Capabilities and Facilities

- Co-located with EOD service detachments and Joint EOD Executive Agency Support office
- 24-7 / 365 warfighter call-back ability to Technical Support Center
- Explosive test and robotics test ranges
- Magnetic Signature Test Facility
- Prototyping facilities to accelerate ideas/rapid support for 3D printing
- Explosive Chemistry Laboratory
- Electronics Laboratory
- EOD Library
- Disassembly complex



Expeditionary Exploitation Unit 1 (EXU-1)

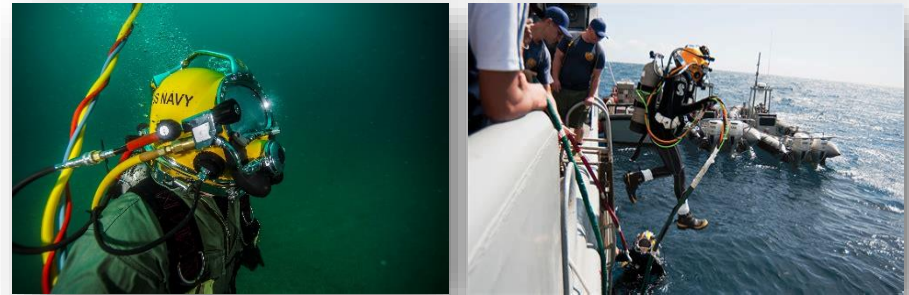


Mission

Technical Exploitation Platoons (TXP) and Foreign Materiel Program (FMP) Platoons collect, process, exploit, and analyze improvised, conventional, and advanced weapons systems and other collected exploitable materiel (CEM), on land and at sea, for the purpose of providing near real-time technical intelligence to tactical commanders, EOD community, service components, Department of Defense (DoD), national level intelligence agencies, and Allied and Partner Nations.

Organization and Manning

- Type II Sea Duty Operational Command (Ech V)
- ISIC: NSWC Indian Head Division



Capabilities

- ✓ Globally deployable tailored to Fleet requirements
- ✓ Expeditionary Mine Countermeasures Exploitation
- ✓ Level-1 Exploitation (field)
- ✓ Level-2 Exploitation (lab)
- ✓ Foreign Materiel Acquisition
- ✓ Intelligence Community & SOF Interoperability
- ✓ Surface and Underwater Post-Blast Analysis
- ✓ Advanced Electronic Exploitation Division



Industrial Complexes



- Air Crew Escape Ordnance Devices
- Cast Composite and PBX
- Decontamination, Demilitarization and Disposal
- Solvent Based Energetics
- Ordnance Test
- Ordnance Dissection and Machining
- Solventless Extruded Double Base
- Specialty Chemicals
- Chemical, Biological and Radiological Defense
- Explosives Processing Development Engineering
- Advanced Energetics Research Lab
- Center for Applied Analytics Technology
- Detonation Physics and Combustion
- Weapon Systems Engineering
- Command Management and Support Services
- Excess Facilities Complex
- Picatinny Systems Engineering
- Explosive Ordnance Disposal
- McAlester Systems Engineering
- Quad City Industrial Complex

**20 unique industrial facilities
at NSWC Indian Head Division**



Questions?





Back-up Slides



- **Please use the following Distro A slides to compliment and tailor your brief to suit your individual audiences. Slides can be used in any amount of order based on your needs.**
- **Slides are grouped in accordance to their general characterization.**



General/Overview



RDT&E (R) Department



Qualification of PBXIH-136 UW Explosive Formulation

Chemical Biological & Radiological Fleet Integration & Support

Warfighter Impact



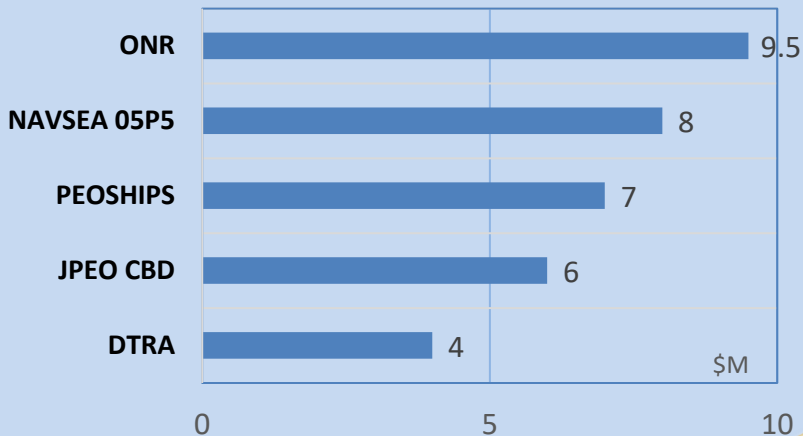
Shipboard Collective Protection

Blast Assisted Munition Advanced Low Cost Munitions Ordnance Replacement

Reactive Material for Enhanced Lethality



Top Customers



WFC Collaborations

- NSWC DD: CBR Defense – RDT&E
- NAWC WD China Lake and NSWC DD: advanced gun propellants and primers and a gun launched solid fuel ramjet projectile to improve range of 5” guns; novel processing methods for enhanced performance formulations
- NSWC DD: Accelerated development of Reactive Materials technology and advanced gun propellants and primers for large caliber guns.
- NSWC Philadelphia: Share ColPro engineering agent roles for ship integration.
- NSWC PCD: CBR Defense in the area of individual protective equipment.

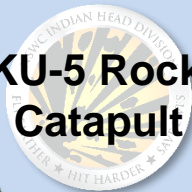
Energetics Manufacturing (M) Department

Warfighter Impact

CXM AF-5/7



**CKU-5 Rocket
Catapult**



**MK90 Propellant
Grain Production**



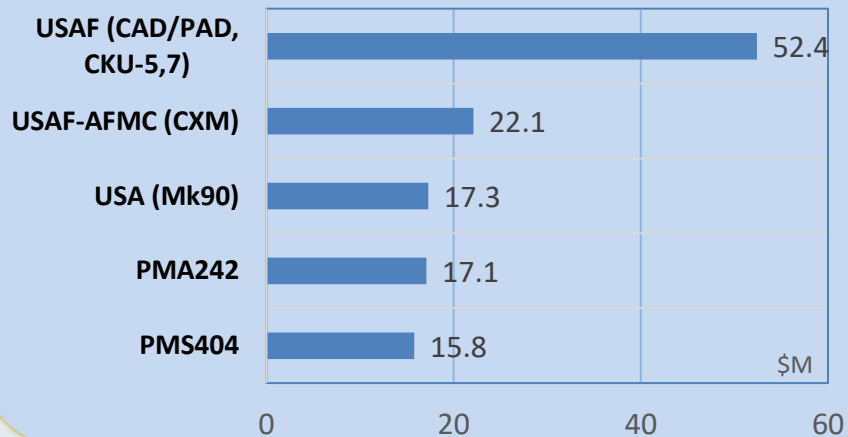
Otto Fuel II



**CKU-7 Rocket
Catapult**



Top Customers



WFC Collaborations

- NSWC DD: Support Navy gun program/development
- NSWC DD: Explosive Waste disposal
- NUWC NPT: Disposal of Mk75 gas generators



Systems Integration (G) Department



Standard Pier-Side Maintenance & Repair (SPMR)



