

NAVAL SURFACE WARFARE CENTER INDIAN HEAD DIVISION



2023 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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Commanding Officer
CAPT Steve Duba

Technical Director
Ashley Johnson, SES

Public Affairs Officer
Matt O'Neal

Editor-in-Chief
Barbara Wagner

Associate Editors
Kristen Knott
Lillian Reese

Layout and Design
Matthew Getz

Photography
Matthew Poynor
Ashli Jernigan

Content Managers
Christina Dillon
Darlene Exum
Kristi Farrell
James Flamish
Jessica Gilroy
George Jones
Crystal Keyes
Anthony Knott
Marisol MacCheyne
Michelle Mandley
Heather Nottingham
Geoffrey Pink
Natasha Rummelhoff
Mark Sciaratta
Bernadette Wackerle

Glossary:	
CAD/PAD	Cartridge Actuated Device/ Propellant Actuated Device
CBRD	Chemical, Biological and Radiological Defense
DoD	Department of Defense
DON	Department of the Navy
ECMP	Energetics Comprehensive Modernization Plan
EOD	Explosive Ordnance Disposal
EODTECHCEN	EOD Technology Center
NAVAIR	Naval Air Systems Command
NAVFAC	Naval Facilities Engineering Systems Command
NAVSEA	Naval Sea Systems Command
NSF	Naval Support Facility
NSWC IHD	Naval Surface Warfare Center Indian Head Division
RDT&E	Research, Development, Test and Evaluation

Departments

EOD Dept.	D
Energetics Manufacturing Dept.	M
Systems Engineering Dept.	E
Systems Integration Dept.	G
RDT&E Dept.	R

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Stepping into the role of commanding officer of NSWC IHD, following the capable hands of CAPT Eric Correll in August, I have seen tremendous movement forward in a number of noteworthy initiatives whose foundations were laid and nurtured during his tenure. This year's Year in Review just scratches the surface of the major strides every department has made in getting after the mission. I am incredibly proud to be a part of the pivotal changes coming and the next generation results command personnel are accomplishing.

Every department at NSWC IHD has made notable strides and achievements in 2023 and within these pages are but a few of our accomplishments. I am proud of the major strides the command has made in just a few short months.

The command has continued to gain significant traction with its Energetics Comprehensive Modernization Plan (ECMP) at both the Secretary of the Navy, Chief of Naval Operations (OPNAV) and the Office of the Secretary of Defense levels. This strategic plan is pivotal for meeting the near-term requirements and laying the groundwork for next-generation munitions capabilities and in just the few short months I have been here I have been impressed with all our team has accomplished.

Command personnel from our Picatinny Detachment address real-time boots on the deck plates issues across the fleet, repairing and providing training for both U.S. and partner nation crews on the use and care of the equipment that is critical to the deterrence of UAV attacks in the Red Sea while our folks at our McAlester Detachment in Oklahoma provide depot-level repair and refurbishment and manufacturing support for multiple systems, along with lifecycle support and kitting support for the fleet. From Indian Head, Maryland, our folks serve as the heartbeat of the command, the core workforce of skilled operators, scientists, engineers, technicians and others who produce the materials needed to support the warfighter around the globe through manufacturing, research and development, testing and storing the materials needed to expand this nation's advantage over our



Commanding Officer Capt. Steve Duba

adversaries. Command personnel are embedded across multiple sites including Ogden, Utah; Crane, Indiana; Camp Pendleton, California; Rock Island, Illinois; Louisville Kentucky; Norfolk, Virginia along with several new locations added this year: San Diego, California, Yokosuka, Japan; and Rota, Spain. At nearly any given time of the day, personnel from NSWC IHD are providing the goods and services needed for our Sailors and Warfighters.

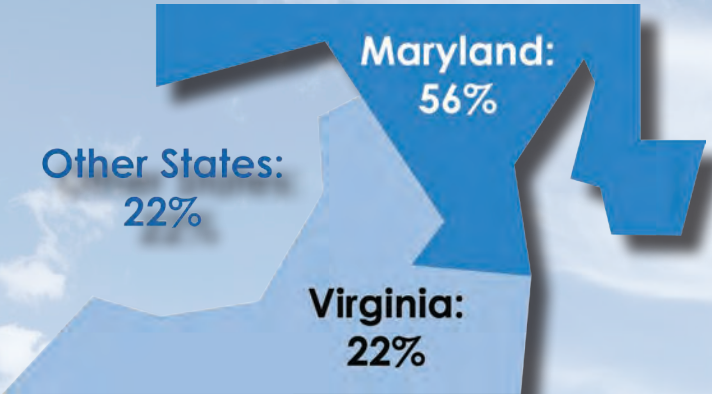
The "workforce behind our workforce," command Comptroller, Contracts and the Corporate Operations Department, provide division technical personnel with the resources and support needed to

successfully conduct business safely and on-time and ensures command's technical personnel are able to focus on mission first: flying father, hitting harder and saving lives.

I have only scratched the surface of all that the hardworking personnel from across the command and the globe have accomplished in 2023. I hope that you will enjoy the rest of the Year in Review publication and read further about the outstanding support they provide to our nation and our partner nation's warfighters. I look forward to being a part of this exciting time at the command.



Where We Live

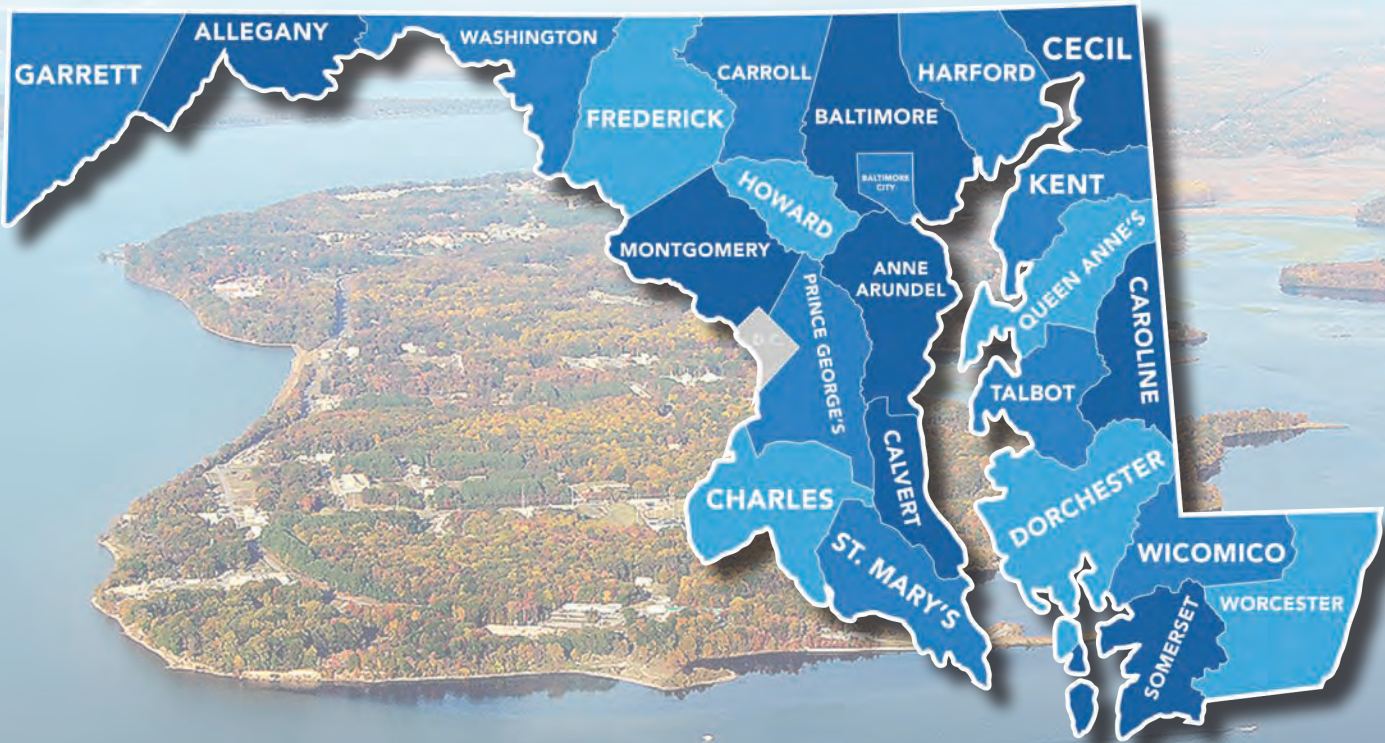


County-by-County Employee Breakdown (Maryland)

Charles	68%
St. Mary's	15%
Prince George's	9%
Calvert	3%
Anne Arundel	2%
Other	3%

NSWC IHD
Total Maryland Payroll
\$337 million

FY23 Maryland
Contract Dollars
\$37.8 million



STRATEGIC LOCATIONS

Total number of employees:
2,412 (civ), 63 (mil)
Other locations: 114

Ogden, Utah: 23 civilians
• Co-located at Hill Air Force Base
• CAD/PAD Air Force Integrated Product Team

Camp Pendleton, California: 7 civilians
• Demonstration and Assessment Team
• Assigned to D Department

Rock Island, Illinois: 4 civilians
• Quad Cities Caliber Cartridge Case Facility
• Aligned with G Department

Crane, Indiana: 3 civilians
• Design and construct portable armories
• Provide automation for front gates

McAlester, Oklahoma: 49 civilians
• McAlester Army Ammunition Plant

Indian Head, Maryland (two sites): 1,907 civilians, 63 military
• NAVSEA Center of Excellence (CoE) for Energetics
• DoD EOD program lead
• Expeditionary Exploitation Unit One (EXU-1)

Picatinny, New Jersey: 265 civilians
• Located at Picatinny Arsenal
• Joint CoE for Guns and Ammo
• Navy Package, Handling, Storage and Transportation, Guns and Ammo

Norfolk, Virginia: 28 civilians
• Demonstration and Assessment Team
• Guns Division
• CBRD

Louisville, Kentucky: 12 civilians
• Naval Guns



** Contractor numbers not included*

X-Bow's Bolt Rocket executes a successful launch in July 2022 using motor grains produced at NSWC IHD.



