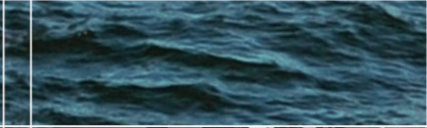
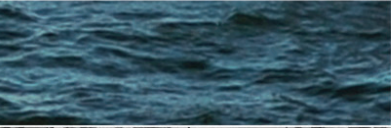
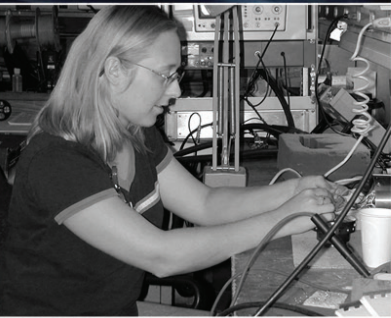




Naval Sea Systems Command

ONWATCH

2011



Keeping America's Navy #1 in the World!



NAVSEA COMMANDER'S FOREWORD

It has been two and a half years since we embarked on our Agenda for Change. I am proud of the steady progress the command has made in achieving the goals we have laid out. These goals are instrumental in fulfilling the needs of the Fleet, achieving a 313-ship Navy and in ensuring our ships reach their intended service life. Our goals and the progress we have made have increased our credibility with the CNO, SECNAV and Fleet Commanders. The work that every NAVSEA employee does is instrumental in this achievement.

One of the most crucial goals that NAVSEA began this year was improving surface ship material condition. We partnered with the surface Fleet on a series of initiatives to increase Fleet support and improve maintenance practices across ship classes. The most critical initiative was realignment of the NAVSEA's surface ship readiness organization. We established the Surface Maintenance Engineering Planning Program to provide comprehensive assessment and sustainment infrastructure for surface ships and reconstituted the intermediate level maintenance performed by the Regional Maintenance Centers. Our Surface Ship Readiness Initiatives and Total Ship Readiness Assessments will provide a framework to execute comprehensive ship life cycle inspections. These initiatives, along with projects such as the Corrosion Control Assist Teams and equipment covers designed to protect deck equipment from rust will ensure that all surface ships are fully mission-ready and able to achieve their expected service life.

We worked this year to improve short term availabilities at our Naval Shipyards, delivering seven of eight submarine availabilities on time and delivering our first Trident refueling availability on time. This monumental progress was critical to maintaining the readiness of the Atlantic and Pacific submarine Fleet and maturing our "Back to Basics" initiative in the shipyards.

One of the biggest Reduction of Total Ownership Cost (RTOC) plans NAVSEA took on this year was on the Virginia-class submarine program. This effort reached out to stakeholders in the Fleet operations and support community to reduce maintenance availabilities to three over the service life of the submarine. By doing so, this provided the Fleet more submarine deployments. What a fantastic achievement!!!! Additionally, the PEO has tirelessly worked to reduce Virginia-class

construction span to 60 months in FY 12. We are well on our way to making that milestone!! We are currently at 65 months with USS Missouri (SSN 780) and over the next eight hulls, we will achieve a reduction of five months—something I think is extremely doable.

In 2010, NAVSEA directed improvements in the acquisition process. Central to this was improving the performance of the Supervisors of Shipbuilding (SUPSHIP) by focusing on correcting cost, schedule and quality issues discovered in the shipbuilding process. NAVSEA increased manning at the SUPSHIPS and focused on improving shipbuilder first-time quality.

Also, this year, Program Executive Officers and NAVSEA led the way in putting in place more fixed price contracts. Central to this was the award of two fixed-price incentive production contracts for the design and construction of 20 littoral combat ships. This dual buy strategy represented a unique and valuable opportunity to lock in the benefits of competition and provide needed ships to the Fleet in a timely manner. The Navy was able to maximize our buying power by leveraging the highly effective competition between the bidders. As part of the dual award, the contractors will each deliver a technical data package which will allow the government a wide range of viable alternatives for effective future competition and enable the Navy to efficiently produce these ships at an increased rate and meet operational requirements sooner.

The innovation of the NAVSEA/PEO team in this competition reflects improvements to 'the way we do business' to deliver better value to the taxpayer and greater capability to the warfighter. The benefits of competition, serial production, employment of mature technologies, design stability, fixed-price contracting, commonality, and economies of scale will provide a highly affordable ship construction program.

Hand-in-hand with improving acquisition practices is our effort to reduce total ownership cost (TOC). NAVSEA was successful in proving our commitment to Navy TOC reduction initiatives, identifying hundreds of potential initiatives and submitting the 35 most promising, mature and technologically feasible ideas to Navy leadership for review. We received funding for eight of the 13 initiatives that the Navy chose to invest in for fiscal year 2012. These initiatives will result in savings of more



Throughout the year, Naval Sea Systems Command (NAVSEA) Commander, Vice Adm. Kevin McCoy, visited command field activities to emphasize the importance of Back-to-Basics, Wounded Warrior and Total Ownership Cost reduction initiatives as the NAVSEA enterprise builds and sustains the Fleet. U.S. Navy photos by Ricky Thompson, Jim Cleveland and Laura Lakeway.

than \$500 million over the future-years defense plan. This is in addition to the hundreds of other TOC reduction initiatives being worked by the NAVSEA team, ranging from business processes such as telephones, to reduction in maintenance availabilities for Virginia-class submarines. These ideas have come from all levels of NAVSEA and continue to be recognized in our biannual TOC awards. This is AWESOME!!

The ever increasing cost of oil has made it vital that the Navy reduce its dependence on fossil fuels. Secretary of the Navy Ray Mabus has made this one of his highest priority goals. NAVSEA made critical progress this past year to support this strategic imperative with initiatives to increase the efficiency of existing platforms through technologies such as advanced underwater hull and propeller coatings, stern flaps, solid state lighting and smart voyage planning system. These “quick win” energy saving technologies, when fully implemented, are projected to produce nearly \$24 million a year in savings – indeed, an innovative feat! Additionally, NAVSEA evaluated an algae-based biofuel aboard both a rigid-hull inflatable boat and a riverine combat boat. Our efforts in this area are crucial towards the Navy goal of a “Green Fleet” by 2016.

The bedrock of NAVSEA is its people. In 2010, we took a hard look at how we fill leadership positions and how we manage talent to ensure that we have a diverse team that truly reflects the capabilities of the country. We will continue this effort in 2011, ensuring that diverse candidates are considered for every senior level position in the entire command. In 2010, our successful hiring playbook pursued not only entry level candidates, but several mid-career professionals, in particular hiring several competent professionals from the Detroit auto industry. Also we are successfully expanding our science, technology, engineering and math outreach initiatives with many key programs in K-12 as well as at the university level. These programs will ensure we will continue to attract the best talents to join our future workforce.

Perhaps the most important commitment NAVSEA made this past year was to become the nation’s leader in hiring Wounded Warriors. We exceeded our hiring goal by 210 percent, hiring more than 280 Wounded Warriors across the command in 2010. In addition, we partnered with federal agencies and private organizations to develop programs and training for veterans to be able to qualify for NAVSEA careers. We will continue this leadership role in 2011 with a goal to hire 365 Wounded Warriors—one for every calendar day—and continue to lead the nation with our Wounded Warrior hiring programs by expanding Learning and Education Centers nationwide. We owe this to the young men and women who have sacrificed so much for our nation in support of freedom around the world.

These are only a few examples of the TREMENDOUS progress NAVSEA made in 2010. In 2011, we will keep our attention on solid performance in our Agenda for Change focus areas *and* also implement several new initiatives aimed at driving costs out of our operations at every level. I am counting on every member of the NAVSEA Team, military and civilian, to help in this regard.

Through the pages of On Watch 2011, I invite you to read in more detail about the men and women of NAVSEA and the awesome work they do every day in maintaining the current Fleet and supporting development of the future Fleet. It is the engineering and technological capabilities of the people of NAVSEA who make the difference in Keeping America’s Navy #1 in the world!

KEVIN M. MCCOY
VICE ADMIRAL, U.S. NAVY
COMMANDER, NAVAL SEA SYSTEMS COMMAND

CONTENTS

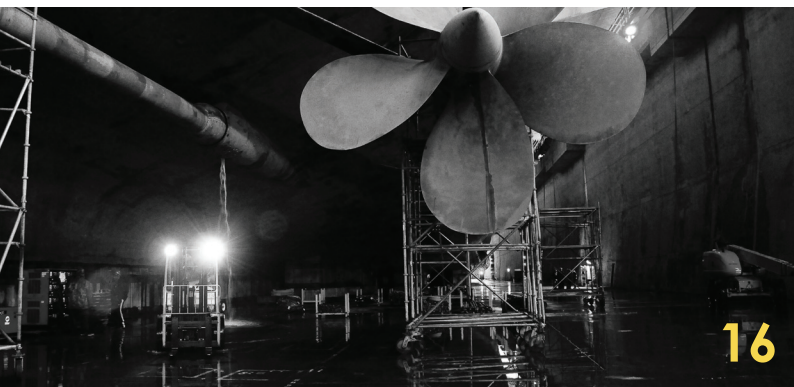
WELCOME

- 2** WELCOME
By Kevin M. McCoy, Vice Admiral, U.S. Navy
Commander, Naval Sea Systems Command
- 4** WELCOME
By Brian Persons, Executive Director,
Naval Sea Systems Command



SUSTAIN THE CURRENT FLEET

- 8** TOTAL OWNERSHIP COST



- 10** SURFACE MAINTENANCE
- 12** NAVAL SHIPYARDS:
MAINTAINING FLEET READINESS
- 16** CARRIER MAINTENANCE
- 18** SUPSALV:
RESPOND, RECOVER, RESTORE
- 20** AEGIS UPGRADE

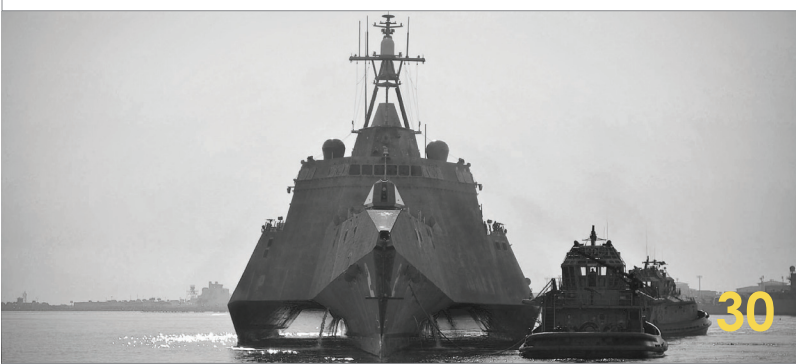
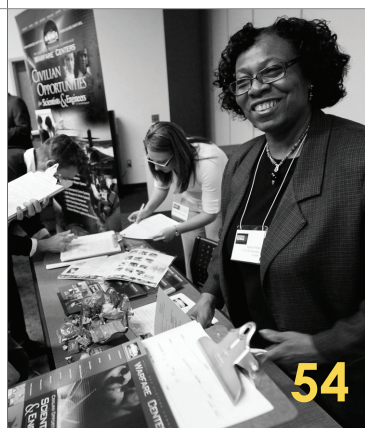
BUILD THE FUTURE FLEET

- 24** WARFARE CENTERS
- 30** LCS: FLEXIBLE SOLUTIONS
- 34** SPECIAL MISSION SHIPS
- 36** VIRGINIA CLASS SUBMARINES
- 38** OHIO CLASS REPLACEMENT

- 40** SUPERVISOR OF SHIPBUILDING
- 42** SHIP TO SHORE CONNECTOR
- 43** JOINT HIGH SPEED VESSEL
- 44** MOBILE LANDING PLATFORM:
PIER IN THE OCEAN
- 46** UNMANNED MARITIME SYSTEMS
- 48** ZUMWALT CLASS
CUTTING EDGE DESIGN
- 49** IRAQI NAVY RECAPITALIZATION
- 50** ENERGY INNOVATION

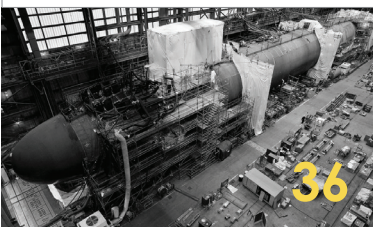
ENABLE OUR PEOPLE

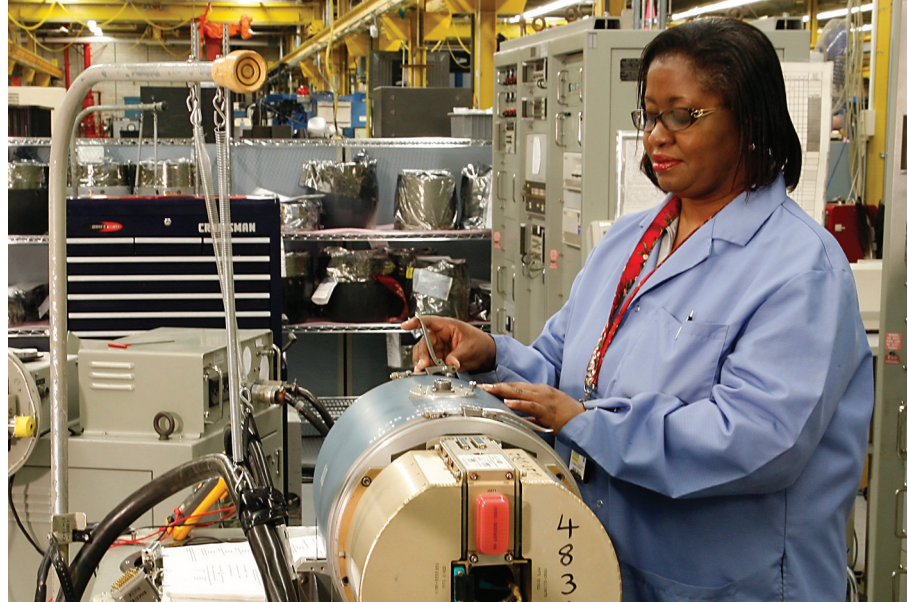
- 54** RECRUITING



- 56** WOUNDED WARRIORS

- 58** OUTREACH





WELCOME!



ENDURING CHALLENGES, TOUGH CHOICES, AND ULTIMATELY, MAKING CHANGE HAPPEN CHARACTERIZED 2010 FOR NAVSEA'S EXECUTIVE DIRECTOR, MR. BRIAN PERSONS. HE CONSIDERS THE CUMULATIVE EFFORTS OF BOTH LEADERSHIP AND THE WORK FORCE IN 2010 AS A CRITICAL FOUNDATION FOR SUCCESSFUL IMPLEMENTATION OF PLANNED PROGRAMS AND INITIATIVES IN 2011. THE FOLLOWING ARE Q&A EXCERPTS FROM ON WATCH 2011'S INTERVIEW WITH MR. PERSONS.

Q: As NAVSEA's senior civilian, what was your primary focus in 2010 for the command?

Brian Persons: It was a very busy year. My primary focus was aligning our senior leadership with the critical work that needed to be accomplished. And a big part of this was to prepare our organization for the inevitable federal budget that is coming for FY11 and FY12.

Vice Adm. McCoy mandated these preparations in his agenda for change, and orchestrating the efforts of the senior civilian leadership with the military is really the best way to address those organizational issues.

We really had a full plate this past year with our transition out of NSPS, our implementation of ERP and our constant efforts to press forward in delivering our products to the Fleet. This involved a lot of interaction between big Navy and the NAVSEA family to understand how to get our body of talent to work with more cohesiveness.

Q: What are you focusing on for 2011?

BP: This is going to be an interesting year. My biggest focus is continuing with the ERP deployment and following through on the projects that we proposed in 2010 as initiatives to the CNO. This will be a year that is focused on getting things done. We have to put our standards in place and go tactically and execute all the strategic initiatives that we've obligated ourselves to do. My job is not so much to focus any one piece of this effort, but to really bring all of it together. We have a portfolio, and I have to figure out how to make that portfolio work in a very dynamic and changing environment. It's going to be a real challenge.

Q: I understand the command made some tremendous progress in identifying RTOC (Reduction in Total Ownership Cost) initiatives and implementing ERP (Enterprise Resource Planning). What would you attribute this success to?

BP: We were successful in identifying opportunities. Now, it's time for us to move forward and execute these initiatives. I would attribute success to the fact that we made it personal for everyone. We gave everyone an RTOC initiative, and what came out of that was an organizational awareness that this approach to our work environment is something that's important to the command.

ERP on the other hand, was clearly an implementation challenge. What really made the implementation successful was the alignment of the Senior Executives to help pull together the complexity of issues correctly and drive it down to a personal

level for everybody. ERP really worked because we made it a personal objective of everybody in the command. If you don't take this down onto everybody's desktop, then people start to rationalize, "that's really not important to me." This was critical, because even simple things—like just going to the training program for ERP and enduring it—was something that we all had a stake in, and that made it personal.

Q: As we move forward in 2011, what is your key message for the work force?

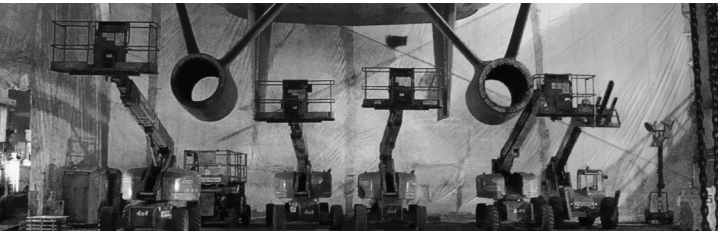
BP: The key message to the work force this year is that with all the ambiguity that's going on around us, both politically and in the budget, we need to make sure that we stay focused on the priorities already in our hands and that we execute them. This is a good year to stay low, execute, and not get caught up in all the drama that is going on around us. Yes, there's no question that we have churn around us; a lot of political changes are going on around us, and there's a lot of budget uncertainty. In these times, the one thing you've got to be able to do, is execute your programs efficiently and effectively. I believe that's critical—now more than ever. We've been given tasks. We have been given the resources to execute these tasks. Now we have to complete our tasks as effectively and efficiently as we can. That's going to be the challenge. The warfighter is still out there, still fighting the war. We can't lose focus of what we need to do to make them successful.

For me, in the leadership position, I have to stay true to the things that we committed to 3 or 4 years ago in rebuilding the work force. That's going to be the number one priority.

Q: How can we stay focused on the way ahead in 2011?

BP: Here's the bottom line. The way to effectively and efficiently deliver programs is through solid planning and firm understanding of the details of your program. If you plan well, have a system, and understand the details – you usually are successful. Now, it takes a lot of time and effort to do that, and I would tell our work force to keep focused on the details of your program. When you get to a point where you have an issue, raise it to the senior leadership.

Even in this time of budget uncertainty, there are opportunities that present themselves. If you look at your issue from a different perspective, and you can begin to see that where there's chaos, there's opportunity. It's just a matter of whether or not you can take the initiative, align your team and resources and move them forward with that focus in mind. While it may be difficult, there are opportunities. It's our job to be agile and thoughtful enough to be able to take advantage of them. ■■■



SUSTAIN THE CURRENT FLEET







TOTAL OWNERSHIP COST: ACHIEVING ACQUISITION EXCELLENCE



REDUCTION IN TOTAL OWNERSHIP COST FOCUSES ON EFFICIENCIES THROUGHOUT THE SHIP AND SYSTEM ACQUISITION PROCESS, FINDING SOLUTIONS TO BEST SERVE FLEET READINESS AND CAPABILITY. IT FURTHER SUPPORTS MANAGEMENT OF THESE ASSETS THROUGHOUT THEIR RESPECTIVE LIFE CYCLES, RESULTING IN AN EFFECTIVE, AFFORDABLE FUTURE FLEET.

In 2010, NAVSEA, its field activities and affiliated Program Executive Offices (PEOs) committed to creating more efficient processes in an effort to reduce total ownership costs (TOC).

"We've taken a close look at our obligations and have really done our best to turn the magnifying glass on our own finances and resources," said Vice Adm. Kevin McCoy, commander, NAVSEA. "The Department of

Defense has asked us to look for efficiencies that will reduce our overall spending without compromising our critical missions."