Shipboard Gun Installation Support

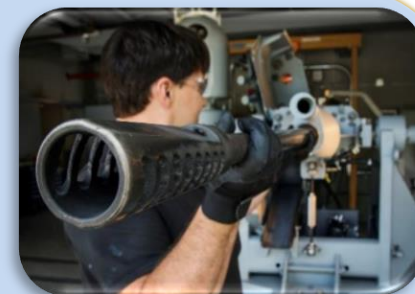
Warfighter Impact

Ordnance Handling Equipment (OHE) ISEA

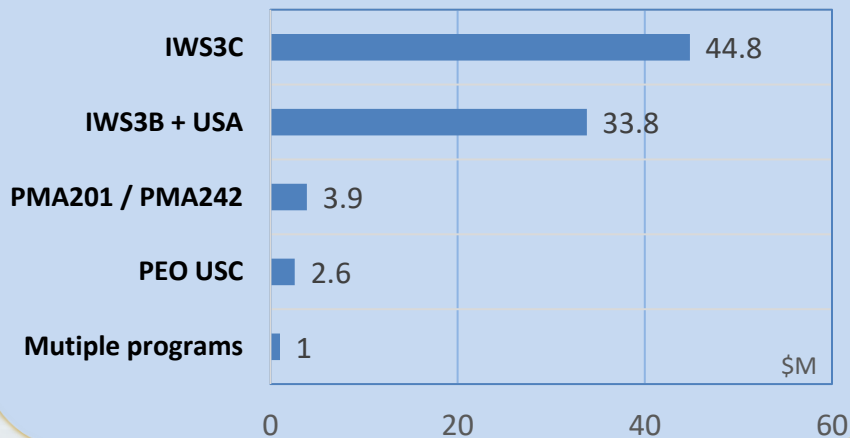
Conventional Ammunition IS & Acq Spt

Mobile Ammunition Evaluation & Reconditioning Unit (MAERU)

Quad Cities Cartridge Case Facility Reactivation



Top Customers



WFC Collaborations

- NSWC DD: Mk 45 Gun Weapon System Technical Enhancement Training and Design Agent for 2T Conventional Ammunition
- NSWC PHD: Fleet Integrated Support Team (FIST) optimizes support to the fleet via the RMC's
- NUWC & NMC Pearl Harbor Detachments Stowage Density: Mk 48 Torpedo Stackable Transportation & Storage Cradle Design, NSWC CR: Pyro Demo In Service & Acquisition Engineering Support
- NSWC DD, NSWC IHD Develop and test the JENGA 5 inch round
- Shipboard Weapons Integration Team (SWIT) is a NAVSEA/NAVAIR team that assures new weapon systems are properly supported and able to move as intended aboard ship
- NSWC Crane: Collaborate with Crane to provide acquisition engineering support for PYRO Demo commodities for the Navy



Systems Engineering (E) Department



Warfighter Impact

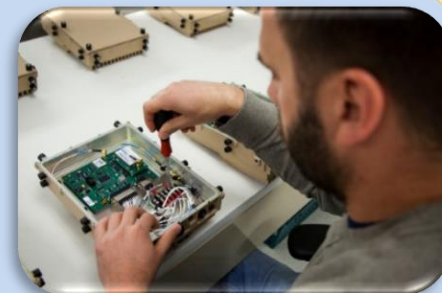
Clandestine Delivered Mine (CDM)

Mk 70 Booster Mod for GQM-163A Target

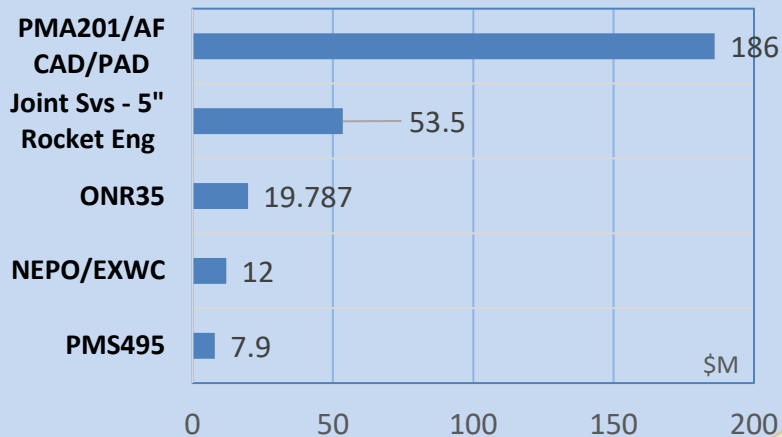
Heavy Weight (HW) Torpedo Prototype (Contender)

Parachute Deployment Rocket Motor (PDRM) Mod 1

Expeditionary Program Office (NEPO) Depot Spt Services



Top Customers



WFC Collaborations

- NSWC PCD: Autonomous AAV / MK154 (NISE 219)
- NUWC NPT, NSWC CD: RPG of the Sea
- NSWC CD: Exploitation of Foreign Mine Influence Fuzing
- NSWC DD: Clandestine Delivered Mine
- NSWC PCD: NSWC DD: System Safety
- NSWC CD: Dynamic System Mechanics Advanced Simulation (DYSMAS)



Explosive Ordnance Disposal (D) Department



Warfighter Impact

JEOD Pubs (AEODPS/60-series)

JEOD NIPR/SIPR Portal

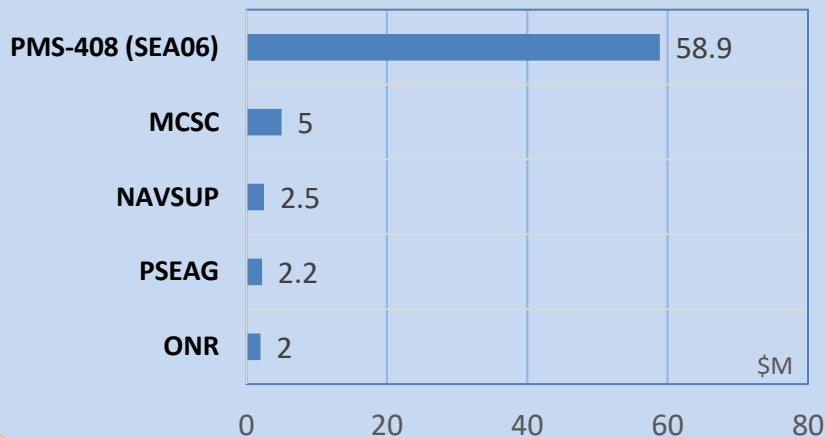
JEOD Robotics

Explosive Detection Equipment

JEOD Tools / Technology & Sustainment



Top Customers



WFC Collaborations

- NSWC Crane: EOD and JCREW programs (Collaborate on several PoRs), also proposing Joint NISE 219 w/Crane for Hemlock program
- NSWC Dahlgren: New/developing collaboration on unmanned communications utilizing IHD Developed FlexCSR Radio and encryption as well as UAS efforts (DD), future NISE 219 proposals
- NSWC Carderock: 2017 ANTX UGV (IHD) launched off USV
- Multiple: Unmanned Vehicles & Autonomous Systems (UVAS) WG – Since 2017 weekly interface between WFCs on projects, unmanned systems needs, etc.



