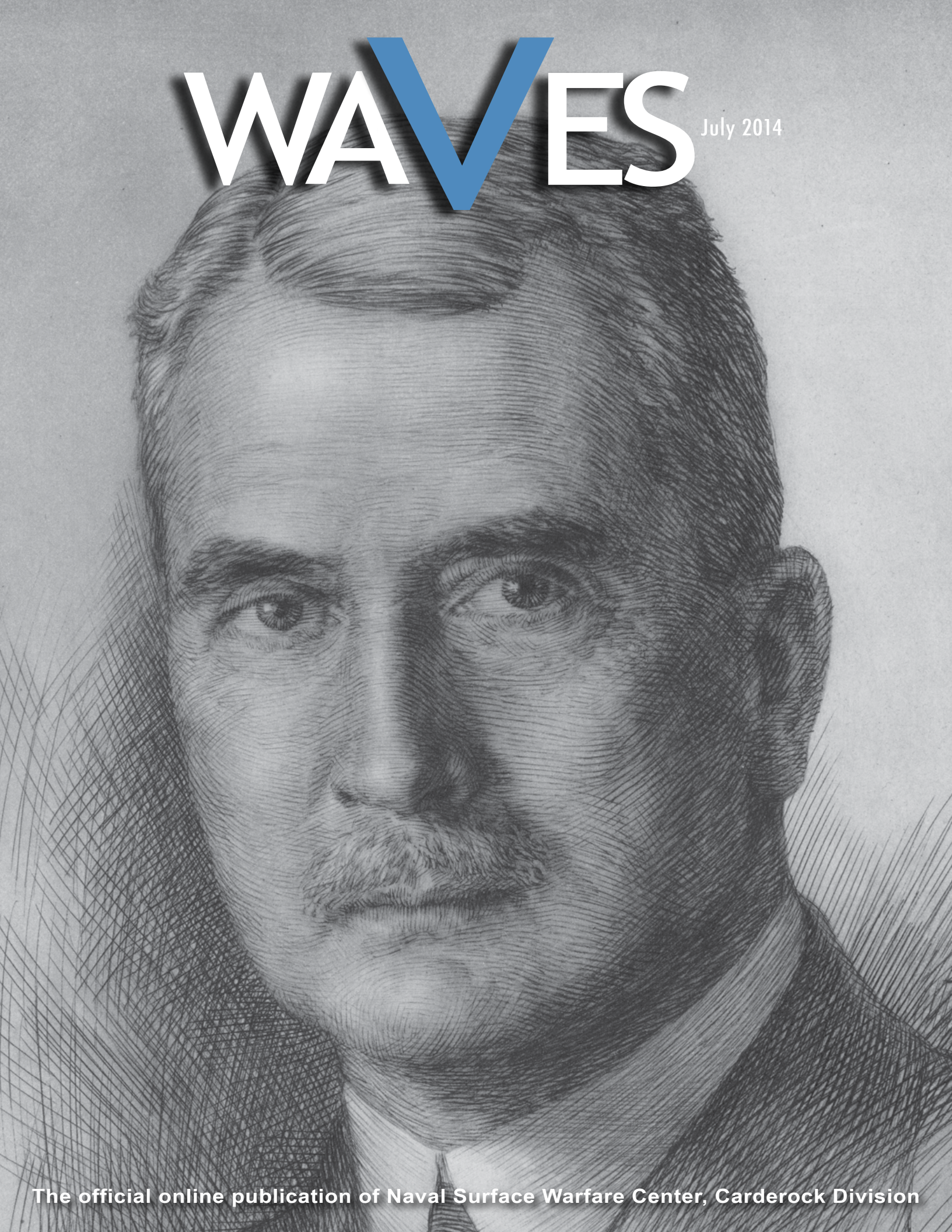
WAVES

July 2014



The official online publication of Naval Surface Warfare Center, Carderock Division

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INSIDE

TEAM

Joseph Battista
Suzanna Brugler
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Margaret Zavarelli

COVER

Pen and ink portrait of Rear Adm. David W. Taylor by Harry S. Moskovitz, 1922. Taylor is one of the seven namesakes for the Magnificent Seven Division Honor Awards held in West Bethesda, Md., June 23, 2014, and Philadelphia, June 24, 2014. The other award namesakes are: Vice Adm. Samuel L. Gravely Jr., Rear Adm. Grace M. Hopper, Rear Adm. Benjamin F. Isherwood, Vice Adm. Emory S. Land, Rear Adm. George W. Melville and Capt. Harold E. Saunders.

FROM THE TOP

Capt. Richard Blank

Commanding Officer of NSWC, Carderock Division

I was honored to be part of the Magnificent Seven 2013 Division Honor Awards in West Bethesda, Maryland, on June 23 and in Philadelphia on June 24. It was my first time attending these awards, and I would like to thank everyone who put together this special event.

Over the past year, I've gotten to meet many Carderock Division staff across the Command. At each location I visit, it is reinforced what a talented workforce we have. You are all dedicated to keeping our Sailors safe and our fleet strong. As someone who wears the uniform, let me express my sincere gratitude to all of you.

The Magnificent Seven Awards recognize an outstanding group of men and women. As individuals and teams, their contributions ensure that Carderock maintains its reputation as a world-class center of technical excellence that supports today's Navy, tomorrow's Navy and the Navy after next.

The awards are named after seven great Navy figures whose innovation and foresight shaped our Navy. Each winner received a medal depicting the image of the particular award's namesake. They also were given a pin. The pin depicts the design of the compass rose on the floor of the historic Building 2 main entrance in West Bethesda, Maryland.

I think it's fitting that the compass rose be the symbol chosen for this elite honor, because a compass is something all Sailors use to give them direction. Carderock's "Magnificent Seven" are our own Navy greats. Their body of work and their knowledge and leadership will serve as our generation's compass – guiding us to our own great future.

It was a very difficult decision to choose finalists from this distinguished group. I think you are all winners. Below are the 2013 nominees.

Congratulations again to all the nominees and to the winners.

Magnificent Seven 2013 Division Honor Awards Nominees

Vice Admiral Samuel L. Gravely Jr. nominees:

Timothy Dapp, Donna Intolubbe, Stephen Wilson, Kim Yee

Rear Admiral Grace M. Hopper nominees:

Geoffrey Gettings, Kevin O'Neill , David Parson, Robert Pellegrini, Sue Rossi, Joan Shanahan, Keith Sockoloskie

Rear Admiral Benjamin F. Isherwood nominees:

William Hertel and Tracy Harasti; Thomas Kush; USS Makin Island (LHD 8) Test Team: Frederick Anderson, Todd Beirne, Ronald Hughes, Jeremy Lewis and Steven Antonides; the MCM Class Integrated Ship Control System (ISCS) and LAN Upgrade Team: Seth Burmaster, Daniel Dang, Michael Gray, Jennifer Jardine, Lawrence Kelsall, Kenneth Kucowski, James McCann, Drew Napolitan, Lindsay Reber, Leo Storniolo, Savorn Thlang, Stephanie Williams and Jeffrey Young

Vice Admiral Emory S. Land nominees:

Audrey Bauer; Paul Luehr; the Washington Navy Yard Employee Relocation Team: Lawson Arrington, John Beston, Mike Hall, Randal Kirk, Chris Mott, Trenton Philippeaux, Gene Schwartzbart, Wendy Schwartzbart, James Spindler, Josh Vanschagen and Mike Yonder; the Pressurized Rescue Module Team: Michael Cheamitru, Elizabeth Crowley, Ross Hempel, J'Vaughn Holmes, Mark Laws, David Leasure, Gerard Mercier, George Robinson and Charles Westmoreland; the MASK Wavemaker Team: Scott Carpenter, Dan Hayden, Joe Katacinski, Karen Krewer, Joe Moeller, Shawnee Shaw, Robert Simpson and Steve Turner

