

NAVAL SURFACE WARFARE CENTER

INDIAN HEAD EXPLOSIVE ORDNANCE DISPOSAL TECHNOLOGY DIVISION



2017

YEAR IN REVIEW

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Command Mission: To research, develop, test, evaluate, 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.

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2017 YEAR IN REVIEW

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COMMANDER'S ASSESSMENT



In my first full year as commanding officer of NSWC Indian Head Explosive Ordnance Disposal Technology Division, I have taken great pride in both our mission mindfulness and our dedicated efforts to provide the warfighter the best possible advantage to decisively win the fight for which they are postured.

We had a successful 2017 showing both growth and potential and I look forward to sustaining and building that momentum in 2018. Through our approximately 2,000 person workforce working hard every day, we continue to solidify the foundation of strategic relevance and necessity.

In developing my 2017 assessment, I viewed the past year through the lenses of Mission, Compliance and Command Climate. This assessment briefly details each of these viewpoints, while also aggregating them to create a more thorough assessment.

Mission

Our mission is to research, develop, test, evaluate, manufacture and provide in-service support of energetics and energetic systems; while providing the warfighter with current information and technology to detect, locate, access, identify, render safe, recover, exploit and dispose of explosive threats. In 2015, we developed a Strategic Plan to ensure our

ability to continue and expand our mission by modernizing our facilities, providing our customers with world-class service, and capturing new business opportunities for sustained growth. The plan's vision is sound and its goals measurable: if properly executed, we will be 400 work-years stronger by 2025.

Although the plan is still young, we are already making measurable success. By the end of 2017, the command had 60 initiatives underway and making clear progress toward our desired end state.

One of the best metrics for mission execution is our command's overall financial performance. With this in mind, we finished 2017 with a net operating result of \$8 million, which is \$4 million more than our original target. Our reimbursable orders also grew by \$53 million from 2016, finishing the year at \$473 million. As a Navy Working Capital Fund, these are key indicators of our organizational health and mission accomplishments.

Compliance

Compliance is the measuring stick for how well we adhere to policies and regulations. One of the ways we measure our compliance is through inspections. During the NAVSEA Inspector General's comprehensive inspection in October, we received an overall "Satisfactory" rating. The overall results showed significant improvement since the 2014 IG inspection.

An Explosive Safety Inspection was conducted at Indian Head and Stump Neck in May, with the command receiving an overall "Satisfactory" rating. A few areas highlighted as extraordinary by the inspectors included: the "model" Arms, Ammunition and Explosives Physical Security program; the huge reduction in inventory at the Material Potentially Presenting an Explosive Hazard sites; the "best inert program ever seen;" excellent magazine operations; and the evident progress made since the last ESI to create a more open culture.

I'd also like to call attention to our Contracts Department's intensive Procurement Surveillance Program audit in August in which we also received an overall rating of "Highly Satisfactory."

Other specific inspections included the Radiological Safety Program, Communications Security, Environmental, Crane Safety and Purchase Card Program. In all of these inspections, we demonstrated our proficiency, as well as our willingness to always learn and improve. This establishes and preserves our credibility: our coffers are full.

Command Climate

One of my primary responsibilities is to ensure we are an informed, aligned, trained, engaged, motivated and a rewarded workforce. To this extent, we began several efforts in 2017 to identify our strengths and weaknesses in our command climate, and to work towards making necessary improvements.

The command administered the Defense Equal Opportunity Management Institute Equal Opportunity Climate survey in September, revealing an overall 74 percent approval rating. Through this survey, we learned a lot about ourselves. Amongst these findings, our organizational processes were identified as an area of concern while our engagement efforts were identified as an area of strength. While DEOCS showed our command climate is doing well, we have room for improvement and continual growth.

Going forward, we have a number of cross-organizational workgroups in place to inclusively, deliberately and consistently implement and monitor a solution set of genuine, progressive and sustainable initiatives. This includes Operation Legacy: a team focused on increasing intra-organizational trust, sense of identity, and shared purpose through new and revised Strategic Plan People Initiatives.

Summary

In total and in summary, our team overcame many obstacles to set the bar high for 2018. I am extremely proud of what we accomplished last year, but realize our potential is greater than our achievements. We are a remarkable organization of extraordinary professionals entrusted with a vital mission, embarked on unprecedented times of responsibility and opportunity. We are a Team: no one succeeds by themselves and no one fails alone. Our shared intent and relentless commitment to safety, learning and each other are what matters most.

Capt. Scott Kraft
Commanding Officer
Naval Surface Warfare Center
Indian Head EOD Technology Division



STRATEGIC THRUSTS



- ◆ 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



ECONOMIC IMPACT

Where we Live

Maryland	61%
Virginia	19%
Other States	20%

* % of the total population of IHEODTD employees

County-by-County Breakdown (Maryland)

Charles	71%
Saint Mary's	10%
Prince George's	9%
Calvert	3%
Anne Arundel	2%
Other	5%

* % is of the employees who live in MD



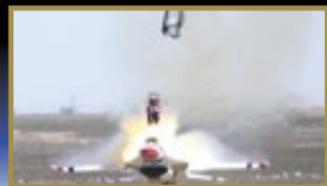
**NSWC IHEODTD
Total Maryland Payroll
\$225M**

**FY17 Maryland
Contract Dollars
\$51.6M**



STRATEGIC LOCATIONS

Ogden, Utah: 21 civ. and 4 ctr.
Co-located at Hill Air Force Base
CAD / PAD Air Force Integrated Product Team



Crane, Ind.: 6 civ.
Design and construct portable magazines and armories
Provide automation for facility front gates

Indian Head, Md. (two sites):
1,674 civ., 3 mil. and 211 ctr.
NAVSEA Center of Excellence (CoE) for Energetics
DoD EOD program lead
Combined Explosives Exploitation Cell platoons



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

Picatinny, N.J.:
242 civ., 2 mil. and 45 ctr.
Located at Picatinny Arsenal
Joint CoE for Guns and Ammo
Navy Package, Handling, Storage and Transportation, Guns and Ammo

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

Norfolk, Va.:
12 civ., 3 ctr.
Demonstration and Assessment Team
Assigned to EOD Department

McAlester, Okla.: 39 civ. and 4 ctr.
McAlester Army Ammunition Plant
Navy Weapons

Louisville, Ky.: 12 civ.
Naval Guns





NSWC IHEODTD announced a partnership with Nammo Energetics Indian Head in January, under the command's Center for Industrial and Technical Excellence designation. CITE is a statutory authority allowing public-private partnerships to perform work related to the command's core competencies. This designation allows the Navy to more efficiently maintain an organic energetics capability and manage under-utilized capacity.



Naval Air Systems Command issued a grounding bulletin Feb. 18, following the discovery of oil in both the under seat rocket motor and ballistic gas lines in aircraft during routine maintenance inspections. When the U.S. Navy's Carrier Air Wing 5 (CVW-5) based at Naval Air Facility Atsugi, Japan, found out it would have to ground its fleet of F/A-18E/F Super Hornet and EA-18G Growler aircraft, flight operations in the 5th Fleet Area of Responsibility appeared to have a significant setback. Those setbacks were averted, however, when command engineers and logistics support came together over a three-day holiday weekend to mitigate any potential long-term aircraft groundings.

Although the ejection seat will fire without the additional boost generated by the USRM, there is a risk the seat and aircrew would not completely clear the aircraft. Upon notification of the Conventional Ordnance Discrepancy Reports, emergency replacements were identified and special arrangements were made to transport units direct to the squadron.

The NSWC IHEODTD and NSWC Carderock Division Hunley Teams shed light into the sinking of the historic H. L. Hunley submarine in April. The joint team collaborated to expand the understanding of non-ideal explosives. The H. L. Hunley, a Confederate submarine built during the Civil War, attacked the USS Housatonic Feb. 17, 1864, off the coast of Charleston, S.C. The 40-foot long experimental boat was built to plant a spar torpedo on the hull of an enemy ship, which would strike the hull and detonate. Within minutes, both the ship and the submarine sank. Hunley became the first successful combat submarine to ever sink an enemy vessel.



Engineers and scientists from NSWC IHEODTD and NSWC Crane formulated a new low-signature cast cure propellant in May. This propellant was selected for study due to its suspected imminent threat to deployed fixed wing and rotary aircraft. The goal of this program is to evaluate the spectroscopic signatures of rocket motor plumes produced by this propellant to improve threat detection and tracking.

Command engineers responded in June to an urgent U.S. Marine Corps need for CCU-127/A Fire Extinguisher Cartridges by inspecting overaged assets and validating 13 for restoration to operational status. The cartridge ruptures a closure disc to dispense fire suppressant into the engine nacelles of U.S. Marine Corps and foreign military sales H-53 series helicopters. The 13 assets were identified out of a pool of more than 1,500 overaged units and will be used to prevent interrupting U.S. Marine Corps CH-53 helicopter operations until the current production contract delivers replacement spares.



EOD Department personnel provided rapid additive manufacturing support for NAVAIR's Aircrew Systems Program Office in June to produce components for T-45 Goshawk crewmembers. Aircrew experienced increasing numbers of physiological episodes while flying due to issues with crew breathing apparatuses. NAVAIR requested support from the DoN AM working group to print 200 valve bodies, and AM support staff from NSWC IHEODTD, Dahlgren and Carderock Divisions responded to meet the requirements.