NAVSEA, at the request of CNO, identified initiatives, such as the elimination of cumbersome work practices and pursuit of commonality, to yield a better return on investments.

"Across the Navy, the Pentagon chose 13 total ownership cost reduction initiatives to invest in for fiscal year 2012," said PEO Aircraft Carriers Executive Director Bill Deligne. "Eight of those are NAVSEA initiatives. Obviously, we've been very successful proving this command's commitment to TOC reduction."

The 2010 TOC initiatives provided by NAVSEA range from revising *Virginia*-class submarine drawings to incorporating an electronic work management system that enables shipyards to conduct maintenance more efficiently. Based on these initiatives, the Department of Defense will direct \$50 million in research and development funding to NAVSEA. That investment is projected to yield almost \$400 million in savings.

"We didn't need an order from the Pentagon to focus on TOC," said PEO Submarines Executive Director Steve Schulze, who, along with Deligne, has been working on TOC initiatives across the command for the last few years. "The fact that we were able to generate so many initiatives in such a short amount of time was proof. NAVSEA understands life cycle cost. We're ahead of the game and we have been for a long time."

Part of NAVSEA's success in reducing TOC comes from a top-down effort to enable all of its employees to be an integral part of the reduction effort.

PHOTOS: In 2010, Reduction of Total Ownership Cost initiatives emerged from every level of the NAVSEA organization, from Fleet repair and maintenance improvements to the low-cost chemical detection kit directly supporting deployed troops. Anticipated savings from these efforts are more than \$700 million over the next five years. U.S. Navy photos by MC2 Gretchen Albrecht, Greg Vojtko, MC2 Zane Ecklund, Jim Cleveland and Mike Welding.

NAVSEA has long funded TOC reduction internally, rewarding employees in 2010 with \$190,000 in cash awards for successful life cycle cost reduction initiatives. NAVSEA's success relies on a collaborative process, with input from industry and sharing of best practices among various PEOs and field activities.

One internal TOC reduction led to the creation and implementation of the Launch and Recovery System version 3 (LRS v3) for Unmanned Underwater Vehicle (UUV) testing. The new system allows for a smaller boat and significantly reduced manpower to launch the UUV, using just two support personnel instead of the five to 12 required for crane operations. To date, LRS v3 has produced \$720,000 in savings and cost avoidance and is projected to save \$2.72 million over the system's life span.

"ACROSS THE NAVY, THE PENTAGON CHOSE 13 TOTAL OWNERSHIP COST REDUCTION INITIATIVES TO INVEST IN FOR FISCAL YEAR 2012. EIGHT OF THOSE ARE NAVSEA INITIATIVES."

BILL DELIGNE
PEO AIRCRAFT CARRIERS EXECUTIVE DIRECTOR

Not all of the internal TOC reductions require technological advances to materialize. A simple audit of labor practices has produced savings through better work force management.

One such TOC reduction at NAVSEA in 2010 included cross-training employees to eliminate workload redundancies and relocating shops to a central area to allow for better workload management, reduced labor costs, and less wasted space. The project, initiated at the Southeast Regional Maintenance Center, triggered substantial productivity improvements and produced a total savings and cost avoidance of more than \$1.8 million and is projected to yield a five-year savings of \$12.6 million over the Future Years Defense Plan.

In all, the internal TOC reductions from 2010 are anticipated to save the Navy more than \$700 million over the next five years.

"Savings are popping out from every corner of our organization," said McCoy. "We're continuing to use these to build a smarter, more efficient organization while setting the example for other Navy commands to follow." ■■■

KEEPING UP WITH THE NECESSARY MAINTENANCE OF SHIPS THAT OPERATE IN THE OCEANS' HARSH ENVIRONMENTS IS A NEVER-ENDING CHALLENGE. A BLUEPRINT FOR RENEWED FOCUS ON THE PLANNING AND APPROACH TO MAINTAINING THE SURFACE FLEET WILL CHART A COURSE FOR GREAT READINESS EFFICIENCIES.



SURFACE MAINTENANCE

With more than 70 percent of the future Fleet already in-service today, the Navy has reinvigorated its goal to ensure each surface ship class will reach its expected service life.

To support increasing global requirements, the Navy must put higher demands on the aging surface fleet. The average steaming hours underway have increased more than 30 percent in the past 10 years. Additionally, the average service life of a Navy ship has increased from 14.8 years to 15.5 years between 2004 and 2008. This increased operational tempo and longer average surface ship service life, without a corresponding increase in sustainment resources, merited a change in approach to surface ship readiness.

To better understand the items that impact the life cycle of a ship, NAVSEA partnered with the American Bureau of Shipping in the summer of 2007 to conduct surface ship

life cycle assessment pilot studies on four different ships representing four ship classes—*Arleigh Burke*-class guided-missile destroyers, *Ticonderoga*-class guided-missile cruisers, *Oliver Hazard Perry*-class guided-missile frigates and *Whidbey Island*-class dock landing ships. The surveys focused on items that impact the life cycle of the ship, such as hull thickness and distributed systems. The assessment pilots provided a solid analytical basis for making crucial maintenance and repair decisions. This effort also utilizes industry best practices

ABOVE: Shipwrights at Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility stage for net repairs aboard the guided-missile destroyer USS *Hopper* (DDG 70). **RIGHT:** Norfolk Naval Shipyard naval architects Bobby Griffin and Allen Lester take measurements of USS *Wasp's* (LHD 1) print shop storeroom contents. U.S. Navy photos by Katie Vanes and MC1 Johnny Michael.

to provide a full view of the criticality of needed maintenance actions. The data will ultimately be a part of the engineered solution for the Class Maintenance Plan for each surface ship class, which is the blueprint for maintaining material readiness through the life cycle for all classes of the surface force.

In January 2010, the Navy launched a series of longer-term Surface Ship Readiness Initiatives (SSRI) to increase waterfront support and improve maintenance and modernization efforts across surface ship classes to keep pace with mission requirements. These SSRIs include:

- ▶ Integrated Assessment Program—a robust assessment program based on a rigorous approach to identifying, evaluating and screening maintenance items.
- ▶ Integrated Sustainment Program—a dedicated sustainment program that is in place throughout the surface Fleet to monitor ships during their operational phase and that provides reliable distance support between major availabilities.
- ▶ Reconstitution of Intermediate Maintenance Activity Capacity/Capability—the right resources, in place and trained to execute all required maintenance.
- ▶ Availability Completion/Work Certification—a work and certification process by which all work needed to be done during availabilities is completed and certified prior to returning to sea.



Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility workers provided maintenance for more than 80 ships during 2010 Rim of the Pacific Exercise, the largest maritime exercise in the world. U.S. Navy photo by Katie Vanes.

- ▶ Surface Maintenance Engineering Planning Program (SURFMEPP) Activity—an organization that manages the entire maintenance process with the responsibility, manpower and technical know-how to get the job done the right way.

Formally stood up in May 2009 as the Surface Ship Life Cycle Management Activity, SURFMEPP was expanded to a shore facility on Nov. 8, 2010, to provide a more comprehensive assessment and sustainment infrastructure for surface ships. The mission of SURFMEPP is to support the level of material readiness that surface ships must achieve to meet their expected service life. The activity provides a means to fully manage the maintenance requirements for ships in the surface Fleet to allow for better planning and increased cost efficiency.

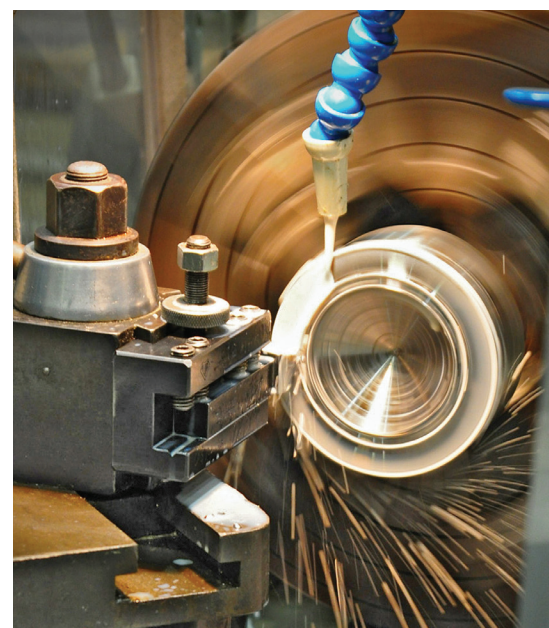
To address the immediate challenges of maintaining warfighting readiness through the life cycle, NAVSEA is leading a series of task forces, focused on developing readiness improvement recommendations for each of the critical mission systems and surface ship classes. The task forces leverage a repeatable framework and disciplined analysis to effectively identify and address deficiencies. Over the past year, surface Navy leadership has commissioned four separate readiness task forces: AN/SPY-1/Aegis Weapon System Readiness Task Force; Mine Countermeasures Ships Readiness Task Force; LPD 17 Class Wholeness Task Force; and Aegis Ballistic Missile Defense Task Force.

Each of these task forces has been charged to undertake an assessment of its given area and then develop and propose a series of actionable recommendations that can be implemented to both improve current readiness and sustain those improvements into the future.

These NAVSEA readiness initiatives demonstrate a commitment to Fleet readiness and a holistic approach to ensure surface ships are ready for tasking, now and in the future. ■■■



NAVAL SHIPYARDS: MAINTAINING FLEET READINESS



A KEY TO ACHIEVING A 313-SHIP NAVY IS THE CRITICAL MODERNIZATION AND MAINTENANCE TASKS THAT KEEP THE FLEET FIT AND READY. THE NAVY'S FOUR PUBLIC SHIPYARDS SHOULD A LARGE PORTION OF THIS EFFORT, OFFERING ESSENTIAL SERVICES THAT ENSURE FLEET READINESS TODAY AND PREPAREDNESS FOR TOMORROW.

B

y 2020, the Navy will require a minimum Fleet size of 313 ships to meet threats to maritime security and defend national interests.

Of that future Fleet, more than 200 ships, or 73 percent, are in our Navy today, so a critical part of NAVSEA's shipbuilding challenge is to ensure that these ships remain ready and relevant throughout their established service lives.

While NAVSEA maintains the Navy's ships together with commercial industry partners, the cornerstone of this maintenance task lies with the four Navy-owned and -operated shipyards—Norfolk Naval Shipyard in Portsmouth, Va.; Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility in Pearl Harbor, Hawaii; Portsmouth Naval Shipyard in Kittery, Maine; and Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Bremerton, Wash.—that do their part to keep every submarine, aircraft carrier and many surface ships modernized and maintained throughout their service lives.

"The shipyards are critical readiness providers for the Fleet," said Rear Adm. Joseph Campbell, NAVSEA deputy commander for Logistics, Maintenance and Industrial Operations (SEA 04). "We've got to make sure the yards are doing their work as efficiently as possible, because the Fleet depends on Naval Shipyard performance. Anything we can do to improve shipyard performance has a direct effect on Fleet readiness."

BACK TO BASICS

During the past year, Campbell's office, responsible for the management of the public Naval Shipyards, has worked with the shipyard commanders on a "back-to-basics" campaign to reduce the time and cost required to complete availabilities, particularly for submarines.

Specifically, from 2005 to the end of 2010, the Naval Shipyards have continued to improve by increasing the percentage of on-schedule availability completions, nearly doubling their rate from 22 percent to 43 percent, and reducing availability schedule delays by an average of 31 days. Additionally, the

PHOTOS: The four naval shipyards perform logistics support and work in connection with ship construction, conversion, overhaul, repair, alteration, dry docking, outfitting, manufacturing research and test work. U.S. Navy photos by Jeremy Lambert, Marshall Fukuki and Jim Cleveland.

shipyards were able to decrease the amount of worker over-time by 5 percent, further reducing availability costs.

"In 2010, we completed seven of eight shorter submarine availabilities—as well as the first Trident submarine availability—on time," said Campbell. "Our challenge now is taking on the longer submarine availabilities and improving the performance on those."

The shipyards were able to meet these goals through a series of initiatives designed to reinforce existing standards while improving processes through increased management oversight on the work sites.



SUSTAIN THE **CURRENT FLEET**

Additionally, the shipyards have incorporated some simple yet obvious concepts to improve efficiencies, such as moving tools and other consumables closer to the worksite.

For example, Portsmouth Naval Shipyard installed consumable material vending machines inside trailers at two of the yard's three drydocks, reducing the amount of time it takes for shipyard mechanics to acquire needed parts and tools. The vending machines are stocked with common materials—from drill bits to batteries—that workers use daily in repair processes. In addition to materials in the machines, the trailers are also stocked with low-cost consumable items that are needed many times each shift, such as respirator cartridges and rags, thus eliminating the need to staff a manual shop store. The installation of the vending machines has produced a total savings and cost avoidance of more than \$265,000, and the shipyard expects to see a five-year savings of almost \$2 million. The vending machine initiative has since been implemented at Pearl Harbor Naval Shipyard, and could soon be implemented at Puget Sound Naval Shipyard, Norfolk Naval Shipyard, and maintenance facilities in Yokosuka, Japan.

Critical to further reducing the time required to complete shipyard periods is the Electronic Technical Work Documents (eTWD) initiative. This initiative will begin in 2011 with plans to implement it across all the shipyards in 2014.

"This is one of our biggest total ownership cost initiatives," said Campbell. "Today, we manage everything on paper, but eTWDs will allow us to move everything to an electronic system. We believe this system will result in an almost 10 percent reduction in our total workload and by 2016, we could see more than \$60 million in savings."

2010 MILESTONES

Beyond the implementation of the back-to-basics initiatives, all four Naval Shipyards had several major accomplishments in 2010.

Norfolk Naval Shipyard completed several major availabilities

on cost and on schedule in 2010, including USS *Montpelier's* (SSN 765) Drydocking Selected Restricted Availability, completed July 26—eight days early—and USS *Newport News'* (SSN 750) Continuous Maintenance Availability, completed March 30.

Portsmouth Naval Shipyard successfully completed USS *Helena's* (SSN 725) Engineered Overhaul on Sept. 9. On Oct. 1, the shipyard began the first-of-class major maintenance availability on USS *Virginia* (SSN 774). While at the shipyard, the submarine will undergo a 14-1/2-month Extended Drydocking Selected Restricted Availability, which consists of various maintenance work and several system upgrades.

On the other side of the country, Puget Sound Naval Shipyard completed 10 major availabilities in 2010, including USS *Abraham Lincoln's* (CVN 72) eight-month Planned Incremental Availability, USS *Michigan's* (SSGN 727) Major Maintenance Period, and USS *Nevada's* (SSBN 733) Engineered Refueling Overhaul, the first Trident submarine refueling to be completed in 27 months, a record time that will become the new standard for SSBNs.

Pearl Harbor completed two major Chief of Naval Operations availabilities—USS *Cheyenne's* (SSN 773) Depot Modernization Period and USS *Bremerton's* (SSN 698) Drydocking Selected Restricted Availability. Earlier in the year, Pearl Harbor completed a unique availability, undocking the Battleship *Missouri* after completing a four-month, \$18 million maintenance and preservation period. The battleship is one of 46 museum ships donated by the U.S. Navy.

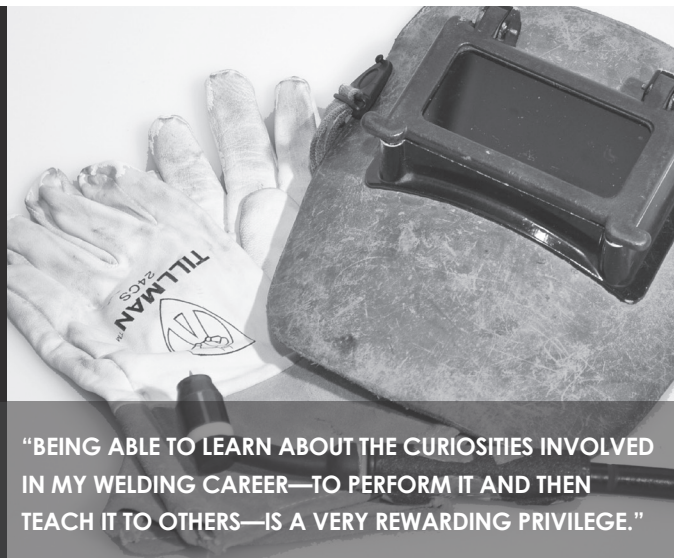
Not all of these availabilities were completed at the shipyards. Two major aircraft carrier overhauls were conducted by a work force deployed thousands of miles from their respective facilities.

Norfolk Naval Shipyard successfully completed USS *Ronald Reagan's* (CVN 76) six-month Planned Incremental Availability May 19 at San Diego's Naval Air Station North Island. The project came in under budget and marked Norfolk Naval Shipyard's largest off-site availability, as well as the largest public-sector work package performed on an aircraft carrier

BERNARDINE MANIBOG

NUCLEAR WELDER
PEARL HARBOR NAVAL SHIPYARD &
INTERMEDIATE MAINTENANCE FACILITY

Manibog assists different lead shops with burning or welding services that range from ripping-out, repairing or replacing structures, components or piping on nuclear systems.



"BEING ABLE TO LEARN ABOUT THE CURIOSITIES INVOLVED IN MY WELDING CAREER—TO PERFORM IT AND THEN TEACH IT TO OTHERS—IS A VERY REWARDING PRIVILEGE."



berthed at North Island. During peak manning, more than 625 shipyard workers from Norfolk and 165 shipyard employees from Puget Sound worked on the project each day.

Similarly, more than 700 Puget Sound employees completed USS *George Washington's* (CVN 73) Selected Restricted Availability in Yokosuka, Japan, May 11. This was the ship's second major repair period since being forward deployed to Japan, and the availability was completed within schedule and budget.



Portsmouth Naval Shipyard Shipfitter Nicholas Libby grinds a piece of steel in the facility's Structural Shop. U.S. Navy photo by Jeremy Lambert. Featurette photos by Liane Nakahara.

WORK FORCE

During the past year, each Naval Shipyard has reached out to its local community, as well as academia, to recruit the next generation of shipyard employees.

During fiscal year 2010, Puget Sound alone participated in 43 different hiring events around the country and visited approximately 30 colleges and universities, placing an emphasis on attending diversity recruiting events. Because of that additional effort, the shipyard is benefiting from an increasingly diverse engineering work force, a critical part of NAVSEA's commitment to building a work force that reflects the diversity of the nation.

For new employees, the Naval Shipyards have developed robust apprentice programs—most lasting a full four years—in partnership with local colleges and universities. The programs include classes in mathematics, physics, design and trade theory, as well as on-the-job training. Puget Sound graduated 188 employees and Pearl Harbor graduated 126 from apprentice programs in 2010. Portsmouth graduated 75 and Norfolk graduated 116.

A milestone for the Naval Shipyards' apprentice programs was the establishment of the Southwest Regional Apprentice School at Naval Air Station North Island, San Diego, which opened its doors to an inaugural class of 24 apprentices, Aug. 16.

The new school—a partnership between Puget Sound Naval Shipyard & Intermediate Maintenance Facility, Southwest Regional Maintenance Center, Naval Air Systems Command's Fleet Readiness Center Southwest, and Southwestern College—is the Navy's first southwest regional apprenticeship program for developing highly skilled journey-level workers and leaders to support the needs of multiple commands.

The shipyards also began offering mentoring programs for employees of all experience levels. The programs provide an opportunity to form goal-oriented partnerships that support individual and organizational development. These partnerships allow learners to explore new experiences and possibilities that they wouldn't necessarily learn on the job or in a classroom.

Finally, NAVSEA and the shipyards continue the commitment to providing a safe working environment to all employees. All four shipyards are certified as Voluntary Protection Program (VPP) star sites. The Occupational Safety and Health Administration's VPP Star program recognizes organizations that have comprehensive safety and health management systems and a robust commitment from labor, management, and employees to continuous, cooperative safety relationships in the workplace. "Star" status indicates a facility has operated at a safety rate superior to the national average, and recognizes continued excellence in work force health and safety matters.