The command hosted a change of command ceremony at Naval Support Facility Indian Head, Md., Aug. 25 at which CAPT Stephen Duba relieved CAPT Eric Correll as commanding officer of NSWC IHD. Pictured: Incoming NSWC IHD Commanding Officer CAPT Stephen Duba addresses the audience at the change of command ceremony at Naval Support Facility Indian Head, Md., Aug. 25. Duba now oversees the DoD's largest full-spectrum energetics facility and the Navy's only public arsenal supporting the DoD and the nation's partners and allies.

Command Announces New Public Private Partnership with X-Bow

NSWC IHD announced a new public-private partnership (P3) agreement with X-Bow Launch Systems Inc. (X-Bow), following a formal signing on March 24. Under this 20-year agreement, the two organizations will work together to develop, qualify and manufacture propulsion systems for current and future needs. The effort will provide affordable, solid propellant rocket systems that meet strict performance requirements. The manufacturing activities will utilize NSWC IHD's existing industrial plant complexes and will help sustain key energetics manufacturing capabilities. This partnership will strengthen the ability of the DoD's industrial base to meet solid propellant rocket motor propulsion needs.

"[P3] partnerships leveraging existing capability and the transfer of federally developed technology can have a positive impact on the scientific research community, the commercial sector, the economy, consumers and the public," said NSWC IHD Technical Director Ashley Johnson.





The CAD/PAD enterprise supported the first NATO CAD/PAD Subgroup International Meeting (pictured above) hosted by NATO Supply and Procurement Agency near NATO Headquarters in Brussels, Belgium April 17-21. The event was held in conjunction with the 5th Air Battle Decisive Munitions Main Group, the 1st Countermeasures Sub-Group and the 18th Precision Guided Munitions Working Group subgroup.

After 17 years, more than \$90 million and thousands of man hours, NSWC IHD's Agile Chemical Facility (ACF) officially produced its first energetic material. The new facility was completed in 2022 and has the capability to produce nearly three times the amount of nitrate ester per hour than the command's original Moser Plant. The ACF can produce all six standard nitrate ester products which were historically produced in the command's continuous process nitration facilities over the past 60 years.



The NSWC IHD EOD Department's Battle Lab Division hosted its inaugural two-day technology exposition on May 22-23. The event showcased new technology and connected the EOD and physical security communities. Battle Lab capabilities including unmanned aerial vehicle (UAV) flights, explosives tests and completed evaluation briefings were highlighted. Topics from briefs discussed include: bulk standoff identification, rapid area detection and U.S. Customs and Border Protection support. Pictured: Battle Lab Division EOD Technology Assessment Branch Manager Owen Burns (far left) and other attendees learn about the products Tomahawk Robotics offers.



The United States is at a critical point, as it urgently sustains and strengthens deterrence with China while also collaborating to counter Russia's unprovoked invasion of Ukraine. Recent reports conclude that the Navy's ability to sustain combat operations is at risk. The conflict in Ukraine and naval weapons delivery delays further highlight the capacity and capability limits of the munitions industrial base (MIB).

DON is focused on wartime preparedness and increasing the capability, capacity and readiness of the fleet. In FY 2022, an exercise was commissioned to identify ways to deliver munitions faster. The deputy assistant secretary of the Navy for (DASN (RDT&E)) requested an ECMP to mitigate backlogs and modernize the DON arsenal infrastructure to meet wartime requirements.

The Navy is using an all-hands-on-deck strategy to bolster its munitions capability and capacity. As a foundational layer to the MIB, NSWC IHD advances state-of-the-art technology, bridges the gap between private sector capacity and national munitions requirements, and stewards core expertise and capabilities as the Navy's expert and trusted advisor in this field.



The ECMP will restore the command infrastructure at NSWC IHD. It will help advance an arsenal that is safe, agile, resilient and ready to provide the capabilities and capacity required for wartime preparation, surge and replenishment.

After the ECMP was developed, NSWC IHD hosted an Industry Day to address construction, architecture and engineering needs with local contractors on Nov. 1 at the College of Southern Maryland's Velocity Center.

"There is literally no where in the country that does all

the things done at Indian Head Division," Commanding Officer CAPT Steve Duba said while speaking to the contractors. "That makes us really special."

The warfare center has been heavily involved in ordnance manufacturing since its designation as the Naval Powder Factory before World War I. NSWC IHD has a rich history of advancing state-of-the-art naval munitions and providing advantage to naval warfighting capabilities.

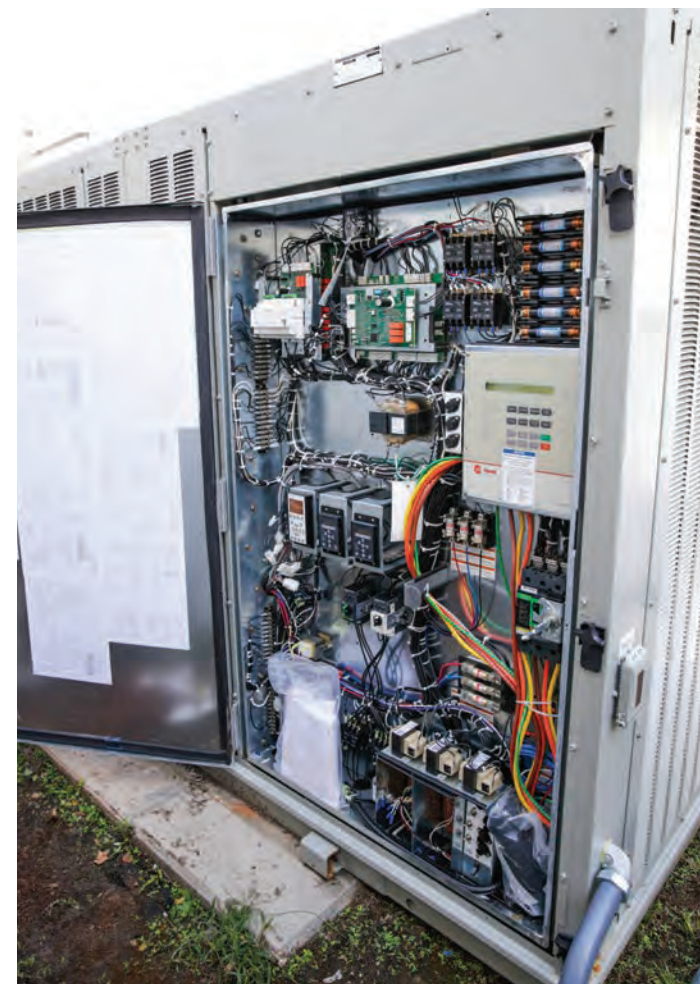
"The Department of Defense is being asked to do something that we haven't done since before the global war on terrorism—and that's getting back to an environment of deterrence," former ECMP Project Manager Jim Sherman said. "That means continuing to advance the readiness, capacity and capability of naval munitions. The Navy's commitment to this modernization plan provides the foundation to achieving this."

More than 50 organizations interested in doing business with NSWC IHD attended the event. Business leaders were briefed by Duba and Sherman. Pamela Minor, a procurement specialist from the Maryland APEX Accelerator, also gave a presentation. MDAPEX Accelerator provides small business counseling to Maryland-based small businesses in the government contracting arena.

Greg Simmons, director of infrastructure, addressed attendees about the rationale behind the infrastructure revitalization effort.

"The architectural and engineering work taking place this year and next year are feeding the construction efforts we'll be taking on over the next decade," Simmons said at the event. "We need new business partners more than we ever have before."

"That is why we invited you here today," Sherman added. "We have over 500 modernization projects planned between now and 2032. This effort is going to make a generational impact—not only for Charles County, but for southern Maryland, the state of Maryland and the entire nation."



MOLECULE TO MISSION (CREATE)

In the 2023 Commanding Officer/ Technical Director Annual Guidance, Molecule to Mission (CREATE) was identified as one of three areas the command has focused on in furthering the NSWC IHD mission of outpacing the adversary. CREATE's collaborative and integrative nature allows for innovative deliverable solutions and increased combat capability. Departments across the command contributed to the physical components, working plans or collaborating to create executable contract actions.

CBRD Erectable Decontamination Station Demo Onboard The USS Arlington (LPD 24)

D Department honed ways to protect the warfighter onboard, underway and in the field. CBRD Division Protection and Integration Branch demonstrated an Erectable Decontamination Station (EDS) aboard the USS Arlington (LPD 24) in March at Naval Station Norfolk in Norfolk, Va. The prototype showcased the inflatable air beam structure. Branch manager Anton Fionov said the EDS technology compliments the ship's existing decontamination station and increases the ship's overall CBR survivability. "It's kind of an expeditionary capability that can be quickly deployed and erected so more folks can be processed during a CBR event," Fionov said. Pictured: RDT&E Department's CBRD Division's Protection and Integration Branch mechanical engineers Michael Neal (left) and Ben Friedman (right) demonstrate the EDS on board the Arlington.



