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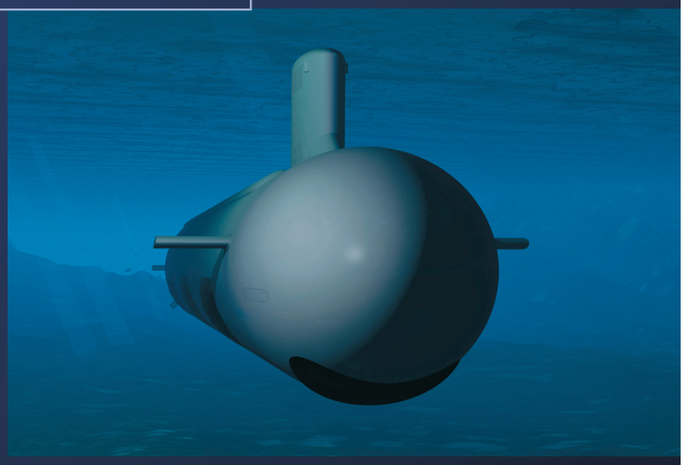
SEA BASING

PROJECTING JOINT OPERATIONAL INDEPENDENCE



NAVSEA
NAVAL SEA SYSTEMS COMMAND
Keeping America's Navy #1 in the World

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Sea Basing serves as the foundation from which offensive and defensive fires are projected—making Sea Strike and Sea Shield realities. As enemy access to weapons of mass destruction grows, and the availability of overseas bases declines, it is compelling both militarily and politically to reduce the vulnerability of U.S. forces through expanded use of secure, mobile, networked sea bases.

—Chief of Naval Operations Adm. Vern Clark

The success of the Navy in Sea Basing its force assets to project operational independence is incumbent upon NAVSEA's ability to sustain fleet readiness and deliver improved warfighting capabilities. The systems developed must operate in joint and coalition environments, and the maintenance initiatives that support them must do so in new and innovative ways to maintain a strong forward deployed Sea Based Navy.

Distance Support: The Next Generation—NAVSEA Team Working to Improve Technical Support to Fleet

The television series *Star Trek: The Next Generation* once featured an episode where the chief engineer of the starship *Enterprise* is faced with a critical engine repair. Through an interactive holographic recreation of one of the ship's original designers he comes up with a solution, saving *Enterprise* in the nick of time.

While similar holographic technology may be many decades away, interactive distance support is alive and well in today's Navy. The Naval Sea Systems Command team is building on existing resources and technology to improve support for Sailors at sea.

The Distance Support Program was established in August 1999, with a goal of reducing shipboard workloads and streamlining support infrastructure access, allowing Sailors to focus on their primary missions.

Today, Distance Support includes the Anchor Desk (www.anchordesk.navy.mil), a web-based initiative providing

Southwest Asia (Sept. 24, 2001)—A Chief Aviation Warfare Systems Operator scans the horizon above USS Carl Vinson *(CVN 70) from behind his GAU-16 50-caliber machine gun aboard an SH-60H Seahawk helicopter. U.S. Navy Photo by Chief Photographer's Mate Daniel E. Smith.*

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on-line technical support through the Internet and e-mail. The Navy Integrated Call Center (NICC) also provides Sailors with one-touch support for technical and logistics questions through an around-the-clock, toll-free phone number.

NAVSEA is now developing Distance Support Next Generation—Advanced Technical Information Support (DSNG-A). DSNG-A will support ships at sea by providing technical support material on a server within a ship's local area network. This will provide the crew with quickly accessible material while reducing Internet connectivity needs.

Fremantle, Western Australia (Jan. 19, 2003)—USS Fletcher *(DD 992) pulls pierside to begin the first Sea Swap.* Fletcher's *crew just completed a six-month deployment with the USS* Abraham Lincoln *(CVN 72) Battle Group, will be relieved by the crew of the recently decommissioned USS* Kinkaid *(DD 965).* Kinkaid's *crew arrived in Fremantle for liberty on Jan. 15, and after the change of command between the two crews, will take* Fletcher *back on deployment to the Indian Ocean and Arabian Gulf. The off-going crew of* Fletcher *will have several days of liberty here in Fremantle before flying back to their homeport of Pearl Harbor, Hawaii. U.S. Navy photo.*

DSNG-A is being tested aboard the forward-deployed minesweeper USS *Guardian* (MCM 5). In addition to evaluating DSNG-A's effectiveness, *Guardian's* crew is testing whether existing technology can support the program.

DSNG-A material aboard *Guardian* includes technical manuals, drawings, equipment-specific training material, predicted failure data and ship class advisories. *Guardian's* DSNG-A also contained a complete copy of the current Distance Support Portal, enhanced with Sailor-to-Engineer data and Navy-developed eLearning courseware demonstrations. DSNG-A also interfaces with *Guardian's* Portable Maintenance Assistants (PocketPMA)—handheld, portable computers designed to reduce maintenance paperwork and workloads.

The latest collaborative tool in the Distance Support inventory is the Remote Technical Assistance Support System (RTASS). RTASS enables Sailors to link their desktop computers to the failed equipment undergoing maintenance. With technology such as shoulder-mounted cameras and voice/keypad communications, RTASS allows for real-time, over-the shoulder technical support from afloat and ashore facilities.

RTASS and DSNG-A are examples of how the NAVSEA team and the Distance Support program are looking to the future to improve the Fleet's warfighting readiness, increase battle group self-sufficiency, reduce shipboard workload, equipment downtime and technical support costs, while improving quality of life for Sailors.

Fleet Maintenance Efforts Make Sea Swap a Reality

A Pearl Harbor-based destroyer tasked with a starring role in the Navy's Sea Swap experiment deployed in top material condition, thanks to behind-the-scenes efforts by Fleet Maintenance Availabilities—Surface (FMR).

FMR completed upkeep in late June 2002 on *Fletcher* to support its deployment and Sea Swap. Project superintendent Jose Vallejo pointed out that the work package was three to four times larger than normal to ensure the material condition of the ship during its extended time at sea.

USS *Fletcher* (DD 992) normally would be expected back in six months, but this time it would be a very long 18 months before it returned. The ship took part in Sea Swap, in which the ship remained deployed but the entire crew was replaced at six-month intervals.

The purpose is to increase the time that ships can remain on station during a period when Navy forces are being stretched thin by growing operational requirements around the globe.

It takes about 45 days to sail between the West Coast and the Persian Gulf. The Navy, by flying crews out to the ship, can save weeks of transit time and millions of dollars in fuel.

Sea Swap involved *Fletcher* and two other Spruance-class destroyers, USS *Kincaid* (DD 965) and USS *Oldendorf* (DD 972), based in San Diego. Three *Arleigh Burke*-class destroyers also participated later in a similar plan.

After leaving Pearl Harbor, *Fletcher* joined a battle group. Six months later, it pulled into an overseas port. In the meantime, Sailors from *Kincaid* went through training and decommissioned their ship. They flew out to the port, relieved the crew on *Fletcher*, and took the ship back out on station. Six months later, the cycle will be repeated.

Cmdr. Thomas Neal, *Fletcher's* commanding officer, sent a Bravo Zulu, extending his *sincere thank you and well done to the men and women of the Pearl Harbor and San Diego maintenance community.* Neal said, *We would not be ready to meet our mission without your professional service and dedicated efforts.*

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LPD-17 Construction Passing Significant Milestones

The steel profile of *San Antonio*, the first ship of the LPD-17 class, can be seen rising along the banks of the Mississippi River at Northrop Grumman Ship Systems in Avondale, La.

LPD-17 is a new class of amphibious transport dock ship that incorporates advanced performance and warfighting technologies that will enhance the amphibious fleet's operational flexibility.