Rear Admiral George W. Melville nominees:

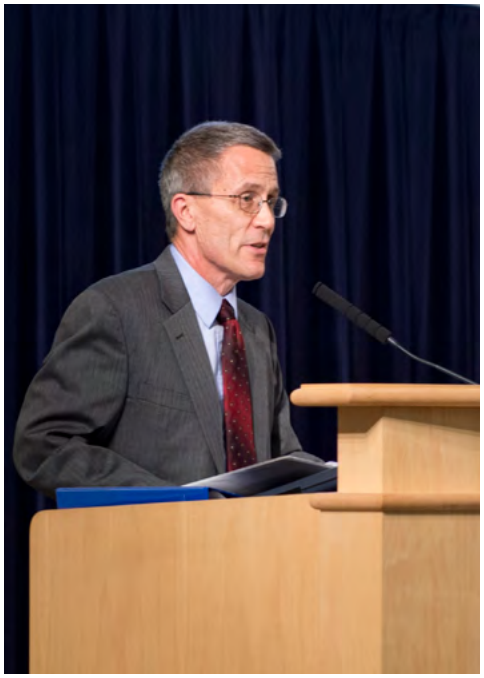
Michael Coakley, David Kihl, Edward Leibolt, Steven Swindler

Captain Harold E. Saunders nominees:

Frank Gerace, Donald Hoffman, Adrian McKenna, Jack Pezza, Robert Wingo

Rear Admiral David W. Taylor nominees:

Vadim Belenky, Matthew Craun, Chris Dafis, Peter Gaus



TECHNICAL DIRECTOR'S CORNER

Dr. Joseph T. (Tim) Arcano Jr.

NSWC Carderock Division Technical Director

I was honored to present the Magnificent Seven Awards. As I said during the ceremonies in West Bethesda, Maryland, and Philadelphia, I am in awe of the magnificent work that goes on here on a day-to-day basis and the challenges you face to deliver, which you do.

During the year I've been here, it has been confirmed for me what a world-class group of folks we have across Carderock Division – people who are excited about the challenging problems that they're trying to solve every day. I was pleased to celebrate with some of our fellow employees whose efforts in this past year have made them standouts.

All of the Carderock employees who were nominated were winners, and it was a difficult task to select the best from among the best. All of our nominees displayed similar qualities to the Magnificent Seven namesakes, such as: innovation, originality, expertise, persistence, accountability, stewardship and resolve. These are things that resonate with each of us as part of the Carderock family.

Reading through the biographies of the seven historic figures these awards are named after is awe inspiring – luminaries such as Rear Adm. Benjamin Franklin Isherwood in the 19th century, the first chief of the Bureau of Steam Engineering and a good communicator. This spring we celebrated the 150th birthday of Rear Adm. David Watson Taylor, whom we consider to be a founding father of Carderock, and a man I think we all hold of the highest character. Rear Adm. Dr. Grace Murray Hopper was a woman who shaped our own more modern era and a true visionary.

These seven awards are truly "magnificent" in that they recognize Carderock Division's exemplary employees of vision, ingenuity, foresight and persistence in the pursuit of excellence.

The Magnificent Seven ceremony gives us the opportunity to connect the illustrious paths of these six men and one woman with our present and future Navy. We can't forget the past as we proceed toward the future. The relevance of our organization, particularly in the future, depends on innovation. Award ceremonies like these are where we take time to recognize the highest levels of innovation and achievement.

I do consider it a special privilege – and I mean that from my heart – to publicly recognize the contributions of our nominees and winners have made to keep our Navy the best in the world. You are men and women of the highest character, proficient in your fields, who truly inspire me. It is an honor to work with you.

It is through the hard work, determination and accomplishments of our entire workforce of 3,500 folks at West Bethesda, Maryland; Philadelphia; Little Creek, Virginia; Fort Lauderdale, Florida; Memphis, Tennessee; Bayview, Idaho; Bangor, Washington; and Ketchikan, Alaska that makes this event possible each year, and helps us to achieve our "vision" of becoming the high-performing technical business recognized as a world-class innovator for advanced ships and ship systems, and for providing the technical solutions that keep our fleet at sea with proven in-service engineering.

So again, congratulations to all of you.

NEEC students help solve current technical challenges the Navy faces

By Nicholas Malay, NSWCCD Public Affairs

Thirty-two teams of engineering students from 20 universities as far away as the University of Washington converged at the Naval Surface Warfare Center, Carderock Division (NSWCCD), May 19, to present research projects directly related to solving real-world Navy challenges.

The Naval Engineering Education Center (NEEC) projects were part of an annual, two-day joint educational event to engage and develop the next generation of scientists and engineers.

The project teams included students, university faculty and technical mentors from the Naval Sea Systems Command (NAVSEA) warfare centers. Project topics included maritime communications, acoustics, noise and thermal management of systems, assessing corrosion, analysis of lithium ion batteries, remote magnetometry, testing and operation of a reduced-scale railgun, submarine higher energy lasers and the use of unmanned vehicles.

The University of Michigan's NEEC project, "Noise Source Nulling and Structural Assessment in Reverberant Environments," studied the use of signal and array-based processing techniques to recover a signal of interest from low signal-to-noise ratio environments. The goal of the project was to aid the U.S. Navy in conducting tasks that require selective listening, such as classifying a remote unknown sound source in a noisy underwater environment where many echoes are present.

"This project really got me interested in acoustics engineering," said University of Michigan graduate Chris Lo. "I am about to start a 10-week internship at Carderock, and I am seriously considering a Navy career – something that I wouldn't have considered before the NEEC program."

Rear Adm. David Duryea, commander of the Naval Undersea Warfare Center, delivers opening remarks at the 2014 Naval Engineering Education Center (NEEC) annual meeting held at Naval Surface Warfare Center, Carderock Division in West Bethesda, Md., May 19, 2014. (U.S. Navy photo by Ryan Hanyok/Released)

"The U.S. Navy uses sonar below water the way it uses radar above water," said Dr. David Dowling, professor of mechanical engineering at the University of Michigan. "Sonar provides the primary means for the Navy to discover the underwater environment – locating adversaries, allies and obstacles."

University of Michigan students Paul Choi and Chris Lo were mentored by NSWCCD mechanical engineer Dr. Natasha Chang, who studies hydro-acoustic sound sources for the U.S. Navy.

"The NEEC project provides value to the Navy by providing a venue where ideas on solving Navy problems can be discussed between NAVSEA and academia," Chang said. "The program also provides training and exposure to students on the type of technical expertise the Navy conducts on a regular basis to cultivate the civilian workforce."

Virginia Tech students Eric Alexander (far right) and Victor Sung (second from right) explain their research on railgun technology during the 2014 Naval Engineering Education Center (NEEC) annual meeting at Naval Surface Warfare Center, Carderock Division in West Bethesda, Md., May 19, 2014. (U.S. Navy Photo by Nicholas Malay/Released)

Florida Atlantic University's (FAU) NEEC project, "Flow Control on Marine Vehicles for High Maneuverability and Station Keeping in Shallow Waters," studied the ability for unmanned underwater vehicles (UUVs) to remain stationary and steady in dynamic wave environments. The Navy uses UUVs to detect mines in shallow water; high-frequency noise can be filtered, but low-frequency noise associated with vehicle motion is more challenging to measure. The team studied certain fish, like the grouper and the shank mackerel, that station keep in high currents with the goal of mimicking marine animals in order to design UUVs that are more capable of station keeping in energetic shallow water.