Roles of the Warfare Centers



- Make naval technical programs successful
- Provide a bridge between the technical community and the warfighter
- Determine and develop capabilities for the fleet
- Verify the quality, safety, and effectiveness of platforms and systems
- Design, develop, and field solutions for urgent operational fleet needs

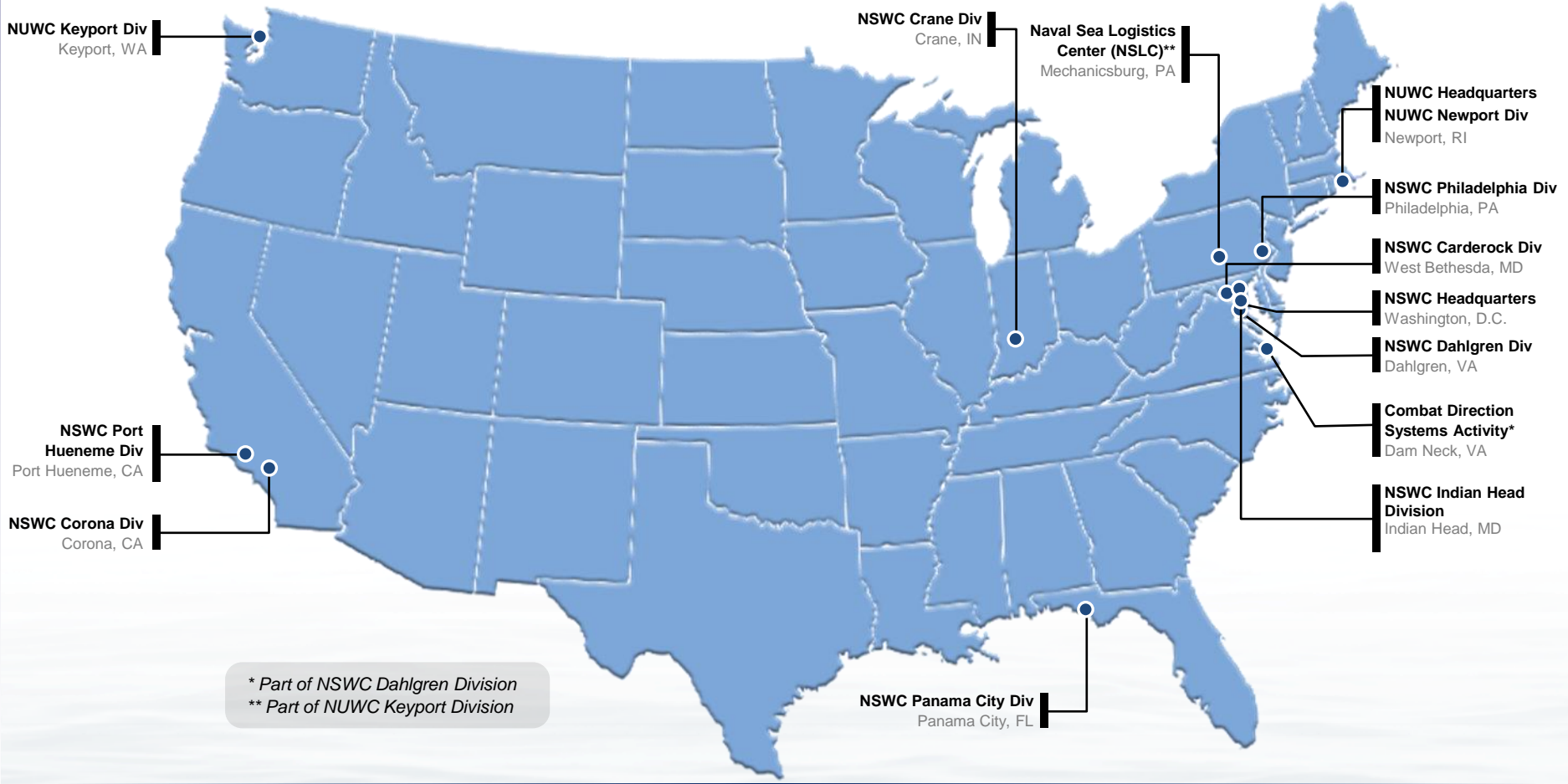
Operating Principles

- Part of the Naval Research & Development Establishment (NR&DE)
- Technical Capabilities - disciplined process for accepting and assigning the right work to the right Division
- Operate under the Navy Working Capital Fund business model
- Workforce size based on funded workload
- Perform work our industry partners can't, won't or shouldn't do

One Team: Expanding the Advantage



NAVSEA Warfare Centers at a Glance



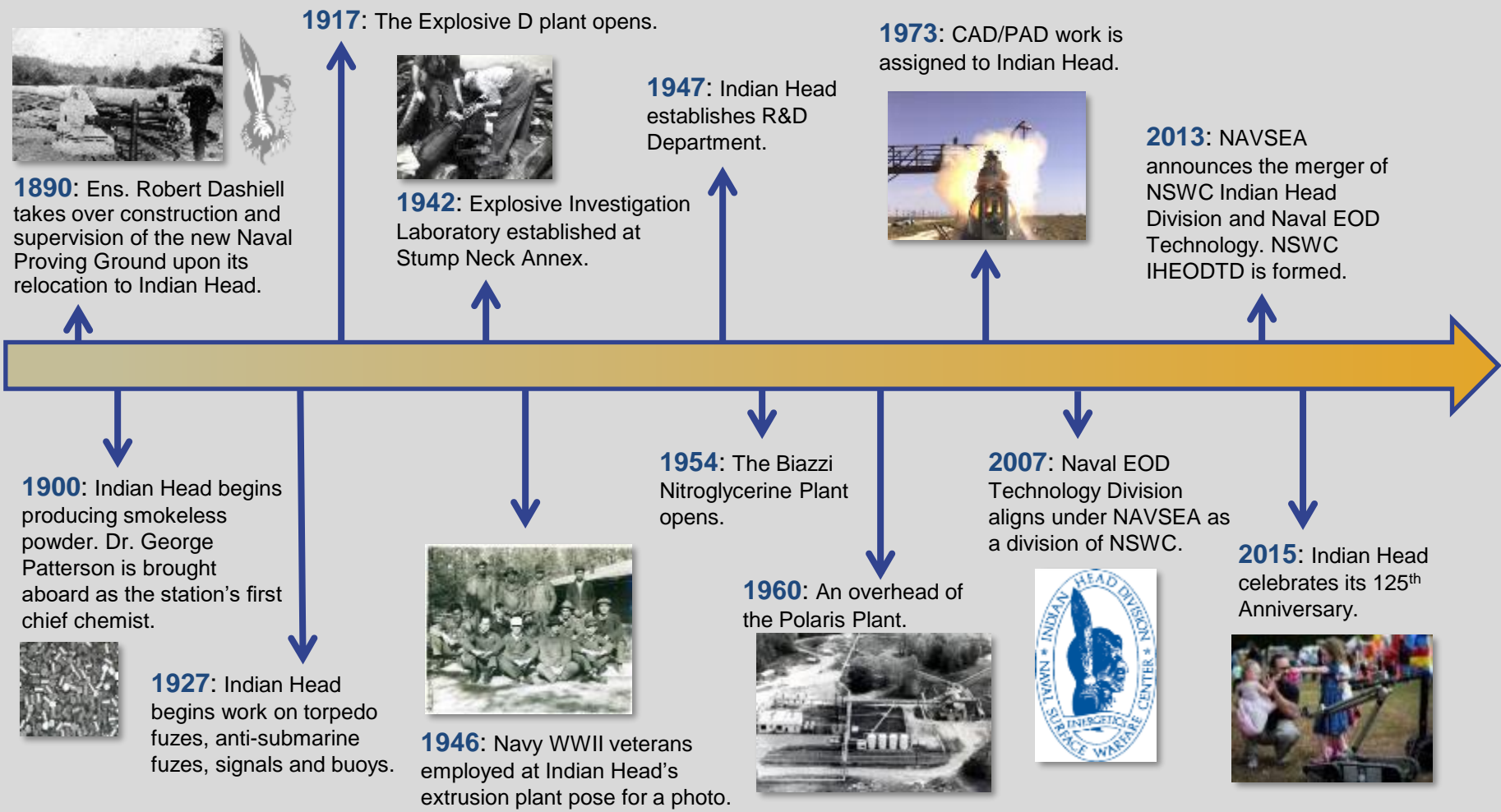
* Part of NSWC Dahlgren Division
** Part of NUWC Keyport Division