LPD-17 is also the first amphibious ship designed to accommodate the Marine Corps' mobility triad of advanced amphibious assault vehicles (AAAV), landing craft air cushion (LCAC), and the MV-22 Osprey vertical take-off and landing aircraft. Each ship can carry 700 to 800 Marines; land them by AAAV, or fly them to their objective from a variety of helicopters or MV-22 Ospreys.

At 684 feet long, 105 feet wide, and displacing nearly 25,000 tons, these ships are the second largest ships in the Navy's 21st Century Amphibious Ready Groups.

The amphibious transport dock ship San Antonio *(LPD-17) under construction at Northrop Grumman Ship Systems Avondale in New Orleans.* San Antonio *is scheduled for launching in July 2003 and should be commissioned in 2005. U.S. Navy photo.*

Keel laying ceremony for LPD-18, the next San Antonio*-class amphibious ship.*

The *San Antonio* construction program enjoyed some success, thanks to a program established by PEO Ships' LPD-17 program office. The program provides incentives to the shipyard to enhance efficiencies and complete construction phases on schedule and within budget.

There is significant progress in other areas as well. The LPD-17 Design Team is nearing completion of detailed design, finalizing the computer modeling that will streamline production.

Northrop Grumman's Avondale Division began prefabrication of *New Orleans* (LPD-18) in February 2002, when the ship's keel was laid. Bath Iron Works started pre-fabrication of the third ship of the class, *Mesa Verde* (LPD-19), in July 2001.

Northrop Grumman Ship Systems, leading a team including Raytheon Electronic Systems and Intergraph Corporation, will deliver the finished *San Antonio* in 2004, shortly followed by LPD-18 and LPD-19.

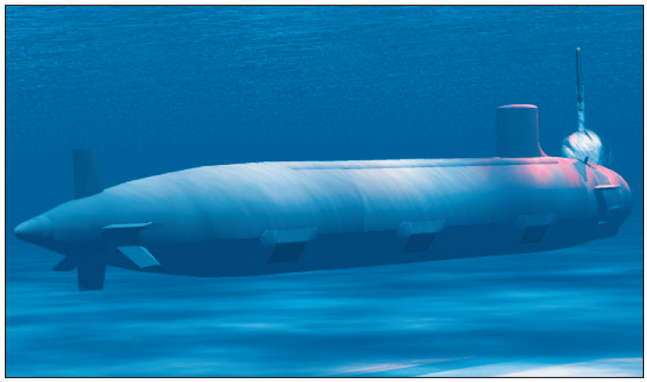
New Submarine Reaches Construction Milestone

The Navy's newest submarine, which will bear the name *Virginia,* reached a significant construction milestone when the pressure hull assembly was completed at General Dynamics Electric Boat shipyard. *Virginia* (SSN 774) is the first of the Navy's newest class of nuclear-powered submarines.

Virginia is more than 80 percent complete and on schedule for delivery in June 2004. With a modular design and a teamed construction effort between Electric Boat and Northrop Grumman Newport News, the Navy has reduced acquisition costs and increased construction efficiency.

The pressure hull is assembled from a series of large steel cylinders welded together to form the familiar cigar shape of a submarine. The pressure hull is designed to resist the pressure of water and to maintain a livable environment for the crew.

From keel to mast, *Virginia* has been designed to support multiple warfare missions from deep ocean to coastal shallows. With its inherent stealth and state-of-the-art command, control, communications, and intelligence system, *Virginia* will provide an unprecedented level of antisubmarine warfare capability, spe-



Artist's concept of an underwater missile launch from a Virginia*-class submarine.*

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Legendary WWII submarine commander, retired Capt. Edward L. "Ned" Beach Jr., died Dec. 1 at his Washington, D.C., home. In addition to his superb naval career, he was an accomplished author and wrote, among many other works, the acclaimed novel, *Run Silent, Run Deep* in 1955. U.S. Navy photo courtesy of the U.S. Naval Institute.

If you seek a monument to Captain Ned Beach, simply look around: to Sailors standing the watch, around the world, around the clock, trained to the standards he helped champion; to an officer corps whose ideals he celebrates in novels and histories that tell us who we are, and more importantly, why we serve; to a Submarine Force of unparalleled accomplishment, operated with skill, daring, and efficiency; to a United States Navy unchallenged on the oceans, advancing freedom and justice around the world.

—Adm. Frank "Skip" Bowman, Jan. 14, 2003

cial operations and battle group support, littoral operations capability, and covert intelligence/surveillance.

NSWC Port Hueneme Develops New Underway Replenishment Transfer System Concept

The Naval Surface Warfare Center Port Hueneme was selected by the Office of Naval Research (ONR) to conduct the development of a new underway replenishment (UNREP) transfer system concept to meet Expeditionary Logistics objectives.

The ONR Future Naval Capabilities Program initiated a project to develop and demonstrate at sea, in fiscal year 2005, an advanced concept UNREP transfer system to resolve operational deficiencies. The objectives of the advanced concept Underway Replenishment transfer system were provided by the Future Naval Capabilities Expeditionary Logistics Integrated Process Team. The objective of the advanced UNREP transfer system concept is to reduce the underway replenishment time by half and the transfer of loads up to 12,000 pounds in higher sea states with a forty percent reduction in manning.

The plan for creating heavy UNREP will advance the state-of-the-art by the use of constant-tension methodology, coupled with tailored transfer options to safely and effectively meet the heavy UNREP operational requirements. Included in the planning is the flexibility to service legacy ships.

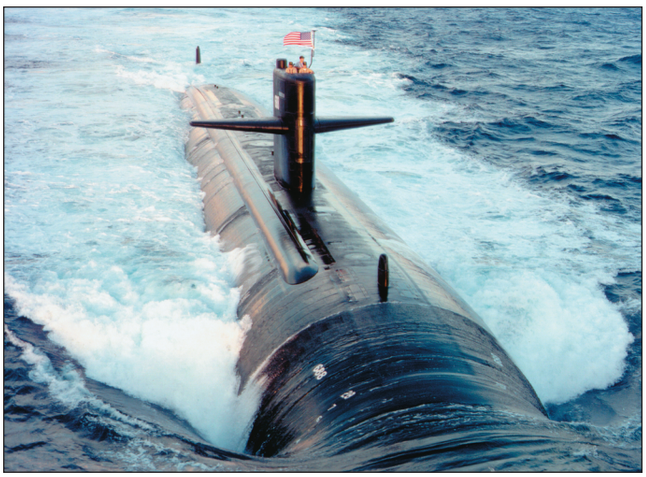
At sea with USS Saipan *(LHA 2) Feb. 12, 2003—Amphibious assault ship USS* Bataan *(LHD 5) takes on fuel and supplies from the fleet oiler USNS* John Ericsson *(T-AO-194) during an underway replenishment (UNREP). U.S. Navy photo by Photographer's Mate 1st Class Courtney Torgrude.*

NUWC Keyport Opens Guam Office for Forward Deployed Submarine Forces

Naval Undersea Warfare Center Keyport Detachment Pacific established a field office in Guam to provide support to forward deployed submarine forces there.

The one-person on-site office at Apra Harbor supports Commander, Submarine Squadron Fifteen, the submarine tender USS *Frank Cable* (AS 40), and three submarines to be forward deployed there.

Among other duties, the onsite representative performs technical support for submarine warfare systems, upgrades, and weapons. The representative also helps with coordination for maintenance, readiness, and other needs with teams that are sent from NUWC's Keyport and Newport centers and its Pacific Detachment in Hawaii.



USS Los Angeles *(SSN 688) creates a bow wave as it moves through the water.*

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SEA ENTERPRISE

RESOURCING TOMORROW'S FLEET

NAVSEA
NAVAL SEA SYSTEMS COMMAND
Keeping America's Navy #1 in the World

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Drawing on lessons from the business revolution, Sea Enterprise will reduce overhead, streamline processes, substitute technology for manpower, and create incentives for positive change… .We will make our Navy's business processes more efficient to achieve enhanced warfighting effectiveness in the most cost-effective manner.