"NEEC provides universities and faculty with opportunities for working with real-life problems of interest to the Navy," said FAU professor Dr. Manhar Dhanak. "It's a good vehicle for partnering with Navy labs."

The FAU students were mentored by Dr. Mark Hyman, an engineer at NSWC Panama City Division in Panama City, Florida, who studies methods of controlling the motion of small mine-hunting or mine-neutralizing vehicles for the U.S. Navy. "Often the vehicles must perform their work in high-energy environments such as near the surface in a sea-state," Hyman said. "Minimizing wave-induced motion is a challenge."

"Collaborating with NSWC Panama City has been a fascinating experience because the project was devised by a group of subject-matter experts working in the field and having their input is invaluable," said FAU Ph.D. candidate Michael Kindel. "The Navy mentors have been a great bridge between the worlds of academia and industry."

The Virginia Tech NEEC project, "Experimental Testing and Operation of a Reduced-Scale

Railgun," looked at ways to improve the efficiency of existing electromagnetic launcher technology in order to improve performance in an array of sea conditions. The project focused on novel methods to reduce the mass, weight, volume, temperature and thermal load and charge time, as well as how it is integrated aboard ship platforms.

Virginia Tech mechanical engineering graduate students George Hric and Eric Alexander, and Victor Sung, a Ph.D. candidate in electrical engineering, were part of the Virginia Tech team mentored by Dr. Christopher Reichert, an engineer at NSWC Dahlgren Division.

"NEEC railgun attracts highly motivated and talented students in all engineering disciplines who are passionate about getting an education in a hands-on collaborative research environment that would bridge into employment opportunities with the Navy and working on exciting projects through which they also serve their country," said Dr. Hardus Ordendaal, an associate professor at Virginia Tech. "In the laboratory I am able to identify the best candidates for opportunities such as jobs and internships offered by the Navy and NSWCCD to forward those resumes."

Former NEEC participant Laura Williamson, a Michigan graduate, said the NEEC program made her aware of civilian career opportunities with the maritime industry. Williamson now works as a signatures engineer at Carderock. "I could contribute to the hydroacoustics branch from the get-go because the NEEC program gave me the fundamental tools to be a productive employee," Williamson said.

Aerospace engineer Kevin Kimmel (right) describes the testing of a wing model in the Subsonic Wind Tunnel at Naval Surface Warfare Center, Carderock Division to students attending the 2014 Naval Engineering Education Center (NEEC) annual meeting in West Bethesda, Md., May 19, 2014. During the meeting, students presented their research projects, which are directly related to solving real-world Navy challenges. (U.S. Navy photo by Nicholas Malay/Released)

In addition to presenting their poster projects in an afternoon session at Carderock, the students and their academic advisors toured several Carderock labs and facilities, including the Electromagnetics Lab, the Subsonic Wind Tunnel and the Structures and Survivability Lab.

"The tour of the Carderock facilities especially exposed me to the type of work naval engineers do, which greatly appeals to me," said Virginia Tech student George Hric.

The NEEC students also received briefings from subject-matter experts and heard advice from Rear Adm. David Duryea, commander of Naval Undersea Warfare Center; Dr. Larry Schuette, the director of innovation at the Office of Naval Research; and NSWCCD Technical Director Dr. Tim Arcano.

NEEC is a joint educational initiative between Naval Sea Systems Command, the American Society of Naval Engineers, the Society of Naval Architects and Marine Engineers and educational institutions from across the nation.

"We're proud to bring such eager and talented students to the study of naval engineering and to the attention of the Navy," said Dr. Steven Ceccio, the director of NEEC and professor of mechanical engineering, and chair and professor of naval architecture and marine engineering at the University of Michigan.

NAVSSES part of 2013 Nunn-Perry Award for Small Business Mentoring winning team

By Joseph Battista, NAVSSES Public Affairs

Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) employees Brett Franks, Machinery Alteration (MACHALT) Program manager, and Irene Katacinski, deputy for Small Business Programs, were part of the team presented with the 2013 Nunn-Perry Award for Small Business Mentoring on May 15 at a ceremony in Arlington, Virginia.

Franks and Katacinski provided guidance and expertise as part of the mentor-protégé agreement between Q.E.D. Systems, Inc. (QED) and Advanced Integrated Technologies (AIT), a service disabled veteran-owned small business based in Norfolk.

The Department of Defense Office of Small Business Programs recognizes mentor-protégé teams annually through the Nunn-Perry Awards – established in 1995 and named in honor of former Sen. Sam Nunn of Georgia, who sponsored legislation creating the DoD Mentor-Protégé Program, and former Secretary of Defense William Perry for his commitment to the program's implementation.

Franks oversaw the program between mentor QED and protégé AIT on a MACHALT project to manufacture and field a new automatic controller for the fuel oil purifier shoot function aboard the Navy's destroyer-class ships.

"The goal was to take AIT from a company of less than a dozen employees to the point where they were confident and experienced enough to support shipboard hull, mechanical and electrical alteration installations on their own," said Franks. "While the goal was to double the size of their business by the end of the three-year program, AIT has already seen growth of almost 150 percent only half way through."

This growth in employees, revenue, and technical and business capabilities was due to the mentoring of an established government contractor, QED, and Franks and Katacinski – who all provided support to AIT in the areas of general business management, corporate infrastructure development, business development and technology transfer, quality assurance, engineering and technical development in component manufacturing, and welding program development.

"The goal is to show an increase in revenue and employees through an established government contracting effort and transfer of technology," said Katacinski.

"The project seemed to be a perfect fit to transition alteration support knowledge from the well-established QED to AIT," said Franks.

The MACHALT Program and the NAVSSES Office of Small Business Programs worked together to outline the milestone plans for this business/technology transfer, and then provided the direction and management for moving the end item units into production.

AIT President Carl Spraberry said the support of QED and NAVSSES has enabled him to grow his business quickly and better support the nation's warfighters.

Taylor Elementary School fourth graders build Seaplanes with warfare center mentors

By Nicholas Malay, NSWCCD Public Affairs

Fourth-grade students from Taylor Elementary School in Arlington, Virginia, bolstered their knowledge of sea-based aviation engineering principles during a Seaplane competition May 13 and 17 at Naval Surface Warfare Center, Carderock Division (NSWCCD) in West Bethesda, Maryland.

NSWCCD Aerospace Engineer Eric Silberg led the students in the Office of Naval Research (ONR) sponsored science, technology, engineering and math (STEM) initiative.

"I learned today that making boats and planes is not easy," said fourth grader Cami Praed. "It takes a lot of hard work."

NSWCCD has developed a program to teach and excite students about aviation, aerodynamics, hydrodynamics, engineering and design. Students build, test and fly a model aircraft based on the NC flying boats while learning about the various engineering and scientific aspects of aircraft design. The histories of flight, Seaplanes and naval aviation are also included in the curriculum.

The students also toured NSWCCD's cutting-edge facilities such as the David Taylor Model Basin and the Subsonic Wind Tunnel (SWT). The 8 foot by 10 foot wind tunnel is used to evaluate models of ships, submarines, aircraft, buoys, marine structures such as oil rigs, unmanned air vehicles and unmanned underwater vehicles. Silberg explained the testing of a wing model attached to a strut and a balance that measures the six components of forces and moments that the model experiences in the air flow in the SWT.