Warfare Center Quick Facts

- ❖ ~24,479 diverse and highly educated employees focused on innovation (~16,400 scientists, engineers, and technicians with ~750 Ph.D.s)
- ❖ 129 unique Technical Capabilities (TCs) across 10 Divisions
- ❖ Operates under the Navy Working Capital Fund (NWCF) business model
- ❖ Disciplined process for accepting and assigning the right work to the right WC Division based on TCs
- ❖ Part of the Naval Research & Development Establishment (NR&DE)
- ❖ Size of the workforce is based on the funded workload
- ❖ Performs work our industry partners can't, won't or shouldn't do.
- ❖ Maintains more than 164 unique RDT&E facilities



Command Timeline



FLY FARTHER

HIT HARDER

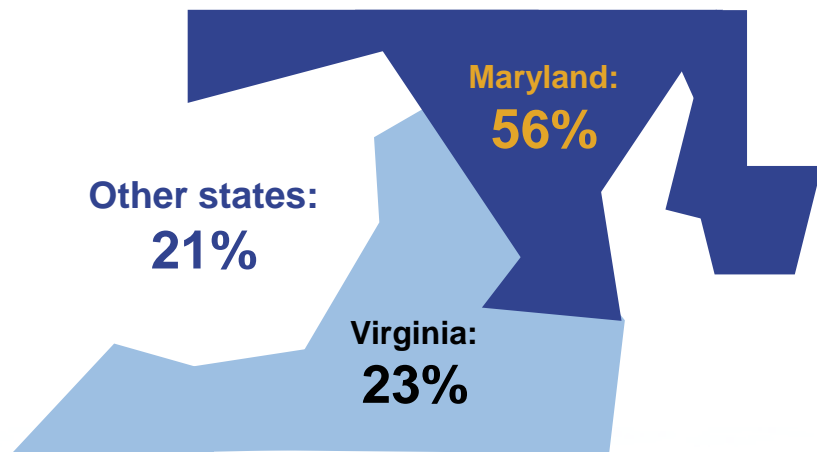
SAVE LIVES



Economic Impact



Where We Live



County-by-County Breakdown (Maryland)

Charles County	68%
Saint Mary's	12%
Prince George's	10%
Calvert	3%
Anne Arundel	3%
Other	4%

**NSWC IHD
Total Maryland FY21
Payroll
\$322 million**

**FY21 Maryland
Contract Dollars
\$36.5 million**

Technology Transfer

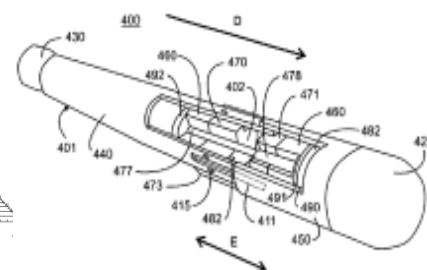
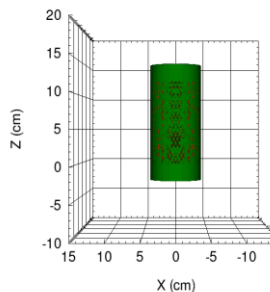
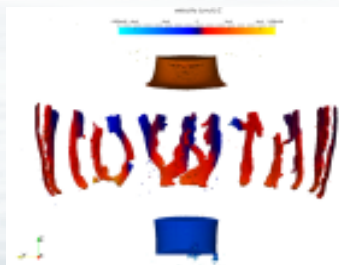
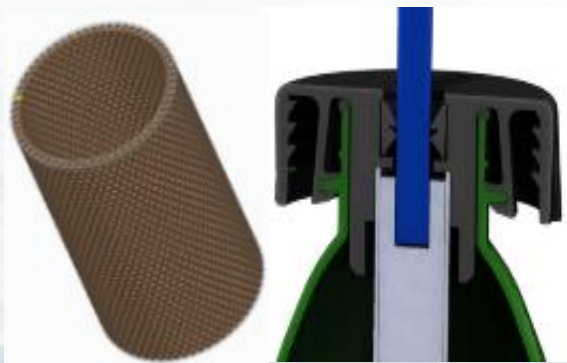
NSWC IHD Technology Transfer initiatives look to jointly develop dual-use technologies with academic and private industry partners, develop collaborations with partners interested in access to our unique expertise and facilities, and assist in the commercialization and marketing of our intellectual property.

Partnering Agreements

- 73 Active CRADAs
- 4 Patent License Agreements
- 9 Educational Partnership Agreements
- 8 Partnership Intermediary Agreements