Following NAVSEA's Safety Summit meeting in May 2010, all Naval Shipyards committed to mainstream safety and eliminating hazards to as low as reasonably achievable as part of a Voluntary Protection Program Plus initiative. Since then, Portsmouth Naval Shipyard, for example, instituted a comprehensive safety awareness course for its employees, working with personnel at all levels to proactively identify potential hazards.

March 2, Pearl Harbor Naval Shipyard was awarded second place in the large industrial category for its safety initiatives. Through workplace inspections, annual safety off-sites and collaboratively developed safety improvement initiatives, the shipyard has seen a 34 percent decline in its total case rate over the past 3 years.

The Naval Shipyards will continue refining each of these focus areas in 2011, working hard to increase the number of on-time availabilities, finding areas to reduce total ownership costs, and maintaining a diverse and highly trained work force to sustain today's Fleet. ■■■

CARRIER MAINTENANCE

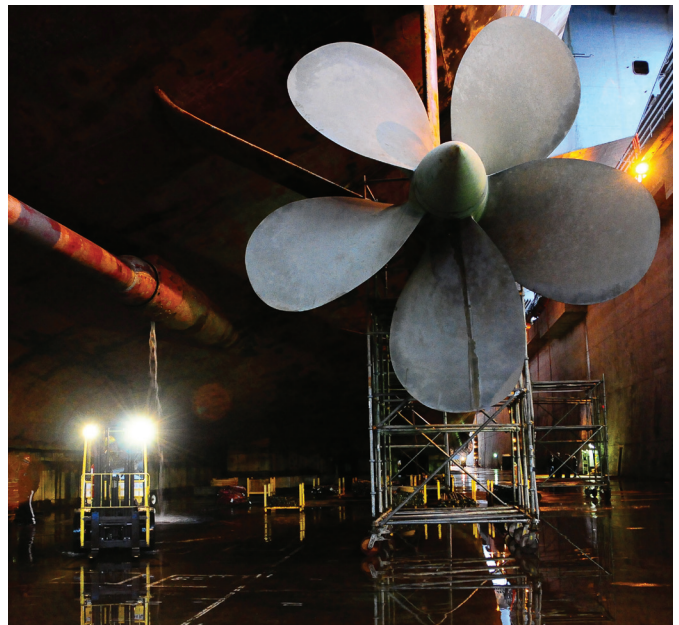
A KEY TO THE LONG LIFE OF AN AIRCRAFT CARRIER AND ITS FIVE DECADES OF SERVICE IS CONSTANT ATTENTION TO READINESS AND MODERNIZATION PRACTICES. WHEN THAT CARRIER IS FORWARD DEPLOYED OVERSEAS, A NOVEL APPROACH COORDINATES MAINTENANCE AND OPERATIONAL DUTIES.

At any time, half of our nation's aircraft carriers may be at sea conducting training, transiting or supporting overseas contingency operations. Keeping these national assets "fit to fight" requires periodic maintenance and modernization throughout the aircraft carrier's 50-year life cycle—a responsibility of the In-Service Aircraft Carrier Program Office, Program Executive Officer Aircraft Carriers (PEO CVN), and the rest of the Naval Aviation Enterprise carrier maintenance community.

In 2010, PEO CVN led the completion of 10 aircraft carrier maintenance availabilities. These ranged from four 30-day Carrier Incremental Availabilities to two Planned Incremental Availabilities, including one on USS *Abraham Lincoln* (CVN 72) and one on USS *Ronald Reagan* (CVN 76). An Extended Drydocking Selected Restricted Availability (EDSRA) on USS *Enterprise* (CVN 65) and three Selected Restricted Availabilities (SRA), including one on the forward-deployed USS *George Washington* (CVN 73), one following new construction on USS *George H.W. Bush* (CVN 77) and one following the Refueling Complex Overhaul on USS *Carl Vinson* (CVN 70).

In January, *Abraham Lincoln* completed its availability. The ship received numerous system upgrades and scheduled maintenance on its catapults, auxiliary systems, propulsion plants and combat systems suite during the 370,000 person-day availability at Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS & IMF).

Approximately 3,000 miles from PSNS & IMF, *Enterprise* completed its last EDSRA, April 19. The Navy accepted re-delivery



USS *Nimitz* (CVN 68) in dry dock at Puget Sound Naval Shipyard and Intermediate Maintenance Facility. During the year-long docking planned incremental availability, major upgrades will be made to the carrier's combat, self-defense, navigation, potable water, and other systems. U.S. Navy photo by MC3 Nichelle Noelle Whitfield. Featurette photos by Laura Lakeway.

of the 49-year-old carrier after receiving necessary ship maintenance and upgrades. *Enterprise* left Norfolk, Va., on Jan. 13, 2011, for its 21st deployment.

ANGELA BUTLER-FRANCO

PROCURING CONTRACTING OFFICER
NAVAL SEA SYSTEMS COMMAND
HEADQUARTERS



Butler-Franco provides critical mission support by obligating funds on behalf of the Government to procure goods and services for the Navy.

“AS A CONTRACTING OFFICER, I AM PROUD OF MY CONTRIBUTIONS TO THE ACQUISITION OF SHIP REPAIR AND TO MANAGING NAVSEA FACILITIES IN A TIMELY AND EFFICIENT MANNER.”

While each availability reflects an important milestone in a carrier's service life, the emphasis on *George Washington's* Selected Restricted Availabilities required a new way of implementing the carrier class maintenance plan.

When CVN 73 arrived in Japan in 2008 as the forward-deployed replacement for USS *Kitty Hawk* (CV 63), not only did

the carrier assume a greater operational tempo, it also came with challenges to its maintenance strategy.

Maintaining the carrier's readiness capability in that forward-deployed environment and an innovative approach to the carrier's established class maintenance plan requirements resulted in a successful forward-deployed maintenance strategy.

“We determined that we needed a series of 120-day Ship Restricted Availabilities with strategies to alternate maintenance in certain propulsion spaces, aircraft launch and recovery systems warfare systems, and other portions of the ship that impact berthing and quality of life. This will allow us to net the same maintenance and give the Navy the operational flexibility it needed,” said Capt. Frank Simei, In-Service Aircraft Carrier program manager.

Another means *George Washington* planners used to support readiness and operational requirements was to increase parts availability and long-lead-time material necessary for depot-level maintenance. This approach reduces the potential risk of not having the supplies when needed.

“Likewise, critical spares is a strategy we imposed state-side,” said Simei. “This has proved very worthwhile in completing availabilities on time.”

Following two successful SRAs, *George Washington* commenced its third SRA in early January 2011.

Regardless of the type of maintenance availability, each is the result of the strong partnership among the Naval Aviation Enterprise carrier maintenance community within the construct of Carrier Team One.

“Carrier Team One has developed into a high performance organization focused on process improvement, risk management and knowledge sharing,” said Simei. “These processes enable availability success and ensure the right maintenance and modernization is completed, the ship's material condition is what's expected, and that the Fleet gets the aircraft carrier back on time.” ■■■



The aircraft carrier USS *George Washington* (CVN 73) departs Busan, Republic of Korea. The Republic of Korea and the United States conducted the combined alliance maritime and air readiness exercise “Invincible Spirit” in the seas east of the Korean peninsula, July 25-28. U.S. Navy photo by MC3 Adam Thomas.



THE NAVY'S MARINE SALVAGE EXPERTS SERVED THE NAVY, THE NATION AND THE WORLD THIS YEAR. FROM AIRCRAFT RECOVERY TO UNDERWATER SHIP REPAIR TO THE DEEPWATER HORIZON POLLUTION ABATEMENT EFFORTS, THE UNIQUE QUALIFICATIONS OF THIS NAVSEA TEAM ARE IN DEMAND AROUND THE GLOBE.

In 2010, NAVSEA's Directorate of Ocean Engineering, Supervisor of Salvage and Diving (SUPSALV) experts provided technical, operational, and emergency capabilities in marine salvage, pollution abatement, diving, diving system certification, and underwater ship husbandry to improve Fleet readiness and capability across the globe.

The magnitude 8.8 earthquake and subsequent 9-meter tidal wave that struck Chile in February prompted a Chilean navy request for a U.S. Navy assessment of damage to its Naval Base Talcahuano and civilian shipyard. As part of a 12-person team, SUPSALV experts supported Chile's request, assessing piers, quay walls, dry docks, industrial facilities,

ships and offering reconstruction recommendations to senior Chilean military officials.

The Department of Homeland Security called on SUPSALV's expertise in April and requested the directorate's pollution response professionals ship 19 miles of oil containment boom to the Gulf Coast to reduce the environmental impact of the Deepwater Horizon oil spill off the Louisiana coast. More than 23,000 barrels of oil were recovered by SUPSALV and its contractor-support team from 23 oil-skimming systems.

"This was one of the biggest environmental challenges we've ever faced as a nation," said Capt. Patrick Keenan, NAVSEA's director of Ocean Engineering, Supervisor of Salvage



"THIS WAS ONE OF THE BIGGEST ENVIRONMENTAL CHALLENGES WE'VE EVER FACED AS A NATION. OUR TEAM TRAINS REGULARLY IN EXERCISES AROUND THE WORLD, AND I THINK THAT PREPAREDNESS FACTOR WAS REFLECTED IN THE SPEED OF OUR DEPLOYMENT WHEN WE GOT THE CALL TO SUPPORT THE ABATEMENT EFFORTS."

CAPT. PATRICK KEENAN, NAVSEA'S DIRECTOR OF OCEAN ENGINEERING,
SUPERVISOR OF SALVAGE AND DIVING

NAVSEA's Supervisor of Salvage and Diving is responsible for all aspects of ocean engineering – including salvage, oil pollution response, in-water ship repair, contracting, towing, diving safety, and equipment maintenance and procurement. Following the explosion and sinking of the ultra-deepwater oil rig Deepwater Horizon on April 22, 2010, SUPSALV responded with personnel and equipment to assist in mitigating damage from the massive oil spill that threatened the Gulf Coast. U.S. Navy photos by MC2 Justin Stumberg and Patrick Kelley.

and Diving. "Our team trains regularly in exercises around the world, and I think that preparedness factor was reflected in the speed of our deployment when we got the call to support the abatement efforts."

SUPSALV's salvage and diving team also employed their salvage expertise in the Pacific Ocean in April, supporting a U.S. Coast Guard-directed initiative to remove 60,546 gallons of petroleum products from the sunken ex-*Chehalis* (AOG 48). Ex-*Chehalis* sank in Pago Pago Harbor, American Samoa, Oct. 7, 1949, as a result of a gasoline tank fire and multiple explosions on the ship.

Other SUPSALV recovery efforts in 2010 included the

location and recovery of a USCG C-130 *Hercules* aircraft and a USMC AH-1 *Cobra* helicopter from 3,000 feet sea water (fsw) off the coast of San Diego, and an E-2C *Hawkeye* aircraft from 11,000 fsw in the North Arabian Sea in support of critical aircraft investigations.

In addition to location and salvage, SUPSALV's expertise includes Fleet maintenance support from its Underwater Ship Husbandry division. Underwater inspections and cleaning, maintenance and repair services to the Fleet were conducted throughout 2010. The division performed 108 support operations that precluded 61 costly drydockings and reduced life cycle costs for ships and submarines. ■■■

AEGIS UPGRADE

NEW THREATS, FROM THE AIR, LAND AND SEA, REQUIRE NEW TECHNOLOGY AND TOOLS FOR TIMELY DETECTION AND DEFENSE. A NEW SYSTEM ARCHITECTURE THAT ACCEPTS RAPID UPGRADES HELPS KEEP CUTTING-EDGE TOOLS AT THE FINGERTIPS OF FLEET TECHNICIANS.

In 2007, the Navy began a new phase of Aegis Combat System modernization for *Ticonderoga*-class cruisers and *Arleigh Burke*-class destroyers with the implementation of upgrades that will provide full ballistic missile defense (BMD) capabilities to defend against nuclear or conventional missile attacks on U.S. and allied territory.

The Aegis system, the backbone of the Navy's surface Fleet, provides immediate and effective capability to counter air, surface, and sub-surface threats to the Fleet and land-based friendly forces. Aegis-equipped ships can simultaneously attack enemy land targets, submarines and surface ships, while automatically implementing defenses to defend against aircraft and missiles.

The upgrades, Advanced Capability Build 2012 (ACB 12) and Technical Insertion 2012 (TI 12), provide the required combat system elements and computing infrastructure, respectively, to upgrade the Aegis computing environment and integrate radar and weapons systems.

"In order to maintain the Navy's warfighting advantage, the combat systems capabilities are periodically updated," said



Capt. Jon Hill, major program manager, Integrated Combat Systems, Program Executive Office Integrated Warfare Systems (PEO IWS). "These upgrades modernize the capabilities of our surface combatants, incorporate Fleet feedback, and address changing threats and new warfare environments."

ACB 12/TI 12 builds off the previous Advanced Capability Build 2008 (ACB 08), which replaced the ship's AN/UJK-7-based military standard (MIL-STD) computing environment with a modernized, upgradable, commercial off-the-shelf (COTS) computing infrastructure aboard *Ticonderoga*-class cruisers (CG 52 to CG 58). ACB 12/TI 12 will replace the MIL-STD equipment with COTS hardware and fiber-optic connectivity on the *Ticonderoga*-class cruisers (CG 59 to 64) and *Arleigh*

ABOVE: Naval Surface Warfare Center Port Hueneme and BAE Systems engineers and technicians lower new Standard Missile 3 canister into the vertical launching system onboard the Self Defense Test Ship at NSWC Port Hueneme to perform thermal model testing. U.S. Navy photo by Charlie Houser.



USS Hopper (DDG 70) launches a Standard Missile 3, Block IA, successfully intercepting a sub-scale short-range ballistic missile, launched from the Kauai Test Facility, Pacific Missile Range Facility, Barking Sands, Kauai. U.S. Navy photo.

Burke-class destroyers, as well as upgrading software. These changes will improve computing speed and reliability while increasing computing environment supportability.


In addition to the COTS, fiber optics and software upgrades, ACB 12 will introduce new capabilities, including naval integrated fire control and counter air, Common Display System, Common Processing System, the *Standard Missile 6* extended-range air-defense missile and BMD capability, which is enabled by a multi-mission signal processor (MMSP). The MMSP capability brings integrated air and missile defense to the Fleet.

ACB 12 is the basis for a common source library for software to enable rapid development of a family of similar systems. This common source library can be leveraged for other ship systems that will facilitate commonality and allows the use of proven code, reducing the need to generate new software.

“ACB 12 incorporates new product line architecture technologies with an increased ability to accept improved warfighting capabilities with less intrusion to the overall system,” said Nilo Maniquis, deputy program manager, Integrated Combat Systems. “This will reduce the time and cost to introduce new capability and pave the way for much more efficient future upgrades.”


ACB 12 completed significant milestones in 2010, including an extensive design review by a broad spectrum Navy review team and completion of the critical design review led by PEO IWS.

ACB 12 will continue element-level testing of computer programs in parallel with continued code implementation. This process allows the individual product line architecture components to be validated as they are being added to the overall system. The system is slated to become the basis for future combat system programs using its common source library as a starting point for upgrades. To date, 1 million lines of code of the anticipated 1.5 million lines of code have been written. ACB 12 is scheduled for combat systems certification at the end of 2013 and warfare system certification in 2014. ■■■



MELANIE LASHUS

AEGIS BMD TEST AND EVALUATION
LEAD ENGINEER, NAVAL SURFACE
WARFARE CENTER DAHLGREN

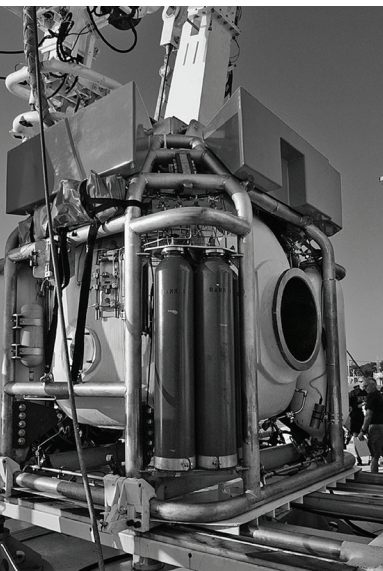


Lashus proves technical and financial leadership to Aegis BMD Test and Evaluation teams.

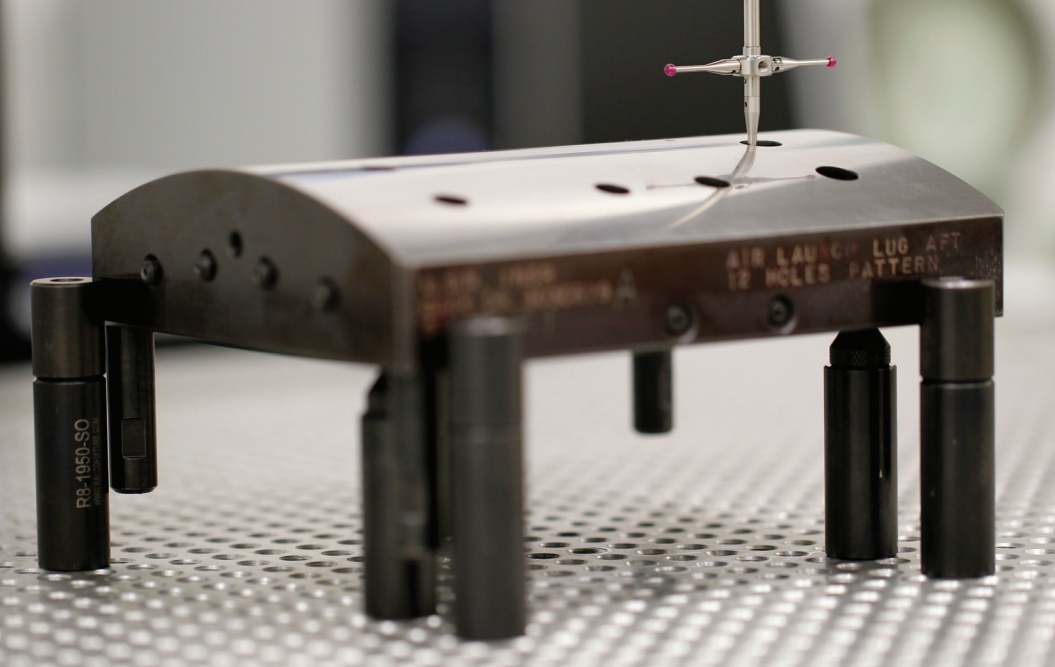
“EVEN THOUGH MY ROLE IS SMALL BY COMPARISON TO THOSE WHO PUT THEMSELVES IN HARM’S WAY TO PROTECT US, IT IS A REWARDING FEELING TO KNOW THAT MY TEAMS’ WORK HELPS KEEP OUR COUNTRY SAFE.”



BUILD THE FUTURE FLEET







WARFARE CENTERS



CUTTING EDGE SYSTEMS IN THE FLEET ARE A DIRECT RESULT OF CUTTING EDGE RESEARCH AT NAVSEA'S WARFARE CENTERS ACROSS THE NATION. EVERY DAY NAVSEA SCIENTISTS AND ENGINEERS FIND SOLUTIONS THAT ANSWER THE FLEET'S NEEDS.

In 2010, the scientists, engineers and support personnel of the NAVSEA Warfare Centers (WFCs) collaborated with Navy and DoD program offices, the Office of Naval Research (ONR) and other branches of government, industry and academia to deliver critical Fleet support and innovative technological solutions to our 21st century Navy and Marine Corps warfighters.

Geographically located across the country, 10 Naval Surface Warfare Center (NSWC) and two Naval Undersea Warfare Center (NUWC) major commands help engineer and sustain the nation's military through 133 technical areas called Technical Capabilities (TCs). These TCs provide "cradle to grave" support for ship and submarine platforms and systems, surface, undersea and littoral warfare systems, energetics, special operations and strategic systems.

In addition to performing core government responsibilities, such as exercising technical authority and certifying safety and performance, the WFCs also complete work that industry partners may not undertake due to profitability and risk, or should not initiate because it requires unique government facilities or expertise.

Of the \$5.3 billion of reimbursable work executed in FY10, the WFCs generated more than \$230 million in total ownership cost (TOC) savings and cost avoidances that were reapplied to meet Fleet urgent needs.