Naval Surface Warfare Center, Carderock Division (NSWCCD) Aerospace Engineer Eric Silberg gives a tour to fourth-grade students from Taylor Elementary School in Arlington, Va., at the Office of Naval Research (ONR) sponsored science, technology, engineering and math (STEM) outreach sponsored Seaplane competition in West Bethesda, Md., May 13, 2014. (U.S. Navy photo by Nicholas Malay/Released)

Naval Surface Warfare Center, Carderock Division (NSWCCD) Aerospace Engineer Eric Silberg poses with fourth-grade students from Taylor Elementary School in Arlington, Va., at the Office of Naval Research (ONR) sponsored science, technology, engineering and math (STEM) outreach sponsored Seaplane competition in West Bethesda, Md., May 13, 2014. (U.S. Navy photo by Nicholas Malay/Released)

"My favorite part was going in the DTMB," said fourth grader Brianna Rider. "I would like to see the engineers testing models in it next time. I also liked the wind tunnel – it is fun to see these things in real-life."

"I liked testing the planes because science is my favorite subject, and I love learning about engineering," said fourth grader Vivian Marceca. "I also liked going in the workshop and seeing how they build models of the planes they use in the Navy. I learned how they made models and tested them. I would love to come back again."

The NC flying boat is the basis for the model due to its significance to aviation and Navy history and because of its close ties with Carderock. In 1919, the NC-4 was the first airplane to fly across the Atlantic Ocean. It was envisioned by Rear Adm. David Taylor and designed in part by Holden Richardson, who also flew an NC on the transatlantic mission and was director of Carderock in the 1940s. "It is an exciting study in engineering and exploration and provides a great story to build from," said Silberg.

Taylor Elementary School students have been working with Silberg and his team of mentors on a unit based on the historic naval flying boat the NC-4. "I have always loved Bernoulli's Principle about the air foil and thrust. I like engineering and building – this was an amazing experiment," said fourth grader Anna Rupert.

The fourth graders started the unit by studying the life and history of the self-taught engineers Orville and Wilbur Wright. This led to a research project of inventions of the early 20th century.

Taylor Elementary School's Lead Science Teacher Julie Campbell and her fourth-grade team connected earlier lessons on Newton's Laws and weather to the principles of flight including Bernoulli's Principle.

"We learned that it takes many years and practice to build models and planes," fourth graders Zoe Davis and Sarah Bailey said. "We also learned a lot about the David Taylor Model Basin. Mr. Silberg showed us many things, like wooden models. We think this is the best STEM project ever."

As students experimented with controlling paper airplanes, computer-based flight lessons and hands-on experiments in surface tension and buoyancy; other students constructed a scaled model of the NC-4.

"The challenging project was accomplished with a kit carefully designed by Mr. Silberg and his team, along with classroom help from the engineers and enthusiastic Taylor parents, as well as a lot of hot glue and scotch tape," said Campbell.

"On the day of the "fly-off" competitions May 13 and 17, students were testing and modifying their planes to get distance and smooth flight," said Campbell. "After this year's first trial run of the project, Mr. Silberg and I will continue to improve this collaborative unit to share nationally with fourth grade-high school. STEM is alive and well in our area."

"This project is an outstanding student design and engineering activity," said Taylor Elementary School Principal Rob Hindman. "Our students are actively engaged in the design and re-design process. Each flight shows obvious progress. This is Taylor's best STEM activity to date. Thanks for leading this project NSWCCD."

Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) chemical engineer Tim Schiavoni receives the Army Commander's Award for Civilian Service from Army Col. Russell E. Coleman, Joint Project Manager Medical Countermeasure Systems (JPM-MCS) commanding officer, at a ceremony at Fort Detrick, Md., May 19., 2014. (Photo by Graphics Specialist Scott Brown/Released)

NAVSSES' Tim Schiavoni receives Army Commander's Award for Civilian Service

By Joseph Battista, NAVSSES Public Affairs

Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) chemical engineer Tim Schiavoni received the Army Commander's Award for Civilian Service at a ceremony May 19 at Joint Project Manager Medical Countermeasure Systems (JPM-MCS) headquarters in Fort Detrick, Maryland.

Schiavoni, with Damage Control, Recoverability, and Chemical Bio Defense Branch at NAVSSES in Philadelphia, earned the recognition for his ongoing support of two JPM-MCS programs – the Advanced Development and Manufacturing (ADM) Facility Program and the Bioscavenger Vaccine Manufacturing Program.

The Army Commander's Award for Civilian Service is equivalent to the Army Commendation Medal and is the fourth highest honor the Army gives for civilian service.

"Really, I just feel like I'm doing my job," said Schiavoni, who holds a bachelor's degree from Drexel University and master's from Villanova University in chemical engineering. "But, it is quite an honor to be recognized for the work I've put into these two projects."

Schiavoni is part of a team overseeing the construction and start-up of the ADM facility in Gainesville, Florida. He spends one week a month onsite monitoring the facility's establishment and compliance with the Food and Drug Administration's (FDA) regulations for biopharmaceutical manufacturing. Once completed, this facility will produce vaccines and drug therapies to counteract the effects of chemical and biological warfare agents.

"This facility will enable the DoD to produce the vaccines in-house and get them to our warfighters much quicker," said Schiavoni, who joined the Carderock Division team in 2009.

Schiavoni has provided in-depth reviews of detailed process and instrumentation diagrams for the ADM facility's utilities and equipment. He recently participated in an ADM review board where he identified the manufacturing equipment necessary to produce vaccines at the new ADM facility to counteract weaponized ricin and botulism toxins.

The second part of Schiavoni's role with JPM-MCS, a division of DoD's Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD), is working with the Bioscavenger Vaccine Manufacturing Program. The mission of this program is to develop vaccines for service members to counteract the effects of nerve agents like sarin gas and VX gas. The vaccines Schiavoni helps to create will ultimately prevent incapacitation and death from exposure to a broad spectrum of nerve agents.

Schiavoni worked on improving gas masks and other chemical and biological defense protective equipment for the Navy before beginning his work with JPM-MCS in July 2012. Prior to joining the Carderock Division in Philadelphia he worked in the private sector for 12 years as an engineer designing and implementing automation systems for biopharmaceutical manufacturing equipment and as engineering support for pharmaceutical clean-room facilities and equipment operation for the production of sterile-injectable drugs. Schiavoni is level II certified in Systems Planning, Research, Development and Engineering (SPRDE).

New Material Conditioning Test Site approved for full-scale testing at Naval Ship Systems Engineering Station

By Joseph Battista, NAVSSES Public Affairs

The new Material Conditioning Test Site at NAVSSES has two vertical cylinders - the smaller (left) is rated to 500 psi and the larger (right) at 3,300 psi. Both hold aging fluids such as fresh water, simulated seawater, and hydraulic fluid that can be heated to 200 degrees Fahrenheit. (U.S. Navy photo by Joseph Battista/Released)

The new Material Conditioning Test Site at Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) in Philadelphia received approval for full-scale testing of polymer materials in mid-March. The test site uses pressure and heat to speed up the aging process of polymers – enabling engineers to test the long-term effects the shipboard environment has on components without having to wait years or decades.

Polymer materials degrade or "age" with time. Environmental factors such as heat, pressure or exposure to chemicals such as the chemical composition of seawater or hydraulic fluid can cause unwanted cracking, fluid absorption or chemical disintegration of the polymer.

"The general 'rule-of-thumb' is for every 10-degree Celsius temperature increase of the polymer in the liquid, the aging time is doubled," said Dr. Debbie Kenney, mechanical engineer and test site manager from Machinery Technology Research and Development Branch at NAVSSES.