EWD is an Innovator in Motoring Warfighter Health

Dr. Prabha Dwivedi and the CBRD Laboratory Science Branch continue to lead efforts developing the In-Ear Wearable Device (EWD) for additional warfighter monitoring. The EWD is a minimally invasive, wearable sensor that provides early indications of physical impairment. The work of Dr. Dwivedi and CBRD Laboratory Sciences Branch supports the Defense Threat Agency/Joint Science and Technology Office (DTRA-JTSO), a more than \$3 million multiagency technology development effort. EWD is a collaborative project with Arizona State University, Naval Health Research Center and U.S. Army Combat Capabilities Development Command Chemical and Biological Center. The EWD was tested by members of the Phoenix Police Department Bomb Squad at Arizona State University in Phoenix, Ariz., for a field operation monitoring physiological signals of bomb technicians during training.

Dwivedi's EWD is a lightweight, modular, self-contained, battery-operated and physiological-sensing device for monitoring a service member's health in real time in all conditions, including on the battlefield. The system consists of an ear-wearable sensor system integrated with an air quality and radiation detection system. These systems measure physiological signatures such as heart rate, blood oxygen level, core body temperature and environmental indicators like chemical and radiological environmental toxicity. Algorithms for adverse event sensing will be programmed in the EWD and integrated with data storage to provide remote monitoring capability via an Android Tactical Assault Kit, or Android Team Awareness Kit (AKAT)-compliant wireless data transmission, a data acquisitions system that controls and operates the device by collecting, analyzing and storing data from the user wearing it.



In 2023, the U.S. Army awarded a \$2 million Small Business Innovation Research Program Phase II grant to TDA Research Inc. to further mature the sensors into a fieldable product. Under Dwivedi's direction, TDA Research Inc. and ASU Research Enterprise developed a modular, wearable, open architecture sensor with two high technology readiness level sensors integrated: TDA's sweat patch (SP) and the NSWC IHD/ASU's EWD.

The integrated SP-EWD can detect biomarkers in sweat such as sodium, potassium, chloride, pH, lactate, cortisol, oxygen saturation, inertial motions, orientations, temperature, breathing rate, heart rate, hypoxia, fatigue, spatial disorientation, excessive sweating, muscular distress, environmental toxicity and more. The device can also be configured to provide haptic feedback through the SP and audible alerts in the EWD. The integrated SP-EWD will also have the capability to send the physiological status of the warfighters to the command center and can be integrated with the ATAK system as required. A medic can view the live data and detailed analysis post process for subsequent intervention. In the Phase-II effort, the team will collaborate with Army Combat Capabilities Development Command and Naval Health Research Center to focus on heat injury prevention and microclimate control. The integrated SP-EWD will detect the onset of heat exhaustion or injury and provide the information needed to run a close-loop control of the wearable cooling system.

G Department Collaborates to Provide CIWS Support

G Department's Self Defense Systems Division collaborated with NSWC Philadelphia Division to provide SeaRAM parts to support the close-in weapon system (CIWS) production line. Due to a manufacturer's inability to procure SeaRAM isolator covers to meet the mid-September delivery of the system, Self Defense System Engineering Branch engineers reached out to discuss additive manufacturing options to provide the parts.

Engineers and financial personnel worked to provide Naval Air Warfare Center Aircraft Division Lakehurst with support to quickly turn around manufacturing and were able to produce the required quantity to meet mission requirements.

R Department Personnel Field Test RIG at Blossom Point

R Department was responsible for preliminary field testing of the ruggedized imaging gauge (RIG) at Blossom Point Research Field in Welcome, Md., in April. RIG is an imaging system that uses an optical fiber bundle of more than 12,000 individual fibers. The system images challenging and violent environments by transmitting the image to a high-speed camera in a safe location. During testing, an additional high-speed camera was placed above the pool to evaluate the test from a large field of view. The pool tests demonstrated the ability to conduct underwater explosive shock testing of lab scale explosives using cost-effective, commercially off-the-shelf parts. Future pool tests will include pressure transducers and an improved RIG system.



Technology Experimentation and Characterization Field Trials on the Potomac River Test Range

RDT&E Department employees from the CBRD Laboratory Sciences, CBR Detection and CBR Fleet Support Branches supported the Technology Experimentation and Characterization Field Trials (TECFT) on the Potomac River Test Range (PRTR) at NSWC Dahlgren Division (DD) during the week of July 17-21. The event was a collaboration between the office of the Deputy Secretary of the Army, Test and Evaluation Dugway Proving Ground, NSWC DD, the Navy's Operational Test and Evaluation Force and NSWC IHD. TECFT provides a testbed of fully refereed outdoor chemical and biological simulant/surrogate releases in the operational environment that allows DoD, other government agencies, industry, academia and foreign partner customers to bring their technologies and collect technical data on their performance. TECFT 2023 Potomac was held in a littoral environment on the PRTR for the first time with all the simulant/surrogate releases occurring over the water. Customers from Department of Homeland Security and U.S. Army Combat Capabilities Development Command Chemical and Biological Center placed their technologies on a floating platform moored in the middle of the Machodoc Creek and collected data over five nights of testing. In addition, the event furthered the Navy's understanding of conducting testing in littoral environments and will help improve our ability to conduct these types of tests in the future.



NISE Submission for Spiral Antenna Improves Detection Effectiveness

Dave Rohde, sensor technologist for the EOD Department's Detection & Diagnostics Engineering Branch, submitted a Naval Innovative Science and Engineering (NISE) proposal for the design and development of a reduced footprint, spiral antenna for ground penetrating radar systems. The intent of the new antenna design is to allow more effective unexploded ordnance (UXO) and improvised explosive device (IED) threat detection on mounted manned or unmanned aerial systems. The NISE effort has spanned several years and has been very successful through an iterative design, develop and test process. Working with the University of North Dakota, Rohde has made advances in the antenna design. The EODTECHCEN machine shop constructed the prototype designs and made modifications as necessary. The branch's radio frequency subject matter experts also tested the performance of the system in the department's anechoic chamber. Rohde developed a technical paper, "Wideband Hybrid AMC Antenna Reflector", that was accepted by the Institute of Electrical and Electronics Engineers for presentation

at the 2023 International Symposium on Antennas and Propagation, July 23-28 in Portland, Ore. This effort is an example of how innovation allows the EODTECHCEN to develop prototypes to address gaps, rapidly develop systems and come up with better solutions for the EOD technician.

Huge Strides for Command's Manufacturing Department in Collaboration and Innovation

The command's M Department Product and Process Scale-up and Manufacturing Technology Division, in collaboration with National Nuclear Security Administration (NNSA) and Lawrence Livermore National Laboratory, has initiated a three-year project to manufacture insensitive high explosive formulations for strategic systems in support of national security for both DoD and Department of Energy. Multiple facilities will be renovated by August 2026 for pilot-scale synthesis of triaminotrinitrobenzene (TATB), an insensitive high explosive that is blended into molding powders for use as a primary explosive in various U.S. stockpile nuclear weapons. This synthesis facility will leverage existing infrastructure and capabilities within NSWC IHD's M Department, including the adjacent Agile Chemical Facility's spent acid waste handling and state-of-the-art control room. The division highlighted key advancements planned for this facility, including automation to improve the consistency of end-product quality. This capability services the need for NSWC IHD's formulations for strategic systems and addresses a lack of capacity in the defense industrial base to meet the demands of the Navy and other DoD organizations. NNSA is leveraging the command's Chemical Process Research & Development Laboratory to explore important aspects of the TATB synthesis process.

The M Department's Energetics Development and Engineering Branch manufactured custom modified Extended Range Mortar Ammunition (ERMA) propellant and provided engineering support for the propellant design and charge weight assessment conducted as part of the recent low-cost air-dropped munition Gun Launch Test #1 at U.S. Army Yuma Proving Ground, Yuma, Ariz. The ERMA propellant formulation was modified as part of an ongoing Joint Enhanced Munitions Technology Program (JEMTP) effort leveraging more than a decade of prior related work sponsored by Office of Naval Research (ONR), JEMTP and IMAD to develop high energy density, yet insensitive, mortar propellant formulations for extended range and other advanced (i.e. guided) mortar systems. This test event was the first system-level demonstration of the modified ERMA propellant formulation and the results exceeded expectations, delivering a nearly 30% increase in performance.

STRENGTHEN THE NAVY'S ARSENAL (PRODUCE)

As the Navy's only arsenal, this second aspect of the CO/TD Guidance, "Strengthen the Navy's Arsenal (PRODUCE)," is about delivering combat capability. Whether we directly provide products and services such as CAD/PADs, rocket motors, explosive grains or support others who do, NSWC IHD is a world leader in energetics manufacturing. We are improving readiness and increasing the output of goods and services our warfighters rely on.