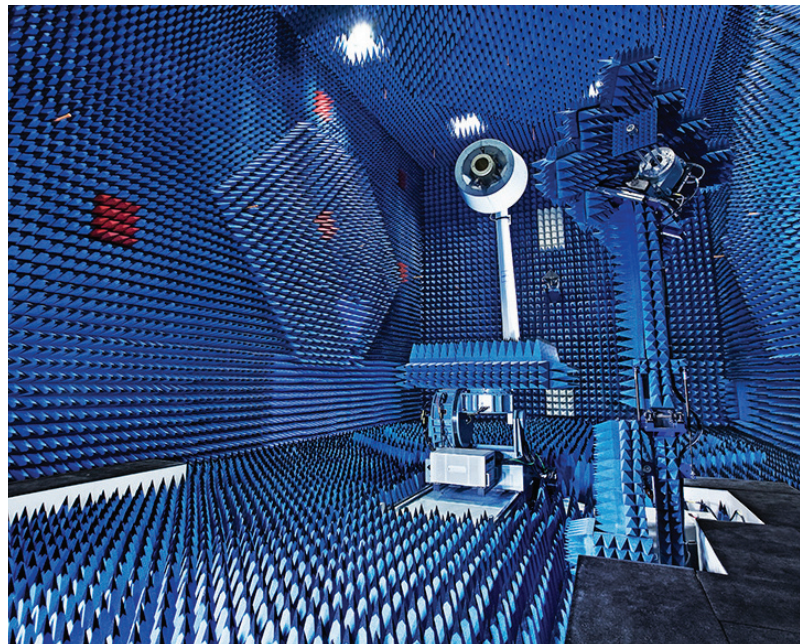
In 2010, the WFCs contributed significantly to energy and environmental efficiency, unmanned systems, support to the Fleet, next generation weapons systems, counter-improvised explosive device (IED) technology, and humanitarian support and disaster relief.

Energy Efficiency

The WFCs made SECNAV's energy goals a high priority in 2010, focusing on improvements in ship and machinery design, fuels and batteries, and devoting nearly 20 percent of technical investment in these areas. NSWC Carderock and Ship

PHOTOS: The warfare centers supply the technical operations, people, technology, engineering services and products needed to equip and support the Fleet and meet the warfighter's needs. The warfare centers are the Navy's principal research, development, test and evaluation, analysis and assessment activities for ship and submarine platform and machinery technology for surface combat systems, ordnance, mines, and strategic systems products and support. U.S. Navy photos by Greg Vojtko, Pat Hardesty, John Williams and MC2 Sharay Bennett.

Systems Engineering Station Philadelphia, as part of a larger Navy team, successfully conducted a bio-fuel test aboard a riverine command boat in October in support of the secretary of



THE NAVY WAS RANKED NO. 1 IN THE WORLD FOR NEWLY PATENTED DISCOVERIES AND INVENTIONS IN 2010.

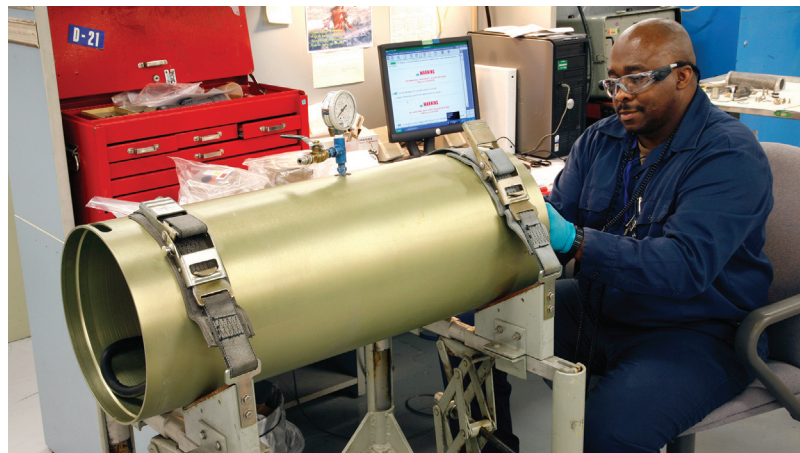
the Navy's efforts to reduce total energy consumption on naval ships. The successful test used a blend of 50 percent algae-based and 50 percent NATO F-76 fuel, demonstrating progress towards reducing the Fleet's reliance on fossil fuels.

This technical team also provided support to USS *Makin Island* (LHD 8), the first amphibious assault ship to be equipped with both gas turbines and an Auxiliary Propulsion System (APS). Instead of using its gas turbine engines, which are less efficient at lower speeds, the ship is able to use its APS roughly 75 percent of the time the ship is underway.

In support of warfighters on the ground, NSWC Crane Division performed an Analysis of Alternative for U.S. Special Operations Command to identify a safe and functional way to provide renewable solar energy to warfighters in theater. As a result of the analysis, Solar Stik technology was selected, tested and delivered to meet this emergent warfighting requirement. The Solar Stik system consists of a 200 watt wind generator and two 50 watt solar panels used to charge a 12-volt DC lead acid battery system.

Unmanned Systems

NAVSEA WFCs made significant contributions in 2010 to advance technology in unmanned systems. NUWC conducted an Autonomy Grand Challenge in 2010, completing a 70-nautical



Science and technology work conducted at the Naval Warfare Centers support the knowledge, concepts, and prototypes upon which tomorrow's high-performance military systems will be built. These warfare centers located across the United States employ a cadre of scientists, engineers, and researchers with unique knowledge of the challenging warfighting environment. The warfare centers also forge partnerships with other defense laboratories, universities, and the private sector to bring new science and technology opportunities to the Fleet. U.S. Navy photos by Pat Hardesty and Greg Vojtko. Featurette photos by Laura Lakeway.



mile transit of a fully autonomous Unmanned Underwater Vehicle from Woods Hole, Mass., to Newport, R.I., without surfacing for GPS reset. This unprecedented 20-hour mission demonstrated precise undersea navigation using advanced map matching techniques and behavior-based autonomous control.

NSWC Dahlgren supported warfighters in combat with the successful Limited Objective Experiment 4 on the Ground Unmanned Support Surrogate (GUSS) vehicle. GUSS, an unmanned, remotely operated vehicle designed and built by Virginia Tech students under a contract with NSWC Dahlgren, can carry up to 1,800 pounds at approximately 5 miles per hour. It is designed as a resupply vehicle for troops and provides an immediate means for the evacuation of combat casualties.

"GUSS is truly autonomous," said NSWC Dahlgren systems engineer Ron Colbow. "Marines on patrol can continue to carry their weapon and be fully functional while maintaining their tactical readiness."

Support to the Fleet

The WFCs are the core of the Navy's in-service engineering team, as scores of talented civilian engineers and technicians provide immediate solutions to emerging technical problems around the globe. In recent years, there has been an increased demand from warfighters on the ground in Iraq and Afghanistan for mine warfare support. In 2010, engineers from NSWC Panama City delivered the 1,000th mine roller system, a device mounted on tanks and armored personnel carriers, designed to detonate anti-tank mines and clear a path through a minefield.

In support of the nation's next-generation aircraft carrier Fleet, NUWC Keyport's Surface Alteration Installation Team successfully completed installation of the Aircraft Carrier Tactical Support Center aboard USS *George H. W. Bush* (CVN 77). The installation included tactically integrated sensors, a capability that improves overall battle space management for undersea warfare, including improved detection, classification and localization of threats.

In support of the future surface Fleet, NSWC Port Hueneme and NSWC Panama City provided critical support to the Littoral Combat Ship (LCS) program. LCS is a revolutionary new warship, designed for littoral warfare missions in anti-submarine warfare, surface warfare and mine warfare. NSWC Port Hueneme swapped out the embarked Surface Warfare Mission Module with a model designed to replicate the space and weight of the Mine Countermeasures Mission Module at NSWC Port Hueneme's Mission Package Support Facility, marking the first time this had been demonstrated.

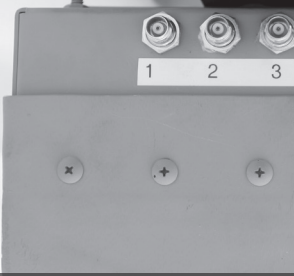
In 2010, NSWC Panama City opened the doors of the new Littoral Warfare Systems Facility (LWSF) that supports the development, integration and certification of the LCS mission packages.

"The LWSF has features which allow both in-service equipment and emerging technologies to be operated together in a laboratory environment," said Capt. Thomas Brovarone, commander, NSWC Panama City. "Ultimately, the facility will



**SHAD
REESE**

RADIO FREQUENCY ENGINEER,
EXPLOSIVE ORDNANCE DISPOSAL
TECHNOLOGY DIVISION



Reese analyses, assesses, and develops communication solutions for small unmanned ground vehicles and unmanned aerial vehicles.

"I LIKE KNOWING THE WORK I DO DIRECTLY IMPACTS AND PROTECTS OUR MEN AND WOMEN FIGHTING ON THE FRONT LINES. IT'S THE REASON I LOVE TO GET UP AND COME TO WORK EVERY DAY."

be linked to other land-based facilities around the country to conduct platform interoperability testing as if it were a deployed platform at sea."

Taking existing shipboard systems to the next generation, NSWC Carderock and Ships Systems Engineering Station Philadelphia conducted full-scale testing of the *Zumwalt*-class destroyer (DDG 1000) Integrated Power System. The Integrated Power System integrates magnetic motor technology, as well as shipboard electrical power systems to provide up to 10 times the amount of power that is available on *Arleigh Burke*-class destroyers operating in the Navy's current Fleet. This additional amount of power will increase efficiency in propulsion, auxiliary systems and potentially next generation weapons systems.

Weapons Systems

Significant response to our newest national priority in missile defense is being collaboratively supported by NSWC Dahlgren and NSWC Port Hueneme, culminating in the installation of Aegis Ballistic Missile Defense Version 4.0 on three ships in the Navy Fleet in 2010.

"Aegis provides a ballistic missile defense architecture that allows our military to detect, identify, and engage an incoming

BUILD THE FUTURE FLEET

threat,” said Rear Adm. Jim Shannon, commander, Naval Surface Warfare Center. “NSWC Port Hueneme and NSWC Dahlgren are providing technical engineering solutions to this network of sensors that is absolutely critical to our national defense.”

The WFCs are also focused on tomorrow’s challenges, highlighted by the partnership between ONR and NSWC Dahlgren in breaking the world-record with a 33-megajoule test shot of the electromagnetic railgun. The test is considered to be a “leap ahead technology.” Besides extending the ranges of the Navy’s current weapons systems, Railgun is being designed to eliminate the need for a high-energy explosive warhead and traditional gun propellants, improving the safety of Sailors and Marines.

“The 33-megajoule shot means the Navy can fire projectiles at least 110 nautical miles, placing Sailors and Marines at a safe stand-off distance and out of harm’s way, and the high velocities achievable are tactically relevant for air and missile defense,” said Rear Adm. Nevin Carr, chief of naval research. “This demonstration moves us one day closer to getting this advanced capability to sea.”

Counter IED Technology

The WFCs also made significant strides forward in 2010, developing, designing and fielding explosive ordnance disposal technology to ground forces in theater in response to this growing asymmetric threat. NSWC Explosive Ordnance Disposal Technical Division authored and disseminated numerous IED-related

RIGHT: The men and women of Naval Explosive Ordnance Disposal Technology Division, a field activity that reports to the Naval Sea Systems Command and a division of the Naval Surface Warfare Centers, work to provide Soldiers, Marines, Sailors, and Airmen worldwide with the information and technological solutions they need to detect/locate, access, identify, render safe, recover/exploit, and dispose of both conventional and unconventional explosive threats. U.S. Navy photo. Featurette photos by Greg Vojtko.



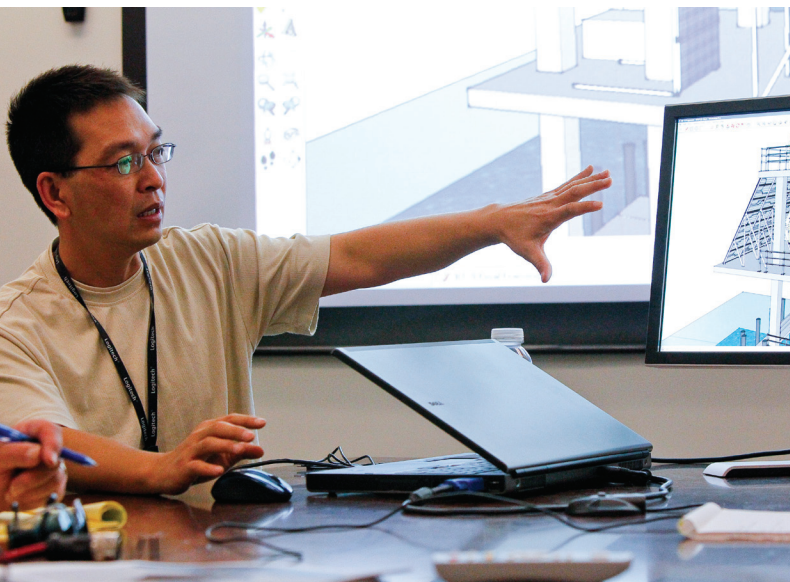
Khanlarian fields questions from the fleet regarding the operation of METBENCH Calibration Management System, and works with the METBENCH team to resolve customer issues and improve performance.



EDVIN KHANLARIAN

ELECTRICAL ENGINEER AND METBENCH
CALIBRATION MANAGEMENT SYSTEM
HELP DESK MANAGER
NAVAL SURFACE
WARFARE CENTER CORONA

“I’M GLAD I CONTINUE TO CONTRIBUTE TO THE DEVELOPMENT OF NEW TECHNOLOGY IN MY CURRENT POSITION, WHILE ALSO BEING THE FRONT-LINE CONTACT WHO PROVIDES VALUABLE ASSISTANCE TO OUR SAILORS IN THE FLEET.”



ABOVE: Technology development is a continuous process of discovery and advancement involving close collaboration among the science and technology community, the user, and the system developer. During the technology development phase, the warfare centers work to reduce technology risk, determine and mature the appropriate set of technologies to be integrated into a full system, and demonstrate critical technology elements on prototypes. Additionally, the warfare centers provide acquisition support by determining the right technologies for the application, ensuring successful development, and providing acceptance testing and in-service support. U.S. Navy photos by photos by Greg Vojtko.

informational products, which provided warfighters in Iraq and Afghanistan, as well as various U.S.-based support entities, access to timely and relevant technical information. NSWC Crane also shipped more than 50,000 Counter Radio-Controlled Improvised

Explosive Device Electronic Warfare (CREW) related items to theater, including IED installation kits, test equipment and other support material. Through radio-frequency technology, CREW is a countermeasures system that is installed on ground vehicles in Iraq and Afghanistan that protects warfighters from IEDs.

Teams from NSWC Corona now train warfighters how to recognize the likely locations of improvised explosive devices through data fusion, pattern analysis and the science of predictive analysis. Building on a comprehensive knowledge of the enemy, vulnerabilities, intelligence and the geography of the environment, this technique helps identify, avoid or neutralize IEDs. The Pattern Analysis Lead Engineer teams continuously integrate battlefield feedback and adapt best practices for subsequent training for deploying warfighters.

In response to a demand from deployed units, experts at NSWC Indian Head developed an inexpensive, easy-to-use kit in less than four months that detects ingredients used in homemade explosives (HME). The kit enables warfighters to more easily identify the chemical components of the many HMEs they encounter on the ground. Each unit costs \$85 and weighs only 6 ounces – including the pouch designed to safely hold the components.

Humanitarian Support and Disaster Relief

The WFCs also participated in the Navy's humanitarian assistance and disaster relief efforts in 2010. In response to the devastating earthquake in Haiti, analysts and engineers from NSWC Dahlgren provided constant, real-time analysis of critical infrastructure in Haiti, the Dominican Republic and other Caribbean nations in support of U.S. Southern Command's (SOUTHCOM) Haiti relief efforts.

"We were able to provide U.S. Southern Command with a pre-earthquake baseline look of the infrastructures in Haiti," said Joe Ingram, NSWC Dahlgren Mission Assurance Division's situational awareness technologies acting branch head. "We immediately responded when SOUTHCOM requested help identifying transportation assets, particularly airfields and seaports in neighboring countries with the potential to assist in the relief and recovery efforts."

The infrastructure analysis included the assessment of telecommunications, electric power and transportation, as well as petroleum, chemical and water supplies damaged in the aftermath of the earthquake. NSWC Panama City Division and Combat Direction Systems Activity Dam Neck also responded to the disaster response efforts by embarking the Deployable Joint Command and Control System aboard USS *Bataan* (LHD 5).

2010 brought with it challenges that the WFCs were uniquely qualified to meet. Harnessing new ideas and integrating them into NAVSEA programs helped meet both existing and emergent requirements from the Fleet and deployed forces. Whether supporting humanitarian relief or other tenets of the Maritime Strategy, the WFC's innovation and expertise answer the call of the Fleet's sophisticated technical requirements. ■■■



LCS: FLEXIBLE SOLUTIONS

THIS EVOLUTIONARY SHIP WILL FLEX ITS MUSCLES IN THE WORLD'S COASTAL REGIONS. THE MODULAR DESIGN ALLOWS EACH SHIP TO BE OUTFITTED FOR SPECIFIC MISSIONS BEFORE AND DURING A DEPLOYMENT. TWIN CONTRACTS EXPAND THE PRODUCTION OF THIS ALREADY FLEXIBLE CLASS OF SHIP.

From beginning to end, 2010 marked a significant transition in the relatively short history of the littoral combat ship (LCS) program. Though the preceding year was no less busy, 2010 saw the program mature as the Navy settled on a final acquisition strategy, deployed the first ship of the class and commissioned the second.

The ships—fast, agile, mission-focused platforms optimized for coastal missions—serve as the backbone of the Navy's future Fleet. Their modular design allow the ships to be tailored specifically for the mission at hand, allowing flexible solutions to deliver needed capabilities to evolving threats.

Perhaps the most significant of the year's events, two contracts were awarded in the closing days of 2010 to both of the LCS shipbuilders—Austal USA in Mobile, Ala., and Lockheed Martin, which is building its ships at the Marinette Marine

Corp. shipyard in Marinette, Wis. The fixed-price contracts were awarded for the design and construction of 10 ships each, for a total of 20 littoral combat ships.

These contracts were a departure from the acquisition strategy announced in late 2009, when the Navy announced it would down-select to a single LCS model—a steel monohull or aluminum trimaran—through a winner-take-all competition between Austal and Lockheed Martin. However, due to the low price of the bids received from each company, the Navy requested and received authorization from Congress to amend

ABOVE: The littoral combat ship *USS Freedom (LCS 1)* conducts replenishment at sea with the amphibious assault ship *USS Bonhomme Richard (LHD 6)*. U.S. Navy photo by MC3 Marcus Stanley.

the acquisition strategy and award contracts to both bidders, resulting in the Navy's continued procurement and operation of both LCS variants, instead of choosing only one.

This award was a unique opportunity to maximize buying power by leveraging the competition between the two bidders, and will produce significant cost savings, sustain stable production of both designs, and still maintain options for future competition.

"I am very pleased and grateful Congress has enabled the Navy's plan to add these needed ships to our Fleet," said Adm. Gary Roughead, chief of naval operations. "Both designs provide the capabilities our Navy needs, and each offers unique features that will provide Fleet commanders with a high level of flexibility in employing these ships. This is good for the Navy, shipbuilders and taxpayers."

Both of the companies have already delivered one ship of each variant—Lockheed Martin's monohull USS *Freedom* (LCS 1) and Austal's trimaran USS *Independence* (LCS 2)—and are in the process of building the third and fourth ships of the class. The future USS *Fort Worth* (LCS 3), under construction at Marinette Marine, was launched Dec. 4, and is more than 80 percent complete. The future USS *Coronado* (LCS 4) is under construction at Austal USA. Both ships are expected to deliver in 2012.