For example, if a polymer normally operates in a liquid at 50 degrees Celsius – during one hour of normal operation the polymer will age one hour. If instead the polymer is held at 60 degrees Celsius for one hour, the polymer will "age" roughly two hours during the one-hour time span. If the polymer is held at 70 degrees Celsius (a 20 degree Celsius elevation above normal operating temperature) for one hour, the polymer "ages" roughly four hours during the one hour.

The polymer is exposed to both elevated temperature and pressure therefore the accelerated aging relationship may not be a simple doubling. The actual aging rate can be faster or slower and is determined through testing. In the Carderock Division's Non-Metallic Materials Research and Engineering Branch in West Bethesda, Maryland, mechanical engineer Joe Korczynski ages material coupons for evaluation to help understand the actual accelerated aging relationship for the polymer.

"There is a limitation on how fast we can accelerate the aging of the polymer material at elevated temperature if the exposure temperature and pressure damage the microstructure of the polymer," said Korczynski.

The test site has two vertical cylinders – one rated to 500 psi and the other to 3,300 psi. Both can hold aging fluids such as fresh water, simulated seawater, or hydraulic fluid that can be heated to 200 degrees Fahrenheit (93 degrees Celsius). Polymers are suspended in the heated liquid, with thermocouples placed inside to monitor the temperature. A controller uses the thermocouple readings to maintain the temperature at the desired level.

Robert Schallock, mechanical engineer and test site engineer from Automation and Controls Research and Development Branch, controls the liquid's temperature to ensure heat consistency inside the cylinders. Schallock said monitoring the temperature prevents the possibility of the liquid becoming too hot and destroying the polymer.

Tim Jackson, mechanical technician from the Machinery Technology and Research and Development Branch, is the test site lead responsible for running all testing, monitoring the temperature and pressure, and conducting the aging studies.

The polymers Schallock and Jackson put in the liquid-filled cylinders will remain there for many weeks and sometimes months – then will be removed and tested by Carderock Division engineers and scientists.

"Being able to age a component is an important step in being able to predict its effective useful life," said Kenney. "We are able to determine how they will hold up over time in different fluids."

Jackson and Schallock are taking the guesswork out of when a shipboard component might fail.

According to Kenney, in the past they could only test coupons, small samples of polymers that represent what a component is made of, using specialized ovens. Now they can place full-size components in one of the two cylinders.

Both cylinders are identical except for their size. The 500-psi cylinder is the smaller of the two. Schallock explained that using the smaller cylinder saves money because less liquid is used, and it takes less time and energy to heat.

Each cylinder operates the same. The polymer is placed in a mesh basket, and then it is lowered into the vertical cylinder from above. The hydrostatic pressure in the cylinder is elevated to the normal operating pressure for the polymer. The liquid is then heated and the expedited aging process begins.

"This test site will help us determine the service life of many components aboard Navy vessels," said Kenney. "We can then be prepared to replace ship components when, and even before, failures occur."

NSWCCD observes Asian American Pacific Islander Heritage Month

By Kate Hogarth, NAVSSES Public Affairs

The director of the Center of Design and Innovation at Temple University Fox School of Business was the guest speaker for the Asian American Pacific Islander (AAPI) Heritage Month program, held at Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) on May 21.

The Naval Asian Society Employee Research Group (NASERG) had the pleasure of hosting Dr. Youngjin Yoo, a professor of management information systems and strategy, to an audience of over 80 NAVSSES employees, as well as Carderock Division employees in West Bethesda, Maryland; Bangor, Washington; Norfolk; and Bayview, Idaho. Yoo gave a talk about changes in society and the industrial economy through the lens of technology titled "Digital Innovation in the Age of Generative Machines."

Yoo began the presentation with examples of how digital technologies are growing and evolving as if they were living organisms.

The "Charlie bit me, and it really hurt" video, was one example he used to explain to the audience the meaning of generative machines. This YouTube video of a baby named Charlie biting his older brother's finger, was at one point the most viewed video on the Internet, seen over 250 million times, Yoo said.

The video has been replicated over 5,000 times — Charlie's and his brother's words were turned into a hip-hop song, made into an exercise video, reenacted by old men and even LEGOs.

The boys' father, who created the video for their grandfather, never intended to have people imitate the video. He could never have predicted how his video would grow and evolve, Yoo said.

Dr. Youngjin Yoo, director of the Center for Design and Innovation at the Temple University Fox School of Business, is presented with a certificate of appreciation by Capt. Walter Coppeans, NAVSSES commanding officer, at the Asian American and Pacific Islander Heritage Month program in Philadelphia, May 21, 2014. Yoo, the guest speaker, is originally from South Korea. (U.S. Navy photo by Joseph Battista/Released)

Dr. Youngjin Yoo, director of the Center for Design and Innovation at the Temple University Fox School of Business, speaks to NAVSSES employees at the Asian American and Pacific Islander Heritage Month program in Philadelphia, May 21, 2014. Yoo is originally from South Korea. (U.S. Navy photo by Joseph Battista/Released)

"Technology is becoming the source of innovation and creativity in a way that the original inventor of technology did not anticipate," Yoo said.

Yoo's teaching and research focus on how digital technology transforms our work and life experiences.

In accordance with AAPI Heritage Month, Yoo shared his own South Korean heritage with a slideshow of his life in pictures. Yoo showed a picture of himself on his first birthday, dressed in traditional Korean costume. It is a Korean tradition to be presented with various objects on a first birthday to predict what is in store for the future. Yoo said no one remembered what he picked. Yoo and his wife moved to the United States in 1992 to study at the University of Maryland and later they started a family. The slide show ended with a selfie taken a few weeks prior, of Yoo and his family on the steps of the Philadelphia Art Museum.

Yoo teaches and gives talks all over the world. He was one of the featured speakers at TEDx Philadelphia in 2001. Since May 2011, he has spent 460 days away from home, gone on 72 trips, has traveled half a million miles and visited 59 cities in 17 countries.

The program concluded with NAVSSES Commanding Officer Capt. Walter Coppeans presenting Yoo with a certificate of appreciation for participating in this year's program.

Since 1977, the month of May is when we recognize the accomplishments and contributions of Asian Americans and Pacific Islanders throughout America. According to the Asian Pacific Heritage website, May was chosen to commemorate the immigration of the first Japanese to the United States on May 7, 1843, and to mark the anniversary of the completion of the transcontinental railroad on May 10, 1869. The majority of the workers who laid the tracks were Chinese immigrants.

The theme for 2014 AAPI Heritage Month was "I Am Beyond." "The phrase captures the aspirations of the American spirit, how Americans of Asian and Pacific Islander descent have always sought to excel beyond the challenges that have limited equal opportunity in America," Kim Yee, Equal Employee Opportunity Advisory Committee (EEOAC) chair, said.

During the program, Yee recognized the work of AAPI Carderock employees with a brief presentation of the recent accomplishments of Dr. Paul Shang, Dr. Thomas C. Fu, Dr. Peter Cho and Pinkesh Bharatia.

The NASERG meet regularly for history presentations, volunteer in joint ERG events, meet for flex lunches and have pingpong tournaments to bond, learn and preserve culture.