TOP NEWS

NSWC IHEODTD's Indian Head University held its inaugural Basic Ordnance Technology 101 Course in June. The BOT provides the fundamental understanding of energetics and is developed for the command's new scientists and engineers. The course included presentations and tours from subject matter experts, who provided the basics of solid propellant



propulsion for applications such as rocket motors, guns and cartridge actuated devices/propellant actuated devices. This was the first year technical visits to the command facilities were included.

EOD Department's AN/GLM-11 Universal Test Set team traveled to more than 58 U.S. military facilities around the world in July and provided one-on-one training to more than 500 U.S. Air Force EOD and electronic warfare personnel. The UTS was designed to ensure mounted and dismounted Counter Radio Controlled Improvised Explosive Device Electronic Warfare systems operate properly within the electromagnetic environment. The training consisted of hands-on instruction concerning the proper functioning and operation of the UTS system, trouble-shooting and preventative maintenance checks of the equipment, basic concepts of CREW, threat configuration file loading, and points of contact at IHEODTD to resolve issues.



Congratulations to Athena Moye, Howard Folkes, Ezban Schan Morrissette, Selena Clark and Jay Emmanuel on their September graduation from the NAVSEA Leadership Development Program.

The NLDP is designed to provide NAVSEA employees the opportunity to develop and strengthen their leadership skills, regardless of where they are in their career.

The Inspector General's Inspection was held in October and the command received an overall "Satisfactory" rating. The results showed significant improvement since the 2014 inspection.

The command notably progressed in 12 of the 21 inspection areas. Within the remaining nine areas, five were assessed as steady and four declining.



NSWC IHEODTD Commanding Officer Capt. Scott Kraft speaks to the Chemical Biological and Radiological Defense Division employees from Dahlgren in October. This division is scheduled to transfer to IHEODTD over the next several years. This visit was part of the communications plan to help educate the employees about IHEODTD.

EOD DEPARTMENT



The United Kingdom Defence Science and Technology Laboratory sent 16 representatives to visit the command in April for an exchange of EOD science and technology information and to discuss areas of mutual interest under the America, Britain, Canada and New Zealand EOD information exchange agreement. The United Kingdom proposed the relationship continue by exchanging chemists for a few months at a time to learn more about each other's capabilities and practices. The first two participants in this program are EOD Department's Christopher Simms and DSTL's Scott Board (pictured left in the EOD suit).



Michael Lee and sons (L-R) Nathan, Matthew and Andrew read the engraved EOD tribute marker in front of the flagpole. Paralympian Brad Snyder (top right) tells his powerful story at the NSWC IHEODTD EOD Memorial Dedication Ceremony in June.



EOD Department and Expeditionary Exploitation Unit One (EXU1) celebrated the EOD mission, history, technology, achievements and family in a dedication ceremony and family day in June. The event recognized both those who have provided – and those who continue to provide – an uninterrupted flow of products, services, solutions and support to the EOD warfighter for more than 70 years.

EOD Department's Robotics Branch participated in the 2017 Advanced Naval Technology Exercise in August. The team partnered with NSWC Carderock's Combatant Craft Division for several unmanned ground vehicle / unmanned surface vehicle collaboration missions, simulating the use of the USVs/UGVs for beach reconnaissance and clearance. Upon completion of the beach operation, the UGVs were tele-operated back aboard the USV, while the USV returned to base via similar tele-operated and semi-autonomous control.



The Advanced EOD Robotic System (Increment 1) acquisition program was declared "logistically ready to proceed" in April for Milestone C by an independent logistics assessment team, and the integrated product support program was declared "ready to proceed" by

the program executive officer. The ILA team graded the program "green" across all 14 assessment criteria. A green rating means the system is ready for production.



EOD DEPARTMENT

The Concept Realization, Innovation and Prototyping Branch led a rapid prototyping collaboration with EOD Mobile Unit 2 in September. An active duty representative of EOD Mobile Unit 2 traveled to NSWC IHEODTD to work with department engineers and technicians to develop, refine and fabricate designs for novel EOD tools.

This supports Objective 5 of the DoN Additive Manufacturing Implementation Plan, enabling manufacturing agility through low volume production in operational environments to reduce development cycles and logistics costs associated with the EOD mission.



EOD personnel show their Halloween spirit!



NSWC IHEODTD conducted a comparative field test and evaluation of large scale non-intrusive inspection systems under an interagency agreement with the U.S. Customs and Border Protection at the Port of Los Indios, Texas. These systems must be capable of screening cargo and vehicles for the detection of various types of contraband, including - but not limited to - narcotics, explosives, weapons, ordnance and currency. The data collected allows a capability and limitation review of each system and shapes requirements for future systems purchase and deployment.

Senior command leadership and EOD Department staff attended November's "EOD on The Hill" at the Rayburn House Office Building in Washington, D.C. This event provides the U.S. Congressional EOD Caucus an opportunity to meet with all four services in a static environment, talk with EOD warfighters and view tactical equipment. Army, Navy, Air Force, Marines and the Defense Threat Reduction Agency all provided EOD displays.



Marines from The Basic School Artillery Instruction Branch conducted offload of ammunition during the Robo Pallet Seminal Transition Event hosted by Marine Corps Systems Command, Program Manager - Fires in August. The department's Demonstration and Assessment Team coordinated and executed the event.

The Logistics Inventory Control Point and Depot Branch Shipping Team coordinated 698 shipments of EOD tools and equipment for Joint Service EOD warfighters totaling 9,220 assets. Eighty-eight of these shipments directly supported the Navy's Foreign Military Sales program, which provided EOD tools and equipment to partner nations via 13 different FMS cases.

The EOD Magnetic Signature Test Facility tested and certified more than 112,000 EOD tools, equipment, components and repair parts for EOD technicians conducting render-safe procedures with magnetically-influenced ordnance. This work provided government acceptance testing for 75 contracts, fulfilled 87 requisitions for inventory stock, and supported the EOD diving in-service engineer.

SYSTEMS ENGINEERING DEPARTMENT

The Systems Engineering Department's McAlester, Okla., detachment completed the installation and system checkout for two new Haas CNC vertical mills in January, increasing their capabilities to include complex five-axis CNC work. McAlester performs rework on shipping containers and ordnance handling equipment, saving costs by reducing the need for new item procurements. 🇺🇸

Department systems engineers completed a run of quick-release fasteners and test samples for the Defense Logistics Agency's Additive Manufacturing Technical Data Package Development and Part Demonstrations project in January. The fastener is a custom machined part used in the CNU-308/E Tomahawk Weapon System all-up-round shipping and storage container. These fasteners cost \$840 each and take several months to procure. Using on-site AM, these same parts can be produced in a matter of days with an estimated unit cost of \$26. 🇺🇸

The department's Fuzing and Initiation Systems Branch delivered a training aide in February to the National Ground Intelligence Center – the first delivery of its kind to the NGIC – as part of a foreign weapon exploitation effort. The device was disassembled and reverse engineered to determine its functionality to include radio frequency communication capability, energy harvesting ability, software code extraction, circuitry and mechanical analysis. 🇺🇸

Weapons mechanics at McAlester, Okla., developed innovative, cost-effective repairs for the containers used to store and transport Tomahawk missiles and components in February. Teams of weapons mechanics created repair processes for the exterior corners and saddle load spreader. The cost of replacing a container with damaged corners and SLS was \$30,000. Following the newly developed repair processes, the total material and labor costs for fixing two corners and two SLS is \$1,380.14 per container, a 95 percent savings. 🇺🇸

The Cartridge Actuated Device/ Propellant-Actuated Device Division's Technology Development Branch Weapons Integrated Product Team supported the SM-3 Block IIA Cooperative Development Project Flight Test, Standard Missile-01 in February. The first intercept of a ballistic missile target using a Standard Missile-3 Block IIA. The missile, fired from *USS John Paul Jones* (DDG 53), destroyed a medium-range ballistic missile target launched from the Pacific Missile Range Facility at Kauai, Hawaii.



The CAD/PAD Joint Program Office hosted the 2017 International Logistics Meeting at Joint Base Andrews, Md., in May to discuss new initiatives and emerging requirements.



SYSTEMS ENGINEERING DEPARTMENT



Members of the Fuzing and Initiation Systems Branch traveled to Picatinny, N.J., to conduct setback survivability testing as part of the High Reliability Dual-Purpose Improved Conventional Munition Replacement Program in July. Four shots were completed utilizing Picatinny's 155 mm Soft Catch gun to evaluate submunition payload survivability in a post-launch environment. 📍

The CAD/PAD Division's Technology Development Branch (F-35 Integrated Product Team) completed Type III final release to service certifications in September for CAD/PAD installed in the US16E ejection seat, transparency removal system, and fire protection system in U.S. Air Force, U.S. Marine Corps, U.S. Navy and foreign military sales F-35 aircraft, certifying these devices meet system requirements. 📍

A plasma-therm deep reactive ion etcher became fully functional in October for the Systems Engineering Department's Fuze and Initiation Branch. The machine's capabilities and efficiency will simplify the branch's processes. DRIE fulfills a vital role in microelectromechanical systems device fabrication and will create the mechanical structures via etching within the MEMS that enable the safety and arming functions.



CAD/PAD Division held its annual All-Hands Picnic in June.