EOD/EODTECHCEN Collaborations Provide Warfighter Solutions

AN/PDX-2 Project Lead Scott Hepp met with representatives from PMS-408, Navy Expeditionary Combat Command (NECC) and EOD Groups (GRU) 1 and 2 to identify systems that needed repair and calibration. Specifically, 15 systems from EOD GRU 2 were submitted under the Navy's casualty reporting process, indicating that there are equipment limitations that could potentially affect readiness. The EOD Systems Division AN/PDX-2 team worked with users, the Navy's Calibration Laboratory, PMS 408 and NECC to identify more cost-effective options for continued support. In addition, the 15 CASREP items were replaced by updated kits and Fleet Liason Navy Detachment delivered them to GRU 2 to avoid shipping costs. Working as a team, NSWC IHD EODTECHCEN representatives engaged with EOD end users and stakeholders to provide innovative solutions to maintain field readiness within a matter of days.



Dynamic System Mechanics Advanced Simulation Training Event

The Systems Engineering Department's Weapons Effects and Analysis Branch conducted a Dynamic System Mechanics Advanced Simulation (DYSMAS) training event. DYSMAS is the Navy's premier high-fidelity hydrocode that provides detailed characterizations of primary weapon effects against structures, including underwater explosions against ships, buried mine characterization and hypersonic weapon engagements. The utility of this code has expanded

beyond its initial mission to characterize weapon effects in maritime environments and is now used by various communities across the DoD to assess implosions, ground vehicle vulnerability to IEDs and nuclear weapon damage, among others. DYSMAS has over 300 active users, and the user base is rapidly expanding as it is brought to new agencies. The event was the largest training event ever held, representing five U.S. government agencies, two U.S. government contractors and two partner agencies from Germany. DYSMAS is maintained by members of the Weapons Effects and Analysis Branch in partnership with the Republic of Germany through a long-standing project agreement. During the training, students received in-depth training about software with direct supervision from Weapons Effects and Analysis Branch analysts. They also had the opportunity to present and work through scenarios from their agencies. The student engagement provided valuable insights, discussions for collaboration opportunities and valuable feedback for the instructors and developers.



The G Department's Self Defense Systems Division collaborated with the U.S. Army machine shop to manufacture CIWS label plates (pictured left) that were needed for system installations by the end of fiscal year. The effort required personnel from across the division to provide engineering, production and financial support. The task was accomplished on time, and the Army was able to produce 10 label plates right at the end of September.



Enhanced Maritime Biological Detection

CBRD Division team members stepped up to meet the requirements of external sponsors in every sense of the word. The team's efforts included meeting requirements and overcoming challenges during the development, acceptance and fielding of the new Enhanced Maritime Biological Detection (EMBD) system upgrade kit to the shipboard Joint Biological Point Detection System (JBPDS). Employees from the division's CBR Detection Branch and CBR Fleet Support Branch came together for reverse engineering of critical components for EMBD new ship system builds and to develop and award a contract with the system manufacturer to procure critical parts needed for system builds. Thinking outside the box, the team developed a whole-system test stand and implemented processes and procedures to perform whole-system acceptance testing. Not only did the team have to deal with the current system issues, they identified a solution for legacy JBPDs obsolescence parts. While working with U.S. Army Combat Capabilities Development Command Chemical and Biological Center and the manufacturer the team used the command's Naval Energetic Systems & Technologies Other Transaction Authority process to work new parts as well as solve both repair and sustainment issues in the field.

During this past year, the cross-departmental team accomplished EMBD Basic Bio Safety Unit (BBSU) and system builds for new ship construction and delivered ten systems to littoral combat ship (LCS), guided-missile destroyer (DDG), landing platform dock (LPD) and multi-mission surface combatant ship classes. In addition, the team completed the test acceptance procedures, developed and built the test acceptance stand and performed test acceptance for seven of the new EMBD system upgrade kits. Due to the expertise and diligence of the team, they identified several critical system defects during the acceptance testing, which allowed issues to be resolved prior to fielding the system to the fleet.

Despite the many hurdles that plagued the effort the team worked together and was able to meet Initial Operational Capability (IOC) for EMBD, which was defined as 16 ships completed by the end of March 2023. Despite countless issues and the first operational system being delivered from the manufacturer six months later than expected, IOC was met within seven months—almost half the time originally allotted by the Capability Development Document.



Smart Arsenal

In 2023, a team from R Department and Corporate Operations Department established a robust connection network starting with production processes and supporting facilities, leveraging the transformative capabilities of 5G technology to modernize communication and data collection at the Navy's public arsenal, aligning with critical technology areas. The implementation of 5G technology at NSWC IHD will revolutionize the command's communication and data collection, providing the speed, reliability and real-time connectivity to ensure a competitive edge while maintaining operational efficiency. When complete, end users will witness significant advancements in three critical operational domains: production data collection industrial monitoring, energetics inventory and transportation management.

M Department Production Levels Back on Track

The M Department's CAD/PAD & Extruded Products Division successfully extruded four lots of Mark 90 grains for the first time since restarting production in 2012 and delivered over 30,000 of those to support the U.S. Army Joint Attack Munition Systems, Aviation Rockets Small Guided Munitions Product Office and Tactical Aviation and Ground Munitions Project Office. The Mark 90 Propellant Grain is the primary energetic source for the Hydra 70 system, 2.75-inch fin stabilized unguided rocket. The delivered quantities are managed by the Army to support Army, Navy and Marine Corps requirements. Reducing delivery time was an enormous effort with collaboration from RDT&E Department's Energetics Evaluation Division, Energetics Manufacturing Department's Industrial Support Division, Contracts Department's Contracting Division, Corporate Operations Department's Infrastructure Division and Property Management Division's Purchasing Requisition Branch. The groups were major contributors to many of the department's successes in 2023.

The CAD/PAD & Extruded Products Division successfully organized and executed manufacturing operations to deliver 1,680 Ejection Sequence JAU-8/A25 initiators to the U.S. Navy, U.S. Air Force, Air Force Foreign Military Sales (FMS) and private party users. The initiators provide the initial gas pressure to start the Aircrew Common Ejection Seat (ACES) II ejection sequence. The Cartridges, Igniters and Primers Branch and CAD/PAD End Items Branch manufacturing teams substantially compressed the overall lead time for the project by procuring non-energetic parts in advance.



M758 (JAU-8/A25) U.S Air Force (ACES II) Initiator

The CAD/PAD & Extruded Products Division and Explosive & Energetics Division successfully organized and executed manufacturing operations to deliver 264 total Mark 122 Mod 1 parachute deployment rocket motors. The Mark 122 Mod 1 parachute deployment rocket motor extracts and deploys the main personnel parachute (pictured next page) on Martin-Baker SJU-17/A series ejection seats used on U.S. Navy EA-18G, F/A-18A/C/D/E/F and T-45 aircraft during the ejection sequence. This modification extends the installed service life of the Mark 122 from 24 to 84 months, substantially reducing required change outs and aircraft downtime.



Naval Aircrew Common Ejection Seat (NACES) SJU-17/A

various joint force bombs. Process improvements significantly increased production rates and the scale-up team is preparing to add capacity by moving the process to NSWC IHD's largest production mixer and adding a solvent recovery system. This new process reduces material touch time, increases the safety and efficiency of the operation, and reduces the environmental impact.

Departmental Collaboration Key to Production

NSWC IHD's E, M and R Departments conducted a ballistic ordnance assessment test on Mark 70 boosters with the goal of extending the service life to meet fleet training and readiness needs. The Energetics Manufacturing Department currently modified it into the first stage booster for NAVAIR Naval Air Aerial Targets Program Office supersonic sea skimming missile target GQM-163 Coyote. NSWC IHD initiated a manufacturing project for a new Mark 70 Booster for the Coyote Missile, but a service life extension is critical to extending the life of current inventory and meeting the fleet's need in the interim. The departments along with the Ordnance Assurance & Safety Office and the command's Quality Director conducted a Test Readiness Review to determine the risk was low and the planned testing would meet required objectives.

The Industrial Support Division completed a months-long upgrade of the 150-gallon vertical mixer, which is used by the Explosives and Energetics Division to produce propellants and explosives used in a variety of ordnance items manufactured at NSWC IHD. The upgrade replaced an obsolete control system and key hydraulic support systems. The new control system uses state-of-the-art programmable logic control and human machine interface technologies resulting in increased safety due to implementation of robust safety interlocks and improved sensor technology.

M Department's Industrial Services Branch is the designated Depot of Record for the Tomahawk Cruise Missile Program (PMA-280). In 2023, the shop provided manufacturing support for Tomahawk Ordnance Handling Equipment as well as Mark 23 Tilt Fixture, Mark 189 "KIT A," Mark 3 Strong Back, Mark 4 Strong Back, Mark 6 Strong Back, Mark 14 Weighted Trainer and several slings. It also provided abrasive blast, painting, welding repairs, weight test and manufacturing support for items refurbished by the Weapons Maintenance Branch. The Industrial Services Branch also manufactured three Table of Allowances for PMA-280 in support of the U.S. Marine Corps, U.S. Army and the Navy Expeditionary Logistics Support Group, which are necessary to support the customers with additional Tomahawk Missile capabilities. The shop produced over 70 carts including the Mark 90 grain carts (local ordnance handling equipment), enabling required throughput in the Extrusion Plant for the Mark 90 grain.

On February 28, twenty-eight Mark 152 warheads successfully completed Lot Acceptance Testing at the Yuma Proving Grounds, Yuma, Arizona, enabling release of 3,170 total units to support PMA-242 FMS and foreign allies. Four additional lots have been funded, with more planned beyond FY24.