Gas Turbine System Technician (Mechanical) 2nd Class Daniella Mazzaro monitors an engineering console inside one of the ship's main engine rooms aboard the Ticonderoga-class guided-missile cruiser USS Antietam (CG 54) in Yokosuka, Japan, March 12, 2014. Antietam is a member of the George Washington Carrier Strike Group. (U.S. Navy photo by Mass Communication Specialist 2nd Class Declan Barnes/Released)

Machinery control systems: the first commonality deep dive

By Joseph Battista, NAVSSES Public Affairs

Naval Sea Systems Command (NAVSEA) Enterprise Commonality Program, headed initially by NAVSEA 05S and now by NAVSEA 06, was established in 2008 to reduce the proliferation of unique systems, subsystems, and components being introduced into the Fleet inventory while supporting improved performance and life cycle cost reduction.

The Commonality Program, through a series of "deep dives," determined cost savings/avoidance opportunities for "Cross Platform" application of the deep dive studies.

"The program has taken a systems-level approach to look across the entire supply chain to define cost saving or avoidance opportunities which the Navy may be able to take advantage," said John Sofia, NAVSEA 06C2 Commonality lead. " The Machinery Control System (MCS) pilot deep dive was the first test of the supply chain approach and defined the potential cost saving and avoidance opportunities."

Early analysis of MCS across the fleet discovered that every surface ship class had a unique MCS, which was cost prohibitive to maintain and operate. The deep dive resulted in the potential total ownership cost (TOC) avoidance projected to be more than $300 million if fully implemented for all new surface ship acquisition and mid-life upgrades.

Machinery control systems facilitate control and monitoring of machinery equipment and systems for gas turbine and diesel engines, electric plants, and auxiliary and damage control systems. This encompasses all devices, connections, MCS network equipment and software.

The Commonality Project Management Team collected the deep dive data and did a thorough analysis working with MCS subject matter experts. They analyzed all MCS major components including the methodologies, topologies and interfaces and multiple categories of software including functionality, methodology, performance and process.

According to Bill Moss, the Commonality Project Team lead at Naval Ship Systems Engineering Station, Naval Surface Warfare Center Carderock Division (NAVSSES) in Philadelphia, there is a lot of variation of machinery control systems throughout the fleet between ship classes, and even within the same classes.

"These are very costly systems, so establishing commonality where we can makes a lot of sense," Moss said.

Three separate Machinery Control System (MCS) Commonality Deep Dives were conducted over the past six years. The first deep dive in September 2007 analyzed major MCS hardware components. As a result, a MCS Virtual Shelf was established and populated with a preferred hardware component set. The Shelf was recently updated with Technical Warrant Holder approval in 2013.

As part of the original MCS deep dive, it was determined that there were 24 different MCS operator workstations. A preliminary analysis concluded the number could easily be reduced to 18, with an end goal of just eight.

Several ship classes have multiple MCS

variant configurations across hulls, including CVN 68 Class, LHD and LCS Classes. The analysis also found more than 94 unique VME cards (VMEbus is a computer bus standard) across the surface fleet, and custom Graphical User Interfaces (GUIs) as part of the Human Machine Interface (HMI). The HMI consists of a computer and standard computer screens that display text and graphics in regards to the monitoring, control and maintenance of ship systems.

The second deep dive in February 2010 concentrated on MCS architecture choices including methodologies, topologies and interfaces. The deep dive identified potential variation reduction within 24 MCS design decision points. As a result the "DoD Design Criteria Standard for the Architecture of Shipboard Machinery Control Systems (MIL-STD-X628)" was developed. Publication of this MIL-STD is scheduled for the fourth quarter of FY14.

The third deep dive in November 2011 analyzed multiple categories of MCS software such as functionality, performance and process. The deep dive evaluated 53 MCS design choices across eight software categories. As a result, three new Military Standards are being developed: MIL-STD-X647, Design Criteria Standard for MCS and SCS Graphical User Interfaces (GUIs); MIL-STD-X648, Standard Practice for MCS and SCS Software Naming Conventions; and MIL-STD-X649, Interface Standard for MCS and SCS. They are scheduled to be published over the next two years.

The MCS architecture standard, MIL-STD-X628, provides every ship acquisition or mid-life program with an MCS architecture that can be tailored to fit their respective platform requirements. The other standards currently under development (software naming convention, GUI and interface standards) are areas identified to provide the greatest return on investment (ROI) for future MCS development.

"We did a good job putting together a standard for MCS architecture," said Moss. "It's not one size fits all, but an optimal mix that provides flexibility within standardization." Military specifications/standards, as well as parts from each deep dive, populate the Virtual Shelf.

Some of the material used to develop these standards has already been implemented within the Navy's USS Gerald R. Ford (CVN 78) Class, LSD 41/49 Mid-Life Upgrade, and in part, through the U. S. Coast Guard (USCG) funded Platform Independent Machinery Control System (PIMCS) Program. The goal of the PIMCS Program is to develop core software with common code that can be adapted and used for any MCS on any cutter/ship class for the USCG, the Navy, or any commissioned

Gas Turbine System Technician 2nd Class Justin Urnowey, from Annapolis, Md., monitors propulsion machinery statuses during an engineering drill aboard the guided-missile destroyer USS Arleigh Burke (DDG 51) in the Arabian Gulf, June 9. Arleigh Burke is deployed in the U.S. 5th Fleet area of responsibility supporting maritime security operations and theater security cooperation efforts. (U.S. Navy photo by Mass Communication Specialist 2nd Class Carlos M.Vazquez II/Released)

Department of Defense (DoD) or Department of Homeland Security (DHS) seagoing vessel.

"It's a method that provides a common modular (MCS) software core; when upgraded, can be back-fit to other deployed MCSs that implemented an earlier version of PIMCS," said Moss.

With the institution of these standards on future ship design programs, MCSs will be built so that Sailors are able to go from one ship to another – within the same class, between different classes, and even between DoD/DHS assets – and start using and maintaining an MCS with little or no training because the architecture and look and feel is similar.

The road to MCS commonality continues as standards and components on the Virtual Shelf are populated and maintained. The searchable Shelf is the repository of items (parts and specifications) that aids shipyards, ship design managers, in-service engineering agents (ISEA), and other users in designing architectures, finding qualified cross-platform components and equipment, and even assisting with parts of detailed design, while capturing TOC benefits.

It is NAVSEA policy, as stated in NAVSEAINST 4120.8 (NAVSEA Policy for Commonality of Systems, Subsystems, and Components), that effective commonality controls and processes be developed and employed by all activities and programs under the cognizance of NAVSEA and NAVSEA affiliate PEOs during all phases of acquisition, modernization and logistic support.

MCS developed without smart standardization can lead to unique systems, which implement the same new technology as non-standard solutions. Creating commonality for MCS architecture, graphics, and coding – having the core software utilizing common code – will help significantly mitigate this problem while leaving innovation intact.

After the initial MCS deep dive and completing years of deep dives across more than 43 areas of hull, mechanical and electrical (HM&E) systems, managing a Virtual Shelf repository of data residing on a DAU web site (https://acc.dau.mil/commonality) required varied disciplines and resources. As the Commonality Program ended the more than four year accelerated Deep Dive schedule that started with the MCS deep dive, the focus now shifts from tactical deep dive analysis to strategic implementation.

The implementation strategy for SEA 06 is directed toward working with NAVSEA program offices, logistics agencies, engineering agents, technical warrant holders, public and private shipyards and NAVSEA headquarters to identify where commonality can be applied. commonality team project managers are working with all in-service and new acquisition teams to identify current and future opportunities to implement commonality strategies. While ship programs are at various stages of acquisition, modernization, or overhaul, they all have targeted areas of opportunity where total ownership costs can be significantly reduced.