—Chief of Naval Operations Adm. Vern Clark

Sea Enterprise improves organizational alignment, reduces overhead, streamlines processes, and reinvests savings to recapitalize our Navy and deliver increased combat capability.

COMNAVSEA Outlines Sea Enterprise Role

Sea Enterprise is a major revolution in the way the Navy supports ships at sea, and the Naval Sea Systems Command is working to support that revolution.

Vice Adm. Phillip Balisle addressed NAVSEA's role in Sea Enterprise and how it is realigning its organization to better support the 21st Century Navy at the 15th Annual Surface Navy Association National Symposium held in Arlington, Va.

Changing the way NAVSEA does business is necessary, Balisle said, because the environment in which the Navy operates has changed.

The Navy played a key role in the United States winning the Cold War, by developing a rotational force that was sent forward consistently with a predictable set of capabilities to show America's might. At the same time, the Navy created the appropriate shore infrastructure to support that force.

At sea aboard USS Kitty Hawk *(CV 63) Dec. 10, 2002—Japan Maritime Self-Defense Force (JMSDF) ship, JDS Chokai (DDF 176), comes along side Kitty Hawk to receive fuel during a replenishment at sea (RAS). Kitty Hawk had the opportunity to work with the JMSDF during several exercises at sea. U.S. Navy photo by Photographer's Mate Airman Bo Flannigan.*

But, the world is different today, and our nation faces both an unpredictable enemy and an unpredictable battlefield.

The Navy's challenge, Balisle said, is to build a capabilities-based force that is responsive and flexible with the right capabilities to match the circumstance, as well as shape the shore infrastructure necessary to support this new force.

Sea Enterprise is more than just saving money, it is a major revolution in how we support a Navy at sea in this new arena.

Naval Station Mayport, Florida (Aug. 17, 2002)—Sailors man the rails of USS John F. Kennedy *(CV 67) as the aircraft carrier is guided into port by tug boats. U.S. Navy photo by Photographer's Mate 1st Class Dominick Haen.*

NAVSEA has set that revolution in motion, with initiatives such as Distance Support. Distance Support leverages state-of-the-art information-technology connectivity to link ships at sea with technical centers ashore in real time. Distance Support is critical for the Navy to forward position ships and keep them on station for extended periods of time.

We've made a lot of progress, but we've only just begun, said Balisle. *Our challenge is to change our shore infrastructure to provide 24/7 support to the fleet.*

To accomplish that, the organizational boundaries must fade away. NAVSEA recently realigned its organization to better serve the fleet. The new command structure reflects a realignment of its program executive offices.

In addition, NAVSEA is working with Naval Air Systems Command, Naval Supply Systems Command and Space and Naval Warfare Systems Command to create the virtual SYSCOM, different organizations working together to improve interoperability and provide even better support to the fleet.

We can no longer be compared with the old paradigm, said Balisle. *Sea Enterprise is not a tweaking of the old way of doing business, but developing a new way of doing business. We must change if we are to build the Navy of the 21st century.*

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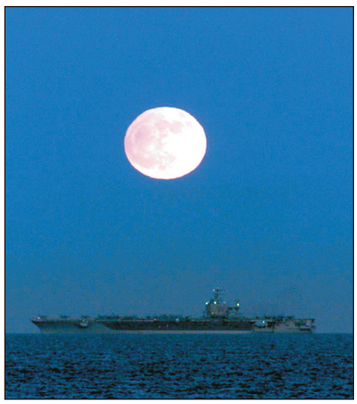
At sea with USS Harry S. Truman *(CVN 75) Jan. 3, 2003—Harry S. Truman departs Souda Bay, Crete, after a holiday port visit. U.S. Navy photo by Aviation Warfare Systems Operator 2nd Class Patrick Frizzelle*

Naval Air Station North Island, Calif. (Mar. 3, 2003)—The aircraft carrier USS Nimitz *(CVN 68) pulls away from its berth as her crew man the rails and bid farewell to their friends, family, and loved ones. Nimitz is beginning a deployment in support of Operation Enduring Freedom. U.S. Navy photo by Photographer's Mate 2nd Class Elizabeth J. Lewis.*

San Diego, CA (May 21, 2002)—USS Nimitz *(CVN 68) transits San Diego harbor for a scheduled work-up period. U.S. Navy photo by Photographer's Mate 2nd Class Frederick McCahan.*



At sea with USS Carl Vinson *(Nov. 20, 2002)—As viewed from the deck of the guided missile frigate USS* Ingraham *(FFG 61), a full moon illuminates the nuclear aircraft carrier Carl Vinson while its crew conduct night flight operations. U.S. Navy photo by Electronics Warfare Technician 2nd Class Christopher Ware.*

NAVSEA Team Supporting Forward Deployed Carriers

America's aircraft carriers have been vital in the nation's war on terrorism. *Our carriers are being called on to project our nation's will and sail in the defense of freedom,* said Vice Adm. Phillip Balisle, NAVSEA Commander. *It's the NAVSEA Team's job to ensure our carriers are ready to respond when the call comes, and to provide the support they need to stay in the fight.*

As 2003 began, USS *Constellation* (CV 64) was on station in the Arabian Gulf, joined by *Harry S. Truman* (CVN 75), both on regularly scheduled deployments. USS *Theodore Roosevelt* (CVN 71) deployed on short notice and was on station as well. USS *Abraham Lincoln* (CVN 72) was ordered to remain deployed longer than scheduled, while *Kitty Hawk* (CV 63) was also ordered to prepare for deployment. USS *George Washington* (CVN 73) was on alert as the nation's surge carrier.

Ensuring that carriers are ready to deploy at a moment's notice and that they can stay deployed for extended periods of time is a priority of NAVSEA, its Naval Shipyards and Supervisors of Shipbuilding, Conversion and Repair (SUPSHIPs).

Norfolk Naval Shipyard in Portsmouth, Va., and Puget Sound Naval Shipyard in Bremerton, Wash., stepped up the pace during 2002 to keep carriers on station during Operation Enduring Freedom. The carriers' increased operational tempo required the shipyards both to accelerate and shorten the duration of previously planned availabilities. Norfolk and Puget Sound successfully met this combined challenge.

Puget Sound completed a six-month planned incremental availability (PIA) on USS *Carl Vinson* (CVN 70) in five months. At the same time, the shipyard moved up by three months the start date for the USS *John C. Stennis* (CVN 74) PIA. Norfolk completed availabilities on *Theodore Roosevelt* and *Truman* that were under cost and ahead of schedule.

A team from Norfolk Naval Shipyard also worked through the holidays to prepare *Theodore Roosevelt* for an accelerated

training exercise to certify the ship ready for deployment.

Another key element in the public shipyards' completing availabilities more effectively and efficiently is their partnership with private-sector shipyards, such as the partnership between Northrop Grumman Newport News and the Norfolk Naval Shipyard for USS *Enterprise's* (CVN 65) extended docking selected restricted availability (ESRA). SUPSHIP Jacksonville is overseeing the ESRA on USS *John F. Kennedy* (CV 67) in Mayport, Fla. *Kennedy's* ESRA, which involves cooperative partnering with three master ship repair contractors and Norfolk and Puget Sound Naval Shipyards, is *the largest carrier availability to date performed outside a public shipyard,* according to David Phillips, deputy SUPSHIP Jacksonville.

Support extends well beyond the confines of the shipyards as well. A rapid response team from Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility flew to *Constellation* while the ship was enroute to the Arabian Gulf. The team assessed damage and provided repair assistance following a fire in one of the ship's main machinery rooms. The team removed fire-damaged insulation and inspected equipment as well as structural, electrical, and piping systems, allowing *Constellation* to continue without delay.