On June 22, the Explosives and Energetics Division mixed and cast 5,420 Anti-Structural Munitions (ASM) grenades, the highest quantity cast using the 420-Gallon Vertical Mixer. The ASM grenade is used for the U.S. Special Operations Command bunker busting activities and clearing fields for helicopter landing and take-off operations. The Energetics and Explosives Division restarted production of a casting powder used in

WORKFORCE FLEXIBILITY AND AGILITY (ADAPT)



NSWC IHD Infrastructure Division Director Greg Simmons (left) and NAVFAC Deputy Public Works Officer James Thompson representing NSWC IHD's Infrastructure Division and CNIC/NAVFAC respectively are partnering to share workspace in two neighboring facilities.
(U.S. Navy photo released)

The final leg in the command's three-part guidance is about strengthening the command team, adapting to the demands of today, and preparing for the demands of tomorrow. These strategic imperatives remain pivotal to our operations, and the command has demonstrated throughout 2023 how adaptability and agility have allowed it to succeed on many fronts.

NSWC IHD Infrastructure Division collaborated with Commander, Navy Installations Command (CNIC)/NAVFAC through facilities SRM program funding to renovate two buildings allowing all Infrastructure Division operations staff to consolidate under one roof. The remodeled building will provide the space necessary to perform inspections, testing and maintenance of grounding, bonding and lighting protection systems, as well as heating, ventilation, air conditioning and fire alarm systems. Instead of conducting repair work in the field, personnel will now have bench space for service ticket repairs, small project construction, woodworking and metal bending. The facility will also allow Infrastructure to store its materials including bench stock, field equipment, lifts and fall protection gear. NSWC IHD will fund repairs for both CNIC/NAVFAC-owned buildings, allowing the command to house its entire operations staff under one roof and improve working conditions for NAVFAC personnel.

Through its Data-Driven and Intelligent Systems (DDIS) Team, the Energetics Technology Division is leveraging artificial intelligence (AI) and machine learning (ML) to promote succession planning within the Systems Engineering Department. Following a self-assessment that revealed nearly 25% of the branch’s employees expect to retire by 2028, knowledge management and retention quickly became significant topics.

“More than 40% of our personnel have less than five years of NSWC IHD experience,” E Department Deputy Department Head Marci Mouer said. “We have lots of paper and electronic documents, which have not had a consistent mechanism for easy access and retrieval.”

“We plan to leverage this MI/AI work to mitigate the knowledge management gap, help enhance employee development and ultimately improve our succession planning when employees leave the organization,” Mouer added. The era of emerging strategic competition supports the need to ensure corporate knowledge is retained and has greater accessibility.

DDIS is leveraging state-of-the-art Large Language Models (LLMs) to provide AI-powered solutions to Indian Head. These LLMs are the same technology that powers ChatGPT and have the capability to generate detailed responses to questions and write poetry, summarize articles and aid in learning a new language.

DDIS Team Lead Mark Cavolowsky said his team uses LLMs to provide a chat-based interface to all of the command’s technical information. “Think about accessing technical reports, status briefs and financial updates; anything shared in our Microsoft Team’s channel, all at your fingertips and from an easy-to-use chat interface. That’s what we’re trying to put together here as part of this knowledge management solution,” Cavolowsky said. The tool will not replace NSWC IHD’s employees but is being used to augment the ability of the workforce.

Computer scientist Michelle Wheatley applauded LLMs’ ability to not only provide the relevant information, but a link for further details. “It’s a lot of Systems Engineering Department data and right now, we are hoping to be able to answer questions such as: ‘What is a primary explosive?’ ‘What is a safety hazard analysis?’ or ‘What are the requirements Military Standard 1316?’ But we’ll expand and make it better.”



The E Department expects that once the technology is leveraged effectively, it will be extended to the rest of the command. The objective is to utilize AI internally to help the arsenal accomplish its mission and externally to solve the challenges that the warfighters face daily.

G Department’s Self Defense Systems Division hosted a visit from Petty Officer Stephanie Horswood from the Royal Australian Navy (pictured left). In order to prepare for her transition to become the instructor at the Australian Schoolhouse for the CIWS system, she visited Picatinny, N.J., to meet the CIWS in-service engineering agent (ISEA). She also toured the facility, met with key personnel to understand the organizational structure, received software and unmanned aerial vehicle mode training and discussed RAN issues that require assistance.



Command’s Security Office Stands Up New CAC Office

At Naval Support Facility Indian Head, in the past the only option was a trip to the CAC office outside the base gate. That is until Security Director Bill Gregor arrived at the command. Gregor came to the command from NSWC Dahlgren Division where he was responsible for its CAC office. He recognized the benefits of having an office readily available for command employees and pitched the idea to the command leadership. Noting the delays and issues command employees were having with CAC appointments, senior leadership asked Gregor to explore the idea for the command in late 2021. A plan began taking shape in 2022, and the Security Division worked diligently to make a command CAC office a reality. In August 2022, with support from the Infrastructure Division, Corporate Communications Division, ACIO/IT Division and the Corporate Business Office Division, an under-utilized portion of building 1601 was renovated and by February 2023, the CAC office was opened to the workforce.

R Department’s CBRD Division Provides Worldwide Support

Members of the command’s CBRD Protection and Integration Branch traveled to Redzikowo, Poland, to inspect and evaluate several mission-critical protection systems at the Aegis Ashore Missile Defense Site. The team conducted System Operation and Verification Testing in April and May 2023 and provided specialized trainings to on-site personnel. The team developed procedures for validating the protection systems and returned to Poland in June to support the Board of Inspection and Survey’s (INSURV) official assessment of the site’s capabilities. The NSWC IHD team led large portions of the damage control demonstrations and greatly contributed to the overall success of INSURV. In July 2023, the team traveled to Deveselu, Romania, to carry out mission-critical tasks at a second Aegis Ashore Missile Defense Site. Together, the groups completed important installations and performed testing to validate the operability of the systems.

The Chemical, Biological, Radiological and Nuclear Defense (CBRND) electronic library was built within the “My Navy Portal” to provide Navy officers, Navy enlisted and Navy civilians an electronic repository to search for all types of CBRND information. The electronic library’s goal is to provide as much current information to the fleet as possible in real time. All CBRD commodity pages are updated with the date and the point of contact so questions and comments can be reviewed and responses sent back. This page provides a repository for the warfighter and technical staff to gain information within referenced documents, messages, videos, interactive tools, new equipment, useful links, new hot items and ask the expert pages. The CBRND electronic library is the type of agile, real-time support the fleet requires to effectively outpace the adversary.



Chemical Weapons Convention Challenge Base Prep Team during the Challenge Inspection Training Exercise at NSWC IHD, June 6-8.

NSWC IHD is recognized by NAVSEA as the lead organization for CBR Defense. In 2023, the CBRD Protection & Integration Branch was able to provide substantial support to the 5th & 6th Fleets Area of Responsibility including Manama, Bahrain and Rota, Spain, as well as Aegis Ashore locations in Romania and Poland. Positioning personnel at key locations worldwide is essential to the fleet and essential to the CBRD mission as NSWC IHD maintains and develops its large portfolio of sponsors.

The Transportation & Magazine Branch was created to support the Energetics Manufacturing Department's manufacturing, Consolidated Stock Point and other command departments, resolving some of the issues associated with contract carriers, including no-shows and drivers who are not properly credentialed to move certain materials. Bringing this branch into readiness required standing up local and off-station hauling (inert/explosives), driver training, an off-station standard process and procuring/outfitting vehicles with needed equipment. The ability to transport between locations improves use of space at NSWC IHD and supports the increasing workload. The branch partnered with Strategic Planning to establish a process for moving missiles, missile support equipment and reentry components to facilitate transporting time-sensitive shipments, e.g., nuclear weapon related materiel, ordnance, HAZMAT, precious metals and classified material. These conveyances will transport Fleet Ballistic Missile (FBM) cargo from/to the following FBM facilities and affiliated locations: NSWC IHD, NSWC Crane, Lockheed Martin Valley Forge, Lockheed Martin Titusville, Strategic Weapons Facility, Atlantic and Cape Canaveral Space Force Base.

NSWC IHD hosted the Chemical Weapons Convention (CWC) Challenge Inspection Training Exercise (CITE) from June 6-8. This event fulfills the DoD requirement for the DON to plan and execute annual CWC CITEs. The Navy Treaty Implementation Program (NTIP) is the designated Navy authority to ensure compliance with the CWC Treaty, which states that no one is allowed to create or manufacture offensive chemical weapons. Any of the countries in the treaty can challenge another country if they believe they have violated the treaty. The accused country/command will be inspected within 72 hours of the official accusation. If one of our Navy commands is the focus, NTIP generates a Tiger team, which consists of personnel from numerous Navy commands to assist the specified command in the inspection. This event is conducted to ensure the Tiger team is properly prepared if and when the need arises.

EOD Department leadership participated in an off-site to discuss SECNAV Instruction 5410.118 establishing the department as the EOD Technology Center, what it means to NSWC IHD, and tie it back to the command's strategic thrust areas and NAVSEA's "Get Real Get Better" initiative, June 14-16. The team has been working on a dedicated funding request effort to become a proactive Technical Agent in alignment with the SECNAV instruction. This is part of the EOD Department's focus area to diversify its funding profile.

NSWC IHD's 2023 Industry Day a Solid Success

NSWC IHD hosted an Industry Day at the College of Southern Maryland Velocity Center in Indian Head, Md. on Feb. 16. There were about 160 participants at the command's first Industry Day in several years, which was kicked off with an introduction to the command and its capabilities from NSWC IHD Technical Director Ashley Johnson.