The first ship of the class, *Freedom*, completed a successful deployment to the Caribbean in early 2010, completing its maiden voyage two years ahead of schedule. During the deployment, *Freedom* conducted counter-illicit trafficking operations and made visits to Colombia, Panama and Mexico. Following the deployment, the ship steamed to Hawaii to participate in the 15-nation Rim of the Pacific (RIMPAC) exercise, demonstrating her combat capabilities on the world stage.

Independence had a no less eventful year, delivering from the shipbuilder in January 2010, and transiting to Norfolk to undergo post-delivery tests and trials.

Regardless of the variant, the underlying strength of the LCS class lies in the use of adaptive mission packages (MP), which provide a modular, focused capability to combatant

commanders in one of three mission areas: mine countermeasures, anti-submarine warfare and surface warfare. These packages consist of the vehicles, sensors, weapons and support crews that enable the ship to conduct its assigned mission.

"From the beginning, an incremental, evolutionary acquisition strategy has been in place for the program in order to field systems as they achieve required maturity levels," said Capt. John Ailes, Program Executive Office for Littoral and Mine Warfare's (PEO LMW) LCS Mission Module program manager. "At the same time, delivery of the seaframe has been taken into consideration to ensure sufficient mission packages are



Naval Surface Warfare Center Panama City engineers recover the Remote Multi-Mission Vehicle, part of the Mine Countermeasure mission package, following end-to-end tests. U.S. Navy photo by David Sussman.

available to support LCS operations. Using this approach allows us to introduce into the MPs greater capability progressively using mature programs of record to mitigate the risk of individual systems."

According to Ailes, a number of capabilities were introduced to the LCS fleet in 2010 or are progressing on schedule toward fielding.

In January, the first surface warfare mission package developmental testing was accelerated to support *Freedom*'s early deployment. Prior to deploying, crews at the Naval Surface Warfare Center in Panama City, Fla., installed the ship's 30mm gun module and a newly designed maritime security module to allow the ship to conduct the counter-illicit trafficking mission, resulting in the seizure of tons of cocaine from at-sea smugglers. The same gun module also demonstrated its designed anti-surface warfare capability by executing tracking and firing exercises during RIMPAC. Aboard *Independence*, a second gun module completed functional integration and end-to-end testing in the summer. Additionally, complete mission package swap-outs were conducted on both LCS variants, in September and November, respectively.

"I AM VERY PLEASED AND GRATEFUL CONGRESS HAS ENABLED THE NAVY'S PLAN TO ADD THESE NEEDED SHIPS TO OUR FLEET. BOTH DESIGNS PROVIDE THE CAPABILITIES OUR NAVY NEEDS, AND EACH OFFERS UNIQUE FEATURES THAT WILL PROVIDE FLEET COMMANDERS WITH A HIGH LEVEL OF FLEXIBILITY IN EMPLOYING THESE SHIPS. THIS IS GOOD FOR THE NAVY, SHIPBUILDERS AND TAXPAYERS."

ADM. GARY ROUGHEAD
CHIEF OF NAVAL OPERATIONS

KEEPING AGING MCM SYSTEMS RELEVANT

Mine Countermeasure (MCM) ships are designed to clear mines from vital waterways. The Navy's new littoral combat ships – when fitted with the MCM mission package – will replace the Navy's MCM ships as they begin to decommission in 2017. However, until the transition from one generation of mine warfare capable ships to the next takes place, it is the responsibility of Program Executive Office for Littoral and Mine Warfare's Mine Warfare Program Office (PMS 495) to help sustain the current MCM force.

"Until LCS takes up the MCM role, we will modernize what we have today," said Donna Carson-Jelley, PMS 495 program manager. "Our in-service systems – for both ships and MH-53 helicopters – must remain operational and reliable, so that we can execute our mine warfare missions today. The modernization plan is really about making sure there are no gaps in our mine warfare capability."

According to Carson-Jelley, PMS 495's MCM modernization plan, which began in 2004 and has been implemented on nearly all of the 14 ships, is replacing cumbersome legacy systems with newer technology that reduces each ship's weight and requires less maintenance. Less weight improves the ships' fuel efficiency and allows ships to be faster and more agile as they maneuver. The program also upgrades obsolete components, providing new capabilities.

In work this year aboard USS *Sentry* (MCM 3) is replacement of the ship's AN/SLQ-37 acoustic generator with an advanced system that reduced weight of the mine hunter by 12,000 pounds. The ship's mine sweeping cable system was replaced



with a magnetic alternative reducing another 5,500 pounds. *Sentry* also received a High-Frequency, Wide-Band (HFWB) sonar system improving the ship's ability to find mines faster by switching from the old system that swept 70 degrees to the HFWB which sweeps 180 degrees.

The Mine Warfare Program Office continues to work closely with NAVSEA and the Fleet to align work with operational schedules, ensuring these valuable naval assets support maximum readiness until they are replaced by future MCM systems.

The year was particularly productive for the mine countermeasures mission package and associated systems, as PEO LMW completed end-to-end testing at the South Florida Test Facility—measuring the system's ability to detect, localize and neutralize mines.

Additionally, the Airborne Laser Mine Detection Systems completed developmental tests; water testing was conducted on the Unmanned Influence Sweep System magnetic cable; the Coastal Battlefield Reconnaissance and Analysis completed integration tests on the Fire Scout unmanned aerial vehicle;



the AN/AQS-20A minehunter sonar system completed developmental testing; and the Remote Multi-Mission Vehicle followed with successful end-to-end testing.

Even potential challenges for the program validated the strength of the modular concept, as demonstrated when the Non-Line-of-Sight Launching Systems was cancelled due to rising procurement costs. Because the ship and mission package use a standard interface, the Navy will be able to install a replacement system without needing to make costly

USS Independence (LCS 2), approaches Naval Station Mayport for a port call en route to Norfolk, Va. U.S. Navy photo by MC2 Gary Granger. Featurette photos by M.J. McCoy.

redesigns to the seaframe.

The program will continue with the development of additional capabilities through 2017, and remain in step with LCS seaframe deliveries to ensure the Fleet has the required flexibility to achieve mission success. ■■■



DePietro, as the director of systems engineering group for the design and development of the Littoral Combat Ship, is responsible for the technical baseline for two ship classes executed within one program.



JOSEPH DEPIETRO

PRINCIPLE ASSISTANT PROGRAM
MANAGER, TECHNICAL,
NAVAL SEA SYSTEMS COMMAND
HEADQUARTERS

“THERE IS NOTHING THAT COULD SURPASS THE OPPORTUNITY TO WORK A DESIGN FROM PAPER TO REALITY AND THEN TO INTERACT WITH THE FLEET DURING INTEGRATION, TEST AND VALIDATION OF THAT CAPABILITY.”



SPECIAL MISSION SHIPS

FROM OCEANOGRAPHIC RESEARCH TO MARINE GEOLOGY AND ACOUSTIC SURVEYS THAT CHART THE OCEAN FLOOR, NAVSEA PROVIDES THE SPECIALIZED VESSELS TO EXPLORE, MONITOR AND EXPAND OUR KNOWLEDGE OF SEA LANES AND THE WORLD'S OCEANS.

The Navy deploys surface ships and submarines to every corner of the globe and relies on a group of unique ships to fully understand the environment in which it operates.

From tracking the migratory patterns of ocean-dwelling mammals to mapping underwater mountain ranges, the Navy maintains a fleet of special mission ships to perform oceanographic and hydrographic surveys, underwater surveillance, missile tracking and other unique operations.

The responsibility for developing and acquiring these unique vessels falls to the Auxiliary Ships, Small Boats and Craft Program Office within Program Executive Office (PEO) Ships, where a small staff is currently managing three special mission ship construction programs.

At the beginning of 2010, PEO Ships awarded two contracts for the preliminary design of two oceanographic research vessels to Dakota Creek Industries in Anacortes, Wash., and Marinette Marine Corp. in Marinette, Wis. The ships, known as

ABOVE: Military Sealift Command's oceanographic survey ships, such as USNS Pathfinder (T-AGS 60), are multi-purpose ships that perform acoustic, biological, physical and geophysical surveys, providing much of the U.S. military's information on the ocean environment. These ships use multi-beam, wide-angle, precision sonar systems that make it possible to continuously chart a broad section of ocean floor. U.S. Navy photo.

Ocean Class AGOR vessels, will be monohull research vessels capable of general purpose oceanographic research in coastal and deep ocean areas. The ships will support a wide variety of research, including oceanography, marine geology, ocean engineering, marine acoustics, and bathymetry, using well-equipped laboratories and a modern suite of equipment to collect data from the lower atmosphere, the sea surface, and below the sea floor. The ships support science missions with

ONCE DELIVERED, USNS MAURY WILL JOIN THE SIX EXISTING SHIPS OF ITS CLASS TO PERFORM ACOUSTIC, BIOLOGICAL, PHYSICAL AND GEOPHYSICAL SURVEYS, PROVIDING MUCH OF THE U.S. MILITARY'S INFORMATION ON THE OCEAN ENVIRONMENT.

berthing for 20 scientists and will be able to operate at sea for up to 40 days at sail distances of as far as 10,000 nautical miles without replenishment.

At the completion of the preliminary designs, the Navy intends to select and award a single detail design and construction contract in 2011. The first ship is expected to deliver in early 2014.

Though the majority of the Navy's special mission ships are operated by Military Sealift Command, the AGOR vessels are unique in that they are leased to and operated by independent

academic institutions associated with the University National Oceanographic Laboratory System. These organizations have provided critically important oceanographic and geophysical information to Navy programs of all sizes and types since the 1950s.

The second special mission ship currently being procured by PEO Ships is the future USNS *Maury*, an oceanographic survey ship designated as T-AGS 66.

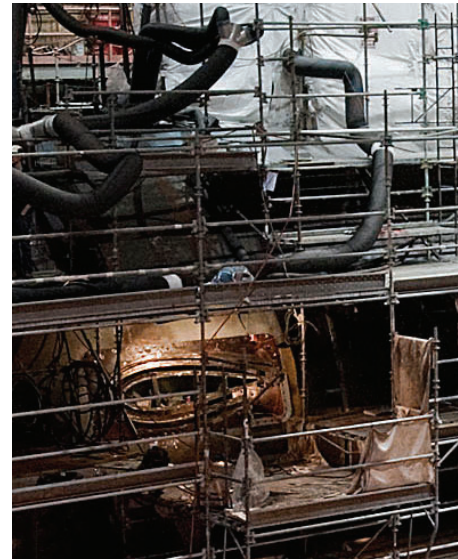
Once delivered, *Maury* will join the six existing ships of its class to perform acoustic, biological, physical and geophysical surveys, providing much of the U.S. military's information on the ocean environment. These ships use multi-beam, wide-angle, precision sonar systems to continuously chart a broad section of ocean floor. The data collected helps improve undersea warfare technology, enemy ship detection and coastline charting. Construction began on T-AGS 66 at VT Halter on Sept. 22, 2010, and is expected to deliver in 2012.

Also being built by VT Halter—at the company's Pascagoula, Miss., shipyard—is the future USNS *Howard O. Lorenzen* (T-AGM 25), a commercially designed ship designed as the platform for the Cobra Judy Replacement Program managed in Program Executive Office Integrated Warfare Systems. Replacing the capabilities of the USNS *Observation Island*, a 50-year-old ship in service with the Military Sealift Command, T-AGM 25 will be responsible for collecting radar data on in-flight ballistic missiles.

Launched in June 2010, the ship is scheduled to deliver to the Navy in spring 2011, when the radar and other mission systems will be installed. The ship and associated radar system will be turned over to the U.S. Air Force for operations and sustainment in 2013. ■■■



Program Executive Office Ships continued to make strides toward the delivery of future USNS *Howard O. Lorenzen* (T-AGM 25). Following delivery of the seafame, Cobra Judy Replacement mission equipment will be integrated with the ship, and *Howard O. Lorenzen* will replace USNS *Observation Island* (T-AGM 23) to support Ballistic Missile Treaty verification and providing high-quality, high-resolution radar data worldwide. U.S. Navy photo.



VIRGINIA CLASS SUBMARINES



AN INNOVATIVE CONSTRUCTION APPROACH REALIZED MILLIONS OF DOLLARS IN EFFICIENCIES, GAINING AUTHORIZATION IN FY11 TO BUILD TWO VIRGINIA-CLASS SUBMARINES EACH YEAR. THIS STATE-OF-THE-ART SHADOW WILL REPLACE THE LOS ANGELES-CLASS SUBS NOW ON PATROL AROUND THE WORLD.

Beginning with USS *New Mexico's* (SSN 779) commissioning on March 27, Team Submarine's Virginia Class Program Office reached several significant programmatic milestones in 2010, building upon its reputation for excellence and innovation.

New Mexico's commissioning, along with the commissioning of USS *Missouri* (SSN 780) on July 31, marked only the second time since 1996 that the Navy has commissioned two submarines of the same class in the same year. Additionally, and as a result of the unique and highly successful relationship between the Navy and its shipbuilding partners General Dynamics Electric Boat and Northrop Grumman Shipbuilding Newport News, the Navy took delivery of *New Mexico* and *Missouri* earlier than their contract delivery dates—four and nine months early, respectively.

“By taking delivery of *New Mexico* and *Missouri* early, our outstanding shipbuilding team has enabled the Navy to put these vital platforms in the hands of our warfighters earlier than planned,” said Rear Adm. David Johnson, program executive officer for Submarines.

To coincide with *Missouri's* commissioning and PCU *California's* (SSN 781) christening on Nov. 6, Team Submarine participated in Science, Technology, Engineering, and Math (STEM) outreach events in St. Louis and at three locations in California. These events allowed students to learn about the science involved with the construction and operation of submarines through exhibits and an interactive submarine simulation called Mission Ocean.

“The enthusiasm and keen interest the students exhibited for submarines during these events was quite impressive,” said



Pressure hull-closure is conducted on *Virginia*-class submarine USS *California* (SSN 781). *California* was christened Nov. 6, 2010; sponsored by Donna Willard, wife of Adm. Robert F. Willard; and launched eight days later. *Virginia*-class submarines displace approximately 7,800 tons, and are 370 feet long. *Virginia*-class submarines are able to attack targets ashore with highly accurate *Tomahawk* cruise missiles; and conduct covert long-term surveillance of land areas, littoral waters or other sea forces. Other missions include anti-submarine and anti-ship warfare; special forces delivery and support; and mine delivery and mine-field mapping. Photo courtesy of Northrop Grumman Shipbuilding.

Dave Miskimens, Team Submarine's director of undersea systems. "Providing these young minds with a STEM-based education will open up a world of possibilities and opportunities for them no matter what career field they pursue."

In addition to reaching key acquisition milestones in 2010, full-scale testing was completed in September on the new Large Aperture Bow (LAB) Array at Seneca Lake in New York. Beginning with PCU *North Dakota* (SSN 784), the first submarine of the Block III contract, *Virginia*-class submarines will utilize the LAB Array in place of the traditional transducer-populated sonar sphere. In addition to increased passive sonar capability on future hulls, the LAB Array supports significant reductions in construction time and material costs for the ship's primary sonar system.

The final milestone for the *Virginia*-class submarine program came on Dec. 21, when Congress passed the 2011 National Defense Authorization Act (NDAA). The NDAA provides authorization for the *Virginia*-class program to increase production to two ships per year beginning in fiscal year 2011. Pending full program funding from Congress, this will mark the first time since 1989 that the Navy has been authorized to build two submarines of the same class in the same year.

"We've worked hard for the last five years to increase production," said Capt. Michael Jabaley, the *Virginia*-class program manager. "The program stands ready to transition to building two submarines per year and deliver these outstanding and necessary naval assets." ■■■



Originally designed for a 30-year service life, the 14 Ohio-class ballistic missile submarines will start retiring in 2027 after more than 40 years of service life. Design, prototyping, and technology development efforts will continue to ensure sufficient technological maturity for lead ship procurement in 2019 of the Ohio-class replacement submarine. U.S. Navy photos by Ray Narimatsu, MCC Dean Lohmeyer, and Lt. Lara Bollinger.

OHIO CLASS REPLACEMENT



THE NEXT GENERATION STRATEGIC DETERRENT WILL WRAP STEALTH AND STRENGTH INTO A SINGLE SUBMARINE. WORKING WITH A PROVEN SYSTEM DESIGN, THIS FOUNDATION WILL ALLOW NAVSEA TO BRING THIS CAPABILITY TO THE FLEET AT A LOWER COST.

The *Ohio* Replacement Program, the next generation class of submarine that will replace the Navy's *Ohio*-class submarines, took its first step toward entering its Technology Development Phase when it conducted a Milestone A Defense Acquisition Board (DAB) with Dr. Ashton Carter, undersecretary of defense for acquisition, technology, and logistics, on Dec. 9, 2010. With the signing of the Acquisition Decision Memorandum (ADM), the *Ohio* Replacement Program will be able to further refine ship features to meet warfighting requirements and to continue its design, prototyping, and technology development efforts. These efforts are vital to ensure that the new class of 12 submarines can meet the same deterrence requirements as the current 14 *Ohio*-class ballistic missile submarines (SSBNs) when they reach the end of their operational life.

"Completing Milestone A is the first major step in an acquisition program," said Program Executive Officer for Submarines Rear Adm. David Johnson. "The ADM not only validates our Analysis of Alternatives that looked at basic submarine design variant with a total of 29 different options, but it also supports progressing to in-depth efforts aimed at achieving established warfighting requirements within the agreed upon service cost position."

The *Ohio* Replacement Program oversees the design, prototyping, and overall management of one of the Department of Defense's most important recapitalization efforts. Recognizing the importance of cost-effectively recapitalizing one leg of the nation's strategic deterrent triad, the program office is taking care to ensure that the class will be delivered with the requisite capabilities at the lowest possible cost. Personnel from Naval Surface Warfare Center Carderock are integral to the design team within Program Executive Office Submarines for the *Ohio* Replacement Program. In addition to developing a coordinated stern configuration to influence ship design and construction schedules, experts in HM&E [hull, mechanical & electrical] Technology Development Strategy are providing design studies, large scale prototyping and testing analysis.

"The men and women of the *Ohio* Replacement Program office and engineering team understand the significance of their work," said Capt. David Bishop, *Ohio* Replacement program manager. "The decisions made in these early stages of the program will have lasting effects for the next 70 years."

Ohio Replacement SSBNs will be designed and built for a 42-year service life and will serve as the backbone of the sea-based strategic deterrent until the 2080s. Continuing to provide the nation with its most survivable nuclear deterrent requires that the *Ohio* replacement SSBN be built with requisite stealth, retaining the ability to remain undetected throughout its operational life.

While the *Ohio* replacement will require investment in stealth, the program is focused on leveraging common submarine systems and proven technology to control cost and risk. This effort includes re-hosting the highly successful *Trident* II D5 Strategic Weapons System, the same system

currently deployed on today's *Ohio*-class SSBNs. With more than 134 consecutive successful launches, the D5 is one of the most tested and reliable weapons systems in the world.

The *Ohio* Replacement Program is actively working on ways to minimize the costs associated with designing and building these strategic deterrence platforms. The United States is working in partnership with the United Kingdom to design a common missile compartment that will go aboard both the *Ohio* Replacement and the Royal Navy's Successor SSBNs. Additionally, the *Ohio* Replacement plans to incorporate the Submarine Force's Submarine Warfare Federated Tactical System (SWFTS), a family of systems that include sonar, optical imaging, weapons control, and torpedo fire control that will be common across all classes of submarines.

"SWFTS allows us to utilize the same systems across all attack submarines and SSGNs [guided-missile submarines], reducing our research, design, and acquisition bills," said Johnson. "By folding the *Ohio* replacement into the model, we will be able to avoid having to design and build a whole new system solely for this platform, avoiding billions [of dollars] in design costs. Instead, we will integrate SWFTS into a larger hull, which is of minimal technical risk."

To further reduce risk and ensure the *Ohio* Replacement can meet operational availability goals, the *Ohio* Replacement Program is already incorporating a design-build-sustain philosophy. This ensures the ship's maintenance team is brought into the design early to improve maintainability—improving operational availability and lowering the ship's life cycle maintenance costs. The *Ohio* Replacement design has greatly benefited from the *Virginia*-class program's reduction in total ownership cost effort, and from the lessons learned during design of the *Virginia* class.