A forward deployed, highly flexible and rapidly reenforcable carrier force is a unique and indispensable component of our nation's arsenal, especially in these uncertain times. No other nation and certainly no single organization can produce such a force. The United States does so through the collaborate teaming of our Navy engineering community, the fleet and our industry partners.

Focused-Mission Ship Studies Help Chart LCS Course

PEO Ships will review industry concept studies that are underway that will help the Navy define future requirements for a focused-mission, multi-capability, high-speed littoral combat ship (LCS).

The Naval Sea Systems Command awarded six, $500,000 contracts to perform 90-day concept studies that will explore a range of approaches in an overall effort to define future ship requirements.

The contractors were asked to develop a concept for a ship designed to counter three specific threats: diesel submarines operating in the littorals; fast, armed small craft; and mines.

LCS will be smaller than current naval ships; it will have a displacement between 1,000 to 4,000 tons and a draft of fewer than 20 feet, as compared to an *Arleigh Burke*-class destroyer that has a displacement of about 9,200 tons and a draft of 31 feet. LCS will also employ a nontraditional hull and be capable of speeds of 40 to 50 knots.

The most significant feature of LCS will be its ability to employ modular mission packages that could be easily added and removed from the ship to support specific missions.

Once the studies are completed, the Navy plans to use the results and data collected from other experiments to draft a new solicitation for up to three preliminary designs for LCS.

The designs would focus more specifically on speed and payload capabilities, while investigating new ways to design and build the ship hulls or platforms in the most cost-effective manner.

The LCS development process underscores the Sea Enterprise philosophy of breaking the old paradigms of shipbuilding.

New Center Highlights Partnership Between NAVSEA, ONR

NAVSEA's Naval Surface Warfare Center Carderock Division signed a charter with the Office of Naval Research (ONR) establishing a new Center for Innovation in Ship Design (CISD).

This new activity, which began operating in August, establishes a partnership between ONR and NAVSEA. NAVSEA staffs and ONR funds CISD, which is located at NSWC Carderock Divi-

Support for Carriers Joint Fires Network. The partnership of NAVSEA, PEO IWS, Naval Air Systems Command and Space and Naval Warfare Command, through the Joint Fires Network (JFN) Program Office, is supporting *Lincoln. Lincoln* deployed with JFN, a transformational network-centric warfare family of systems that provide near real-time intelligence correlation, sensor control and planning, target generation, precise target coordinates, moving target tracks, and battle-damage assessment capabilities to support more timely engagement of time-critical targets. This capability allows *Lincoln* to quickly share a greatly improved battlespace picture with other ships in the area of operations, and with Army, Air Force and Marine sites using their services' versions of the JFN.

Kitty Hawk, also completed installation of JFN components.

In response to Lincoln's order to remain deployed and Kitty Hawk's order to prepare, the program office sent teams to both ships to upgrade the JFN software and provide training, said Cmdr. Lyle C. Brown, JFN Director for Fleet Operations. *This will enhance the system's joint interoperability, while providing greater real-time situational awareness to the battle group commander.*

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Carrier Team One. "These shipyard successes didn't just happen," said Rear Adm. William Klemm, NAVSEA Deputy Commander for Logistics, Maintenance and Industrial Operations. "They are the result of our dedicated, highly-skilled work force, operating as one shipyard in four locations by standardizing maintenance and business practices. And initiatives like Carrier Team One allow us to provide quality fleet support to the carriers and get them back out doing the nation's business."

The Carrier Team One concept, a NAVSEA-led initiative, brings together all the stakeholders—from both the Navy and private industry—involved in carrier availabilities. They focus on improving key planning and execution processes and ultimately perform more maintenance and modernization for the dollar.

The U.S. Navy's newest aircraft carrier, Ronald Reagan *(CVN 76) is towed out of the yard as it prepares for early testing of its systems.*

Puget Sound Naval Shipyard, Wash. (Apr. 11, 2002)—Civilian shipyard workers clean out the bottom of a steam driven catapult system on the flight deck of USS Carl Vinson *(CVN 70), in preparation for extensive renovations. U.S. Navy photo by Photographer's Mate Airman Dustin Howell.*

Naval Station Norfolk, Va. (Dec. 5, 2002)—Sailors man the rails aboard the aircraft carrier USS Harry S. Truman *(CVN 75) while the ship prepares to depart for a regularly scheduled six-month deployment. U.S. Navy photo by Photographer's Mate 3rd Class Christopher B. Stoltz.*

sion headquarters. The center's work supports National Naval Responsibility for Naval Engineering, thus, ensuring a healthy U.S. ability to develop innovative designs for Navy vessels.

This interdisciplinary activity is devoted to creating and developing breakthrough ship-design technologies, concepts, processes, and computational tools. The focus is on talent, knowledge, and innovation, nurturing interest and generating experience in the naval engineering field. CISD brings together faculty and students with government engineers and similar experts from the shipbuilding and repair industry.

The center hosts innovation cells that investigate design needs for ships of the future. It sponsors outreach programs for continuing education, encouraging and honing skills of naval engineers and scientists as well as supporting research at universities, increasing interest and furthering the base of knowledge in the ship design community.

To these ends, ONR funds two cells that are underway. One is called Small Fast Ships, the other, Modeling and Optimization.

SURFTECH Streamlines Process of Delivering Technology to Surface Fleet

The Surface Ship Technology (SURFTECH) initiative provides a more effective process of bringing new technology to the surface fleet.

SURFTECH—run by the Naval Sea Systems Command and the Chief of Naval Operations' Surface Warfare division—was established because the accelerating pace of technology development required a more focused approach to developing technology and a process to transition that technology to the fleet. SURFTECH is an organization and a set of business practices that provide a forum to address the surface Navy's research and development needs.

SURFTECH is strengthening communications and cooperation between the fleet, resource sponsors, NAVSEA, science, technology, research and development activities, program executive officers and program managers.

SURFTECH's specific objectives include

- developing a process to assess and prioritize research and development initiatives,
- aligning technology investment with fleet required capabilities,
- identifying technology shortfalls, and
- providing advocacy for the surface Navy technology program.

SURFTECH is similar to the Submarine Technology, or SUBTECH process, already in place for the submarine fleet. The program involves the support of the fleet from the beginning of the process to identify mission capability requirements.

Portsmouth Naval Shipyard Completes Record-Breaking Availability on *Alexandria*

At a time of war, the nation needs its front-line submarines back in service and in top condition; the delivery of *Alexandria* well ahead of schedule meets that demand.

USS *Alexandria* (SSN 757) returned home to Submarine Base New London in Groton, Conn., following a depot maintenance period (DMP) at Portsmouth Naval Shipyard (PNSY) in Kittery, Me., that set a new benchmark in submarine maintenance. The shipyard delivered *Alexandria* to the fleet more than two months earlier than scheduled.

Alexandria, originally scheduled for a 13-month DMP, received approximately $125 million of maintenance and modernization and returned to the fleet in under 11 months. PNSY's record-setting accomplishment bested its previous best for a DMP completion by seven weeks. The previous record had only been set in February 2002, while completing a DMP on USS *Miami* (SSN 755).

PNSY's latest maintenance success is the result of its focus on continuous improvement, both in the availability planning and execution phases. The shipyard continues to refine its processes, reduce costs, and shorten schedules and it is taking the lead in exporting its proven processes to the other naval shipyards.

The shipyard used the Baseline Project Management Plan, a submarine community initiative that provides a *cookbook* approach to planning submarine availabilities. The plan requires the project team to look at how all the required jobs fit together and ensure there is no down time between tasks.

Naval shipyards are maintaining and refueling nearly 20 percent of the submarine force through fiscal year 2008. As a result, there is a greater emphasis on completing submarine maintenance as efficiently as possible.