The Fuze and Initiation Branch's MEMS team demonstrated gun launch survivability of the MEMS S&A device assembly for the Hyper Velocity Projectile in November. The MEMS S&A was gun launched from a 155 mm artillery cannon during a test at White Sands Missile Range in New Mexico. The round was retrieved from the desert floor and returned to NSWC IHEODTD for disassembly and inspection in the MEMS microenergetics laboratory. 📍

The CAD/PAD Division's In-Service Engineering Branch supported the AV-8B Joint Systems Support Activity at Naval Air Warfare Center Weapons Division's investigation on the BRU-70/A Digital Improved Triple Ejector Rack due to ordnance "hang fires" reported by AV-8B aircraft squadrons between 2015-2016. The investigation found the cause to be faulty electrical wiring supplied by each aircraft's power supply. NSWC IHEODTD's support helped rule out the stores release CCU-107/B impulse cartridge that disengages ordnance from the racks. 📍

MISHAP INVESTIGATION SUPPORT TEAM

The U.S. Navy (attached to the Systems Engineering Department's In-Service Engineering Branch) and U.S. Air Force (attached to the Systems Engineering Department's Air Force Integrated Product Team Branch) Mishap Investigation Support Teams specialize in installation and operational use of cartridge and propellant actuated devices. Each team is chartered by the Naval and Air Force Safety Centers to deploy in support of investigations usually involving an aircraft mishap. The team is tasked to locate and verify functionality of any CAD/PAD utilized during the mishap. In the event of a device malfunction, the command may initiate an engineering investigation within CAD/PAD Division.

A District of Columbia Air National Guard F-16C Fighting Falcon aircraft from the 121st Fighter Squadron, 113th Wing, out of Joint Base Andrews, Md., crashed in April during a routine training mission. The Airman ejected successfully. The CAD/PAD U.S. Air Force MIST was activated by the Air Force Safety Center and deployed to the crash site in support of the Safety Investigation Board. An investigation concluded all CAD/PAD functioned as designed with no anomalies noted.

killed in the mishap. Upon aircraft recovery, a Conventional Ordnance Discrepancy Report was initiated by the AMB to direct an engineering investigation on one of the aircraft's JL02 TCU-5A/A Cartridge Actuated Thruster. The CAD/PAD Navy MIST, which was not activated by the Naval Safety Center to support the mishap on-site, coordinated the return and investigation of the JL02. The investigation concluded the JL02 operated as designed with no anomalies noted.

A U.S. Navy F/A-18F Super Hornet assigned to Strike Fighter Squadron (VFA) 146 aboard USS *Nimitz* (CVN 68) experienced an engine malfunction and crashed during emergency landing at Bahrain International Airport, Muharraq, Bahrain in August. The naval aviator ejected successfully. The CAD/PAD MIST was activated by the NSC and deployed to the crash site in support of the Aircraft Mishap Board. An investigation concluded all CAD/PAD functioned as designed with no anomalies noted.

A U.S. Marine Corps MV-22 Osprey tiltrotor aircraft attached to Marine Medium Tiltrotor Squadron (VMM) 265, 31st Marine Expeditionary Unit, 1st Marine Aircraft Wing embarked aboard USS *Bonhomme Richard* (LHD 6) experienced an in-flight emergency and crashed into the waters 18 miles off the coast of the Shoalwater Bay Training Area, Queensland, Australia in August. While 26 Marine passengers egressed safely, both aircrew and one passenger were

The Naval Safety Center activated the CAD/PAD MIST in January when a U.S. Navy T-45C Goshawk aircraft crashed off the east runway at Naval Air Station Meridian, Miss., following a bird strike. The student and instructor pilot both ejected safely and were transported to a local medical facility for evaluation. The investigation determined that all CAD/PAD functioned as designed with no anomalies noted.



A U.S. Navy F-5N aircraft assigned to Fighter Squadron Composite (VFC) 111 crashed 20 miles southeast of NAS Key West, Fla., in August. The naval aviator ejected successfully and was rescued by a USCG MH-65 helicopter dispatched from Coast Guard Air Station Miami. The aircraft and ejection seat were not recovered, and the CAD/PAD Navy MIST was not activated by the Naval Safety Center to support the AMB. The mishap aircraft and its Improved Northrop ejection seat contain a JL96 (CKU-7A/A Rocket Catapult), M207 (M90 Delay Cartridge, 0.30-Second), M218 (M91 Impulse Cartridge), and M897 (M25A1 Cartridge Actuated Thruster) manufactured by NSWC IHEODTD's Energetics Manufacturing Department. These, along with other mishap aircraft devices manufactured by industry partners, were validated through destructive and non-destructive testing conducted by the command's Research, Development, Test and Evaluation Department.



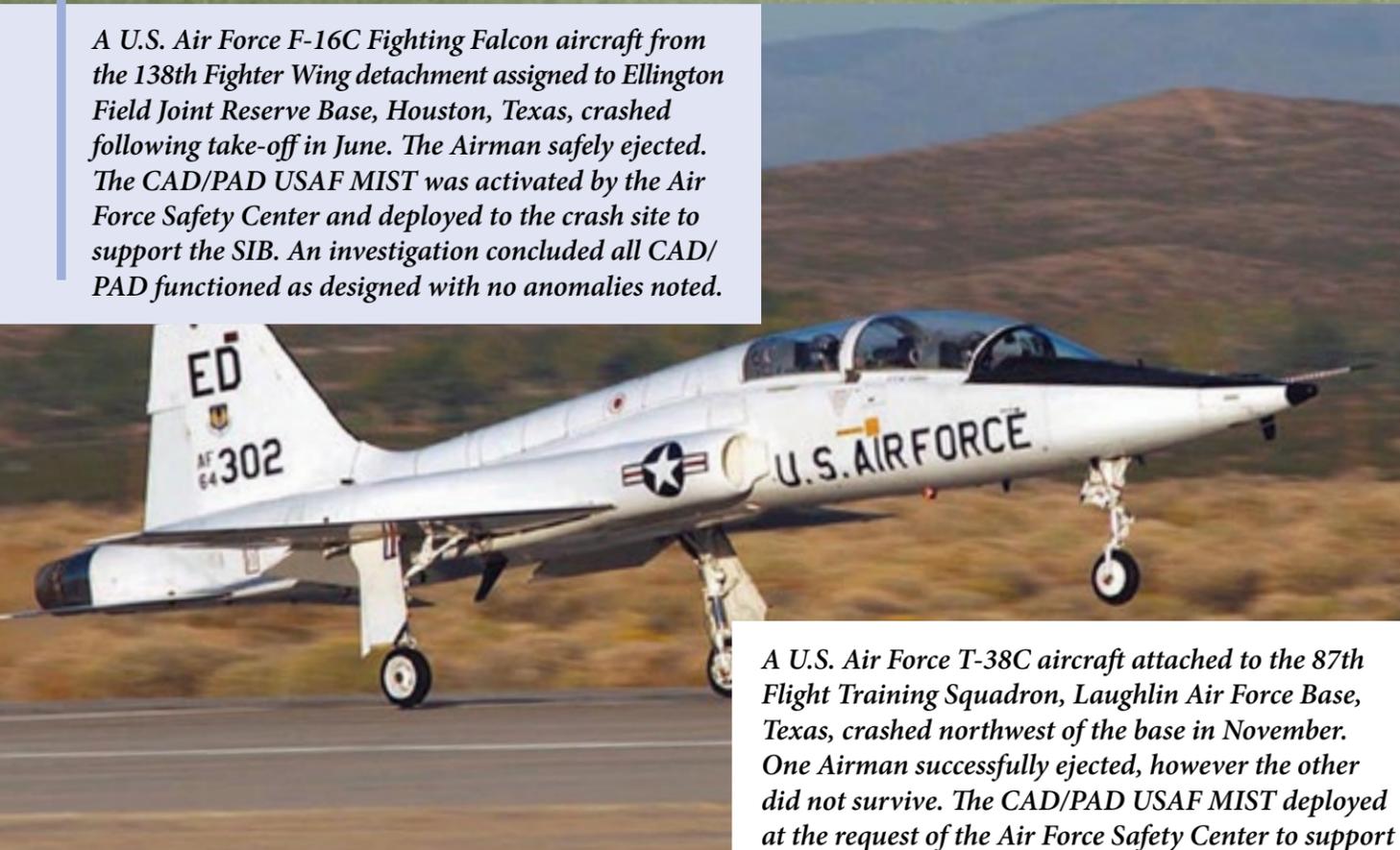
Personnel survey the crash scene of a T-45C aircraft. (U.S. Navy photos by Nicholas Schombs)

MISHAP INVESTIGATION SUPPORT TEAM



A U.S. Navy F/A-18F Super Hornet assigned to Strike Fighting Squadron (VFA) 122 at NAS Lemoore, Calif., experienced a ground mishap in August involving the aft ejection seat's Mk 122 Mod 0 Parachute Deployment Rocket Motor that auto-ignited while parked on the flight line. No personnel were harmed in this event. The CAD/PAD Division worked with the F-18 Program Office, T-45 Program Office, and Commander, Naval Air Forces to ensure individual wings comply with previously-issued direction to remove and submit expired assets to NSWC IHEODTD for further analysis/disposition.

A U.S. Air Force F-16C Fighting Falcon aircraft from the 138th Fighter Wing detachment assigned to Ellington Field Joint Reserve Base, Houston, Texas, crashed following take-off in June. The Airman safely ejected. The CAD/PAD USAF MIST was activated by the Air Force Safety Center and deployed to the crash site to support the SIB. An investigation concluded all CAD/PAD functioned as designed with no anomalies noted.