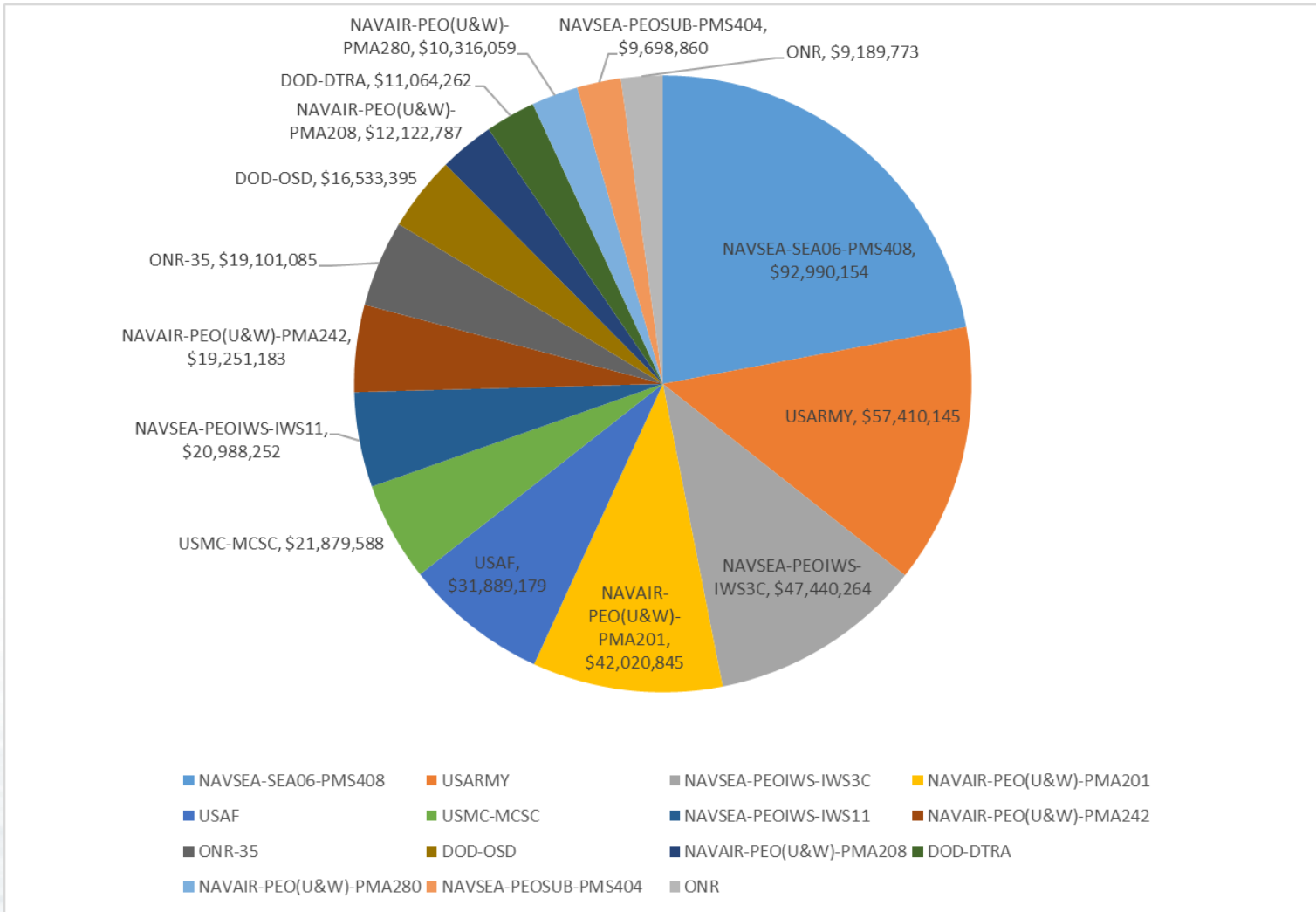
10 Year Metrics

- CRADAs
 - 144 collaborations
 - \$18 million
- Patents
 - 172 patents awarded
 - \$71,000 in revenue





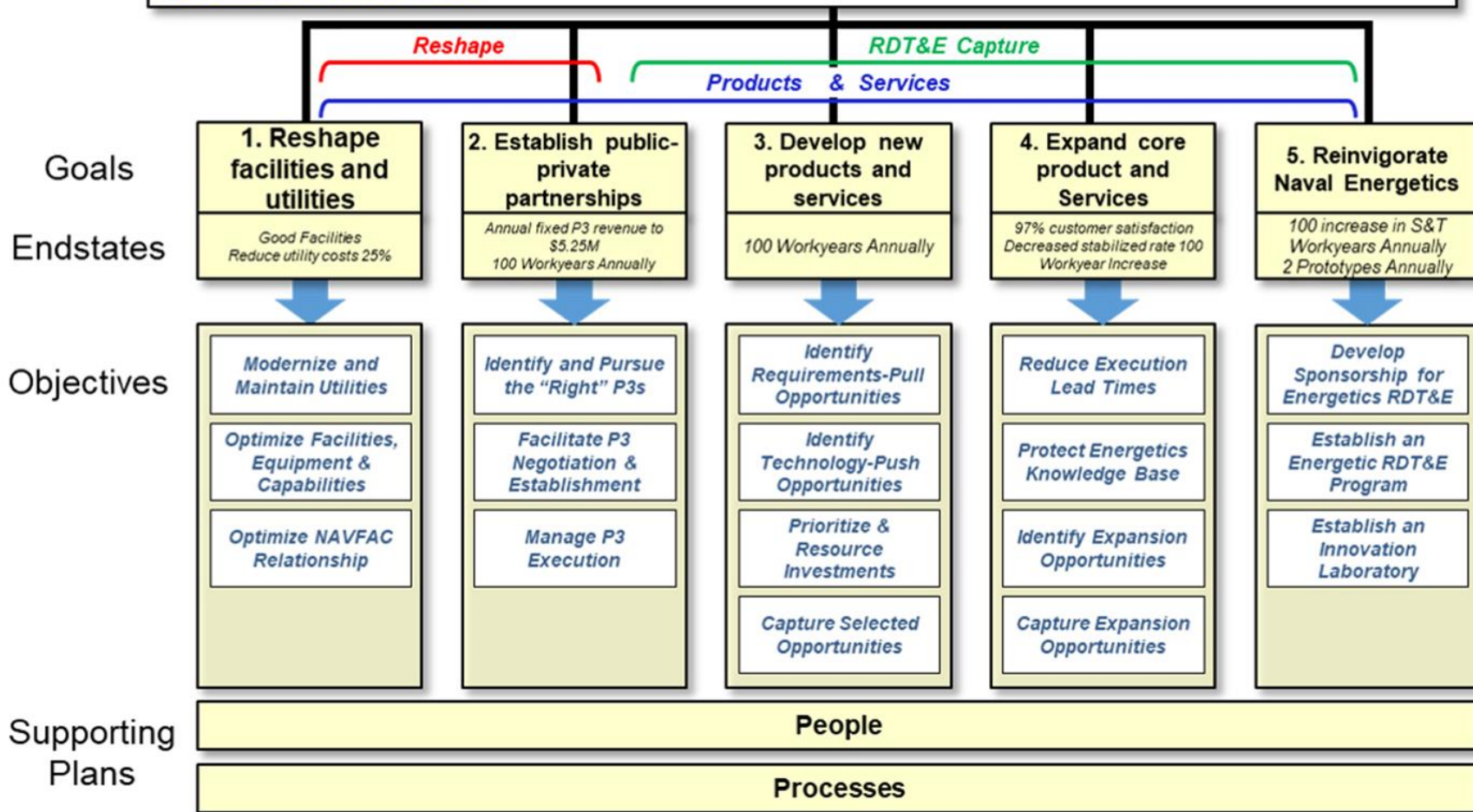
FY20 Customer Base (Top 15)



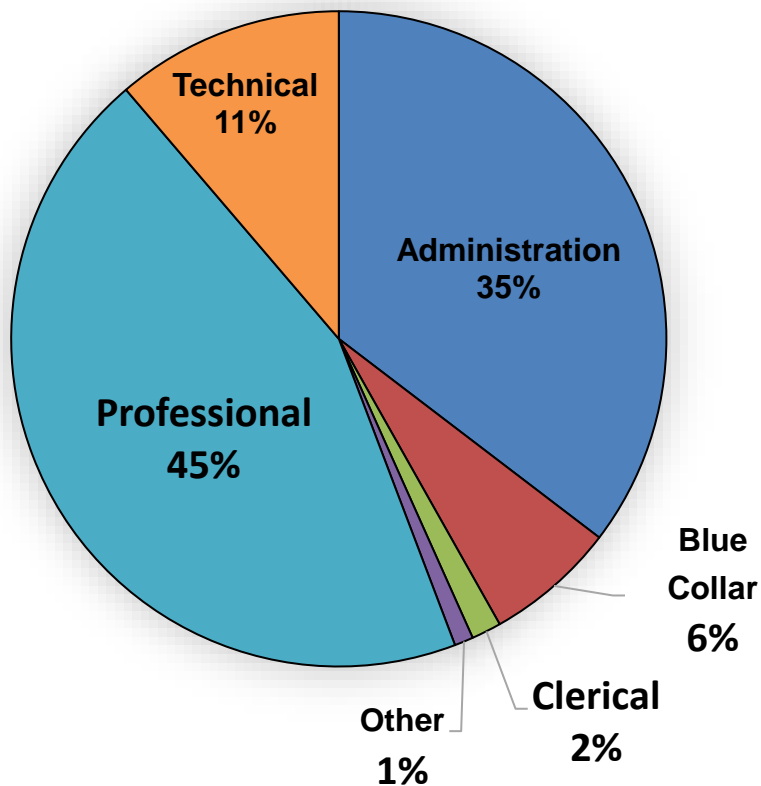
Total FY20 accepted reimbursable authority is approximately \$596 million

Strategic Vision and Goals

Vision: In 10 years, NSWC IHD will grow 400 work-years stronger by **reshaping our industrial complex**; **capturing research, development, test and evaluation (RDT&E) opportunities in energetic systems**; and **providing reliable, quality and affordable products and services**.