Our Naval Shipyards are not just working harder, they are working smarter, and that boils down to people, said Vice Adm. Phillip Balisle, Commander, Naval Sea Systems Command. *Portsmouth is a prime example of that and should feel justifiably proud of the* Alexandria *effort.*

DDG 51 Multiyear Contract to Save Taxpayer Dollars

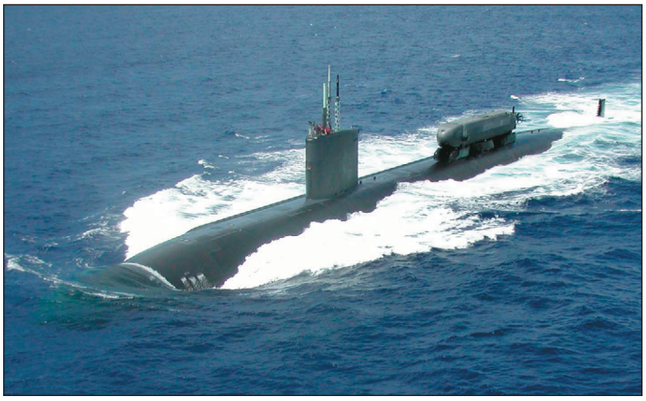
The award of the DDG 51 multiyear contract is not only a significant milestone for one of the Navy's most successful acquisition programs, but also the cornerstone for the completion of the DDG 51 and LPD 17 workload exchange agreement, noted former Navy Secretary Gordon England. *The DDG multiyear contract and the workload exchange agreement will save taxpayers more than $500 million through the life of these two programs. This award is a testament to the teamwork, professionalism and value created by our industry and government team.*

PEO Ships is leading an initiative in which Bath Iron Works (BIW) and Northrop Grumman Ship Systems (NGSS) are being awarded fixed price incentive multiyear contracts worth a combined total of approximately $5 billion for construction of 10 *Arleigh Burke*-class (DDG 51) *Aegis* destroyers.

BIW, a unit of General Dynamics (GD), was awarded a $3,170,973,112 modification to contract for six ships over four years: One in fiscal 2002, one in fiscal 2003, two in fiscal 2004, and two in fiscal 2005. The addition of the multiyear ships increases the number of ships under that contract from one ship, DDG 102, to seven ships total. The work will be performed in Bath, Maine.

NGSS, formerly Ingalls Shipbuilding, Inc., was awarded a $1,968,269,674 for four DDG 51-class ships: One in fiscal 2002, one in fiscal 2003, one in fiscal 2004, and one in fiscal 2005. Work will be performed in Pascagoula, Miss.

Two of the multiyear ships awarded to BIW in fiscal 2004 and fiscal 2005 are in accordance with the memorandum of understanding (MOU) signed and announced by GD, NGSS and the Navy in June 2000. The MOU outlined the terms and conditions for transferring the construction of four LPD 17-class amphibious transport dock ships from BIW to NGSS owned-Ingalls and Avondale shipyards in exchange for construction of four additional DDG 51-class destroyers or equivalent workload at BIW.



USS Greenville *(SSN 772) with the Advanced SEAL Delivery System (ASDS) attached to its topside during a test of the system.*

NAVSEA Awards SSGN Conversion Contract

Naval Sea Systems Command awarded a $442,923,371 contract to Electric Boat Corp. to provide detail design, procurement, and manufacturing of Long Lead Time Material (LLTM) to support the conversion of up to four *Ohio*-class SSBN submarines to *Ohio*-class SSGN submarines.

PEO Submarines is heading up the SSGN conversions. This LLTM support is a step in the innovative process of converting and old platform to serve in a new role. The contract provides for a complete, accurate, and producible Ship Detail Design and the manufacture and procurement of LLTM to support the conversion of SSBN submarines to SSGN submarines.

The work will be performed in Groton, Conn., Quonset and Newport, R.I., and is expected to be completed by September 2007.

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NEMAIS Brings Integrated Navy Maintenance to Mid-Atlantic Region

The Navy launched a new automated information system for maintenance activities in the Mid-Atlantic Region that streamlines and improves the maintenance process and fleet readiness.

The Navy Enterprise Maintenance Automated Information System (NEMAIS) Program is a joint initiative between NAVSEA and the Atlantic and Pacific Fleets to modernize Navy maintenance business processes and information systems.

This first production use of the system marked the culmination of a two-year development effort to improve Navy maintenance processes and information systems with commercial off-the-shelf software. Development involved reengineering business practices for Navy maintenance processes. The NEMAIS solution was then configured to meet process requirements using commercial software and an integrated database.

NEMAIS is one enterprise resource-planning (ERP) pilot that is being *converged* into a Navy Integrated ERP. When fully implemented, more than 35,000 Navy and civilian personnel at Navy commands at sea and ashore will use the system.

Full deployment will allow the Navy to make better maintenance decisions, shut down as many as 140 legacy information systems, improve maintenance efficiency, and free up additional dollars for operations. It will also give the Navy a powerful tool to identify, evaluate, and reduce total ownership costs and true maintenance costs.

NAVSEA Cost-Sharing Program Helps Develop Innovative Laser-Cutting System

The NAVSEA-sponsored National Shipbuilding Research Program (NSRP) funded 10 months of research and development through Bender Shipbuilding, Alabama Laser Systems, and BOC Gases to successfully install and test the only production laser-assisted oxygen (LASOX) cutting system.

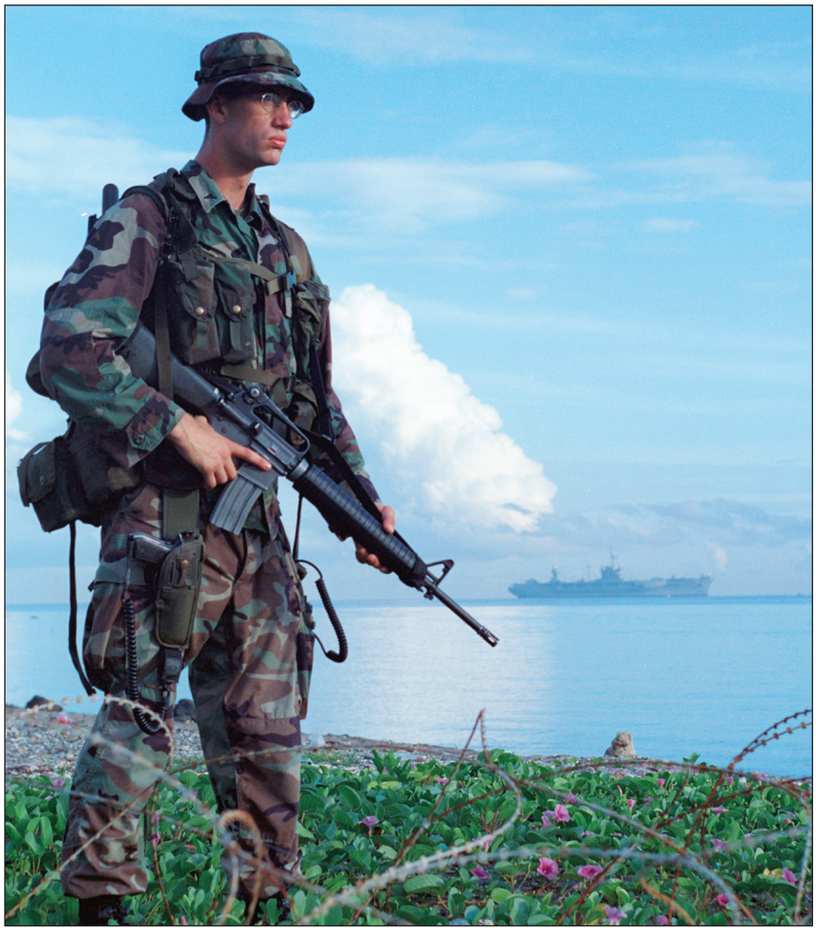
The LASOX system can achieve laser quality cuts through at least two inches of steel. Further research and development is working toward a goal of cutting through four inches of steel.