A U.S. Air Force T-38C aircraft attached to the 87th Flight Training Squadron, Laughlin Air Force Base, Texas, crashed northwest of the base in November. One Airman successfully ejected, however the other did not survive. The CAD/PAD USAF MIST deployed at the request of the Air Force Safety Center to support the SIB. An investigation concluded all CAD/PAD functioned as designed with no anomalies noted.



SYSTEMS INTEGRATION DEPARTMENT

Systems Integration Department Close-In Weapon System in-service engineering agents completed the installation of nine reliability, maintainability and availability ordnance alterations aboard USS *Farragut* (DDG 99) and USS *Iwo Jima* (LHD 7) in February.

Two 16-inch dummy projectiles were obtained from NSWC Crane as their inventory was about to be demilitarized. The inert shapes were reconditioned and painted, the rotating bands were polished and clear coated, and simulated fuze shapes were manufactured and installed by the Army's machine shop. These two historical ordnance items are now displayed at the front of the main Navy building at Picatinny Arsenal.



The Systems Integration Department completed transitioning the Weapons Station Earle Industrial Support Group function to NSWC IHEODTD Detachment McAlester, Okla., in February. As part of this transition, McAlester was designated as the depot source of repair for five ordnance handling equipment items, making it eligible to perform repair work for the Naval Supply Systems Command.



The CIWS ISEA Field Service Team's Jason Follin completed nine reliability, maintainability and availability ordnance alterations aboard USS Kearsarge (LHD 3) in March. The department's Self-Defense Systems Branch Field Service team also completed installation of seven CIWS ORDALTs aboard USS The Sullivan's (DDG 68) in Mayport, Fla.



Human Resources Division personnel Lisa Robey, Brittney Vincent and Mary Bottass coordinated a Navy Recruiting Event at Picatinny, N.J. Department managers interviewed 13 candidates from various universities; eight of them were selected as candidates for employment. The department also used the NAVSEA Pathways Program to hire eight Office Automation and Engineering interns in August.

Mk 38 ISEA personnel completed the installation of two Mk 38 Mod 2 (25mm) Machine Gun Systems and completed installation and check-out testing in August aboard USS *Gridley* (DDG 101) in Everett, Wash.



The department held its inaugural "Navy Bring your Child to Work Day" in April.

SYSTEMS INTEGRATION DEPARTMENT



NSWC IHEODTD Commanding Officer Capt. Scott Kraft and Technical Director Ashley Johnson traveled to Picatinny, N.J. in June. Their visit was kicked off by an All-Hands meeting, where awards were distributed, employees were recognized by their peers, and hosted a discussion on the state of the command.

The Mk 45 ISEA team developed an engineering change proposal to eliminate a potential safety hazard for ship personnel and equipment damage in October. The team identified a need to safely regulate the nitrogen tanks issued to ships force personnel with nitrogen pressures greater than 2,200 PSI. Until then, regulating a maximum safe nitrogen fill pressure from nitrogen tanks provided by shipyards and vendors for use on major caliber guns did not exist.



Systems Integration Department human resource specialists and Corporate Operations liaisons facilitated, coordinated and hosted the inaugural Fiscal Year New Hire Facility Tour in October.

System Integration Department personnel Selena Clark and Marisol MacCheyne coordinated with the command's Workforce Development Office and organized mentoring events in May, July and October.

A Systems Integration Department CIWS ISEA G32 PHALANX/CIWS Field Service technician executed emergency travel in support of USS *James E. Williams* (DDG-95) CIWS MT 22 in November. Following replacement of the scan drive assembly and top hat, and an operational test, a 600-round pre-action calibration test firing was completed with no casualties. Post-fire inspection of breech bolts revealed above-normal wear-and-tear prompting removal of the gun and further disassembly. An inspection of the removed gun assembly revealed damage to the roller guide and marginal wear to the front and rear unlocking cams. The worn roller guide

was replaced using on-board repair parts. Reassembly of the gun and operational verification testing was completed and the gun was restored to full working order.

The Systems Integration Department coordinated with Army and Defense Contract Management Agency representatives for a visit by DCMA Director Vice Adm. David Lewis in December. Lewis toured the department's turret and Packaging, Handling, Storage and Transportation facilities.



Department personnel celebrated some spooktakular fun during their annual Halloween party.



The department participated in the fifth annual "Introduce a Girl to Engineering" event in February as part of a Picatinny Chapter of Women in Defense initiative. The event encourages young girls to consider pursuing an education in science, technology, engineering and math and is coordinated by the Army Research Development and Engineering Center's STEM office.



Attendees to a Systems Integration Department speed mentoring event pose for a group shot.



The Functional Ground Test team conducted a production acceptance test of the latest Tomahawk missile and celebrated the delivery of the 4,000th Block IV cruise missile to the fleet in August. The testing ensures the mission requirements are met using the latest operational software to guarantee a reliable and effective weapon for the fleet.

A patent application was drafted in March for an environmentally friendly fireworks disposal unit, a concept created by the command's Research, Development, Test and Engineering Department scientists. The unit was designed to mechanically destroy commercial fireworks underwater where the water provides an element of safety and a medium to separate water-soluble components from inert solids. This concept offers EOD personnel and police an alternative to the hazardous and environmentally complex task of burning large caches of confiscated fireworks. Funding for this task was provided by the NSWC IHEODTD Velocity Lab.

RDT&E Department scientists collaborated with NSWC Crane and U.S. Army activities in March for a five-year project agreement with the United Kingdom's Ministry of Defence. The arrangement allows both countries to jointly address exploration, experimentation and examination of nitrocellulose, a widely used energetic material in rockets,

explosives and weapons in the Navy which are still not well understood.

RDT&E scientists Terri L. Schull and Stephen N. Stiles synthesized, scaled-up and formulated nano-crystalline nitrocellulose, a possible substitute for plastisol nitrocellulose, to make PBXN-103 underwater explosive in May. Formulations of PBXN-103 were prepared using batches of nano-nitrocellulose from both sources of nitration medium. The formulated explosive produced from the 70 percent nitric acid produced an explosive composition best described as granular and resembling a double-base paste. The formulated explosive produced from the 90 percent fuming nitric acid produced an explosive composition that is considerably more fluid and behaves, with processing, much more like PNC-based cast-cure explosives.

Department scientists installed a new elemental analysis instrument in April, which establishes the

purity of organic compounds, including energetic materials. Results from this elemental analysis are critical in quality control of commercial off-the-shelf chemicals used in Navy weapons systems and also required in reporting novel synthesized energetic molecules.



The Joint Insensitive Munitions Technical Program 2016 Team of the Year was awarded to the Task 13-3-26 Program in April.



Test and Evaluation Division Director Rob Beagley speaks during the department's Safety Stand Down in October.

RDT&E DEPARTMENT

NSWC IHEODTD was selected as one of the winners of the DoN Innovation Sustainment Group Pitch Tank in July following a January pitch session held at the Pentagon. Dr. Samuel Emery, a research physicist with the department's Dynamics and Diagnostics Branch, provided a pitch focused on the command's potential large-scale development and production of energetic materials additive manufacturing explosives and propellants.

RDT&E scientists synthesized alkyl passivated aluminum clusters via a novel synthetic route and produced clusters in July exhibiting notable solubility in organic solvents. Burning drop experiments demonstrated enhanced fuel combustion rates up to 25-30 percent with the dissolved material. Enhanced fuel combustion has potential applications for future Navy propulsion systems through combustion enhancement via solvation or injection.

Department scientists with colleagues from the Naval Research Laboratory and The George Washington University published a surface passivation strategy for inorganic nanocrystals in September. "Sulfur-Capped Germanium Nanocrystals: Facile Inorganic Ligand Exchange" details the use of an easily prepared sulfur reagent for the preparation of germanium nanocrystal films, appearing in the October 2017 edition of The Journal of Physical Chemistry C. This work aims to generate low-cost solution processing methods for inorganic electronic devices, specifically solar cells for future Navy applications of energy-harvesting devices for the recharging of batteries in the field.



NSWC IHEODTD annually hosts U.S. Naval Academy Midshipmen majoring in engineering, chemistry, physics or a related field for a four-week internship with command scientists and engineers. This year, the command welcomed aboard Midshipman 2nd Class Gabriel Gosney for the summer internship position in May. Gosney conducted technical projects under the mentorship of IHEODTD scientists and engineers and learned about energetic materials, ordnance and weapon systems.



RDT&E employees held their annual holiday party in December.



ENERGETICS MANUFACTURING DEPARTMENT

The Energetics Manufacturing Department shipped the first lot of triethylene glycol dinitrate to UTC Aerospace Systems in January. The material is used in a gas generator formulation to support the Airbus 380 escape slides.

The department's Rockets and Cartridge Actuated Device/Propellant Actuated Device division completed production of lot 5 warheads for Nammo Talley in March, including several that underwent destructive lot acceptance testing prior to the final deliverable of 2,340 warheads. The work-for-private-party agreement between Nammo Talley and NSWC IHEODTD allows the command to produce 1,742 M72A7 warhead assemblies. The M72A7 LAW is a man-portable, shoulder-launched rocket designed to destroy armored vehicles.

The Energetics Manufacturing Department completed casting of 1,700 grenade bodies for the Mk 14 Mod 0 Anti-Structural Munition Grenade in June. NSWC IHEODTD developed, qualified and produces the Mk 14 Mod 0 ASM Grenade for the U.S. Special Operations Command.



John Luense, an engineer in the Energetics Manufacturing department, celebrated 50 years of employment with the command in May. Luense supports the Systems Engineering Department's Warhead and Propulsion Technology Branch on a double-based propellant development and scale-up project.