"The *Ohio* Replacement program is fortunate to be co-located with both the *Virginia*-class program and NAVSEA 07 [Deputy Commander for Undersea Warfare]," said Bishop. "We are taking advantage of all the opportunities to ensure that we design, build, and deliver the right submarine, with the right capability at the right cost," he concluded.

The lead *Ohio* Replacement SSBN will embark on its first strategic deterrent patrol in 2029. It will continue the uninterrupted legacy of continuous sea-based strategic deterrence started by USS *George Washington* (SSBN 598) in 1960. Also in the same year of 2029, USS *Alaska* (SSBN 732) is scheduled to inactivate, maintaining a U.S. Strategic Command's requirements for a SSBN force structure of 12 operational boats. To ensure that the *Ohio* Replacement is up to the challenge, it will deliver in 2026 and require approximately one year of testing, one year in a post-shakedown availability, and will conduct two submarine launched ballistic missile test launches to certify both crews and to reach its full operational capability.

Completion of Milestone A and the hard work ongoing in the Technology Development Phase will set the course for success. ■■■



SUPERVISOR OF SHIPBUILDING

A SMALL GROUP OF NAVSEA ENGINEERS ARE CHARGED WITH THE HUGE TASK OF ENSURING THE EFFICIENCY AND QUALITY OF THE SHIPS CONSTRUCTED BY NAVSEA'S INDUSTRY PARTNERS. SUPERVISOR OF SHIPBUILDING UPHOLD STRICT DESIGN STANDARDS, OVERSEEING THE CONSTRUCTION PROCESS FROM KEEL LAYING TO FLEET DELIVERY.

Naval Sea Systems Command's Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP) are the Navy's on-site technical, contractual and business authority, providing government oversight as shipbuilding industry partners build America's Fleet.

In 2010, the men and women of SUPSHIP—co-located with commercial shipbuilders—launched seven vessels, christened eight, delivered five, and commissioned five.

The four SUPSHIPS—located in Bath, Maine; Groton, Conn.; Newport News, Va.; and along the Gulf Coast of Mississippi—along with a number of detachments on site at shipbuilders across the country, employ about 1,200 people who administer and manage Department of the Navy shipbuilding and nuclear ship repair contracts totaling approximately \$110 billion.

"The SUPSHIP community continues to work closely with industry partners to improve overall quality of our ships, improve delivery schedules and realize more total ownership cost reduction opportunities," said Rear Adm. Joseph Campbell, NAVSEA's deputy commander for Logistics, Maintenance and Industrial Operations.

According to Campbell, SUPSHIP conducted a thorough self-assessment to improve project oversight in the fall 2009. The results identified four core functions of SUPSHIP that must be properly executed—quality assurance (QA), project oversight, contract administration and engineering. This led SUPSHIP to partner with NAVSEA Headquarters senior staffs and the three affiliated shipbuilding Program Executive Offices on a "back-to-basics" initiative.

In 2010, the quality assurance team, led by SUPSHIP Groton Commanding Officer, Capt. Leslie Elkin, developed an effective QA program assessment to ensure effective new construction oversight; created standardized QA contract clauses; established critical shipbuilding process metrics; and conducted additional audits of shipbuilder quality management systems.

Quality assurance improvements in 2010 focused on first-time quality—specifically for critical shipbuilding processes, such as welding, coatings application, and electrical systems—to ensure product issues are discovered and corrected before delivery. Targeting first-time quality during construction by conducting oversight of the shipbuilder's quality management systems earlier in the process yields a much greater return on investment than applying corrective actions on finished products.

The project oversight team, led by SUPSHIP Newport News Commanding Officer Capt. Kevin Terry, is focused on standardizing project office roles and reporting procedures, and developing a communication plan between government and shipbuilder. These steps will lead to better shipyard project performance and government alignment.

In 2010, the contracts team, led by SUPSHIP Bath Commanding Officer Capt. Dean Krestos, focused on contracts and related business processes to help program managers achieve cost, schedule and quality objectives. The team has developed common Earned Value Management dashboard metrics and improved pre-/post-award communication between NAVSEA Headquarters and field contracting officers responsible for contract administration.



The skilled work force of Naval Sea Systems Command's Supervisor of Shipbuilding, Conversion and Repair (SUPSHIP) administer and oversees the construction and modernization of Navy ships and submarines. In 2010, an increased focus on first-time quality assurance, project oversight, contracting and engineering helped SUPSHIP improve performance. U.S. Navy photos. Featurette photos by Jim Cleveland.

The final team, engineering, initiated late in FY 2010, led by SUPSHIP Gulf Coast Commanding Officer Capt. Bill Galinis, is focusing on execution of waterfront technical authority by the SUPSHIP engineering staffs. This team is examining the role and level of technical support provided during ship design phases, ship construction, testing, and delivery. Additionally, the team is working to identify, document and implement best practices in support of the effective and efficient exercise of technical authority during acquisition.

Sharon Smoot, NAVSEA's executive director for Logistics, Maintenance and Industrial Operations, also attributes an active recruitment strategy for recent SUPSHIP successes. According to Smoot, setting ambitious recruiting goals, actively participating in the NAVSEA recruiting partnership, and effectively executing a cohesive recruiting/hiring plan are increasing diversity across the SUPSHIP community and increasing job opportunity awareness internally.

"Across the enterprise, NAVSEA recognizes that our work force, our people, are our greatest asset," said Smoot. "SUPSHIP is working to not only acquire, but also develop and retain the talented and diverse people required to execute and improve shipbuilding oversight operational effectiveness."

In addition to the four ongoing back-to-basics initiatives, SUPSHIPs have also increased their focus on work force training and professional development over the past two years to increase retention. During that span, 448 SUPSHIP employees received refresher training on SUPSHIPs operations.

Concentrating efforts on perfecting the basics, along with increasing and developing the work force, enables SUPSHIPs to provide the quality administration, management and oversight needed as our industry partners build the Navy's future Fleet. ■■■



THOMAS MENET

QUALITY ASSURANCE SPECIALIST
(ELECTRICAL)
SUPERVISOR OF SHIPBUILDING CONVERSION
AND REPAIR, BATH, MAINE

Menet validates ships electrical systems through calibration and operational tests conducted ashore and at sea.

"AFTER LEAVING NAVAL AVIATION FOLLOWING EIGHT YEARS AS AN ACTIVE DUTY P-3 FLIGHT ENGINEER, I WAS EXCITED BY THE OPPORTUNITY TO SERVE OUR NATION ONCE AGAIN AS A CIVIL SERVANT."

SHIP TO SHORE CONNECTOR

THIS COMPLEX, NAVY-DESIGNED HOVERCRAFT IMPROVES THE SEASONED LCAC WORKHORSES OF THE AMPHIBIOUS FLEET, WITH A MORE RUGGED VERSION CAPABLE OF QUICKLY TRANSPORTING LARGER PAYLOADS ASHORE ON A CUSHION OF AIR, READY TO SUPPORT MILITARY OR HUMANITARIAN MISSIONS.

As the Navy's veteran Landing Craft, Air Cushioned (LCAC) hovercraft approaches the end of its service life, the next generation Ship to Shore Connector (SSC) will maintain the increasingly mission-critical, amphibious transport of forces across the beach.

The vessels—which will operate similarly to the LCACs—will be designed for a 30-year service life and will allow the Navy to increase capability while reducing maintenance and total ownership costs. SSC will be designed to carry the larger payloads of increasingly heavier tanks, armored vehicles and support equipment, with the built-in ruggedized reliability to operate in the harshest littoral environments. The SSC will support a full spectrum of potential operations, from humanitarian assistance and disaster relief to amphibious assault.

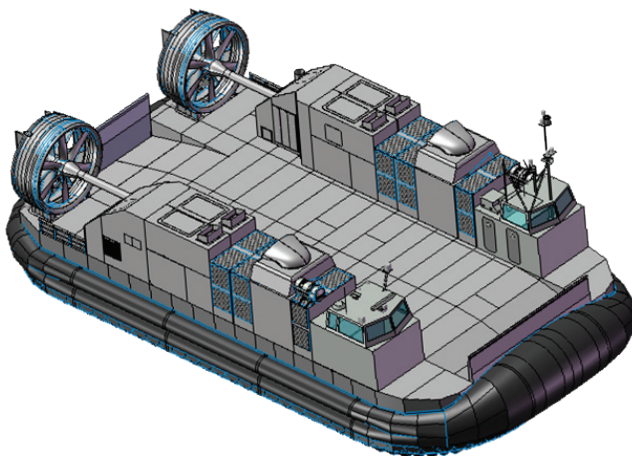
The SSC program reached several milestones in 2010, including the validation of the Capabilities Development Document in June and the approval of the Technical Data Package in July. These documents detail required craft specifications and drawings and clearly define the craft's characteristics,

requirements and systems. The program also held an Early Operational Assessment and a Technology Readiness Assessment in November to validate a number of future concepts for the vessels.

Set to deploy on each of the Navy's in-service amphibious ships, as well as to embark on the future Mobile Landing Platform ships, SSC will reach speeds in excess of 35 knots, with a payload of approximately 74 tons. The vessels will be able to operate day or night, from 25 nautical miles offshore or greater and will be capable of over-the-beach operations with the ability to operate independent of tides, water depth, underwater obstacles, ice or mud.

The SSC's "in-house" Navy design is one of the most complex undertakings by NAVSEA in more than 10 years. The vessel is being designed with total ownership cost in mind, and the final design will be more fuel efficient and have a lower operating cost than the LCACs it will replace.

NAVSEA expects to award a detail design and construction contract in the fourth quarter of fiscal year 2011. The first production craft is scheduled for delivered in fiscal year 2018. ■■■



The Ship to Shore Connector (SSC) is a low-flying rotorcraft designed to transport weapon systems, equipment, cargo and personnel. It replaces the Landing Craft Air Cushioned hovercraft. The SSC can obtain a speed of more than 35 knots, carry a payload of 74 tons, perform over-the-beach operations, and operate independent of tides, water depth, underwater obstacles, ice, mud, or beach gradient. U.S. Navy illustration.

JOINT HIGH SPEED VESSEL



FAST AND SLEEK, THE JOINT HIGH SPEED VESSEL PROVIDES RAPID TRANSIT OF EXPEDITIONARY FORCES AND EQUIPMENT, MEETING THE NEEDS OF THE NAVY AND THE ARMY.

Although still a relatively new program, the Joint High Speed Vessel (JHSV) program made significant progress in 2010. Approved for fabrication in late 2009, the shipbuilder has begun construction on the first three vessels—high-speed transport ships being procured for the Army and Navy. At the close of 2010, the first ship, the U.S. Army vessel *Spearhead* (JHSV 1), was midway through construction, and the second ship, the Navy vessel *Vigilant*, began construction in September. The Navy also awarded construction contracts for the next three ships

of the class in 2010—*Fortitude*, *Fall River* and *Resolute*.

PEO Ships is managing the construction of the first 10 JHSVs, five to be operated by the U.S. Navy and five by the U.S. Army.

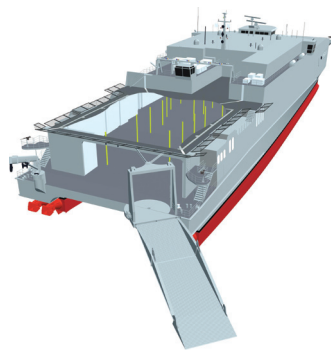
“We’re excited to build this class of ship,” said Capt. George M. Sutton, the Joint High Speed Vessel program manager in PEO Ships’ Strategic and Theatre Sealift office. “Significant production and

financial risk has been avoided by implementing proven commercial production design and technology, ensuring stable requirements, minimizing change and through the ruthless pursuit of cost reduction and efficiency.”

The JHSV program merges the previous Army Theater Support Vessel and the Navy High Speed Connector, to decrease costs by taking advantage of the inherent commonality between the existing programs. The vessels are commercially designed, non-combatant ships designed to leverage commercial technology.

The program takes full advantage of Austal’s newly constructed Modular Manufacturing Facility, which is expected to improve production efficiencies in ship construction, reducing construction duration and lowering production costs. The facility was designed to Lean manufacturing principles, centralizing fabrication work indoors, and providing tools and material at point of use. The layout and assembly line provides workers with improved access to maximize the amount of pre-outfitting that can be accomplished before launching each ship into the water. The facility represents an approximately \$80 million investment by the company, and will eventually provide a five-fold increase in Austal’s existing capacity.

Developed to support inter-theater troop transport, JHSVs are capable of transporting 600 tons, at a distance of 1,200 nautical miles, and at an average speed of 35 knots. JHSVs operate in shallow-draft ports and waterways, enabling roll-on roll-off discharge capabilities. *Spearhead* is expected to deliver to the Army in 2012 and the planned delivery of USNS *Vigilant* (JHSV 2) to the Navy is also expected in 2012. ■■■



The JHSV program is procuring high-speed transport vessels for the Army and the Navy. These vessels will be used for fast intra-theater transportation of troops, military vehicles and equipment. U.S. Navy illustration.

MOBILE LANDING PLATFORM: PIER IN THE OCEAN

USING A PROVEN, COMMERCIALY-TESTED SEA FRAME, THE MOBILE LANDING PLATFORM SHORTCUTS THE STANDARD ACQUISITION TIME LINE, OFFERING A GIANT STEP FORWARD IN THE FLEET'S ABILITY TO MOVE VEHICLES AND EQUIPMENT ASHORE.

Recognizing the need for the ability to transfer vehicles from Navy cargo ships at sea to Landing Craft Air-Cushioned (LCAC) vessels for transport ashore, the Navy began a program to develop and build three Mobile Landing Platforms (MLP). In August 2010, an advance procurement contract for these vessels was awarded to General Dynamics-NASSCO in San Diego, Calif. This fast-paced acquisition program is expected to have the first MLP under construction by July 2011 and deliver in fiscal year 2013.

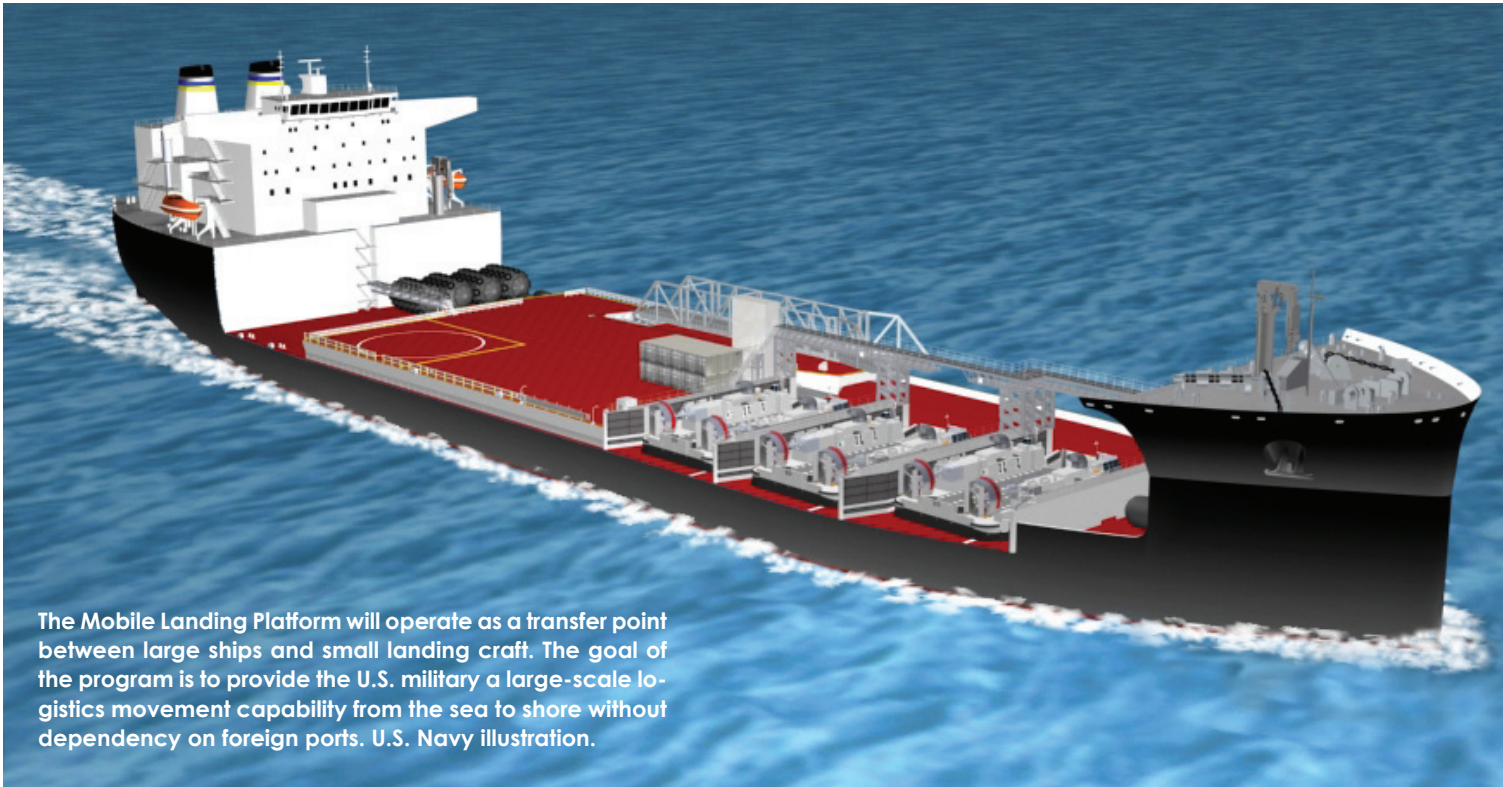
MLP is based on an existing commercial-design, the *Alaska*-class crude oil carrier built by NASSCO, ensuring development costs remain low. The design will be modified to allow MLP to operate as a float-on/float-off (FLO-FLO) vessel.

Leveraging commercial FLO-FLO technology, the MLP will provide a surface interface between Large, Medium Speed Roll-on Roll-off (LMSR) prepositioning ships, Joint High Speed Vessels (JHSV) and landing craft.

The platform will have two primary capabilities: transfer of equipment, personnel and sustainment at-sea; and delivery of the vehicles and equipment ashore. A sort of “pier in the ocean,” the MLP enables the at sea transfer with heading control, ballast and list control to support LCAC operations. The platform has an open, reconfigurable mission deck and will, in its basic form, have a core capability set that includes a raised vehicle deck, sideport ramp, large mooring fenders, a U.S. Coast Guard certified flight deck and up to three LCAC lanes, allowing multiple LCAC loading.



Using a surrogate mobile landing platform (MLP) ship (M/V *Mighty Servant 3*, shown left), the Navy conducted an at-sea demonstration, transferring vehicles from the “MLP” to a large/medium-speed, roll-on/roll-off (LMSR) ship (USNS *Soderman*, shown right) using the Test Article Vehicle Transfer System (TAVTS). TAVTS—the grey bridge structure spanning the two vessels—allowed personnel and vehicles to transfer between the ships in both high and low sea states. U.S. Navy photo.



The Mobile Landing Platform will operate as a transfer point between large ships and small landing craft. The goal of the program is to provide the U.S. military a large-scale logistics movement capability from the sea to shore without dependency on foreign ports. U.S. Navy illustration.

Looking to the future, the MLP is designed to be fitted with alternate equipment and mission packages as needed, such as hospital facilities, expanded aviation capabilities, and communications systems to rapidly augment amphibious

and joint forces. Coupled with a *Lewis and Clark*-class ship and other auxiliary vessels, the MLP will provide a first step in crafting a sea-based capability to deploy prepositioned forces ashore. ■■■

TAVTS BRIDGING THE GAP

In February 2010, the Navy completed an at-sea exercise, part of the Test Article Vehicle Transfer System (TAVTS), to demonstrate the transfer of vehicles between a surrogate Mobile Landing Platform (MLP) ship and a Large Medium-Speed Roll-on/Roll-off (LMSR) ship.