NSRP is a collaboration of 11 U.S. shipyards working with government, industry, and academia to achieve the continuous product and process improvements necessary for the U.S. shipbuilding industry to be internationally competitive, with one goal being to build more affordable Navy ships.

The LASOX process is being developed to enable the cutting of thick steel (50-100 millimeters), with a relatively low laser power (less than 2 kilowatts). The LASOX process is an exothermic burning reaction in which the heat of the laser beam is used to bring the steel to ignition temperature and a specially designed nozzle is used to deliver a supersonic stream of oxygen to the heated spot, resulting in ignition and then sustained burning.

The final product of the project will be a commercially available LASOX system sold to U.S. shipbuilding and repair companies at a discount. Through commercialization and technology transfer, the project team will provide additional impetus for other U.S. shipbuilders to invest in laser-cutting technology, which has already demonstrated significant benefits at Bender Shipbuilding.

It doesn't take an Einstein to see that this will allow better, cheaper parts in both military and civilian new builds and repairs, and may revolutionize certain types of plate cutting. This is some of the best heavy plate cutting I've seen in my 37 years in the business, said Bob Lewis, General Manager of Bender's metal processing facility.



Dili, East Timor (Mar. 13, 2002)—A U.S. Marine stands guard on the shoreline in Dili, East Timor, as USS Blue Ridge *(LCC 19) rests at anchor. U.S. Navy photo by Photographer's Mate 2nd Class Jacob A. Johnson.*

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SEA TRIAL

ACCELERATING ENHANCED CAPABILITIES TO THE FLEET

NAVSEA
NAVAL SEA SYSTEMS COMMAND
Keeping America's Navy #1 in the World

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Our enemies are dedicated to finding new and effective methods of attacking us. They will not stand still. To outpace our adversaries, we must implement a continual process of rapid concept and technology development that will deliver enhanced capabilities to our Sailors as swiftly as possible.

—Chief of Naval Operations Adm. Vern Clark

Pacific Missile Range Facility, Kauai, HI (Jul. 5, 2002)—The guided missile destroyer USS O'Kane *(DDG 77) launches an SM-2 standard missile from its forward Vertical Launch System (VLS) during exercise Rim of the Pacific (RIMPAC) 2002. The guided missile frigate USS* Crommelin *(FFG 37) (right) and the Spruance-class destroyer USS* Paul F. Foster *(DD 964) (center) follow in formation. U.S. Navy photo by Photographer's Mate 1st Class Chris Desmond.*

Integrated Communications and Advanced Networks

USS *Nimitz* (CVN 68) demonstrated the advanced capabilities of one of the Navy's newest integrated shipboard network systems.

The Integrated Communications and Advanced Networks (ICAN) consolidates a number of separate, cumbersome devices and replaces them with single, multifunction, multipurpose units. It also integrates existing analog technologies with new capabilities, resulting in space and weight savings in the ship design. ICAN's four components include:

- an integrated voice system that consolidates telephones, radios, shipboard announcing systems, sound-powered phones and intercoms;
- a machinery control system, integrating the aqueous film-forming foam (AFFF) control and monitoring system, the JP-5 control and monitoring system, list control indication system, and various alarm system;
- the ship-control indication system, centralizing the monitoring of ship control and navigation functions; and
- the navigation critical network, which performs data distribution to users needing time-critical navigation information.

ICAN replaces most of these existing systems' components, and replaces existing user devices and displays with new human-machine interface displays that receive and display information from the network. The end result is a ship that operates more efficiently and requires fewer people to monitor shipboard systems.

The installation and integration of ICAN was a major challenge that required a lengthy effort to implement. ICAN is an example of spiral development, and its forward-leaning technologies will serve this generation of warfighters.

Florida Exercises SSGN Role in Navy's Future

Giant Shadow, conducted with USS *Florida* (SSGN 728)—scheduled to be one of the Navy's future guided missile submarines—is the first in a series of experiments before the overhaul and conversion of four *Ohio*-class ballistic missile submarines (SSBNs) to SSGNs begins.

NAVSEA, PEO Submarines and the Commander, Naval Submarine Forces (COMNAVSUBFOR) sponsored *Giant Shadow*, the first limited objective experiment under the Sea Trial initiative of the Chief of Naval Operations' Sea Power 21 vision.

The SSGN conversion program, spearheaded by NAVSEA and PEO Submarines, takes four SSBNs selected for decommissioning and transforms them into new platforms with capabilities to fight in future conflicts.

The SSGNs will have the capability to support and launch up to 154-Tomahawk missiles, a significant increase in capacity as compared to other platforms. The 22-missile tubes will also provide the capability to carry other payloads, such as unmanned underwater vehicles (UUVs), unmanned aerial vehicles (UAVs) and Special Forces equipment.

This new platform will also have the capability to carry and support more than 66 Navy SEALs and insert them clandestinely into potential conflict areas.

Giant Shadow explored how a network of forces, including *Florida*; special warfare forces; UUVs and UAVs; and various

At sea with USS Florida *(SSGN 728) Jan. 22, 2003—USS Florida sails off the coast of the Bahamas during Giant Shadow. Giant Shadow is a Naval Sea Systems Command/Naval Submarine Forces experiment to test the capabilities of the Navy's future guided-missile submarines. Florida is one of four Ohio-class ballistic missile submarines (SSBN) to be converted to guided missile submarines (SSGN). U.S. Navy photo by Chief Journalist David Nagle.*

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Seahorse UUV Tested During Giant Shadow. Pennsylvania State University's Applied Research Laboratory developed the unmanned undersea vehicle (UUV) *Seahorse* for the Naval Oceanographic Office. The vehicle is 28-feet long, weighs 10,500 lbs., and has a range of 300 nautical miles. Its testing is overseen by the newly established National UUV Test and Evaluation Center (NUTEC).

Seahorse

The Forward Pass Consortium is an industry team selected by NAVSEA to demonstrate how a network of forces consisting of Special Operations Forces, UUVs, unmanned aerial vehicles, and a stealthy undersea platform (SSGN) can be combined to provide the Joint Force Commander with new capabilities. The first submarine demonstration was held in January 2003, with an SSBN before its conversion to an SSGN. *Seahorse* was selected as the UUV for the experiment. Off-hull testing was conducted as a risk-mitigation measure.

aerial, underwater, and ground sensors could be used to provide surveillance, collect real-time intelligence, develop and recommend a course of action for the joint commander and launch a time-critical strike.

Elements of the experiment included an at-sea demonstration and validation launch of two Tomahawk missiles from Florida; the first ever-vertical launch of a UUV; and an insertion of SEALs from *Florida*.

Giant Shadow also provided an opportunity to evaluate various technologies, such as nuclear-biological-chemical sensors, intelligence, surveillance, and reconnaissance (ISR), and targeting systems.

Several Navy commands participated in *Giant Shadow*. USNS *Mary Sears* (T-AGS-65), Naval Meteorology and Oceanography Command's oceanographic survey ship was home for the command and control capabilities that will be put onboard the SSGN as part of the conversion process. Naval Air Systems Command's *Hairy Buffalo*, a modified P-3C aircraft, provided ISR capability and communication networking that would normally be provided by a high-altitude UAV like Global Hawk. Naval Oceanographic Office provided their UUV, the *Seahorse*, and elements of Naval Special Warfare Group Four supported the special warfare phases of the experiment.

At sea with USS Florida *(SSBN 728) Jan. 16, 2003—USS Florida launches a Tomahawk cruise missile during Giant Shadow in the waters off the coast of the Bahamas. U.S. Navy photo.*

The SSGN conversion, which includes engineered refueling overhauls (ERO), will take place at Norfolk Naval Shipyard and Puget Sound Naval Shipyard. The EROs began with *Ohio* in November 2002 and *Florida's* will begin in August 2003. The other two SSBNs selected for conversion are *Michigan* and *Georgia*. The first SSGN is scheduled for delivery in 2007.