During the presentations, NSWC IHD personnel explained to more than 90 business entities — ranging from large corporations to small businesses — that the command has a need for their services. Participating personnel also demonstrated that the Navy had specific funding set aside for targeted small businesses to provide the goods and services that the command and ultimately the warfighter an advantage over adversaries.

"While the command's Industry Day was for all firms, regardless of size classification, I am encouraged that our attending small business firms left the event with much enthusiasm on the forecasted opportunities for small business," NSWC IHD's Small Business Director Jennifer Barnidge said. DON Office of Small Business Programs Director Jimmy Smith, the event's keynote speaker, encouraged small businesses to lean into the opportunities available with the command.

Following presentations, attendees visited booth displays from NSWC IHD departments to gain knowledge about the goods, services and needs the companies in attendance might be able to deliver. Overall, both the command and the attendees left the event with the knowledge and contacts to move forward and potentially collaborate.



The EOD Department develops novel tools for disposal of ordnance as well as provides third party evaluations of commercially available technology in order to identify solutions for the EOD warfighter. Here, EOD Department leadership discuss a 3D printed explosive disposal tool with a vendor during Industry Day in Indian Head, Md., Feb. 16.



Robot Range Enhancements Unveiled at the Fall DoD EODT&T Program Board Meeting

NSWC IHD's EODTECHCEN hosted the fall EOD Technology and Technical (EODT&T) Program Board meeting, September 28. Members of the board, comprised of rear admirals, brigadier generals, major generals and other high-ranking officials from each of the four services were afforded the opportunity to witness the ribbon cutting for a new facility located at the robot range at EODTECHCEN.

The new facility deemed "The Robot Building," not only showcases a static exhibition of the evolution of robots and robotic platforms dating from the 1980s to present day but houses a space that allows for growth as state-of-the-art test methodologies continue to evolve. The structure, conveniently co-located adjacent to the robot test range, will provide ample opportunity for test structures to be used indoors alongside the outdoor structures at the test range.

The robot range is a proven asset since the early 2000s used to quantify unmanned system performance. Upgrading to standardized test methods will allow for a better understanding of system performance, as well as completing the link between requirements and robot performance. The robot test range has been used to test capabilities of robotic platforms for legacy EOD robots including the Man Transportable Robotic System (MTRS) and Remote Ordnance Neutralization System (RONS) platforms, and houses various terrains and scenarios including grass, gravel, sand, dirt, rubble, mud, water, slopes and indoor environments. The range was used extensively for evaluating robotic systems and upgrades supporting Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF), ultimately supporting more than 6,000 procured and sustained robots for EOD operators throughout the lifecycle of the MTRS and RONS.

The process to upgrade to the new robot testing facility came with a few challenges. Beginning in 2012, EODTECHCEN identified the need to standardize NSWC IHD's Unmanned Systems (UxS) test capabilities. The contract was awarded, and the design was completed in FY 2019. Although construction began in FY20, it was immediately put on hold due to identification of buried UXO. Following UXO remediation, construction resumed in mid-FY22, and the facility was completed in the third quarter of FY23.

"This facility was originally designed in a previous era and was really hopping. It got its start as a test bed for unmanned ground and aerial vehicles and has come a long way from a basic NAVFAC project to a NAVSEA Capital Investment Project," said Duba.

The Robot Building isn't the only enhancement for NSWC IHD's UxS test capabilities. During the process of upgrading the range, several standardized test capabilities were constructed with assistance from U.S. Naval Construction Battalions (Seabees) from Norfolk, Virginia, and the National Institute of Standards and Technology (NIST), resulting in six CONEX boxes capable of reconfiguration for a multitude of standardized NIST test methods. EODTECHCEN will use the new building to develop, integrate, assess and test unmanned systems, technologies, payloads and advanced capabilities — all targeted at meeting the gaps identified within the current joint EOD (JEOD) Integrated Capabilities Priorities List. Planned and potential additions to the building include an unmanned aircraft systems test net, a motion capture system and high-end computer/server systems. These upgrades aim to increase the multi-domain UxS capabilities of JEO operators via RDT&E in UxS technology areas including automated threat recognition autonomy; UxS collaboration; artificial intelligence/machine learning; intelligence, surveillance and reconnaissance; and standoff access/neutralization.

"This has been my pet project since 2012," said Deputy EOD Department Head (Acting) Mike Del Signore. "As of today, this facility will be utilized by all EOD Technology Center divisions moving forward — from interoperability to interchangeability, [this] is what the facility is designed to do."

International Programs Office Gains Momentum Across the Globe in 2023

The EODTECHCEN's International Programs Office (IPO) started 2023 off strong hosting visitors from the United Kingdom under its American, British, Canadian, and Australian and New Zealand Armies' Program (ABCANZ) agreement in both March and April and ended by hosting two information exchange meetings with Denmark in September and Norway in November.

A delegation from the Czech Republic visited the EOD Department in June 2023 for the very first time based on its brand new Information Exchange Annex — a result of its long-awaited agreement that was signed in 2022.

The group also sought out new EOD exchange agreements by taking an exploratory trip in July to Seoul, Republic of Korea, and contributed to the Evolved SeaSparrow Missile (ESSM) program with the Turkish Navy in Çanakkale, Turkey, in December, providing important instruction for handling the ESSM system in emergency situations.

In late-February, IPO traveled to the NATO EOD Centre of Excellence in Trenčín, Slovakia, along with eight other NATO nations for the first writing session of the ATP-3.18.1 Allied Tactical Publication and returned to the country later to attend the 7th NATO Demonstration and Trials where the theme was "future EOD development in light of modern conflicts and technological progress." Over 27 countries attended this expo to share and discuss their operational requirements and technological advancements.

In May, members of EOD Department and the Military Technical Acceptance Board (MTAB) attended an EOD Information System (EOD IS) Users Group meeting in Sweden. EOD IS is a collaborative integrated geographical, management and information system used by over 17 countries and contains information on ordnance items that EOD units could encounter. EOD Department and the MTAB are considering becoming active members of the group.

EOD Department personnel and PMS-408 visited Sweden in September as part of an FMS case to teach the ins-and-outs of the Mobile Field Kit software. This kind of training provides foreign partners with the knowledge to utilize EOD 60-series publications quickly and efficiently out in the field.

IPO continued to partake in bi-annual NATO EOD Working Groups — the 64th one held in London in May, and the 65th in Loutraki, Greece, in October. EOD Department personnel also attended NATO Counter-IED Working Groups in June in Sweden, as well as November in Amsterdam.

The annual 2023 ABCANZ EOD & Diving Working Group was held in London, England, the first week of November where various personnel from all over the command attended as well as foreign partners from Australia, Canada, New Zealand and the United Kingdom. This group fosters a solid collaborative relationship with U.S. foreign allies and focuses on a reduction in duplication in testing, diving, EOD technologies and information development.



The Department of Defense 2022-2023 Albert Einstein Distinguished Educator Fellow Dr. Nicole Yemothy (left) and 2022-2023 Albert Einstein Distinguished Educator Fellow for the National Science Foundation, working in the National Science Board Office, Vida Treviño (center), explain how to build a kite STEM kit to local southern Maryland teachers.

As one of the largest employers in Charles County, Maryland, NSWC IHD knows that much of its future workforce can be found in its own backyard. Therefore, the command values continuous community work and STEM outreach in area schools. Throughout 2023, NSWC IHD personnel supported a number of STEM events.

Train the Trainer Event

Command employees, supported by the Energetics Technology Center, Inc., partnered with the United States Naval Academy to conduct a “Train the Trainer” class for local teachers in the Charles County area at the College of Southern Maryland’s Velocity Center in Indian Head, Md., on Feb. 21. The event aimed to demonstrate a variety of STEM classroom activities teachers could perform with their students. The class was led by Dr. Nicole Yemothy, the Department of Defense 2022-2023 Albert Einstein Distinguished Educator Fellow with the Air and Space Forces K-12 STEM program, who gave the 21 teachers in attendance a variety of examples of in-classroom science, technology, engineering and math activities. Yemothy would not only explain the activities but encouraged participation from the teachers for a fun and realistic educational opportunity. NSWC IHD employees participated in the seventh annual History, Industry, Technology, and Science (HITS) Expo at St. Charles High School in Waldorf, Md., on March 11. The event hosted an overall attendance of approximately 400-500 participants of all ages.

“It really is a great annual opportunity for us to display the critical technologies developed and produced here at this command and to give these students an idea of what careers a background in STEM can lead to,” Chief Technology Officer Dr. Kerry Clark said. “For us to showcase that, while also engaging the students with some cool systems, is a win-win for everyone involved. We want to be an active force in training the next generation of scientists and engineers at Indian Head and what we do here helps us do just that.”

Art of Innovation STEAM Festival

More than 400 students and their families packed the College of Southern Maryland’s (CSM) Velocity Center in Indian Head, Md., on April 22 to get a hands-on look at some of the exciting arts and science activities and opportunities available in their backyard. NSWC IHD joined other local participants to showcase the importance of STEM during CSM’s second annual Art of Innovation Science, Technology, Engineering, Arts and Mathematics (STEAM) Festival. Attendees participated in hands-on STEAM activities including a performing arts exhibits, 3-D printing activities, and — of course — robotics demonstrations from NSWC IHD’s EOD robotics technicians. The command’s display included a fighter pilot ejection seat, giving students and their parents a visual understanding of the instrumental role command technology plays in ensuring a pilot can successfully eject during an emergency.