The standard operating procedure for static firing the Mk 106 and Mk 111 rocket motors was redacted and released to McAlester Army Ammunition Plant, Okla., in August. McAlester is responsible for demilitarizing Tomahawk Missiles.

When anti-structural munition grenades are cast, occasionally the endformers are not fully pressed in pressed in fully or tend to work their way out during the cure process. When this occurs, the fuze adapter doesn't fully seat in the assembly. The explosive fill must be trimmed by hand to allow the fuze adapter to sit even inside the grenade mouth. To fix this functionality inconvenience, the Energetics Manufacturing Department created a

3D-printed ASM grenade trimming tool in September to trim the excess explosive to the proper depth allowing the fuze adapter to fit properly. It took only a few days to generate the printed concept, which was then designed and fabricated in less than 20 hours and \$30 in material.



The Energetics Manufacturing Department's Office Team fell 13-7 to the defending champions of the Operations Team in September. The annual softball game was played under a gorgeous fall sky, accompanied by friends, food and a little good natured trash talk.



Department personnel attended the 2017 ChemShow in New York City in November. Employees met with industry leaders to learn about their products and technology could be applied to the department's facilities and products.



The Energetics Manufacturing Department raised \$850 for gift cards and donated food for 10 Thanksgiving dinner baskets in November. The donations provided holiday meals for the military families on base.

2017 TOTAL

The Energetics Manufacturing Department recorded no reportable explosive mishaps during 2017. There were also 11 successful pilot ejections within design envelopes involving 68 Energetics Manufacturing Department manufactured components.



The Energetics Manufacturing Department took a moment to celebrate at the department's Family Appreciation Day picnic in June.



CORPORATE OPERATIONS DEPARTMENT



The Workforce Development Branch hosted three speed mentoring events in 2017. The branch regularly offers these events throughout the year, allowing employees to receive advice in a series of timely conversations with experts and mentors.

James T. Young, a DoN Certified Lean Six Sigma Black Belt, provided Continuous Process Improvement training to Black Belt candidates at the NAVSEA Lean Six Sigma College from January through July.

The department developed and signed the command's Continuity of Operations Plan, which provides planning capabilities to perform mission-essential functions during emergency events.

In collaboration with the Navy Facilities Engineering Command, department personnel completed eight Lean Six Sigma Events in the fields of engineering, acquisition, shops and transportation.

The department purchased captioning software and secured a contract for sign language interpreting services to allow full work day availability of interpreters and the captioning of recorded media.



The Human Resources Division celebrated the opening of football season with their annual September tailgate event, along with neighbors in the Equal Employment Opportunity / Diversity and Inclusion Office, and the Corporate Operations Department. Decked out in their favorite team gear, participants brought in delicious tailgate goodies and set them up in their offices to share.



Corporate Operations oversaw the annual execution of 28 facility projects totaling \$9.2 million. The department also reduced annual utility usage and cost by approximately \$6 million.



Command and station personnel celebrated Diversity Day in August. This event was designed to enhance cross-cultural awareness and promote pride, teamwork and esprit de corps among military members, civilian workforce and their families.



The NSWC IHEODTD Recruiting and Student Outreach Branch implemented the largest hiring of Pathways program students in command history. The command welcomed 50 Pathways interns in June and July, in the areas of engineering, science, finance and office automation. The branch worked to develop and document command policy for the program, worked with managers to find and select qualified individuals for these positions, and train managers and students on program best practices.

CORPORATE OPERATIONS DEPARTMENT



Corporate Operations Department employees enjoy gourmet nachos at the employee picnic in June.



Graduates from the NSWC IHEODTD Lean Six Sigma CPI Green Belt Training held in September and October received their certificates. The command's CPI office completed two Green Belt training classes graduating 31 employees. Trained Green Belts serve as a CPI consultant and advocate for change within their own organizations.

The department's Security Division worked with Command Evaluations and the NAVSEA Security Director to clear all 49 discrepancy cards received during the security portion of the 2014 Inspector General/Command Inspection Program inspection.

The command security director conducted 11 active shooter training sessions for more than 2,070 command personnel, fulfilling the annual training requirements established by U.S. Fleet Forces Command and the Secretary of the Navy.

The department's Information Technology Branch extended the Defense Research and Engineering Network to the Stump Neck site for the first time. The network allows the EOD Department to perform research tasks not possible from the Navy-Marine Corps Intranet network.

The Corporate Operations Department passed the NAVSEA IG inspections with a Satisfactory rating in the following areas: COOP, Cybersecurity, the Defense Acquisition Workforce Improvement Act, Diversity, Equal Employment Opportunity, Human Resources Management, Records Management and Security.



EOD Department Robotics Branch Manager Mike Del Signore gives an overview of the EOD robotics program during the Science and Engineering Interviews hosted at the NSF South Potomac Mix House in January.

CONTRACTS DEPARTMENT



January began a new era for Contracts Department. Building 1558, which had been home to the contracting organization for more than 45 years, was completely demolished and personnel were relocated to a newly refurbished building 841.



The Contracts Department hosted an intern from Naval Air Systems Command in Patuxent River, Md., for a three-month rotation in March. While working at Indian Head, Sifiso Mkhize performed pre-award and post-award contracting functions.

The Contracts Department held its Annual Employee Appreciation Picnic in June. In addition to hamburgers, hot dogs and barbeque, employees enjoyed a rousing game of corn-hole while others took on their department head in a game of kick ball.



The command provided funds for Jessica Scalfaro to attend the Duke Leadership Program at Duke University's Fuqua School of Business in Durham, N.C., in June. The training teaches six dimensions of leadership and uses a personalized method for helping leaders develop their competencies in each of the six areas.

The command's Chief Contracting Officer Renee Brown co-signed a memorandum of understanding with her counterpart at the Naval Facilities Engineering Command in July. The MOU established a collaborative relationship between the two parties and set specific tasking for an NSWC IHEODTD contract specialist to provide support to NAVFAC. The agreement ended Dec. 31, 2017.



The department completed its triennial Procurement Surveillance Program Audit in August, with a passing grade of Highly Satisfactory. The result of this audit means the department retains its unlimited procurement authority for another three years.

CONTRACTS DEPARTMENT

September is, by far, the busiest month of the year for the Contracts Department, as approximately 25 percent of all transactions are awarded during the last 30 days of the fiscal year. The management team provided breakfast for the department and held a Crazy Hat Day. By the end of the month, the Acquisition Liaison Division had processed more than 804 procurement data packages and the Small and Large Purchase Divisions awarded 2,107 actions totaling more than \$267million.



The Contracts Department let down their hair and got “ghouled-up” for some Halloween fun and games in October.



Contracts Department Head Renee Brown was selected to participate in “Leadership Southern Maryland.” This executive program combines hands-on study and in-depth discussion of current issues facing the Southern Maryland.



The Contracts Department enjoyed their annual Holiday Party in December at the Port Tobacco Marina.



The Purchase Card Program completed a November audit conducted by Level 1 Agency Program Coordinators, receiving a “Satisfactory” score, the highest that can be achieved. During the 18 month rating period, the team processed 7,749 transactions.



SAFETY OFFICE



Michelle Hinkle, NSWC IHEODTD Human Resources Safety Council representative, shares her outlook on the importance of safety in the workplace during the Corporate Operations Department's Safety Stand Down in October.

The Ordnance Assurance and Safety Offices performed annual inspections of all command buildings including the Systems Integration Department's sites in Picatinny, N.J., the Contracts Department's newly renovated Building 861, and the McAlester, Okla., detachment. The Safety Office also helped to map the command's future state of the Hazardous Material Procurement Process and the Consolidated Hazardous Material Reutilization and Inventory Management Program Process in January.

The Safety Office initiated efforts to prepare Safety Integrated Program Team charters following the Center for Industrial and Technical Excellence agreement signing with Nammo Energetics Indian Head in January.

The newly formed Safety Technical Rigor group briefed NSWC IHEODTD Technical Director Ashley Johnson on initial safety rigor efforts in February.



An explosives safety self-assessment was conducted on ESSA Program 5, Ammunition and Explosives Facilities and Operations at NSWC Crane in March. The NSWC IHEODTD ESSA team was augmented by explosives safety specialists from NSWC Crane, and Navy captains from the Naval Reserve Force.

The Naval Ordnance Safety and Security Activity Explosive safety inspections conducted in May at the Indian Head, Stump Neck and Picatinny sites received an overall "Satisfactory" rating. A few areas highlighted by the inspectors included the "model" Arms, Ammunition and Explosives Physical Security program efforts; the reduction in inventory at the Material Potentially Presenting an Explosive Hazard sites; the "best inert program ever seen;" the excellent magazine operations; and an increased culture to openness.

The Safety Office bid fair winds and following seas to Occupational Safety and Health team members Terry Randolph and Rennie Tibbs. Terry retired after 36 years of service and Rennie retired after 37 years of service.

The Safety Office prepared presentations in August to meet the Chief of Naval Operations' mandated Operational Pause effort due to ship accidents. The presentations on OSH, explosive safety and environmental programs refreshed employee awareness.

The Safety Office assisted in the explosive safety requirements re-write for Research, Development, Test and Evaluation, OP-5 Appendix G. It was later



The Safety Office held a dual celebration luncheon for Halloween and National Boss Day.

reviewed at the Navy's Explosive Safety Workshop in November.