NAVSEA Testing New Life-Saving System

A lifesaving device that will revolutionize the way the Navy handles man overboard will soon be on all ships.

The Man Overboard Indicator, or MOBI, will soon be implemented throughout the fleet, based on results of evaluations aboard selected deployed ships and the recommendations of fleet maintenance officers.

MOBI can be activated by hand or automatically on contact with the water. Its alarm system is designed to improve the safety of Sailors involved in operational situations with the potential for falling overboard. MOBI uses a transmitter to aid in the detection, location, and recovery of Sailors who fall overboard.

MOBI was tested aboard 20 ships in the USS *Abraham Lincoln* (CVN 72) and USS *George Washington* (CVN 73) Carrier Battle Groups and the USS *Nassau* (LHA 4) and USS *Belleau Wood* (LHA 3) Amphibious Ready Groups, along with USS *Constellation* (CV 64). BriarTek, the company producing MOBI, began installing the devices in February 2002 for the ships to evaluate during their deployments.

MOBI was used for an entire deployment to ensure that it would stand up to the rigors of an at-sea environment and would have a positive effect on saving lives.

The cooperation from the ships, from Briartek, and from the NAVSEA engineers combined to make the test a success.

At sea aboard USS Constellation *(CV 64) Dec. 17, 2002—Airman Eric Kruger of Strike Fighter Squadron One Five One (VFA-151) sports the new Man Over Board Indication (MOBI) System, which can be attached to an MK-1 Life Preserver and used to electronically send off a signal if a Sailor should fall from the ship. U.S. Navy photo by Photographer's Mate 2nd Class Felix Garza, Jr.*

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SEA WARRIOR

THE RIGHT SKILLS, AT THE RIGHT PLACE, AT THE RIGHT TIME

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The Sea Warrior program implements our Navy's commitment to the growth and development of our people. It will serve as the foundation of warfighting effectiveness by ensuring the right skills are in the right place at the right time

—Chief of Naval Operations Adm. Vern Clark

Aboard USS Kitty Hawk *(CV 63) Oct 11, 2001—Fire Controlmen from the Combat Systems Department load a rolling airframe missile (RAM). U.S. Navy Photo by Photographer's Mate Airman Jo Wilbourn.*

New NAVSEA Directorate Focuses on the Warfighter

NAVSEA's responsibility is to ensure that every ship it builds and every system it delivers is designed, acquired, and supported with warfighter performance, training, safety, and survivability in mind. How our Sailors and Marines perform makes the difference between victory and defeat.

NAVSEA's Human Systems Integration (HSI) Directorate is focused on training, enhanced Sailor and Marine performance, and improved systems. These will provide Sailors and Marines the equipment they need to carry out their missions successfully.

The Fleet is more than ships, submarines, aircraft and the systems we install on them. The fleet is also Sailors and Marines—energetic, talented and exceptionally dedicated Americans who volunteered to perform incredibly complex duties in a harsh and often hostile environment. Without highly motivated and well-trained Sailors, our ships, submarines and aircraft are lifeless and inanimate platforms.

At sea aboard the USS Tarawa *(LHA 1)—Former Secretary of the Navy, Gordon England, shares lunch with Sailors and Marines aboard the amphibious assault ship during a visit off the coast of California. The Secretary told the men and women that President Bush and the American people are proud of them and appreciate the hard work they are doing in defense of freedom. U.S. Navy photo.*

In the past, systems were built and Sailors were expected to adapt to them. HSI seeks to design systems with Sailors' input and recommendations addressed up front, so that crews can perform tasks more efficiently and with fewer people.

The HSI Directorate is NAVSEA's certification authority to ensure new systems delivered to the fleet are useable; enhance Sailor performance; optimize manpower and training; and promote safety, survivability, and quality of service.

Ordnance Disposal Team Thwarts Frontline Terrorism

A team from Naval Explosive Ordnance Disposal Technology Division (NAVEODTECHDIV) protected warfighters in Afghanistan during Operation Enduring Freedom.

Udairi Range, Kuwait (Jul. 12, 2002)—Explosive Ordnance Disposal (EOD) technicians explode or cook off old ammunition and ordnance that is no longer usable. EOD teams from the U.S. Army, Navy, Air Force, and coalition forces conduct training exercises to improve joint capabilities between the services. U.S. Navy photo by Photographer's Mate 2nd Class Aaron Peterson.

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Kandahar, Afghanistan (Feb. 20, 2002)—A U.S. Navy Explosive Ordnance Disposal (EOD) technician places C-4 explosives on Chinese 82-mm type 65 recoilless rifles, and 82-mm high explosive antitank (HEAT) recoilless rifle rounds near the Kandahar International Airport in Afghanistan. U.S. Navy photo by Photographer's Mate 1st Class Ted Banks.

Maj. Gen. Vines, commanding general of Combined Joint Task Force 180 in Bagram, Afghanistan, commended the team for its accomplishments. *It was inspiring to observe how the war fighting community and the research, development, and technology branch of our military worked as a team, and within 30 days, reverse-engineered, rapidly prototyped, and installed [equipment], which effectively and inexpensively provided a capability to protect our convoys, patrols, and personnel*, he said.

Vines described the NAVEODTECHDIV support as *a perfect example of a rapid prototype program that directly met the warfighters' emergent requirements in an urgent, effective, and resourceful manner.* He further commented, *These individuals can be extremely proud of the work they have done to protect the lives of Coalition and U.S. Forces fighting the war on terrorism in Afghanistan.*

In addition to providing EOD tools and equipment, NAVEODTECHDIV has developed and is distributing EOD Operational Support Guides that identify the explosive hazards from mines and other unexploded ordnance that U.S. forces may encounter in operations.

Although initially developed for EOD use, the value of the information in the books was quickly recognized by other U.S. military elements. Army Headquarters requested 10,000 copies of the books for use by non-EOD military personnel. The Navy and Marine Corps have submitted similar requests.

Naval Postgraduate School Establishes NUWC Sponsored Chair

A memorandum of understanding (MOU) has been signed between the Naval Undersea Warfare Center (NUWC) and the Naval Postgraduate School (NPS), establishing a Chair of Undersea Warfare at the Navy's corporate university.

The resurgence of interest in undersea warfare as a component of littoral and expeditionary warfare has resulted in initiatives at the Postgraduate School to enhance the academic and research content in several curricula with undersea warfare related- material, said former NUWC Commander Rear Adm. John D. Butler.

The result of those initiatives and the establishment of a USW Chair place the Navy school as a major center of excellence for instruction, research, and analysis in the field of undersea warfare.

This fills a critical need for NPS and NUWC, as well as the Navy overall, as littoral warfare has become an increasingly important warfare area, said NPS Superintendent Rear Adm. David R. Ellison.

Admiral Ellison also said that the incumbent would serve concurrently as the Director of the Postgraduate School's USW Research Center and provide counsel to the school's Systems Engineering Academic Committee.

Among the duties of the new chair will be the review and execution of curriculum content, as well as identifying the need for research topics and conduct of direct studies in the mine warfare and anti-submarine warfare areas. The chair will also provide wargaming support for the Office of Naval Research and other naval activities.

According to the MOU, the appointment will be coordinated between the NPS Superintendent and NUWC Commander. Recruitment for the USW Chair will be from the ranks of Navy and Marine Corps officers who have discharged senior responsibilities in USW-related activities, and from academia, government, or industrial laboratories.

NUWC is the Navy's full-spectrum research, development, test and evaluation, engineering and fleet support center for submarines, autonomous underwater systems, and offensive and defensive weapons systems associated with undersea warfare.