The test, led by the Strategic Theater Sealift Office (PMS 385) within PEO Ships, was part of risk-reduction efforts for the MLP program and was structured to demonstrate technologies developed to manage the dynamic forces encountered when transferring military vehicles between ships at sea. The goal of the testing and the program was to provide the capability to the U.S. military for large-scale

logistics movements from the sea to shore without dependency on foreign ports.

The test demonstrated a self-deploying ramp system that was installed on the surrogate MLP (*M/V Mighty Servant 3*) and a new self-deploying side-port platform that was installed on USNS *Soderman* (T-AKR 317)—a Military Sealift Command LMSR.

The successful demonstration of the TAVTS and of the dynamic positioning system capabilities provides a significant enhancement potential for future sea-basing logistics operations to provide a more capable and ready Fleet.

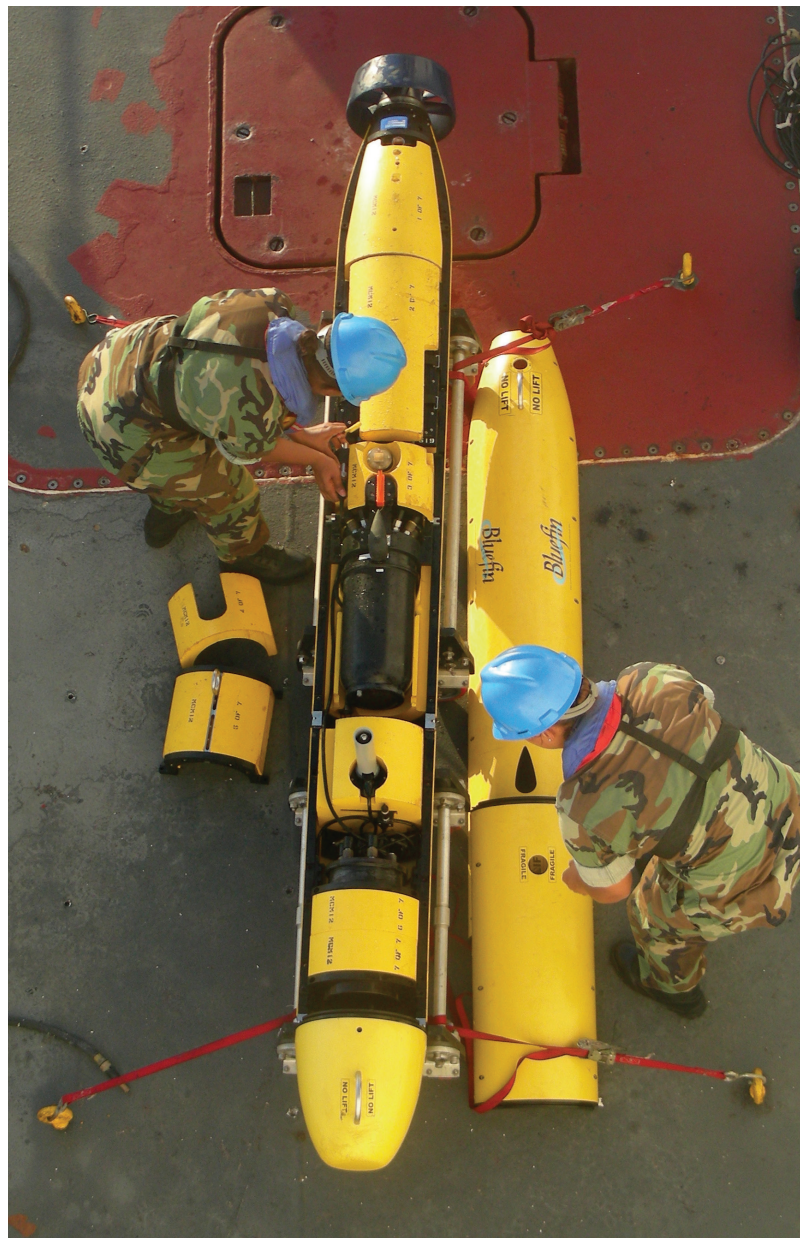
UNMANNED MARITIME SYSTEMS

A REORGANIZATION BRINGS A RENEWED FOCUS ON THIS SECNAV PRIORITY PROGRAM. UNMANNED VEHICLES ARE A CRITICAL COMPONENT OF THE EXPEDITIONARY TEAM, EXPANDING THE TEAMS' CAPABILITY TO TAKE ON MORE DISTANT, DANGEROUS MISSIONS AT A REDUCED RISK TO OUR PEOPLE.

Program Executive Office for Littoral and Mine Warfare's (PEO LMW) surface and undersea unmanned vehicle programs underwent significant changes in 2010 as part of the Navy's increased effort to leverage unmanned systems technology. Particular emphasis is being placed on the development and acquisition of unmanned maritime systems (UMSs) for intelligence, surveillance and reconnaissance (ISR) and mine counter-measure (MCM) missions to allow unmanned vehicles to conduct these missions instead of risking the lives of Sailors and Marines.

Assistant Secretary of the Navy for Research, Development and Acquisition (ASN & RD&A) Sean Stackley directed the establishment of the Unmanned Maritime Systems Program Office (PMS 406) in July 2010 to expedite the development and acquisition of UMSs.

RIGHT: Navy leadership has taken a strong stance on the importance of unmanned vehicles—the secretary of the Navy has made it one of his top three priorities, and the chief of naval operations intends to demonstrate an unmanned undersea vessel fleet by the end of the next decade. Although challenges remain, unmanned vehicles and sensors represent the Navy's future, both as a way of augmenting force structure and removing Sailors from high-threat environments. U.S. Navy photo. Featurette photos by Richard Allen.



PMS 406 now serves as an advanced development program office to help field surface and subsurface prototypes sooner, get feedback from end users, and incorporate feedback into future development and procurement.

ASN & RD&A also directed that PMS 403 be re-designated as the Remote Mine Hunting System (RMS) Program Office to manage RMS and AN/AQS-20A sonar acquisition programs already in low-rate, initial production. RMS is used to detect, classify, localize and identify bottom and moored mines in littoral regions. It uses an unmanned, autonomous Remote Multi-Mission Vehicle (RMMV) that tows an advanced Variable Depth System (AQS-20A) equipped with sonar and electro-optical sensors to provide high-resolution images of mine-like objects and high-pre-

"THESE SYSTEMS AND OTHERS SUCH AS THE AIRBORNE MINE NEUTRALIZATION SYSTEM AND THE EXTENDIBLE MINE NEUTRALIZATION SYSTEM ARE CRUCIAL TO NAVY'S EXPEDITIONARY CAPABILITIES AND WILL DO THE DULL, DIRTY AND DANGEROUS WORK OF LOCATING, IDENTIFYING AND NEUTRALIZING THREATS TO SHIPS AND PERSONNEL OPERATING IN THE LITTORALS."

VICTOR GAVIN
PEO LMW EXECUTIVE DIRECTOR

cision location information. These systems can operate in shallow or deep waters and provide mine counter-measure (MCM) capability, without putting Sailors or ships in the minefield.

"We have been restructured for success," said Victor Gavin, PEO LMW executive director. "These organizational changes will focus PMS 403 on the RMMV and AQS-20A as Major Defense Acquisition programs while PMS 406 focuses on developing new UMSs within PEO LMW. The bottom line is that more experience, expertise and resources will be put toward the Navy's UMS effort."

Additionally, PEO LMW's program office for Mine Warfare (PMS 495) conducted the first flight test of the Coastal Battle-field Reconnaissance and Analysis (COBRA) Block I system at Yuma Proving Ground, Ariz., Oct. 13, successfully testing the system's performance on the Fire Scout vertical take-off unmanned aerial vehicle.

The AN/DVS-1 COBRA system is carried by the MQ-8B Fire Scout to conduct unmanned aerial reconnaissance in littoral areas, detecting minefields and obstacles in preparation for amphibious operations. The Block I upgrade was designed to address the beach zone and inland areas, specifically. The first production unit is scheduled for delivery in fiscal year 2012.

"These systems and others, such as the Airborne Mine Neutralization System and the Extendible Mine Neutralization System, are crucial to Navy's expeditionary capabilities and will do the dull, dirty and dangerous work of locating, identifying and neutralizing threats to ships and personnel operating in the littorals," said Gavin.

Combined, the three program offices of PMS 403, PMS 406 and PMS 495 continue to make significant strides toward achieving the secretary of the Navy's and chief of naval operations' top priorities to pursue unmanned systems as an integrated part of our force and truly reduce personnel requirements, extend endurance and develop improved autonomy in future unmanned maritime systems. ■■■



Keegan develops Advanced Autonomous vehicle capabilities that can be applied across Navy Unmanned Platforms.



**MICHAEL
KEEGAN**

COMPUTER ENGINEER
NAVAL UNDERSEA WARFARE CENTER
NEWPORT

"IT'S EXCITING AND REWARDING TO KNOW THE ADVANCE AUTONOMOUS SYSTEM CAPABILITIES I'M WORKING ON ARE HELPING TO ADVANCE STATE-OF-THE ART SYSTEMS."

THE NAVY'S NEWEST GENERATION OF DESTROYER, THE ZUMWALT CLASS BRINGS WITH IT SIGNIFICANT ADVANCES IN STEALTH AND FIREPOWER, AS WELL AS THE MOST MATURE DESIGN PRIOR TO CONSTRUCTION TO DATE.



ZUMWALT CLASS

CUTTING EDGE DESIGN

Less than two years since fabrication began, the first ship of the Navy's newest class of destroyers, the future USS *Zumwalt* (DDG 1000), has seen significant progress in 2010.

Under construction in both Bath Iron Works in Bath, Maine, and Northrop Grumman Shipbuilding in Pascagoula, Miss., one-third of *Zumwalt* is fully constructed, and the shipbuilders have started work on each of the remaining sections. Similarly, the second ship of the class, the future USS *Michael Monsoor* (DDG 1001), started construction and is approximately 12 percent complete.

Zumwalt is the lead ship of a three-ship class of next-generation multi-mission surface combatants tailored for land attack and littoral dominance. Much of the program's ability to successfully execute to date is attributed to the substantial technology maturity and design and production readiness efforts incorporated in the program. The design for DDG 1000 was more than 80 percent complete at the start of fabrication, greater than any previous surface combatant.

ABOVE: The multi-mission DDG 1000 is tailored for sustained operations in the littorals and land attack, and will provide independent forward presence and deterrence, support special operations forces, and operate as an integral part of joint and combined expeditionary forces. U.S. Navy illustration.

Beyond construction on the hulls, the first BAE-developed 155mm Advanced Gun System (AGS) was delivered in 2010, as were the first two magazines. The AGS, using the specially designed Long-Range Land Attack Projectiles, is capable of achieving a minimum range of 63 nautical miles, providing a three-fold improvement in naval surface fires coverage. The first AGS production gun successfully test-fired a total of 155 rounds in November 2010.

The *Zumwalt* 78-megawatt Integrated Power System, the ship's electric power generation, propulsion, and service distribution system, has also been delivered to Bath Iron Works for installation. Additionally, all 26 of the ship's major mission systems are in production on or ahead of schedule for delivery to the shipyards. This equipment includes the SPY-3 Multi-Function Radar and the Mk 57 Advanced Vertical Launching System.

Following a Nunn-McCurdy cost review in 2010, the program was restructured to include three ships (DDG 1000, 1001, and 1002); remove the Volume Search Radar (VSR) from the ship design—leaving space and weight reservation for possible future inclusion; adjust the Initial Operational Capability date from fiscal year 2015 to fiscal year 2016; and revise testing and evaluation requirements. Following certification, DDG 1000 received Milestone B approval in October 2010, paving the way for the program's Engineering and Manufacturing Development phase. ■■■

IRAQI NAVY RECAPITALIZATION

IN THE WAKE OF THE GULF WAR, THE NATION OF IRAQ IS WORKING TO REBUILD ITS INFRASTRUCTURE. NAVSEA IS SUPPORTING THE SELF DEFENSE CAPABILITY OF THIS PARTNER NATION WITH FAST, CAPABLE PATROL CRAFT.

To meet its missions, the Navy requires partner nations capable of meeting and disrupting threats to national security and economic stability on the open ocean and within national boundaries. Unfortunately, many coastal nations do not have the money, infrastructure or expertise to design and build combat-effective navies and coast guards.

Uniquely positioned to assist allied nations in these efforts is the Auxiliary Ships, Small Boats and Craft Program Office within PEO Ships. In addition to procuring auxiliary ships, special mission ships and combatant craft for the U.S. Navy, the office also manages a foreign military sales program that provides more than 100 vessels of varying size and mission to allied nations each year—117 in 2010 alone.

“Our foreign partners rely on PEO Ships’ expertise in combatant craft acquisition,” said Rear Adm. David Lewis, program executive officer for Ships. “This assistance represents a commitment for continued cooperation between the United States and our partners.”

One of the more interesting foreign assistance programs currently being managed by PEO Ships is the recapitalization of the Iraqi navy. Virtually non-existent following decades of war and economic sanctions, the fledgling force is ramping up the acquisition of new types of vessels to protect its shoreline and off-shore oil interests.

Currently, PEO Ships is managing the procurement, construction, delivery and reactivation of 15 35-meter patrol boats and two 60-meter offshore support vessels (OSVs) in an effort to reconstitute the country’s ability to enforce maritime sovereignty and security.

Using a design chosen by the Iraqi government, the 35-meter patrol boats are heavily armed fast-attack craft designed to support a crew of 25 for six days and can reach speeds of 30 knots.

The first boat of the class successfully delivered in September 2010. The second, third and fourth boats have also delivered from the shipbuilder, and have either been transferred or are in the process of being transferred to Iraq navy base



Foreign partners rely on the expertise of the Navy’s Support Ships, Boats and Craft program office for boat design and acquisition. This assistance represents a commitment for continued cooperation between the United States and our partners. Photo courtesy of Swiftships.

at Um Qasr. Swiftships Shipbuilders LLC is currently building boats five through eight at their shipyard in Morgan City, La. The craft are on schedule to deliver throughout 2011.

Further cementing the Navy’s commitment to this program, the United States has agreed to pay for a portion of the vessels using Iraqi Security Force Funds. The Iraq Security Force Fund program manages purchases of defense articles such as vehicles, weapons, and ammunition using a proven procurement process for placing orders for equipment quickly and transparently.

Designed to support the patrol boats, the first of two planned offshore support vessels began construction in August of 2010 in Houma, La., at Gulf Island Marine. The OSVs will serve as patrol boat support ships by providing oil platform security, diving support, and pollution abatement and have the capability for limited firefighting. With the flexibility to rapidly change its mission with limited advanced notice, the OSV is unique in its mission capabilities. The first OSV is scheduled to deliver in 2011.

PEO Ships will continue to assist with acquisition and oversight efforts on both vessel types and will also provide follow-on technical and training support to the country’s navy upon delivery of each vessel. ■■■

ENERGY INNOVATION

IN PURSUIT OF THE SECNAV GOAL OF A FLEET LESS RELIANT ON FOSSIL FUELS, NAVSEA IS PRESSING AHEAD WITH RESEARCH AND INITIATIVES THAT WILL PAVE THE WAY FOR NEW VESSELS AND SYSTEMS POWERED BY ALTERNATIVE ENERGY SOURCES FOR A CLEANER, GREENER NAVY.

In 2010, NAVSEA's engineers continued the evaluation of energy-saving initiatives that support the Secretary of the Navy's Strategic Energy Plan of reducing the Navy's reliance on petroleum products. Finding innovative methods to reduce fuel consumption in ships already designed and delivered is a challenge, and every percentile matters.

Projected fuel savings of up to one percent per ship per year in addition to maintenance savings is expected through the online water wash initiative, designed to clean ships' gas

turbines more efficiently. Existing offline wash equipment is augmented with a set of nozzles, hoses and an automated three-way diverter valve to send wash fluid to either online or offline nozzles.

"The online water wash keeps the ship engines cleaner for longer periods," said Doyle Kitchin, director, NAVSEA Fleet Readiness Research and Development Program. "The result is greater fuel efficiency and reduced down time, maintenance costs and Sailor labor."



LEFT: The riverine command boat is powered by an alternative fuel blend of 50 percent algae-based and 50 percent NATO F-76 fuels to support the secretary of the Navy's efforts to reduce fossil fuel consumption on naval ships. U.S. Navy photo by MC2 Josue Escobosa.

OPPOSITE PAGE: USS *Makin Island* (LHD 8)—the eighth and final ship in the *Wasp*-class of multipurpose amphibious assault ships—is the first Navy ship built with an auxiliary propulsion system and gas turbine engines. U.S. Navy photo by MC2 Josue Escobosa. Featurette photos by M.J. McCoy.

GREGORY TOMS

Toms provides technical leadership and sets technical standards for naval fuels, lubricants, hydraulic fluids and greases.

NAVAL FUELS AND LUBRICANTS
TECHNICAL WARRANT HOLDER,
NAVAL SEA SYSTEMS COMMAND
HEADQUARTERS



"I AM PROUD OF THE PROGRESS AND ACCOMPLISHMENTS MADE TO DATE, AND KNOWING MY WORK WITH THE NAVY'S ALTERNATIVE FUELS PROGRAM WILL MAKE A DIFFERENCE IN PROVIDING THE NAVY OPTIONS TO THE CURRENT PETROLEUM-BASED FUELS."

Online water wash testing is ongoing in USS *Preble* (DDG 88) for *Arleigh Burke*- and *Ticonderoga*-class ships.

Testing and evaluation also continues in USS *Pearl Harbor* (LSD 52) for solid state lighting. Replacing shipboard incandescent and fluorescent lighting with LEDs similar to those found in consumer electronics is expected to reduce fuel consumption by approximately one percent annually per ship, in addition to maintenance cost avoidance.



Another initiative, the Combustion Trim Loop system, transitioned from evaluation to fleet implementation in October, making LHD-class ships' boilers more efficient. The system, coupled with a new stack gas analyzer, lowers fuel consumption by providing optimum air flow and a better fuel-air mixture to the boilers. The system is scheduled for installation in LHD 1 through 7 by the end of fiscal year 2016.

"Factoring the number of barrels of fuel these ships burn each year, the 2.1 percent overall fuel savings projected is substantial," Kitchin said. "It should generate significant fuel savings each year."

While several initiatives involve shipboard modifications, testing continued in 2010 on a "drop-in replacement" to shipboard fuel. A 50-50 biofuel blend of hydrotreated renewable diesel derived from algae and petroleum NATO F-76 fuel was evaluated in a 7-meter rigid-hull inflatable boat in July, and in a riverine command boat in October. Additional power and propulsion systems full-scale tests are planned including diesels, a marine gas turbine, and a boiler evaluation. These tests are part of a systematic approach for selecting and evaluating those propulsion and power systems for testing which best represent the larger fleet. This qualification process represents a cost-effective approach for the Navy's entire engine inventory.

Program Executive Office Ships continued factory testing, in 2010, of a prototype Hybrid Electric Drive (HED) for *Arleigh Burke*-class destroyers, which account for more than 40 percent of the U.S. Navy's surface ship fuel consumption. The HED is designed to integrate electrical motors and power generators into the ships' existing mechanical propulsion systems, enabling them to run on electrical power at low speeds and, in a later development, to generate more electrical power. The result is improved fuel economy, added power generation and enhanced propulsion reliability.

"*Arleigh Burke*-class operating profiles show that the ships often operate at speeds that don't fully optimize the ships' turbines," said Glen Sturtevant, Team Ships director for science and technology. "Hybrid Electric Drive will reduce energy consumption by utilizing fewer gas turbines for propulsion while loading gas turbine engines and generators at their optimal operating conditions."

NAVSEA's energy-saving initiatives extended beyond ships in 2010, including providing support to deployed Marine Corps units. Naval Surface Warfare Center Carderock and the Office of Naval Research have developed the Ground Renewable Expeditionary Energy System, a 300-watt continuous, solar- and battery-powered system, providing Marines an alternative electric power source in the field while reducing fuel requirements. The first seven "green" units were deployed to Marines in Afghanistan in October.