Naval Surface Warfare Center, Carderock Division honors Magnificent Seven

By Nicholas Malay, NSWCCD Public Affairs

Naval Surface Warfare Center, Carderock Division's (NSWCCD) 15th annual presentation of the Carderock Division's Magnificent Seven Division Honor Awards in West Bethesda, Md., June 23, 2014. (From left) NSWCCD Commanding Officer Capt. Rich Blank; Ship Signatures Electronics Engineer Robert Wingo; Ship Signatures Mechanical Engineer Dr. Matthew Craun; NSWCCD Comptroller Robert Simpson; NSWCCD Ship Signatures Deputy and Mechanical Engineer Stephen Wilson; Naval Architect David (Dan) Hayden; Naval Architect Dr. David Kihl; Model Fabrication Shop Manager Robert Pellegrini; Mechanical Engineer Scott Carpenter; Electrical Engineer Scott Turner; Facility Engineering and Operations Division Head Herman (Joe) Moeller III; NSWCCD Technical Director Dr. Tim Arcano and Research and Design Acquisition Division Head Shawnee Shaw. (U.S. Navy photo by Ryan Hanyok/Released)

Recipients of Naval Surface Warfare Center, Carderock Division's (NSWCCD) prestigious 15th annual Magnificent Seven Division Honor Awards were recognized for their significant achievements to the Division in 2013 during ceremonies in West Bethesda, Maryland, on June 23 and in Philadelphia on June 24.

"These awards were started in 1999 to give the Division an opportunity to celebrate our commitment to excellence and our accomplishments together," said Capt. Walter Coppeans, commanding officer of Naval Ship Systems Engineering Station (NAVSSES) in Philadelphia. The award arenas included research; science and engineering; leadership and management; collaboration; organizational support; and equity and diversity.

The seven awards are named for historic Navy figures, including Rear Adm. David Watson Taylor and Rear Adm. George W. Melville, considered to be the founding fathers of Carderock Division.

"All of our nominees displayed similar qualities to the Magnificent Seven award namesakes, such as innovation, originality, expertise, persistence, accountability, stewardship and resolve," said NSWCCD Technical Director Dr. Tim Arcano. "These are things I think that resonate with each of us as part of the Carderock family."

Each honoree was presented a medal depicting the likeness of each award's namesake, accompanied by a pin designed after the compass rose on the rotunda floor of the historic Building 2 in West Bethesda, Maryland.

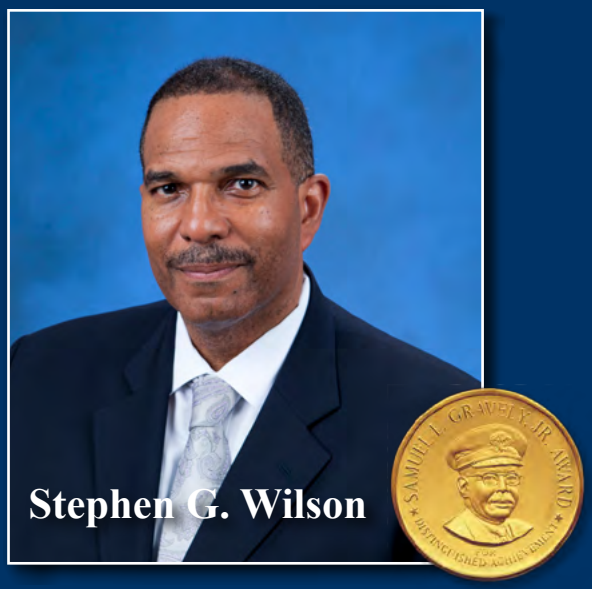
"I think it's fitting that this compass rose be the symbol chosen for this elite honor, because a compass is something all Sailors use to give them direction," said Capt. Rich Blank, NSWCCD commanding officer. "The men and women we recognize today are our own Navy greats. Their body of work and their knowledge and leadership will serve as our generation's compass, guiding us to our own great future."

"We hear it often, 'It's all about the ships,'" said Dr. David Kihl, a naval architect in the Survivability, Structures and Materials Department. Kihl was the recipient of the Rear Adm. George W. Melville award for developing a strategy to focus attention on the unique problems of random, fully reversed seaway loads, and provided structural data with which to address fatigue-related issues specific to ship structures. "This phrase is so true – for without the ships, transporting personnel and equipment to carry out the Navy's missions would be impossible. Whether the ship is new or old, unique or conventional, integrity and reliability are cornerstones of the ship performance foundation which we support through analytical, numerical and experimental investigations. This is what we do. I'm proud to be part of such a dedicated and experienced workforce supporting he Navy's interests. We make a difference."

Robert Wingo, an electronics engineer in the Signatures Department, received the Capt. Harold E. Saunders award for his outstanding technical knowledge and leadership in the conception, development and demonstration of the WILMA moored sensor system. In response to new requirements for the Virginia-class hull USS California, Wingo challenged the requirement and came up with a new and solution of an in-water line moored sensor system that is cost-effectively deployed and recovered with standard boat assets.

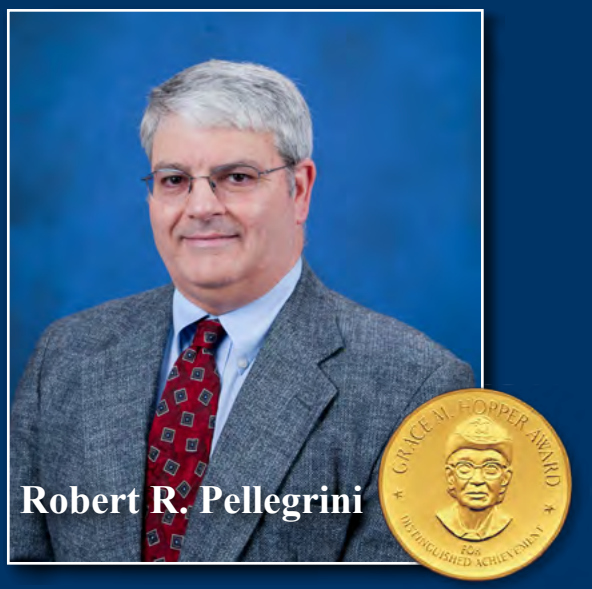
Wingo credited his team's work on the award and said, "I feel a sense of pride that we are passing our knowledge down to young, energetic engineers who were an integral part of our team and contributed to this patent-pending technology." He said a lesson learned from the rapid prototyping effort was "it's not the man power, it's the will power," to overcome technical and non-technical roadblocks.

VICE ADMIRAL SAMUEL L. GRAVELY JR. AWARD



For his leadership and example, Mr. Wilson has distinguished himself by promoting equal opportunity for the selection, promotion and retention of women and minorities at the Carderock Division and has worked tirelessly to eliminate barriers to hiring and promotion.

REAR ADMIRAL GRACE M. HOPPER AWARD



As a result of his outstanding organization, tireless work efforts and foresight as well as excellent managerial and team-building skills, Mr. Pellegrini has established best management practices, improved quality control and increased worker safety.