NPS, located in Monterey, Calif., is a unique academic institution with an emphasis on education and research programs that are relevant to the Navy, defense, and national and international security interests.

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Fleet Benefits From NSWC Corona Ground Tracking System at NAS Fallon

Naval Surface Warfare Center (NSWC) Corona, Calif. has developed a system that is helping carrier air wings train before deployment.

The Navy's most advanced air strike training takes place at the Naval Strike and Air Warfare Center (NSAWC) in Fallon, Nev. NSAWC conducts air-wing level training for carrier air wings before deployment cruises. One of the most difficult training scenarios involves finding and destroying time-critical targets, capable of movement at any time.

Participants in the strike training attempt to minimize the time span between when a target is identified and when ordnance is deployed against it. To obtain the most realistic results, simulated adversary targets (such as a simulated Scud missile launcher) are allowed to react and move realistically. However, to measure the air wing's success against the target, it is necessary to have a real-time picture of both the air and ground target positions.

NSWC Corona designed, procured, installed, and tested a GPS-based ground tracking system (GTS) at the Fallon Range Training Complex (FRTC), Naval Air Station Fallon. The system provides real-time positioning information for ground units or electronic warfare (EW) threats during fleet training exercises on the FRTC. The GTS is used to provide accurate ground positioning information to the display and debriefing system at NSAWC.

The Fallon GTS uses a combination of commercial-off-the-shelf equipment and software, and customized government software to deliver an integrated air and ground picture to the trainers at NSAWC. In a phased approach, engineers and technicians from NSWC Corona and Fallon installed and tested a proof-of-concept system and network in July 2001. The current system, capable of tracking five vehicles over primarily EW training threat portions of the FRTC was completed in December 2001. The system is, however, expandable and can track a nearly unlimited number of ground targets, depending upon the configured router bandwidth and the rate of position updates required of the tracked units.

NSAWC Fallon has successfully used the system to enhance training for five deploying air wings. It was used with Carrier Air Wing-14 from the USS *Abraham Lincoln* (CVN 72) Battle Group. The system has also been used to enhance the Desert Rescue exercises in June 2002. The system has been quite useful to NSAWC in the execution and analysis of exercises involving air and mobile ground participants.

Fallon is already proposing an expansion of the system to track more vehicles over a wider area. Similar GTS configurations are being considered for Marine Corps Air Station (MCAS) Yuma, Ariz.; MCAS Cherry Point, N.C.; Marine Corps Base Camp Lejeune, N.C.; and the Virginia Capes Fleet Area Control and Surveillance Facility, Oceana, Va.

Preparing the Shipyard Workforce of Tomorrow. Training tomorrow's workforce of skilled craftspersons and engineers is a leading priority of America's public and private shipyards.

It takes an average of six to eight years to train a shipyard worker to the level of journeyman mechanic, technically skilled to work on nuclear submarines and aircraft carriers. The average age of a shipyard worker is about 45, and 33 percent of shipyard workers are over the age of 50.

To meet this challenge head on, the Naval Shipyards, under the guidance of Naval Sea Systems Command (NAVSEA), are rejuvenating the skilled workforce base through the shipyard apprentice program.

The congressionally supported shipyard apprentice program for production trades is a subset of the shipyard workforce revitalization program, designed to ensure the Naval Shipyard workforce will have the skills and flexibility required to meet the demands of the future.

The four-year Shipyard Apprentice Program trains employees in occupational fields through formal classroom trade theory training and on-the-job work experience. The program also includes academic classroom training with a community college partner. Graduates of the program are U.S. Department of Labor-certified journeyman, with a Technical Certificate or Associates Degree.

There are currently more than 1,750 apprentices in the four Naval Shipyards.

Each naval shipyard has apprentice programs tailored to meet its requirements and the NAVSEA command guidelines. Working in partnership with labor unions and employee/management organizations, the shipyards hire candidates based on projected workload, workforce demographics, and attrition.

Echoing Rear Adm. William Klemm, NAVSEA's Deputy Commander for Logistics, Maintenance and Industrial Operations' vision of One Shipyard—Four Locations, the shipyards share information to improve apprentice training as well as program management and administration.

Projections indicate that over the next ten years, the shipyards will need to hire and train an additional 1,400 workers each year to compensate for attrition and maintain critical skills. Hiring for the apprentice program will continue to be strong over the next two years. The 2003 Defense Appropriations Act added $10 million for the Shipyard Apprentice program.

Norfolk recently completed its largest recruiting and interviewing schedule since the program restarted in 1996 with an enrollment of 16 students. Today it has about 420 active apprentices. Plans included the hiring of 140 students for classes beginning in July 2003.

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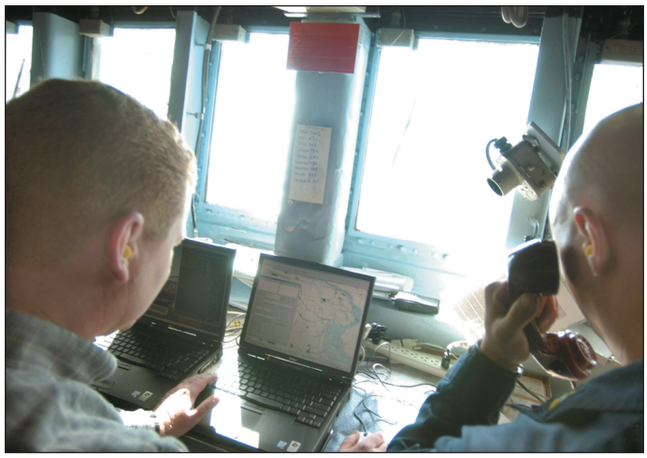
Indian Head's IMPASS System Proves Right on Target

The Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) system allows warfighters to hone their live-fire combat skills while operating at sea.

In 2000, the Office of Naval Research (ONR) needed a system that would address restrictions being placed on weapons training facilities and the associated threat of being unable to conduct training critical for military readiness. It became apparent that a replacement for bombing ranges was needed. The Virtual At-Sea Training (VAST) system, with Indian Head Division's IMPASS as an integral component, was born to fulfill that need and allow virtual testing to be performed.

At sea aboard USS O'Bannon *(DD 987) Nov. 24, 2002—Sailors deploy probes used during a test of the Integrated Maritime Portable Acoustic Scoring and Simulation (IMPASS) system. U.S. Navy Photo by Photographer's Mate 1st Class Marthaellen L. Ball.*



At sea aboard USS O'Bannon *(DD 987) Nov. 24, 2002—Mr. Chris Rice, a researcher from NAVSEA's Naval Surface Warfare Center Indian Head Division, controls the virtual reality-based bombing range during a test of the Integrated Maritime Portable Acoustic Scoring and Simulation (IMPASS) system. U.S. Navy Photo by Photographer's Mate 1st Class Marthaellen L. Ball.*

Each IMPASS system is composed of seven buoys, five of which are deployed in a pentagon shape in the water, one is for the ship's position and the seventh is a spare. The five buoys act together and triangulate the location of any impact. The ship's crew, or spotter, views a realistic presentation—a landmass with topography similar to a real-world scenario for example—that correlates with an area over the open ocean.

The ship engages and shoots at the virtual target. The actual ordnance lands in the water within the array of buoys. The buoys then send a signal back to 'score' the hit. A global-positioning satellite (GPS) provides precise positioning data of the buoys and firing platforms.

During trials at Eglin, the IMPASS system successfully detected 18 nonexploding bombs dropped from A-10 aircraft. The following day, the crew aboard the *Ticonderoga* successfully engaged a computer-simulated target with ordnance shot from the ship's 5-inch, 54-caliber gun. Initial indications showed that the VAST system successfully scored exactly where the ordnance rounds landed in the water.

As communication and satellite technology advances, the IMPASS and VAST systems have leveraged that technology to better train the warfighters who will ultimately deploy weapons in battle.

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