Across the full range of ships and systems, NAVSEA's engineers are delivering real returns on energy investments, answering the strategic imperative set by the Secretary of the Navy. ■■■



ENABLE OUR PEOPLE







RECRUITING

THE FUTURE OF NAVY SHIP DESIGN AND MAINTENANCE LIES IN THE HANDS OF TOMORROW'S LEADERS. NAVSEA'S STRATEGY IN DEVELOPING A RICH RESOURCE FOR BRIGHT, MOTIVATED EMPLOYEES INCLUDES AN EVER-EXPANDING EFFORT TO PROMOTE NAVSEA'S UNIQUE CAREER OPPORTUNITIES.

NAVSEA broadened its recruiting efforts in 2010, expanding partnerships with affinity groups and coordinating a NAVSEA-wide approach to attracting new talent to meet emerging employment needs throughout the command.

NAVSEA's Recruiting Partnership led the way in 2010, with a collaborative effort across the enterprise to target intern, entry-level, mid-career and diversity-focused hiring. This collaborative team of recruiting representatives from all business units brings together recruiting, hiring and on-boarding communities, leveraging resources to expand the pool of candidates for NAVSEA positions.

"We put a lot of work strategically integrating and expanding our professional, business and academic relationships with organizations into our corporate recruiting efforts," said Tony Gilbert, NAVSEA warfare center engineer and corporate recruiting liaison. "Through this unified approach, we've done a better job of educating potential job candidates about NAVSEA, who we are and what we do. That in turn puts us in a better position to hire the right person in the right job, at the right time and place."

NAVSEA recruiters expanded their outreach efforts in 2010, attending university and industry career fairs, and professional symposiums and expos across the United States, including Alaska, Hawaii and Puerto Rico. Specific recruiting initiatives focused on Wounded Warrior hiring, resulting in a record number of disabled veterans joining NAVSEA's work force.

At the university level, NAVSEA established the Naval Engineering Education Center (NEEC) in May 2010 to educate and develop world-class naval systems engineers. Led by the University of Michigan, the NEEC consortium of initially 15 colleges and universities, along with the American Society of Naval Engineers and the Society of Naval Architects and Engineering,

will increase the number of students who graduate with an accredited degree; provide world-class faculty specialized in naval engineering; coordinate employee development opportunities to retain naval engineering talent for the Navy; and increase the availability of naval engineering education programs and courses across universities and colleges.

"The NEEC will provide NAVSEA a pipeline of engineers in critical career fields to address the challenges we face in building and sustaining the 21st century Navy," said Brian Persons, NAVSEA executive director. "This is a huge step to help address Navy research and engineering development needs and challenges."

NAVSEA strengthened existing partnerships with Hispanic, African-American, women's, and other affinity groups with targeted marketing campaigns, attendance at career fairs, and support of diversity-focused professional organizations. The biggest gain came in October 2010, when NAVSEA became the first organization to sponsor the Society of Hispanic Professional Engineers' (SHPE) opening ceremony at their annual conference.

"NAVSEA's affiliation with professional organizations that are both technical in nature and diversity related is critical to our recruiting efforts," said Tim Troske, NAVSEA executive liaison with SHPE and NSWC Port Hueneme technical director. "Partnerships such as these allow NAVSEA exposure to a pool of talent that will benefit the diversity of our work, as well as the diversity of our work force."

Individual NAVSEA field activities also made gains in attracting new hires with educational partnerships. In June, NSWC Dahlgren expanded a partnership with the University of Mary Washington, increasing the scope of the original agreement to provide students an opportunity to work with warfare center personnel in facilities to include mutually beneficial innovative



NAVSEA values the ingenuity that comes from the diversity of our workforce, and continues to build relationships with educational and professional organizations to ensure its strength. NAVSEA recruiting efforts support the chief of naval operations' objectives for the Navy to be recognized as an employer of choice in the United States. U.S. Navy photos. Featurette photos by Laura Lakeway.

research projects. NSWC Indian Head and Naval Explosive Ordnance Disposal Technology Division signed a three-year educational partnership agreement with the University of Puerto Rico, Mayaguez and Polytechnic University of Puerto Rico, San Juan to include research opportunities and work internships.

In October, NSWC Corona signed an education partnership agreement with the University of California, Riverside's (UCR) Bourns College of Engineering. For NSWC Corona, the agreement facilitates training and recruitment of UCR graduates as future employees; following completion of the internships, about 95 percent of undergraduate interns join the NAVSEA work force.

"The expansion of such educational partnerships ensures we maintain technical excellence for the Navy with talented, up-and-coming scientists and engineers," said NSWC Corona Commanding Officer, Capt. Jay Kadowski.

NAVSEA's four shipyards were also successful in attracting new talent to their trade apprenticeship programs. The four-year, work-study program combines full-time paid employment with on-the-job training and classroom instruction. All shipyards participated in college fairs, and Norfolk Naval Shipyard also held a college day in July to inform area college representatives about career opportunities for prospective engineers and science majors.

NAVSEA also benefited from a new apprentice school in 2010. The Southwest Regional Apprentice School at Naval Air Station North Island, San Diego was the result of a partnership between Southwestern College and Puget Sound Naval Shipyard and Intermediate Maintenance Facility; Southwest Regional Maintenance Center; and Naval Air Systems Command's Fleet Readiness Center Southwest. This is the Navy's first southwest regional apprenticeship program developing highly skilled, journey-level workers and leaders supporting the needs of multiple commands. ■■■



Reece recruits new talent for NAVSEA and assists job seekers through the employment process.

"I LOVE INFORMING THE COMMUNITY ABOUT CAREER OPPORTUNITIES ACROSS THE NAVSEA ENTERPRISE. BY BRINGING CANDIDATES FACE TO FACE WITH NAVSEA TEAM MEMBERS, WE OFFER JOB SEEKERS A REAL-WORLD PREVIEW OF ALL THE PROFESSIONS AVAILABLE ACROSS OUR ORGANIZATION AND HIGHLIGHT NAVSEA'S ROLE IN SUPPORTING THE U.S. NAVY."

WOUNDED WARRIORS



IN THE QUEST TO BUILD A SOLID 21ST CENTURY WORK FORCE, NAVSEA HAS FOUND A RICH RESOURCE IN THE WOUNDED WARRIOR. WITH DIVERSE BACKGROUNDS AND STRONG TECHNICAL EXPERTISE, THESE YOUNG MEN AND WOMEN HAVE THE OPPORTUNITY TO CONTINUE TO SERVE THEIR NATION.

With a solid foundation of Wounded Warrior outreach in 2009, NAVSEA launched an ambitious effort in 2010 to expand career opportunities to injured service members. Partnerships with federal agencies and private organizations increased education, training and employment for Wounded Warriors, while enterprise-wide recruiting initiatives shattered NAVSEA hiring goals for the year.

“Given all that Wounded Warriors have overcome and their front-line perspective, these are exactly the employees we want in our midst at NAVSEA,” said Vice Adm. Kevin McCoy, NAVSEA commander. “We’re working to establish programs to fill any skills gap and bring these service members onboard as Navy employees. Our goal is to ensure Wounded Warriors have every opportunity and all the support they need to transition from military service to civilian service.”

NAVSEA launched an aggressive outreach effort for Wounded Warrior hiring in 2010, setting hiring goals for each of its activities. NAVSEA warfare centers, shipyards, and other business units actively sought Wounded Warriors with the skill sets to meet their work force demand. This coordinated effort brought 282 Wounded Warriors to NAVSEA, more than double the year’s goal, and was recognized by Assistant Secretary of the Navy (Manpower and Reserve Affairs) (ASN M&RA) Juan Garcia with the Wounded Warrior Hiring and Support Award in November.

NAVSEA’s shipyards led the way in Wounded Warrior hiring, accounting for more than half of those numbers.

“Wounded Warriors’ talents and skill sets are a needed and welcome addition,” said Capt. Mark Whitney, Puget Sound Naval Shipyard & Intermediate Maintenance Facility commander. “Their ranks have joined all sectors of our work force, from shipyard workers to administrative support to management. Our goals are to increase our targeted hiring next year to allow more Wounded Warriors to serve their country as federal civilian employees.”

In cooperation with ASN M&RA, NAVSEA expanded its outreach efforts to federal agencies at the first National Capital Region Wounded Warrior Hiring and Support Conference in February 2010. More than 600 representatives from the military services and federal agencies attended the conference to understand the barriers Wounded Warriors face in seeking post-injury employment, and how to overcome them.

“The conference was an opportunity for NAVSEA to share our success stories, lessons learned, and examine how to cooperate with other agencies to develop a robust, effective

ABOVE: In the two years since NAVSEA established its Wounded Warrior program, the command has successfully developed and executed an enterprise-wide initiative to attract, recruit and retain Wounded Warriors. Mark Gwathmey transitioned from active duty to civil service through NAVSEA’s Wounded Warrior program and today works in the command’s Security Directorate. U.S. Navy photo by M.J. McCoy. Featurette photos by Richard Chaffee.

network for Wounded Warrior hiring,” said Dennis McLaughlin, NAVSEA Wounded Warrior outreach lead and Naval Surface Warfare Center (NSWC) Indian Head technical director.

The first partnership NAVSEA formed in 2010 was with the Army’s Warrior Transition Command. NSWC Port Hueneme expanded that commitment by partnering with the Army’s Warrior Transition Battalion Center at Ft. Bliss, Texas, to support the employment needs of severely injured service members.

“OUR GOAL IS TO ENSURE WOUNDED WARRIORS HAVE EVERY OPPORTUNITY AND ALL THE SUPPORT THEY NEED TO TRANSITION FROM MILITARY SERVICE TO CIVILIAN SERVICE.”

VICE ADM. KEVIN MCCOY, NAVSEA COMMANDER

NAVSEA also made gains in its partnerships outside of the federal government. NSWC Crane’s Learning & Employment Center (LEC) established itself as the gold standard of a private/public partnership. Working with service members already detached from the military, the LEC provides comprehensive support for veterans and their families, to include career and financial assistance. While philanthropic and state grants cover funding, NAVSEA provides employment opportunities. In 2010, two new centers opened in Indianapolis, Ind., and Southern Maryland, expanding NAVSEA’s footprint in Wounded Warrior hiring.

NAVSEA also entered into a new joint enterprise in 2010. Working with Veterans Individual Training Assistance Link (VITAL) and Defense Acquisition University (DAU), NAVSEA launched a contracting career pipeline at four military hospitals in the Fall. Wounded Warriors begin a customized individual development program of education and/or coursework while recuperating in the hospital to achieve certification in the

acquisition field, and job placement as a civilian employee. VITAL mentors leverage federal resources for injured service members, such as tuition assistance, and ensure class work is appropriate to each individual’s medical regimen, while



Due to advances in modern military medicine, unprecedented numbers of wounded service members are returning to the fight or transitioning their service to civilian employment. NAVSEA Commander, Vice Adm. Kevin McCoy, NAVSEA Executive Director Brian Persons and NAVSEA Wounded Warrior Outreach Lead Dennis McLaughlin speak with wounded service member James R. Clark and his wife at Walter Reed Army Medical Center. U.S. Navy photo by Laura Lakeway

NAVSEA subject matter experts serve as academic tutors, working with Wounded Warriors to complete DAU coursework.

“The LECs and our VITAL/DAU partnership are great opportunities for both NAVSEA and wounded veterans,” said Cmdr. Dave McAfee, NAVSEA Wounded Warrior program manager. “With NAVSEA’s job diversity and geographic reach, veterans have employment opportunities with a wide variety of skills and careers, while NAVSEA grows its work force. It’s a win-win situation.” ■■■



Mattis builds portable machinery; and designs, builds and refurbishes tooling to support the Machine Shop and waterfront personnel.



“I CHOSE TOOL-MAKING BECAUSE OF THE CHALLENGE OF WORK AND DAY-TO-DAY VARIATION. I ENJOY PROBLEM SOLVING AND UTILIZING THE SKILLS OF THE CRAFT TO ASSIST OTHERS NEEDS. THERE IS ALSO A LOT SATISFACTION IN SEEING THE JOB THROUGH THE PROCESS—FROM DESIGNING/DRAWING THROUGH TO THE TESTING OF A COMPLETED INSTRUMENT.”

BRIAN MATTIS

SECOND YEAR TOOL-MAKER APPRENTICE
PUGET SOUND NAVAL SHIPYARD AND
INTERMEDIATE MAINTENANCE FACILITY





“OUR EFFORTS TO GET THE YOUNGEST STUDENTS—DOWN TO THE GRADE-SCHOOL LEVEL—INTERESTED AND EXCITED ABOUT SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS ARE A VITAL INVESTMENT IN THE FUTURE OF THE NAVY AND THE NATION.”

DON MCCORMACK
NAVAL UNDERSEA WARFARE CENTER TECHNICAL DIRECTOR



OUTREACH

WITH A SECURE FUTURE DEPENDENT ON NAVSEA'S ABILITY TO EXTEND ITS TECHNICAL EXPERTISE THROUGH THE COMING CENTURY, NAVSEA'S WORK FORCE IS ACTIVELY ENCOURAGING MATH AND SCIENCE SKILLS AT THE EARLIEST LEVELS OF EDUCATION WITH A SINGLE THOUGHT IN MIND: TODAY'S STUDENT IS TOMORROW'S NAVAL ARCHITECT, READY TO FACE FUTURE ENGINEERING CHALLENGES.

In support of its Enterprise Talent Management Strategy to build and sustain the 21st century work force, NAVSEA conducted sustained outreach efforts in 2010 to stimulate student interest in science, technology, engineering and math (STEM) careers.

These coordinated efforts targeting students from kindergarten through college, as well as STEM instructors, were part of an enterprise-wide effort to cultivate interest in STEM and bolster NAVSEA's future work force.

"Over the next five years in the warfare centers alone, more than 30 percent of NAVSEA's science and engineering work force are or will become eligible for retirement," said Don McCormack, Naval Undersea Warfare Center technical director. "Our efforts to get the youngest students - down to the grade-school level - interested and excited about science, technology, engineering, and mathematics are a vital investment in the future of the Navy and the nation."

In partnership with the National Defense Education Program—a Department of Defense initiative to encourage STEM studies and careers—NAVSEA warfare centers around the country held STEM summer camps for elementary, middle- and high-school students. Volunteer NAVSEA scientists and engineers engaged participants in hands-on robotics activities on

submarine design, naval architecture, and marine and ocean engineering concepts, and challenged students to find technological solutions to real-world engineering problems ranging from oil spill recovery to using sonar to map the ocean floor.

"The goal is to increase the attraction of the Navy's warfare centers and shipyards as an eventual place of employment for the students participating in the program," said Bob Stiegler, NAVSEA's NDEP K-12 naval program coordinator. "Experience to date has shown that students can be attracted and retained in engineering programs if they are exposed early to the joys of creation through design, discovery through research, and invention through hands-on experimentation."

NAVSEA shipyards also conducted outreach efforts throughout the year to educate students on its diverse career opportunities, the shipyard's apprentice program and how shipyards support the Fleet. At Norfolk Naval Shipyard's Shipbuilding, Repair and Maritime Career Day in March, more than 800 middle-school students participated in hands-on activities featuring pipefitting, electronics work, rigging projects, marine hull design and a ship driving simulation.

NAVSEA's outreach efforts extended not only to students, but teachers. NSWC Crane, in partnership with the University of Southern Indiana, held workshops at the elementary, high school and university level to expose students to the warfare center's technical capabilities. NSWC Carderock hosted a first-of-its-kind weeklong summer institute for local high school teachers. NAVSEA scientists and engineers introduced participants to the world of naval engineering with tours and lectures, as well as hands-on training with technology to incorporate into their classrooms.

"The goal of the institute is to expose teachers to the real world of engineering so that they can bring relevance to the material they are teaching their students," said Toby Ratcliffe, NSWC Carderock outreach coordinator and engineer. "We hope our efforts generate student interest in not only naval engineering, but a career with NAVSEA." ■■■

The NAVSEA enterprise encourages students to explore their full potential through a multitude of outreach efforts. Through discussions and putting technology in the hands of students, NAVSEA mentors show students how interesting science and math can be and also help students visualize themselves in a STEM career with the Navy. Consolidated outreach efforts are part of a continuing NAVSEA initiative to develop relationships with minority-serving educational institutions; and directly support the chief of naval operations' priorities to attract a diverse, high-performing future force; lead STEM education outreach; grow top technical talent for tomorrow's Navy, and double the Navy's STEM investment within five years. U.S. Navy photos by Greg Vojtko and David Pastoriza.



2010 SHIP MILESTONES

Keels Laid:

William McLean (T-AKE 12), March 26
PCU Michael Murphy (DDG 112), June 18
USAV Spearhead (JHSV 1), July 22
Medgar Evers (T-AKE 13), Oct. 26

Christened:

PCU Spruance (DDG 111), June 5
Charles Drew (T-AKE 10), Feb. 27
PCU William P. Lawrence (DDG 110), April 17
PCU San Diego (LPD 22), June 12
PCU Howard O. Lorenzen (T-AGM 25), June 26
Washington Chambers (T-AKE 11), Sept. 11
PCU California (SSN 781), Nov. 6
PCU Fort Worth (LCS 3), Dec. 4

Delivered:

USNS Matthew Perry (T-AKE 9), Feb. 24
USS Jason Dunham (DDG 109), June 4
USNS Charles Drew (T-AKE 10), July 14
USS Gravely (DDG 107), July 26
USS Missouri (SSN 780), July 29

Commissioned:

USS Independence (LCS 2), Jan. 16
USS Dewey (DDG 105), March 6
USS New Mexico (SSN 779), March 27
USS Missouri (SSN 780), July 31
USS Jason Dunham (DDG 109), Nov. 13
USS Gravely (DDG 107), Nov. 20





COMMAND 2011 POCKET GUIDE

THE COMPLETE DIRECTORY TO PEOPLE AND
OFFICES AT THE NAVAL SEA SYSTEMS COMMAND



Commander
Vice Adm. Kevin M. McCoy

Executive Director
Brian Persons, SES

Director
Office of Corporate Communications
Patricia Dolan

Deputy Director
Office of Corporate Communications
James Slater

Editor
Stephanie N. Collins

Art Director
Cynthia Snipes

Photo Editor
Monica McCoy

Assistant Editors
Alan Baribeau
Landon Hutchens
Chris Johnson
Lt. Kurt Larson
Colleen O'Rourke

Statement A: Public Release
Distribution is unlimited

AUTHORIZATION

The Secretary of the Navy has determined this publication is necessary in the transaction of business required by law of the Department of the Navy.

EDITORIAL

On Watch 2011 is the magazine of the Naval Sea Systems Command (NAVSEA) Office of Corporate Communication. Its leadership includes Active and Reserve military and their families, civilian employees, media, industry partners, veterans, retirees and the general public. Contents do not necessarily reflect the official views of the Department of Defense, the U.S. Navy or NAVSEA. Inclusions of or references to any product or service in editorial content do not constitute endorsement by the U.S. Navy or NAVSEA. All trademarks, service marks or other symbols, names, images or logos are and remain the sole property of their respective owners. Please send feedback and military address corrections to the NAVSEA Office of Corporate Communication.

Web site: www.navsea.navy.mil
E-mail: nssc_public_affairs@navy.mil
Voice: (202) 781-4123 or DSN 326-4123
Fax: (202) 781-4713 or DSN 326-4713

Mailing Address:
Naval Sea Systems Command
Attn: Office of Corporate
Communication (Code 00D)
1333 Isaac Hull Avenue SE
Washington Navy Yard DC 20376

OPPOSITE PAGE: There were a number of ship milestones achieved in 2010. Pictured above left to bottom right, PCU Fort Worth (LCS 3) christened, Dec. 4; PCU Michael Murphy (DDG 112) keel laid, June 18; USNS Charles Drew (T-AKE 10) delivered, July 14; Washington Chambers (T-AKE 11) christened, Sept. 11; USS Jason Dunham (DDG 109) delivered, June 4; and USS New Mexico (SSN 779) commissioned, March 27. U.S. Navy photos courtesy of Lockheed Martin, MC2 Dale Patrick Frost, General Dynamics-NASSCO, Sarah Burford, General Dynamics Bath Iron Works, and Alan Baribeau.



1333 Isaac Hull Ave., S.E.
Washington Navy Yard, DC 20376
www.navsea.navy.mil