Occupational Demographics



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



S&T/RDT&E



Full Spectrum Capabilities

**Research
Development
Test & Evaluation**

Engineering

Manufacturing

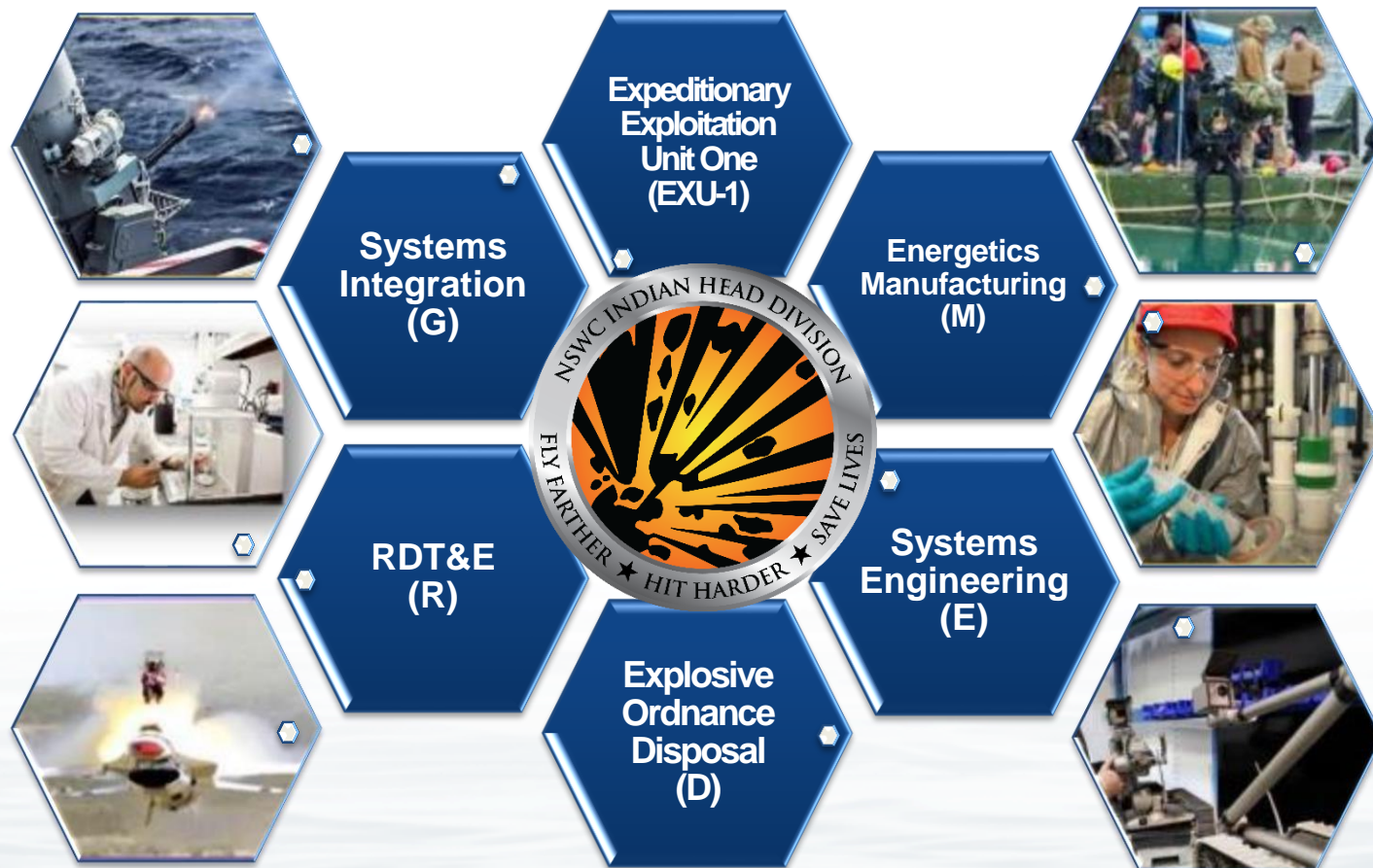
**Operational
Footing**



Indian Head's operations range full spectrum from basic research to warfighter support