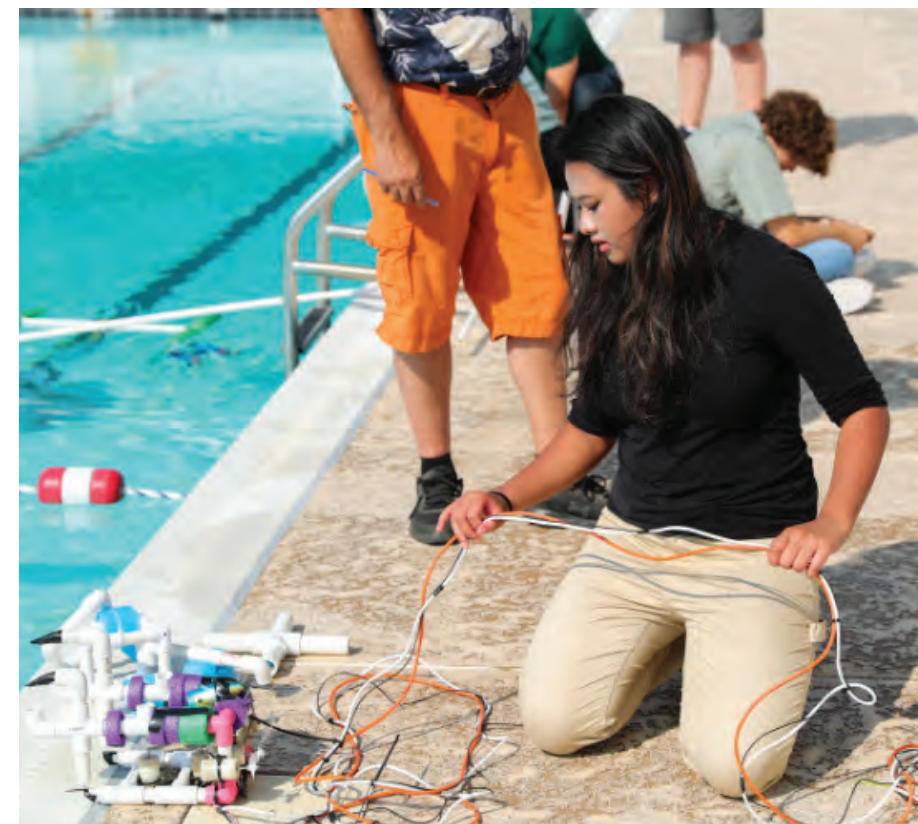
Command NETAP Program a Swimming Success

Twelve high school students with the NSWC IHD’s Naval Energetics Technology Apprenticeship Program (NETAP) braved brutal temperatures during the program’s underwater robotics competition at the Naval Support Facility Indian Head’s Aquatics Center on Aug. 8. The competition was the culmination of the high school students’ three-week summer internship with NSWC IHD.

NETAP provides students an opportunity to engage in a hands-on internship to develop their engineering skills. Over the course of this multi-week program, the students bolstered their tooling, soldering and programming skills by building miniature unmanned underwater vehicles.



Daniel Swick, a robotics technician in NSWC IHD’s Unmanned Systems Branch, describes the EOD functions of an iRobot Packbot during the History, Industry, Technology and Science Expo at St. Charles High School in Waldorf, Md., on March 1.



US Patent Number: US 11851382 B1
“Flexible Halocarbon Pyrolant”

Kenneth B. Basom and Bryan Milani

The conformable pyrolant includes a fluorocarbon liquid, a fluorocarbon powder and a micron size powdered aluminum bound together with a binder system that includes polyisobutylene and colloidal silicon dioxide. The conformable pyrolant is capable of achieving temperatures on the order 10,000° F., which will breach an ordnance item and thermally decompose an insensitive explosive fill. The conformable pyrolant also includes tungsten, wherein tungsten and silicon dioxide oxidize into fluorinated compounds, therein extending the burn and gasifying and then enhancing ebullition and volume in general. The versatile conformable format is capable of being shaped into geometries for inclusion in ordnance items or molded into configurations for disposal of insensitive munitions.

US Patent Number: US 11804670 B1
“Electrical Signal Connector Receptacle Assembly for Use with Access Port”

Matthew Boyer, Elizabeth Lee and Jennifer Robbins

An electrical signal connector receptacle assembly includes an annular mounting member configured for rigid attachment to a structure. The annular mounting member has a front end having a front opening and a rear portion. A connector ring is rotatably attached to the annular mounting member such that the connector ring rotates with respect to the annular mounting member. The connector ring is configured to be removably and rotatably attached to the electrical signal connector. In an exemplary embodiment, the connector ring is configured for threaded engagement with the electrical signal connector. The connector ring includes an interior region within which the annular mounting member is located and a front end having a front opening and a rear end having a rear opening. The rear portion of the annular mounting member extends through the rear opening of the connector ring and is configured to be attached to the structure.

US Patent Number: US 11796279 B1
“Disrupter Driven Highly Efficient Energy Transfer Fluid Jets”

Arthur W. Ellis, Lee Foltz, Eric S. Morefield, Phillip R. Quillen and Ian B. Vabnick

Provided herein are projectiles for use in a propellant driven disrupter device, and associated methods, to neutralize an explosive target. The projectile may comprise a friction reducing container at least partially filled with one or more fluids, fluid mixtures, particles and other components to provide one or more desired fluid properties to achieve a desired one or more jet parameters upon target impact. The fluid(s) in the container are referred to as highly efficient energy transfer fluids due to the improved fluid jet action on target compared to conventional water projectiles. The projectiles and disruptor can be more precisely tailored to the target, thereby increasing the likelihood of successful disablement and decreasing the likelihood of inadvertent and uncontrolled explosion.

US Patent Number: US 20230211861 A1
“Explosively Formed Active Water Barrier Rpg Protection System and Method for Maritime Vessels”

Raymond Gamache and William G. Szymcza

Disclosed is a method and system to provide protection for maritime vessels from multiple threat types including shoulder launched rocket propelled threats, ballistic (howitzer), and larger scale missile systems. According to an exemplary embodiment, the protection system is based on the ballistic launch (from the protected vessel) of an explosive charge(s) aimed -5 meters away from the vessel and -1 meter beneath the waterline followed by detonation to enable the formation of a water wall. Through the formation of a water wall, incident threats can be initiated (piezo fuze), and passivated through dynamic interaction with the water formation. In addition, the upward velocity of the water wall can enable an upwards rotation of the incident threat changing the orientation of the warhead jet formation (for shape charge warheads) above the vessel.

US Patent Number: US 11661483 B1
“Syntheses of Polysilylether Polymers In Additive Manufacturing Of Energetic Materials”

Robert C. Brothers and Rebecca Wilson

A method of making a polysilylether (PSE) polymer includes: cooling a solution of diethylamine to 0° C. under argon; adding cold dialkyldichlorosilane to form a first mixture; slowly warming the first mixture to form dialkylbis(diethylamino)silane; diluting the first mixture with hexane then filtering via cannula; evaporating the hexane and excess diethylamine; purifying the dialkylbis(diethylamino)silane under vacuum distillation; adding the dialkylbis(diethylamino)silane to a solution of diol dissolved in tetrahydrofuran to form a second mixture; heating the second mixture to 60° C while reflux condensing; and cooling and concentrating the second mixture under vacuum to form a resultant mixture containing the PSE polymer.

US Patent Number: US 11628895 B1
“Sprocket for Mobile Robot Track Drive”

Andrew Czop, Juan Carlos Roman Sanchez and Adam Shaker

A novel sprocket for a track drive of a mobile robot may allow for some deformation of the track so that the track better conforms to the surface on which the robot travels. The novel sprocket also may prevent excessive track deformation or deflection that may result in undesirable de-tracking.

US Patent Number: US 11624429 B1
“Compact Linear Drive Mechanism”

James K. Hopkins

A linear drive mechanism includes a drive gear connected to an actuator. A first assembly is connected to the drive gear. The first assembly includes a first plurality of leadscrew assemblies connected to a first output link of the drive mechanism. A second assembly is connected to the drive gear. The second assembly includes a second plurality of leadscrew assemblies connected to a second output link of the drive mechanism. The first output link is positioned opposite the second output link and the first assembly, and the second assembly is located between the first output link and the second output link.

US Patent Number: US 11609071 B1
“Below/above-water Remote Energetic Attachment Kinetic Kill Rod (BREAKKR) Projectile”

Lee Foltz and Adam Pegouske

A disruptor projectile includes a shaft made up of an elongated rod. A head piece assembly is connected to an end of the elongated rod. A post is located inside the head piece assembly. A tether line having an end with an eye splice is attached around the post. The length of the tether line extends parallel to the elongated rod.

US Patent Number: US 11572976 B1
“Multiple Angle Pivoting Placement (MAPP) Stand”

Lee Foltz and Mie Shattuck

A stand for vertically aligning borehole charges on non-level surfaces. The stand has a support base. A ball and socket assembly includes a socket portion connected to the support base and a ball portion disposed in the socket portion. The socket portion includes a grip interface to press against the ball portion. A body is connected to the ball portion. A clamp is attached to the socket portion at an interface of the ball and socket assembly between the socket portion and the ball portion. The body is configured to contain a shaped explosive charge for making a borehole. The ball and socket assembly is substantially hollow. The clamp adjusts compression of the ball and socket assembly.