The Safety Office participated with the Inspector General's review of the command's OSH and environmental programs. Both programs were graded as "Satisfactory."

The Safety Office began a weekly drumbeat of Operational Risk Management meetings to increase awareness of risk management efforts throughout the command.



The Safety Office held its annual Holiday Celebration and Potluck Luncheon featuring the wrapping of presents for a local military family.



COMPTROLLER DEPARTMENT



Employees and their families celebrate during the department's employee picnic in August.

Analyzing annual trends also aids in an improved budget and rate-setting process which is a key element to the success of the SCCs.

The reduction of dormant tri-annual undelivered orders and unfilled customer orders in compliance with FY17 "De-Obligation/Write-Off Procedures for Dormant and/or Invalid Undelivered Order and Unfilled Customer Order Balances" assisted with the reduction of carryover and more accurate financial reposting. Comptroller released a 2017 departmental data call and guidance providing individual knowledge-sharing working groups for assistance to meet deadlines and offer guidance when necessary. IHEODTD was successful in meeting all of its aggressive deadlines and resolving more than 500 dormant documents for approximately \$3.5 million.

Finally, the department took a joint approach to meeting the fiscal year guidelines for fund document closure against cancelling funding. This method created between Contracts, the business financial managers and Comptroller led to better communication, knowledge transfer and timely execution of all necessary steps. This resulted in not only a more efficient process, but the resolution of more than 3,500 documents.

Comptroller personnel let down their hair at their employee picnic in August.



Comptroller had a groundbreaking year for creating improved processes and strengthening cross-departmental relationships. Some of the department's 2017 successes included the cost transfer process revisions, the service cost center review, aged tri-annual resolutions, and fund document closure.

The cost transfer process was refurbished to be more efficient and auditable. The collaborative effort between Comptroller and department financial personnel resulted in updated cost transfer guidance, policy and desk guides that clearly define the process, as well as updated roles and responsibilities. The process was designed with the proper internal controls, delegation of authority, training requirements and key supporting documents to ensure it met accounting policies and procedures to ultimately pass audit. This decreased Comptroller analyst work years relating to cost transfer processing, allowing focus to move to analyzing fringe benefits.

The 2017 financial success of the service cost centers was also a collaborative effort between Comptroller and the SCC managers and teams. The department's efforts to generate weekly budgets for analysis allowed for a more proactive approach to support informed annual business decisions.



Systems Integration Department's Mike Kelly updates leadership on the council's 2017 progress.

PROFESSIONAL DEVELOPMENT COUNCIL

The Professional Development Council concluded its 44th term in 2017. This group brings together non-supervisory personnel interested in enhancing their leadership skills and knowledge of the command. The 2017 council included members from all the command's technical departments, as well as Corporate Operations.

To foster understanding of the team environment, build leadership skills and foster esprit de corps, the group kicked off its term with a weeklong leadership offsite. The offsite took the team outside the office and made them reliant on one another to accomplish tasks at a challenge course. The offsite also provided an opportunity to conduct personality trait and leadership style analysis to better understand key aspects for working with others. The event concluded with the group selecting a corporate project to accomplish within the term.

The corporate projects gave the group the opportunity to execute a project of command-wide impact,

proposed from within the workforce. The 44th term chose to tackle initial user training for the InFusion intranet toolset.

The project allowed the members to learn about requirements generation, goal setting, project boundaries and scheduling, and resource coordination with an emphasis on presentation and communication skills. By the end of the term, the PDC had conducted several briefings to teach command personnel on the setup and navigation of InFusion: NAVSEA's suite of social media tools.

The team also conducted a series of lunch-and-learn events covering position-specific topics to increase knowledge of critical senior roles, mentoring, coaching and advice on career progression options. Similar topics were discussed with senior executive service members during events at the Washington Navy Yard and at the Picatinny Arsenal, N.J.



NSWC IHEODTD Technical Director Ashley Johnson with Commanding Officer Capt. Scott Kraft and College of Southern Maryland President Dr. Bradley Gottfried sign a five-year Education Partnership Agreement in January.

Systems Engineering Department's Chris Fawls and Office of the Technical Director's John Hungerford provided mentoring and technical input to seniors in La Plata High School's engineering curriculum in February. As part of this program, students learn

engineering concepts and work in teams to manage, design, develop and build an engineering product.

Students of the 12-week elective Modern Weapon Design course, offered every spring to juniors and seniors in advanced studies at the U.S. Naval Academy, fired explosively formed penetrators designed during the course. The EFPs featured additively manufactured casings from NSWC IHEODTD.

NSWC IHEODTD volunteers served as judges for local Charles County Public Schools preliminary science competitions, culminating in a final science fair in March. NSWC IHEODTD Chief Technology Officer and Science, Technology, Engineering and Math Coordinator Dr. Kerry Clark presented special command awards to four students at the History, Industry, Technology, and Science Expo Awards presentation.

Systems Engineering Department's Jon Kilikewich and Andrew Taggart, and Energetics Manufacturing Department's Bryan Kilikewich and Tara Reed

supported the annual SeaPerch competition held during the Charles County HITS Exposition in March. SeaPerch introduces students to engineering, fabrication, problem solving and teamwork, all within an easily approachable curriculum. Remote operated vehicles designed, built and tested by elementary and middle school teams navigated through an obstacle course set at the bottom of a pool.

The Cartridge Actuated Device/Propellant Actuated Device Division hosted seven Scientist and Engineering Apprentice Program students in July. CAD/PAD employees taught the basics of CAD/PAD including ejection seat theory of design, component design considerations, and verification/validation discussions. The EOD Department mentored SEAP students in designing, analyzing and prototyping robot grippers for the MK 1 and MK 2 EOD commercial-off-the-shelf robots in August.



The Charles County High School's For Inspiration and Recognition of Science and Technology Robotics team "Robo Raptors," sponsored by NSWC IHEODTD, received the Excellence in Engineering Award in March for use of components produced through additive manufacturing. Systems Engineering Department's Andrew Taggart, David Fuller and Kevin Genson coached the team and assisted in manufacturing the components.

NSWC IHEODTD Material Properties Branch Manager Phillip Vaughn (left), interviews Brendon Cox (right) at the Science and Engineering Interview Event held at the Mix House in May. The event helps select the most sought after and highly qualified prospects from around the country for openings at NSWC IHEODTD.





EOD Department's Robotics Branch personnel continued its annual support for the Charles County Middle School League's VEX Robotics Program: a nationwide effort to expose students at all levels to the first principles of robotics. The program typically begins in the fall and runs through the spring. Mentors devote their time to guide the students to develop solutions to the VEX challenge by refining students' concepts, assisting in building platforms and teaching the basics of programming a robot.

J.C. Parks Elementary School revealed its newest addition to its science department in December: an augmented reality sandbox. Command engineers assisted in the construction and presentation of the educational sandbox, which uses a projector and a Microsoft Kinect along with display software to give it topography.

NSWC IHEODTD participated in the Science and Engineering Apprenticeship Program designed for high school students to attend an eight-week apprenticeship at a DoN laboratory. Seven rising seniors were accepted into the program from local high schools. The apprentices studied explosive detection equipment; learned about warhead, shield and penetration mechanics, worked in rocket propulsion alongside CAD/PAD engineers, and received an abbreviated Green Belt Training lesson from the Continuous Process Improvement team.

NSWC IHEODTD connected with the next generation of scientists, engineers and warfighters with its STEM exhibit at the 2017 Charles County Fair in September. Internal support from the technical departments allowed the command to demonstrate and display EOD robots and tools, CAD/PAD ejection seat technology, inert rocket systems, X-ray technology and the Joint Modular Intermodal Container.

The command engaged with community and economic leaders at the Maryland Economic Development Association's fall conference at the Patuxent Naval Air



The fifth grade Model Rocket Club at J.P. Ryon Elementary in Waldorf, Md., launched their handmade model rockets in October. Volunteers from NSWC IHEODTD assisted in the facilitation of the club.

Museum in Lexington Park, Md., in October. Dr. Chris Wilhelm, NSWC IHEODTD's Customer Advocate for Science and Technology, helped lead this effort by giving the attendees integral knowledge and background into the government's Technology Transfer program.





The command participated in the opening of the Energetics Technology Center's Technology Transfer, Training and TechFire™ in the town of Indian Head, Md., in March. The space provides a place for organizations that want to do business with NSWC IHEODTD the opportunity to meet and collaborate in a convenient, easily accessible location.

NSWC IHEODTD signed a Cooperative Research and Development Agreement with Pacific Scientific Energetic Material Company in January. The CRADA focuses on development of an electronic time delay to replace existing pressed chemical column delays and small column insulated delay technologies. The agreement also includes cooperative research and development in additive manufacturing of cartridge actuated device components.

NSWC IHEODTD presented two displays showcasing the command's technologies and capabilities at the 2017 Print-a-thon in March. EOD Department Engineer Juan Roman-Sanchez presented specialized robot grippers that can be 3-D printed for new and replacement grippers on the Man-Transportable Robotic System, Talon, Packbot, and the Advanced

EOD Robotic System. Research, Development, Test and Evaluation Department's Research Scientist Sean Maharrey displayed additively manufactured explosive charges.

A Navy CRADA was signed between NSWC IHEODTD and St. Mary's College of Maryland in October. The objective of this CRADA is to develop processes supporting the advancement of inkjet printing technology for the solution deposition of inorganic materials for the purpose of fabricating electronic devices. At the conclusion of this agreement, the command hopes to demonstrate a successful transition of its current airbrush spray technology to an Inkjet deposition method, enabling the feature size of the devices and their overall area to be reduced.