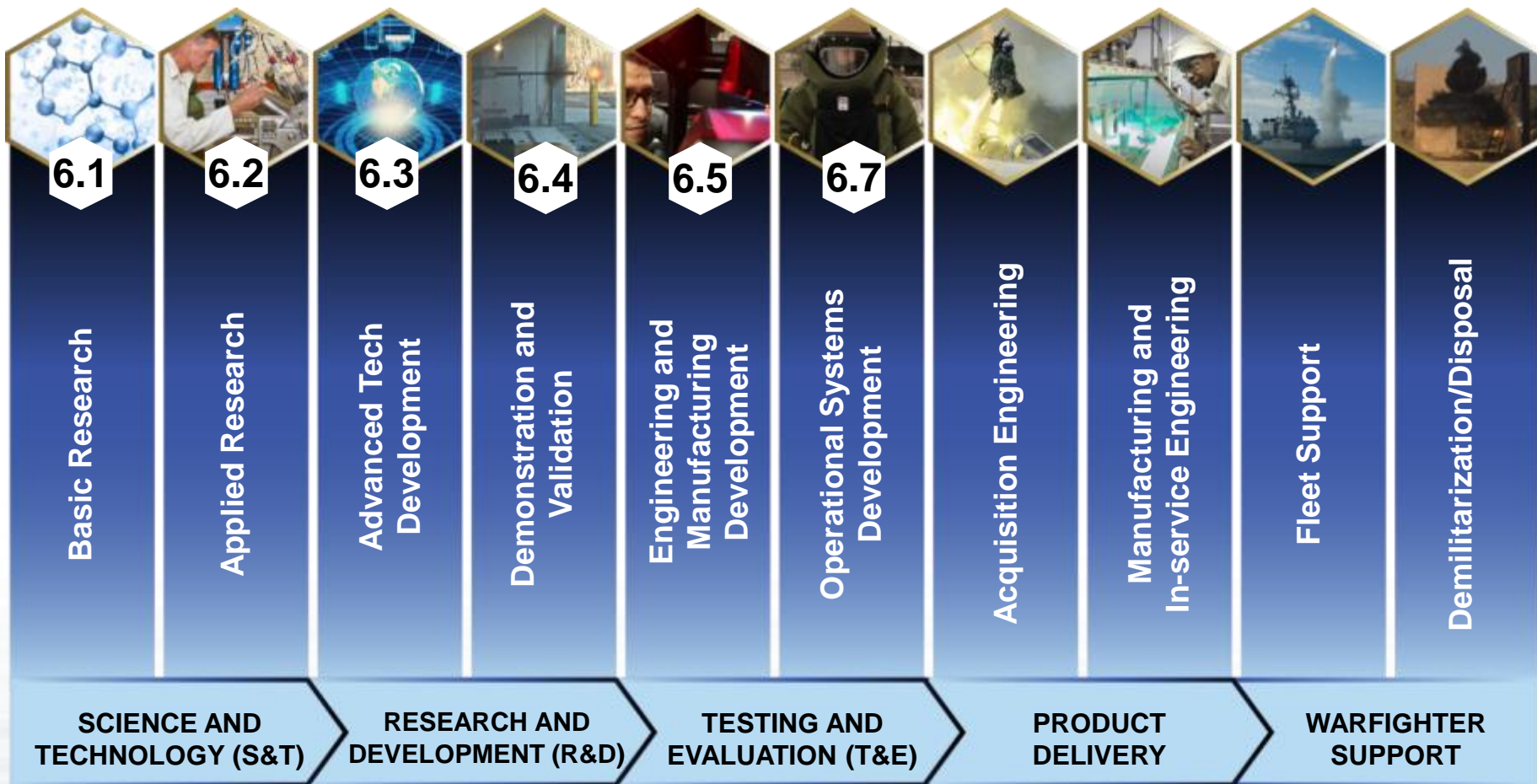


Technical Departments





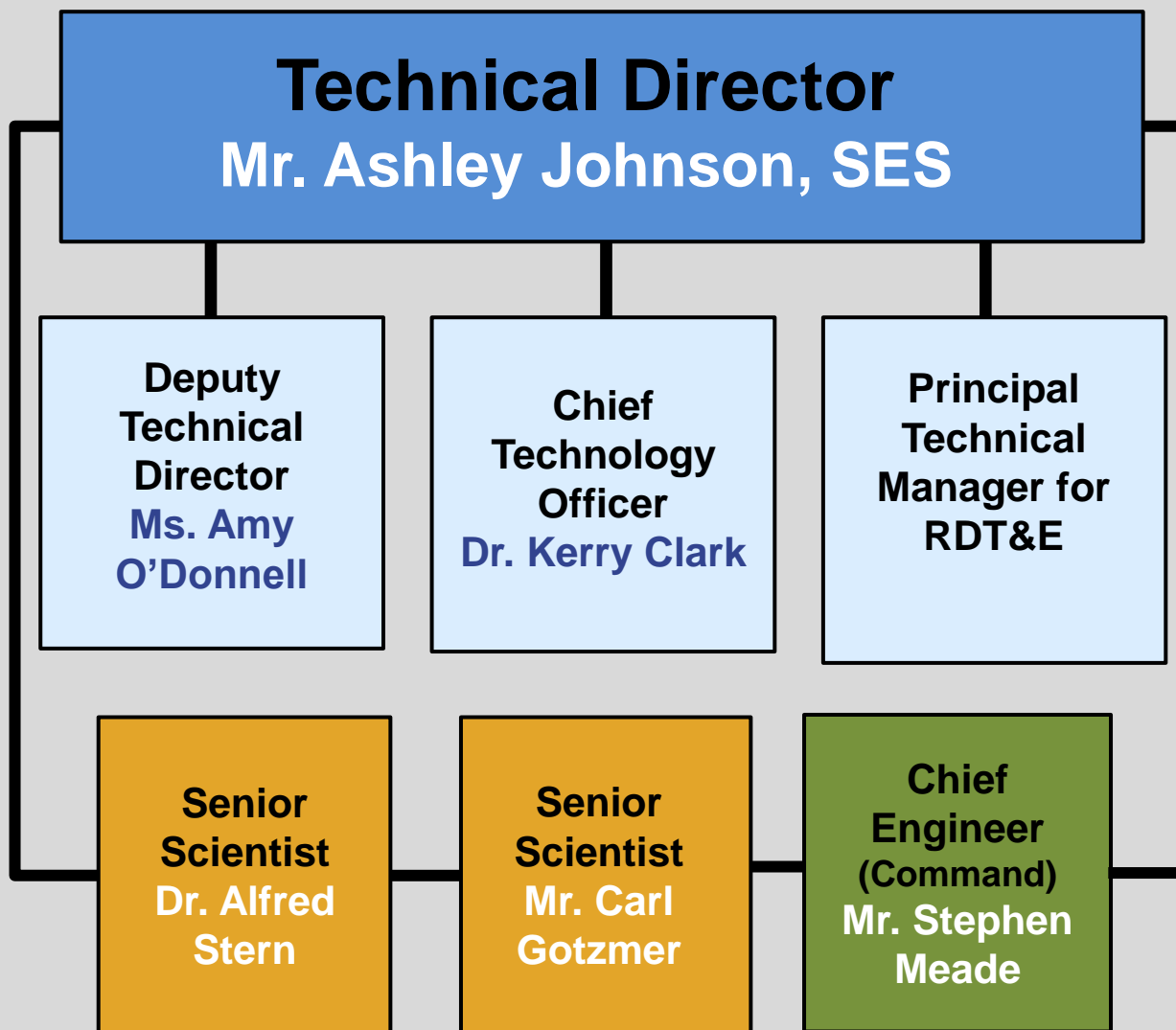
Molecule-to-Mission



Only DON activity delivering both energetics and EOD technology solutions from basic research through disposal



Scientific Technical Staff



Key

- = Senior Technologists
- = Senior Scientists
- = Chief Engineer



Explosive Ordnance Engineering (SEA-05E)



Deputy Warrant Officer
Ashley Johnson, SES

Deputy Director
Spencer Johnson

Technical Warrant Holders

Explosives (05E1)

- Michael Kenyon

PHS&T (05E2)

- David Hoegler

Propellants and Energetics Propulsion (05E3)

- Dr. Jamie Gumina

CAD / PAD (05E4)

- John Burchett

EOD (05E5)

- Michael Hollander

Small Arms (05E6)

- David Long

Anti-Terrorism Afloat (05E7)

- Mike Konerman



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
7. EOD Unmanned Systems
8. Conventional and Improvised Weapons Exploitation
9. Chemical, Biological, and Radiological Defense Systems
10. Force Protection Systems Engineering, Integration, and Equipment Ashore



Center for Industrial and Technical Excellence



NSWC IHD received Title 10 sec 274 designation as a Center for Industrial and Technical Excellence (CITE) for Energetics and Ordnance systems Depot maintenance and Arsenal activities in May 2014.

CITE designation provides the legal authority for NSWC IHD to form Public-Private Partnerships (P3).

- Workloads critical plant complexes
- Facilitates collaboration with private industry
- Reduces total ownership costs to the NAVY, promoting financial viability



To date we have entered into five P3 agreements with Private Industry

- Chemring – APOBS Grain Manufacture
- Chemring – Mk90 Grain Manufacture
- NEIH – Rocket Motor and Warhead Manufacture
- GreyOps – Explosive Neutralization Tools for EOD Applications
- GMP - RDT&E and Manufacture of Energetic Materials and Ordnance Systems

We are currently engaged in active P3 negotiations with several companies and expect three new P3s to be finalized in FY2021



Warfighter Products



CARRIER STRIKE GROUP

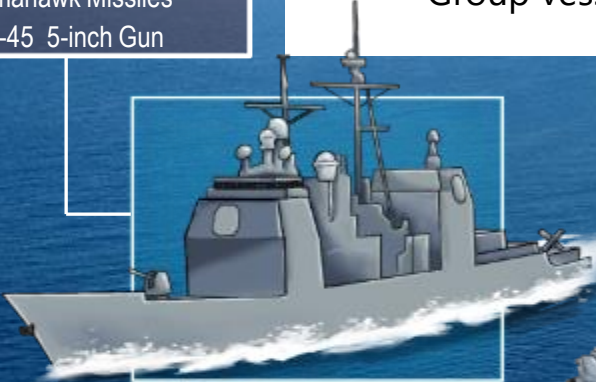


Phalanx CIWS
 SM-2 Missile
 MK-53 Decoy Launching System
 Tomahawk Missiles
 MK-45 5-inch Gun

NSWC IHD provides products that are utilized across all Carrier Strike Group vessels and aircraft.