2022 Honorary Awards

From handling urgent fleet requests, to working together effectively and efficiently to ensure our workforce had what they needed at all times, the command’s Honorary Award winners demonstrated their commitment to the command’s tenets, to the fleet and to each other.

- Robert B. Dashiell Award for Excellence**
Dr. Benjamin C. Kirkup

Dr. George W. Patterson Award for Outstanding Accomplishment
Steven Possehl

Joe L. Browning Award for Managerial Excellence
Julie Greaves-Jacko

Admiral Harold R. Stark Award for Innovation
Dr. David Vaccarello

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

Captain H.E. Lackey Award for Community Service
Diane Sabal

Continuous Process Improvement Award
Foreign Object Debris (FOD) Control Team:
Daniel Bragunier, Dale Cornette, Peter Cusack, Paul Desear, Bryan Fiala, Aaron Gentili, Christopher Gonzalez, Dwight Hancock, Sean Hancock, Michael Lateulere, John Lopes, Laura McDonald, Michael Mahaffey, Christopher Mikus, Marcia Mouer, John Packard, William Russell, Diane Sabal, Matthew Schrader, Joseph Schutt, John Shumpert and Mark Williams.

Equal Employment Opportunity, Diversity & Inclusion Award
Organizational Effectiveness Team (OET): Tara Blondin, Alyssa Cunningham, Christine Farrell, Lisa Griffith, Tammy Kershner, Gabriela Kunz, Jameelah Lewis, Phillip Melton, Karla Rodriguez-Gonzalez, Laramie Snell, Barry Trotter, Stuart White and Amanda Wilmot.

Internal Customer Service Award
Susan Simpson

Lance Corporal T.J. Honeycutt Award for Forward Deployed Service
Brent Loechler
- Excellence in Business Operations Award**
Christine Farrell

Excellence in Project Management Award
RJ Nemeth

Individual Excellence in Quality Execution Award
Arnas Bendoraitis

Excellence in Quality Execution Award
Tagging Team:
Robert Beach, Christopher Burrows, Blake Dickinson, David Frye, John Hager, Colleen Jones, Justin Joyce, Paula Loucas, Melissa Puffenbarger, Diane Sabal, Jason Steffin, Iris Vazquez-Ayala, Geoffrey Williams and Cindy Yeager.

Excellence in Systems Engineering Award
Christian Mezzacappa, Jr.

Excellence in Safety Execution Award
Dr. Katie M. Brown

Roger M. Smith Team Award
Purpose Built Munition (PBM) Team:
Arnas Bendoraitis, Christopher Bruce, Brian Cole, Robert Dame, Bryan Fiala, Mohsin Ghazali, Evan Haas, Thomas Kidwell, Emily Leitsch, Paula Loucas, Jackson Maenner, Zachary McDonough, Patricia Pickeral, Amanda Robson, Conan Schultz, John Sheriff, Timothy Smoot and James White.

Spirit of Indian Head Award – The Rising Star
Jessica Bartolozzi

Spirit of Indian Head Award – The Emerging Legend
Mark Cavolowsky

Spirit of Indian Head Award – The Legend
Carla Bacote

NAVSEA Excellence Awards

Two command employees were recognized at the NAVSEA level for the FY22 Warfare Center (WC) NAVSEA Excellence Awards. Comptroller Department Head Thomas Raleigh and Dr. Kathryn Brown, a scientist in the NSWC IHD RDT&E Department were recognized with Business Operations: NAVSEA WC Comptrollers “One NAVSEA Teamwork Award” and the FY22 WC NAVSEA Excellence in Safety Award, respectively.

NAVAIR Awards

NAVAIR Dave Berche Award:
Gustin Paras (E Department)

Department of the Navy (DON) Civilian Service Recognition

DON Civilian Service Commendation Medal:
Kristy Burns, Heather Nottingham and Brandy Stickel

CAD/PAD (E Dept) - Lee Manis, Jessica Schombs, Brandon Blevins

NSWC IHD CAD/PAD Joint Program Office (JPO) was presented with the NAVAIR Commander’s Award for Availability on May 31. The NAVAIR Commander’s Awards recognize outstanding teams and individuals across NAVAIR who have demonstrated creativity, agility and accountability in delivering the capability the fleet needs on time, at an affordable price. The award recognized the team’s response to an unprecedented quality escape issue that grounded more than 500 F/A-18B/C/D, F/A-18E/F Super Hornet; E/A-18G, Growler; T-45 Goshawk and F-5 Tiger II training aircraft. CAD/PAD personnel developed inspection procedures, adopted agile logistics processes and systematically managed over 20,000 suspect devices. Their timely and innovative efforts allowed naval aviation to rapidly return to an acceptable readiness posture, restore confidence in the energetics of the Navy’s egress systems, and ensure that naval aviators operate with the safest aircraft possible.



Commander, Naval Air Systems Command Vice Admiral Carl Chebi (left) presented the NSWC IHD CAD/PAD JPO with the NAVAIR Commander’s Award for Availability during a ceremony at the Naval Air Station Patuxent River in Lexington Park, Md. on May 31. CAD/PAD JPO Director Gregory Longworth (center) and JPO Navy Deputy Program Manager Jason Caron (right) received the award on behalf of the team of engineers, technicians, logisticians, analysts, handlers, drivers and radiographers from across the command who were responsible for the prestigious award.

DON Civilian Service Achievement Medal:

Human Resources team: Joselyn Alonso, Heather Del Selva, Jennifer Hughes, Lindsey Longshore, Diana Murray, Lauren Moreland, Lisa Robey, Jill Ryan, Victoria Skelton and Lauren Trilli

Security team: Michelle Campbell and George Jones

E Department: Courtney Gamble

R Department: Rachel Buchanan

G Department: John “Billy” Stansberry

DON Meritorious Civilian Service Award:
Timothy Morris (G Department)

USD (Comptroller) CY2022 Financial Management Award:
Ian Whitehead-Scanlon (E Department (E1)) – USD (Comptroller) CY2022 Financial Management Award for work on NAVSEA Indian Head Deep Dive Study



Flag Letter of Commendation (FLOC)

Jeff Smith, Mark Brown, Matt O'Neal (PAO) and Dr. Ashley Molinaro were awarded a FLOC from the Director, Surface Warfare, OPNAV N96, Rear Admiral Fred Pyle for their work coordinating Assistant Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs (ASD(NCB)) Rosenblum, and Deputy Assistant Secretary of Defense for Chemical and Biological Defense (DASD/CBD) Watson. The team included Kelly Miles, Jeff Renner, Mike Mills and crew members from USS Truxtun (DDG 103) hosted Rosenblum and Watson along with several VIP members from the Joint Program and the Office of the Secretary of Defense onboard the Truxtun to discuss modernization, life cycle costs, equipment readiness and system confidence, and demonstrate the collaborative effort between NSWC IHD, JPM Sensors, NAVSEA, OPNAV, and JPEO and display the EMBD. Pictured left to right: CAPT Steve Duba, Anton Fionov (accepting on behalf of Ashley Molinaro), Mark Brown, Matt O'Neal, Jeff Smith and Technical Director Ashley Johnson.

National Intelligence Meritorious Unit Citation

Dr. Victor Bellitto of the Interagency North Korea Missile Team was awarded the National Intelligence Meritorious Unit Citation in recognition of outstanding service from April 2021 to September 2022 for analysis that re-characterized a signification threat to the United States and allied partner nations and drove action to counter the proliferation of material used for weapons of mass destruction delivery systems. A team of civilians and military officers examined the validity of a long-standing analytic line by relentlessly analyzing data sets in a short time to glean information that was briefed to the president of the United States and the National Security Council, paving the way for United States Government and allied partner nation action.



NSWC IHD Personnel Security manager Michelle Campbell recognized the influx of hiring actions and created a plan to expedite processing of personnel security clearances to meet the increased demand. As the command's Security Management Team lead, George Jones ensured his team completed the required security clearance actions and reviews for onboarding new employees. Their efforts led to a 30% decrease in security clearance paperwork completion time, despite an unprecedented increase in workload. Pictured left to right: Corporate Operations Department Head Angela Creasey, Lisa Robey, Michelle Campbell, George Jones and Corporate Operations Department Deputy James Sherman.



DON Civilian Service Achievement Medal G41 John "Billy" Stansberry was honored for his leadership, mentorship and passion for supporting the warfighter to ensure that every CIWS mount, USN and FMS, has the most cutting-edge technology and is available to execute its mission. He oversees CIWS ISEA field service (on-site and distance support) for the United States Navy, United States Coast Guard, United States Army and FMS. Pictured left to right: G Department Deputy Jeff Rozanski, Self Defense System Fleet Support Branch employee John Stansberry, and Duba.



NSWC IHD Communications Security Account Manager Chris Dobry provided extraordinary administrative support to the command and its six subordinate local elements. He diligently processed 1,030 transactions and upgraded more than 136 pieces of critical equipment ensuring classified information was properly protected across several networks. Pictured left to right: Corporate Operations Department Head Angie Creasey and Chris Dobry.



DON Meritorious Civilian Service Award- G42 Timothy Morris was honored for his 35-plus years of leadership as the CIWS Configuration Management Specialist. In this role, he has delegated approval authority from the PEO for Class II engineering changes and provides critical time sensitive support to the Raytheon production facility. Pictured left to right: G Department Head Dave Rogers and Timothy Morris.



**OUTPACE OUR
ADVERSARIES**