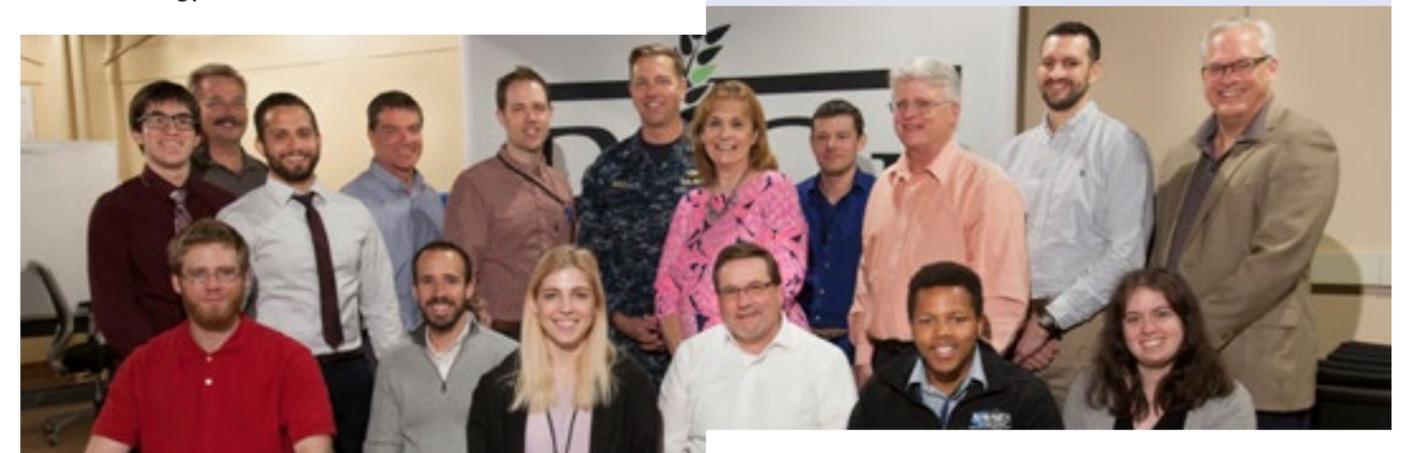
Velocity Lab



The Velocity Lab hosted its base-wide preview in September. The facility's modern floor plan is designed to support small design workshops, light prototyping and formal meetings.

A Partnership Intermediary Agreement was signed between NSWC IHEODTD and the Patuxent Partnership in December. The agreement aims to allow both parties to identify opportunities for small businesses and educational activities to utilize the technology available within the command.

NUWC Newport hosted an innovation event with NSWC IHEODTD and the U.S. Naval Reserve in April to focus on undersea weapons, autonomous vehicles, and energetic effects-to-mature-concepts for ultra-lightweight weapon development and undersea obstacle breaching.



Melt Cast Engineering Technician Carl Dixon pours explosive simulant into a patty sample mold. In the background, the NSWC IHEODTD Basic Ordnance Technology class attendees observe pouring operations.



Innovation Lab Lead Dan Pines (left) and Customer Advocate Office's Dr. Chris Wilhelm (right) discuss the concept of "agile thinking" during an innovation talk at the town of Indian Head's Black Box Theatre in January.



Dr. Aaron O'Toole, an EOD Department mechanical engineer, demonstrates the Man Transportable Robotic System Mk-1 Mod 0 to students at the 2017 DoD Lab Day at the Pentagon in May. The event featured multiple NSWC IHEODTD technologies and was coordinated to increase awareness of the programs and projects conducted in the DoD laboratories and Warfare Centers to senior defense leaders, Congressional staff, media and STEM students.

PATENTS TOTAL in 2017

Patent Number 9,594,012. SLIDING FRICTION TESTER FOR EXPLOSIVE MATERIAL.

Harold Sandusky, Joshua Felts

Patent Number 9,587,909. MODULAR DISRUPTER CANNON.

Dennis Askin, Lee Foltz and David Rivera Marchand

Patent Number 9,561,842. REMOTE CONTROL MINE NEUTRALIZATION DELIVERY SYSTEM.

Normary Camacho-Cardoza and Jean Pierre Ledee

Patent Number 9,638,504. WARHEAD FUSE.

Gerrit Sutherland and Harold Sandusky

Patent Number 9,701,442. GENERAL USE OF STRAPLESS PALLET.

Mark A. Heinrichs and Gregory Bender

Patent Number D 793,828. FLAT SIDED CHISEL SLUG.

Dennis Askin, Mike Del Signore, Jean Nelson, Catherine Eaton, Ed Taylor and Bhargav Shailesh Patel

Patent Number 9,784,541. INCREASED LETHALITY WARHEAD FOR HIGH ACCELERATION ENVIRONMENTS.

Kevin Genson and Edward Lustig

Patent Number: 9,819,016. CARBON NANOTUBE BASED COMPOSITE ELECTRODE.

Farhad Foroohar, Victor Bellitto, Vasant Shivran Joshi and Stanley Caulder

Patent Number: 9,829,296. EXPLOSIVE CONTAINER POSITIONING SADDLE FOR MUNITION DEMOLITION.

Dennis Askin, Lee R Foltz and Angel Diaz

To learn more about command patents, please visit:
<http://patft.uspto.gov/netahtml/PTO/search-bool.html>



Rear Adm. Tom Druggan, Commander, Naval Surface Warfare Center, presents Senior Intelligence Officer Kenneth Conley and Lead Scientist Carl Gotzmer the Scientific and Technical Intelligence Committee Certificate of Service and Appreciation during a September visit to the command.

The EOD Department's AN/GLM-11 Universal Test Set Team received a NAVSEA Excellence Award for the FY16 third and fourth quarter in January. The team traveled to 58 U.S. military facilities around the world and provided one-on-one training to more than 500 Air Force EOD and electronic warfare personnel. The UTS ensures mounted and dismounted Counter Radio Controlled Improvised Explosive Device Electronic Warfare systems used by joint service military personnel operating properly within the electromagnetic environment.

Energetics Manufacturing Department employees Tod F. Ricks, Kimberly C. Csanadi, Dr. Patrick B. Greer and Dr. David T. Boruta received the Warfare Center Innovation Award in March for their innovation in the chemical production development of C1-Diol in support of critical weapons systems. Research, Development, Test and Evaluation Department employee Robert Rast also received an Innovation Award for improved end-of-life predictive previous aging protocol for rocket motors, improving methods used by the command and the Navy.

Systems Engineering Department's Jerry Webster of the Systems Safety Branch received the Should-Cost and Innovation Award in April from the Under Secretary of Defense for his support to the Joint Light Tactical Vehicles Program Office.

Alfred N. Briggs, III, Technical Warrant Holder for EOD, received the DoN Superior Civilian Service Award in June. Briggs was nominated for his exceptional service, performance and dedication to his roles and responsibilities.

Systems Engineering Department employees Joe Pastorious, Jon Madejski and James Aquino were presented letters of commendation in July by NAVSEA Expeditionary Missions Program Office Program Manager Capt. Aaron Peters for their efforts on a Joint Urgent Operational Needs Statement for Counter Unmanned Aerial Surveillance which provided Joint CREW dismounted systems.

Cartridge Actuated Device/Propellant Actuated Device Acquisition Branch Manager Carol A. Kasterko received the DoN Meritorious Civilian Service Award in October. Kasterko coordinates and provides CAD/PAD item pricing and availability to sponsors including the DoD and other government agencies, foreign military sales countries, and private parties. Her team initiates and manages procurement actions, in-house production, re-work efforts, and testing as required. Kasterko was recognized for her vision to promote teamwork which has been instrumental in expanding the annual CAD/PAD production.



Roger M. Smith Team Award

Visco-Modification Team: Brian Schaffer, Brian Mason, Christopher Milby, Phillip Jones, Salil Mohan, Victor Bellitto and Zaeemuddin Husain (members are from both the Systems Engineering and Research, Development, Test and Evaluation Departments)

Project Manager of the Year

Kyle Foley, Systems Engineering Department

Lance Cpl. T. J. Honeycutt Award for Forward Deployed Service

Jared Spears, EOD Department

Command Award for Safety Excellence

Lester Leonard III, Energetics Manufacturing Department

Internal Customer Service Award

(Individual category) Kenneth Moore, Corporate Operations Department
(Team category) Cynthia Gilroy, Austin Garruba, Nathaniel Link, Courtney Thompson, Michelle Jones and Shannon Taylor with the Travel Administration Team, Employee Services Office

Equal Employment Opportunity and Diversity Award

Rutherford Taylor Jr., EOD Department

Dr. Horst Adolph Award for Outstanding Patent

Incendiary Devices Team: Steven Kim, Conan Schultz and Carl Gotzmer

Continuous Process Improvement

Michael Kelly, Systems Integration Department

Capt. H. E. Lackey Award for Community Service

Steven Possehl, RDT&E Department

A.J. Perk Outstanding Operator /Technician of the Year

(Individual category) Johnnie Hart, Energetics Manufacturing Department
(Team category) Francis Lange and Nicholas Schombs, Systems Engineering Department

Adm. Harold R. Stark Award For Innovation

Robert Rast, RDT&E Department

Joe L. Browning Award for Managerial Excellence

Bill Borgelt, Systems Engineering Department

Dr. George W. Patterson Award for Outstanding Accomplishment

John Cox, Systems Engineering Department

Robert B. Dashiell Award for Excellence

Richard Pence, EOD Department.