REAR ADMIRAL BENJAMIN F. ISHERWOOD AWARD
MCM Class Integrate Ship Control System (ISCS) and LSN Upgrade Team


Seth D. Burmaster


Daniel Dang


Michael J. Gray

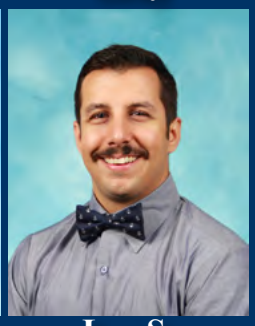

Jennifer R. Jardine


Lawrence J. Kelsall


Kenneth F. Kucowski


Drew C. Napolitan


Lindsay M. Reber


Leo S. Storniolo


Savorn Thlang

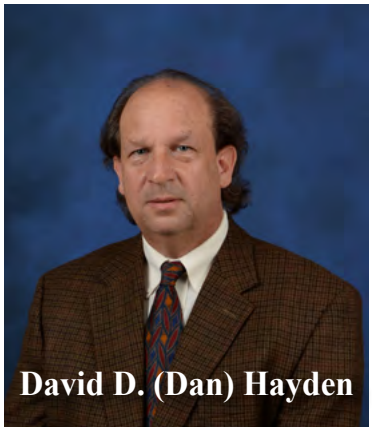

Stephanie M. Williams


Jeffrey S. Young

The team developed, tested and performed the first shipboard installations of the MCM Class Integrated ISCS and LAN upgrade, correcting numerous obsolescence and reliability issues that were causing serious operational impacts throughout the MCM class. *(James E. McCann not pictured)*

VICE ADMIRAL EMORY S. LAND AWARD
MASK Wavemaker Replacement Team


Scott A. Carpenter

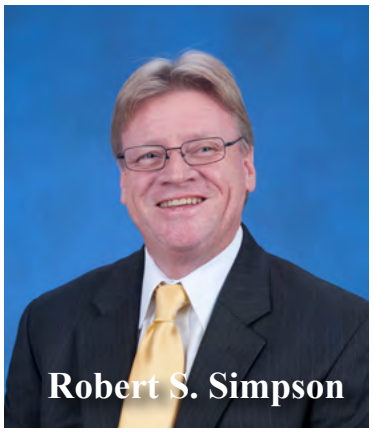

David D. (Dan) Hayden


Joseph E. Katacinski


Karen A. Krewer


Herman J. (Joe) Moeller III


Shawnee J. Shaw


Robert S. Simpson

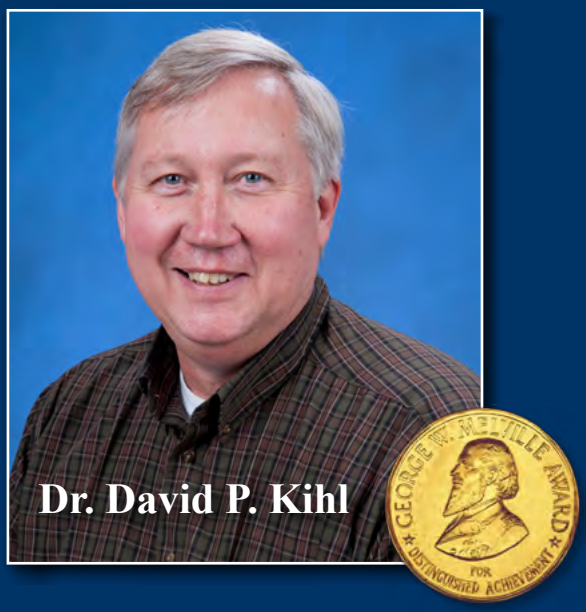

Steven R. Turner

The awardees managed the team, maintained the plan of actions and ensured collaboration both within government and with the various organizations and contractors involved in the development of the new Wavemaker.

For more than one hundred years, the Navy has built and conducted extensive testing on physical prototypes of ships called scale models before building the real ship in full scale. In 1962, Carderock built the Maneuvering and Seakeeping Basin (MASK) facility in order to test the scale model performance of ships, platforms and moored systems in realistic sea conditions. The 360-foot long and 240-foot wide facility holds approximately 12 million gallons of water and is used to evaluate the maneuverability, stability and control of scale models.

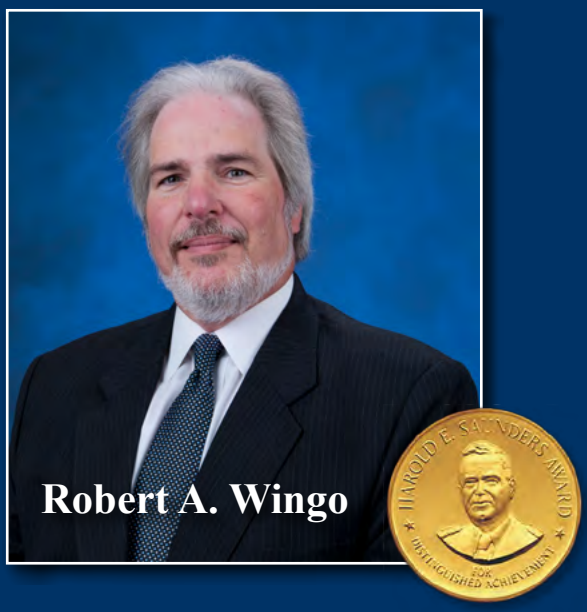
Naval Ship Systems Engineering Station, Naval Surface Warfare Center, Carderock Division (NAVSSES)'s Joseph Katacinski (right) provides thank-you remarks on behalf of the Wavemaker Team, recipients of the Vice Adm. Emory S. Land Award, during the 15th annual Magnificent Seven Division Honor Awards ceremony in Philadelphia, June 24, 2014. Naval Surface Warfare Center, Carderock Division (NSWCCD) Commanding Officer Capt. Rich Blank (seated); NSWCCD Technical Director Dr. Tim Arcano; NSWCCD Comptroller Office Department Head and award recipient Robert Simpson; and NAVSSES Commanding Officer Capt. Walter Coppeans watch the Wavemaker construction time-lapse video. (U.S. Navy photo by Ryan Hanyok/ Released)

REAR ADMIRAL GEORGE W. MELVILLE AWARD



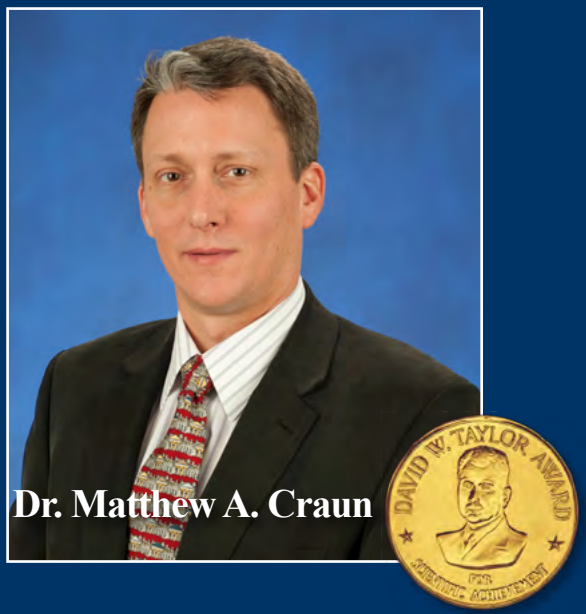
For his unique and superior technical expertise that has resulted in more than 60 patents documenting his pioneering research and development efforts and their application and implementation to resolve and/or enhance U.S. Navy capabilities.

CAPTAIN HAROLD E. SAUNDERS AWARD



For his outstanding technical knowledge and leadership in the conception, development and demonstration of the WILMA moored sensor system.

REAR ADMIRAL DAVID W. TAYLOR AWARD



For the development and execution of a robust research and development program aimed at identifying key knowledge gaps and developing enabling technology to achieve advanced, affordable acoustic stealth for the Ohio Replacement Program.

NSWCCD Magnificent Seven recipients were presented a pin designed after the compass rose on the rotunda floor in Building 2 in West Bethesda, Md., along with a medal depicting the likeness of each award's namesake. (U.S. Navy photo by Katie Ellis-Warfield/Released)