CAD/PAD
 Sidewinder Missile



Otto Fuel for Torpedoes
 Tomahawk Missiles
 CAD/PAD

Evolved SeaSparrow Missile
 MK-53 Decoy Launching System
 CAD/PAD
 Countermeasure Anti-Torpedo
 Phalanx CIWS

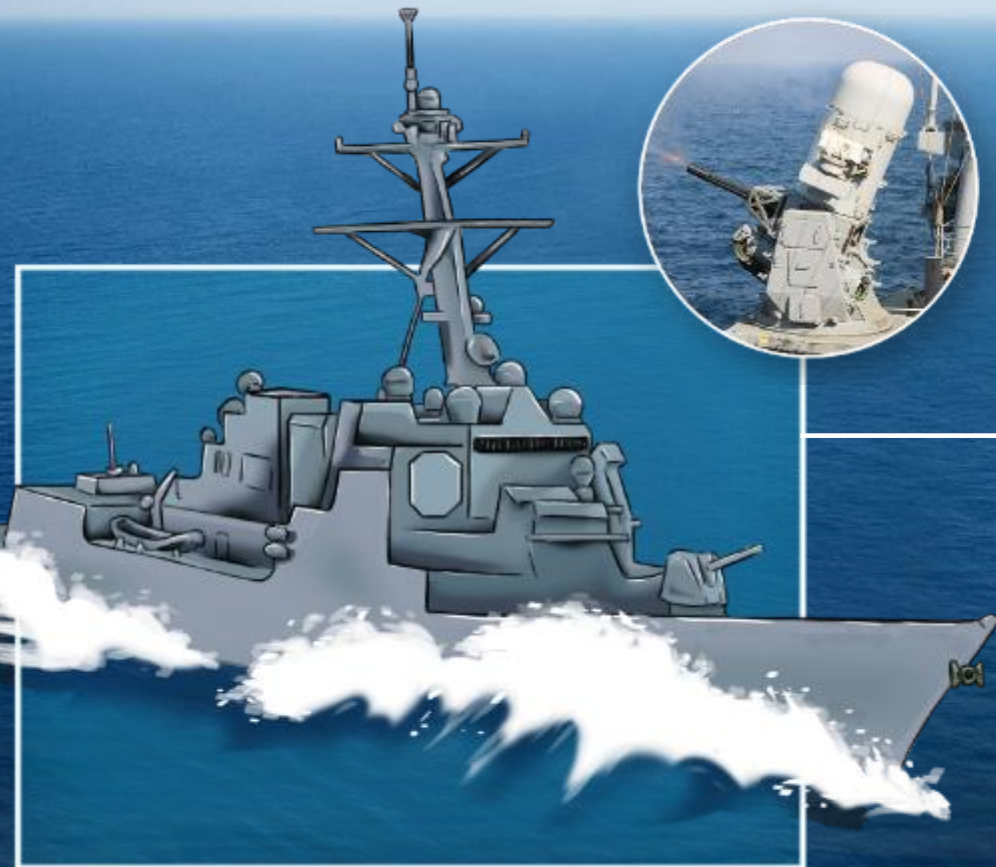
MK-45 5-inch Gun
 Standard Missile
 Tomahawk Missiles
 Otto Fuel for Torpedoes
 Phalanx CIWS
 MK-53 Decoy Launching System

CARRIER PRODUCTS



Phalanx CIWS
MK-53 Decoy Launching System
Countermeasure Anti-Torpedo
Evolved SeaSparrow Missile

DESTROYER PRODUCTS



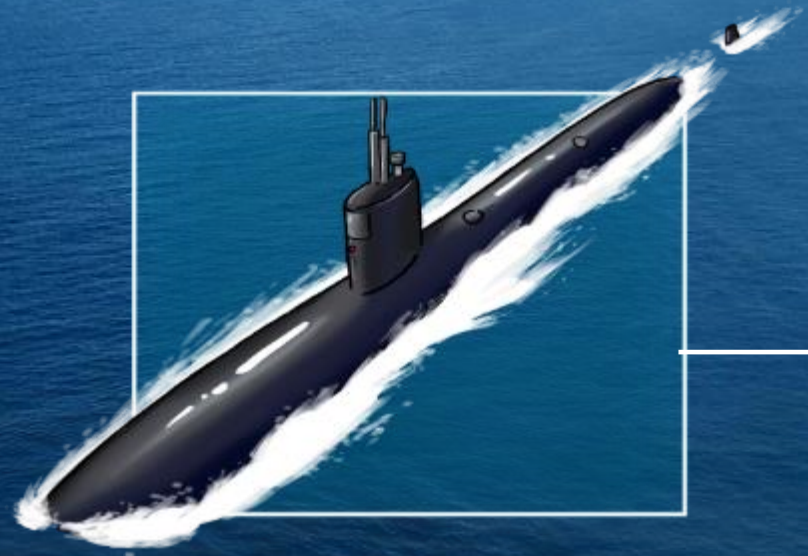
MK-45 5-inch Gun
SM-2 Missile
Tomahawk Missiles
Otto Fuel for torpedoes
Phalanx CIWS
MK-53 Decoy Launching System

AIRCRAFT PRODUCTS



Sidewinder Missile
CAD/PAD Products
2.75 in. Rockets

SUBMARINE PRODUCTS



Otto Fuel for Torpedoes
Tomahawk Missiles
CAD/PAD

GROUND FORCES PRODUCTS



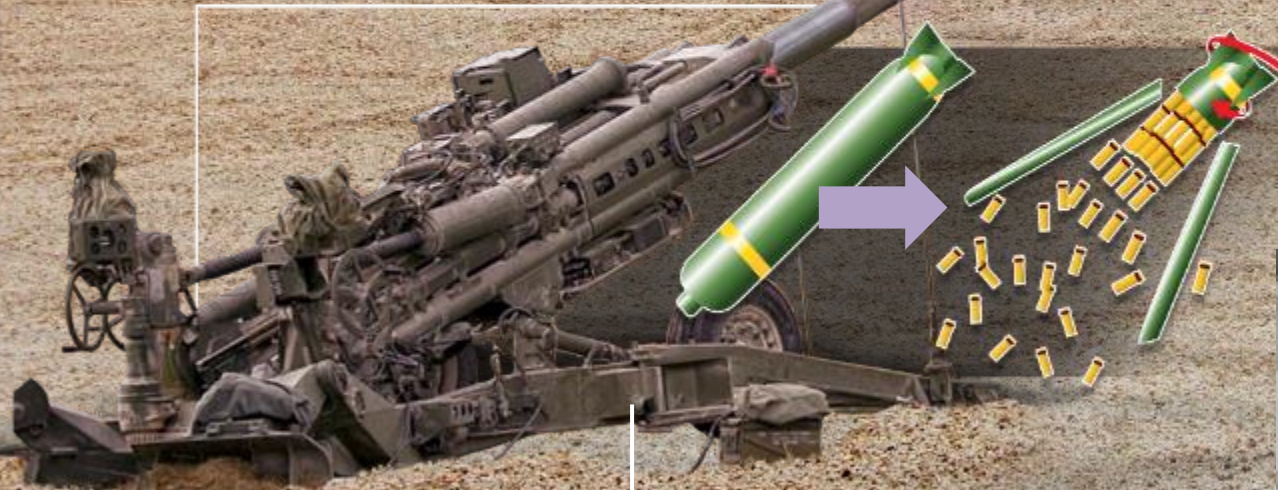
Shoulder-Launched Multipurpose Assault Weapon



Homemade Explosives Test Kit



Novel Explosives



High-Reliability Dual-Purpose Improved Conventional Munitions Replacement (HRDR)

EOD Robotics