STRATEGIC PLAN

In 2014, NSWC IHEODTD Technical Director Ashley Johnson challenged command senior leaders with a vision: In 10 years, IHEODTD will grow 400 work-years stronger by reshaping our industrial complex; capturing research, development, test and evaluation opportunities in energetic systems; and providing reliable, quality and affordable products and services.

This led to two years of work for creating a strategy to accomplish that vision. Although the plan is still in its early stages of execution, significant strides were achieved in 2017.

Goal 1: Modernize, restore and/or reshape IHEODTD facilities, utilities and infrastructure to ensure mission achievement and fiscal sustainability.

Building on the results of a three-year business case analysis and infrastructure strategy plan, the command executed priority efforts in 2017, including:

- Demand for more rocket motor dissection capacity spurred an initiative to expand current facilities. Funding was provided for the design phase and the preliminary design review identified the project's basic requirements.
- The infrastructure division completed eight hazard analyses as part of the fire protection modernization effort, and a contract was awarded for design of modernizing the fire protection in five buildings.
- The Decontamination and Disposal Branch recycled 396,000 pounds of metal from the "Material Potentially Presenting an Explosive Hazard" sites. The branch also decontaminated an obsolete explosive operating building and prepared it for demolition.

Goal 2: Establish Public-Private Partnerships to enhance energetic materials and systems to support the fleet.

The command announced its partnership with Nammo Energetics Indian Head: the command's third Center for Industrial Technical Excellence partnership. CITE is a statutory authority allowing public-private partnerships to perform work related to the command's core competencies and allows the Navy to better maintain an organic energetics capability and manage under-utilized capacity.

Goal 3: Develop new products and services across IHEODTD core competencies to support strategic investments and to transition advanced warfighting capabilities.

The Customer Advocate Office restructured how it conducts business to help the command grow stronger by 400 work-years. Processes and tools were created to improve how the command pulls customer needs and pushes technologies to meet warfighter needs.

Goal 4: Establish IHEODTD as the energetic materials and systems provider of choice to protect the Navy's intellectual capital while expanding delivery of core products and services.

NSWC IHEODTD developed and implemented a business opportunity capture process and a capture review board for oversight. The 2017 Quality Metrics Customer Survey concluded with 91 percent of participants rating the command equal to or better than seven, on a 0 – 10 scale.

Goal 5: Invigorate interest in energetics to promote new RDT&E investment and the consideration of advanced energetics options within the capabilities development and acquisition process.

NSWC IHEODTD conducted a naval enterprise energetic assessment resulting in a naval energetics revitalization strategy. This is the first integrated, cross operational domain naval energetics science and technology strategy to align and focus resources on technologies needed to advance operational capabilities. The strategy identified 23



critical operational gaps requiring improved energetics resulting in recommended technology, organization and policy, and resourcing. The strategy also identified technology needs for energetics to align internal investments and anticipated Office of Naval Research and stakeholder technical development tasks.

IHEODTD continued progress to establish an on-base Velocity Lab to enable agile development, facilitate external partnerships, and retain/develop critical expertise. In 2017, the command:

- Conducted a "sneak peek" open house of the new facility.
- Hosted two innovation and technology transfer talks at Black Box Theater in Indian Head, Md.
- Signed an Education Partnership Agreement with College of Southern Maryland.

A new scouting tool was also developed for the workforce to share information, such as trip reports for business opportunities and technology discovers.

People Supporting Plan: Ensure IHEODTD's workforce is properly informed, aligned, trained, engaged, motivated and rewarded.

The Human Resources Office implemented an automated employee performance expectations tool

for the 2018 performance cycle in September. The Performance Expectations Module Tool allows additional visibility into employee contributions, providing a better understanding of their expectations and allowing them to document their accomplishments. The tool also assists managers in the creation, maintenance and rating of an individual's yearly performance expectations.

Progress was made to develop and implement a personnel acquisition program to anticipate organizational needs and acquire human capital to achieve the command's strategic goals. Internal processes were also improved and streamlined to make the recruiting process more efficient, resulting in an increase in the number of hiring actions executed within the 80-day goal.

Process Supporting Plan: Provide fast, rigorous, repeatable, accurate and safe work systems.

The 2016 Technical Rigor Revitalization architectural plan defined the path initiatives for a multi-year strategy to renew the command's focus and proficiency for the its technical execution process areas. The command established four technical rigor pillar programs for quality execution, safety execution, systems engineering and project management. Chartered pillar teams were formed and completed their baseline assessment of the command's current posture in early 2017, with the improvement plan approved in July. An initiative plan was also implemented for execution in August.

Indian Head University was established for the workforce to enhance specific proficiencies. The IHU construct establishes various "colleges." Technical Rigor established the College of Technical Excellence with the initial 100, 200, 300 and 400 courses needed to assure a proficient workforce. The first proficiency course was developed and executed for scientist and engineers who have been with the command for less than three years. Two weeklong courses were conducted for 80 participants in 2017 with an additional three courses planned for 120 in FY18.



Joint Staff, Energetic Materials Additive Manufacturing

Kevin Genson, Dr. Samuel Emery and Dr. Sean Maharrey discuss energetic materials additive manufacturing with representatives from the Joint Staff in January.



29th Commandant of the Marine Corps

NSWC IHEODTD Technical Director Ashley Johnson hosted the 29th Commandant of the Marine Corps, retired Gen. Al Gray (far right). Retired Marines Col. Thomas O'Leary (far left) and Lt. Gen. George Flynn were also on hand for the January visit.



Steven Schulze SEA-05 Executive Director

Outgoing Technical Warrant Holder for Explosive Ordnance Disposal Terry Briggs, discusses diverse technologies included in the EOD warranted technical area with Executive Director, Naval Systems Engineering Directorate Steven Schulze (left) in February while incoming TWH EOD, Michael Hollander looks on.

Chief of Naval Research Rear Adm. David Hahn

Detonation Scientist Dr. Forrest Svingala discusses the command's novel diagnostic equipment with Chief of Naval Research Rear Adm. David Hahn in February.





James Smerchansky
NAVSEA Executive Director

Research Physicist Dr. Samuel Emery discusses the command's ability to design and produce energetic materials by way of additive manufacturing with NAVSEA Executive Director James Smerchansky during his command visit in August.



Dr. Arun Seraphin and Dr. Anish Goel
Professional Staff Members of U.S. Senate Committee on Armed Services

Explosive Detection Equipment Chemist Chris Simms explains the explosive printing process to Professional Staff Members for the U.S. Senate Committee on Armed Services, Dr. Arun Seraphin (left) and Dr. Anish Goel (center), as Acting EOD Deputy Department Head Denice Lee looks on during their visit in August.



College of Southern Maryland Board of Trustees

The College of Southern Maryland Board of Trustees view additively manufactured samples produced at the command during their visit in August.

James Balocki
Deputy Assistant Secretary of the Navy (Installations and Facilities)

NSWC IHEODTD Technical Director Ashley Johnson discusses testing capabilities with Deputy Assistant Secretary of the Navy (Installations and Facilities) James Balocki at the Detonation Science Facility in August.





Rear Adm. Tom Druggan
Commander, Naval Surface Warfare Center
 Commander, Naval Surface Warfare Center Rear Adm. Tom Druggan speaks to the Tenets Recognition awardees, alongside NSWC IHEODTD Commanding Officer Capt. Scott Kraft and Technical Director Ashley Johnson in September.



Rear Adm. Michael Moran
Program Executive Officer for Tactical Aircraft Programs
 Engineering Technician Leroy Mason explains the cartridge actuated devices test set-up utilized for countermeasure cartridge testing to Program Executive Officer for Tactical Aircraft Programs Rear Adm. Michael Moran as Cartridge Actuated Devices / Propellant Actuated Devices Joint Program Office Director Paul McCafferty looks on in November.



Boyd K. Rutherford *Maryland Lt. Governor*
 NSWC IHEODTD Technical Director Ashley Johnson and Maryland Lt. Governor Boyd K. Rutherford discuss infrastructure and capabilities while touring command facilities in September.

Marine Corps Warfighting Laboratory Fellows
 RDT&E Department's Diagnostics Branch Scientist Dr. Jorge Castellanos describes the material-extrusion additive manufacturing process to Marines during the Marine Corps Warfighting Laboratory Fellows visit in October.





Warfare Center Leadership Meeting

NSWC IHEODTD hosted the Warfare Center Leadership Meeting in October. The biannual meeting brings Warfare Center leadership together to discuss policy, personnel and technical information.

Brig. Gen. Christian Wortman
Marine Corps Warfighting Lab Commanding General and Vice Chief of Naval Research

NSWC IHEODTD Technical Director Ashley Johnson discusses the advantages of densified propellant with Marine Corps Warfighting Lab Commanding General and Vice Chief of Naval Research, Brig. Gen. Christian Wortman in November.



Leadership Southern Maryland

The Leadership Southern Maryland Class of 2018 pose for a group photo during a December tour of the command.



Capt. Jamie Engdahl, Precision Strike Weapons Program Manager

Precision Strike Weapons Program Manager Capt. Jamie Engdahl presents Letters of Appreciation to command personnel instrumental in supporting the oil intrusion maintenance issues on under seat rocket motors in the Naval Aircrew Common Ejection Seat in March.



2017

YEAR IN REVIEW