

Navy Integrates Weapon Systems with Unmanned Vehicles for New Surface Warfare Capability

NAVAL SURFACE WARFARE CENTER DAHLGREN DIVISION PUBLIC AFFAIRS (OCT. 2, 2014)

John Joyce

DAHLGREN, Va.—Navy engineers used technologies supporting the science of integration to guide live gun fire onto distant targets, demonstrating a new integrated surface warfare capability in a maritime environment, Sept. 29.

Military and civilian leaders observed as unmanned surface and air vehicles—integrated with naval guns and the Aegis combat system—relayed targeting data to operators engaging fictitious threats on the Potomac River Test Range.

“This is a major first step in demonstrating an integrated surface warfare capability utilizing unmanned vehicles in support of the key engagement functions of plan, detect, control, engage, and assess,” said Neil Baron, Naval Surface Warfare Center Dahlgren Division (NSWCDD) distinguished

scientist for combat control. “We are working hard at focusing on the integration sciences to deal with mission engineering challenges for surface warfare.”

Specifically, Baron and his team of Navy scientists and engineers used the science of integration to make surface warfare systems interoperable with unmanned air and unmanned surface vehicles, enabling streaming identification and shot correction data to naval gunnery throughout the test.

“It’s a spectacular example of how scientists and engineers are enabling new technologies for the warfighter,” said Baron.

Surface warfare officers evaluating the technology joined civilian technologists at the event to prove the Navy can bridge interoperability gaps—known as the interstitial space—between complex system-of-systems.



DAHLGREN, Va.—A Scan Eagle unmanned aerial vehicle (UAV) launches from the Naval Surface Warfare Center Dahlgren Division (NSWCDD) Potomac River Test Range. NSWCDD scientists and engineers demonstrated how the science of integration makes surface warfare systems interoperable with unmanned systems—including Scan Eagle UAVs—during a surface warfare integration experiment here, Sept. 29, 2014. Surface warfare officers evaluating the technology joined civilian technologists at the event to prove the Navy can bridge interoperability gaps known as the interstitial space between complex system-of-systems.

U.S. Navy photo

"The ability to send a small, persistent unmanned system down range in hostile territory for real-time gun or missile engagement spotting and targeting is needed by warships," said NSWCDD Engagement Systems Department Military Deputy Cmdr. Marc Williams. "The technology has the potential to be important for surface ships, especially relating to Aegis weapon system, Naval Surface Fire Support, and surface warfare."

Williams, the surface warfare tactical action officer for the experiment, ordered a gun engagement on a fictitious threat based on identification and targeting data he saw streaming from an unmanned surface vehicle.

At that point, the commander used a deployed Scan Eagle unmanned aerial vehicle's streaming video data to spot, precisely target, engage, and continually support reengagement through gun targeting corrections to the MK160 gun weapon system operator.

"Scan Eagle has been deployed on guided missile destroyers for years to provide persistent electro-optical and infrared surveillance," said Williams, adding that, "it has been used for Naval Surface Fire Support spotting to walk gun rounds onto an enemy target, but not in an automated fashion like in this experiment."

Moreover, Williams used a Navy technology called Visual Automated Scoring System (VASS) to instantly correct the gun targeting.

The NSWCDD-patented system is an automated, computerized method for determining gunfire miss distances using video data. With a non-line-of-sight weapon system, VASS allows the gunner to adapt gun pointing angle and converge gunfire onto a target without having to risk the lives of forward observers.

"This was as much a demonstration about integration as it was about the three research initiatives being exercised," said Baron.

The NSWCDD-funded initiatives featured a virtual ship called the *USS Dahlgren*, VASS adaptive fire control, and new mission engineering efforts to link surface combatant warfare systems with unmanned vehicles.

Throughout the test, the cybernetic *USS Dahlgren* responded to reports of hostile threats by searching intelligence and data across multiple air and ship control operational systems, maximizing response accuracy and timeliness.

"The virtual *USS Dahlgren* is hosting new technological advancements and platforms for integrated test and evaluation full speed ahead," said NSWCDD Technical Director Dennis McLaughlin who watched the demonstration. "We are providing linkage that ensures our test and evaluation capabilities can be rapidly adapted to changing warfighter needs."

Bridging the interstitial space between Navy surface combatants, integrated systems, and adaptive fire control is vital to accomplish key fiscal year 2015 Navy objectives—proliferating unmanned systems; integrating unmanned systems into the Navy culture; and developing, fielding, and deploying unmanned systems in the air, on and under the sea, and on the ground.

"The science of integration—a relatively new area of investigation for NSWC Dahlgren Division—hides in the interstitial space," said Baron. "We are working hard at focusing on the integration sciences to deal with mission engineering challenges for surface warfare. These demonstrations are casting a strong light into the interstitial space to address naval interoperability and integration challenges, and continue to advance warfighting capabilities into our surface fleet."

For more news from NSWC Dahlgren, visit <http://www.navy.mil/local/NSWCDD/>.

DoD Competition to Launch New Manufacturing Institute

DEPARTMENT OF DEFENSE NEWS, DEFENSE MEDIA ACTIVITY
(OCT. 8, 2014)
Cheryl Pellerin

WASHINGTON—President Barack Obama has announced an upcoming Defense Department-sponsored competition that will provide the awardee up to \$110 million in federal funds to launch an Institute for Manufacturing Innovation, or IMI, whose work involves photonics—the science and engineering applications of light.

The Integrated Photonics IMI is the fourth DoD-led manufacturing institute to be announced since the pilot project was launched in August 2012.

In photonics, light is used to capture and display images, convert energy, and detect, transmit, store, and process information. Integrated photonics is an important innovation that simplifies optical system design, reduces the size of components and power used, and improves reliability.

Critical Future Technology

Through its ability to carry vast quantities of data and its application to information systems, harnessing this light represents a critical future technology.

Beginning in early November, when DoD officials release a broad agency announcement for the competition, the department will collect proposals from teams of nonprofit organizations, universities, and private companies to head the institute. The \$110 million available over five years must be matched by at least \$110 million in nonfederal commitments.

"Our U.S. industrial base serves at least two major national security objectives. It is the engine that drives our economy and it equips our soldiers, sailors and airmen," Andre Gudger, DoD's acting director of Manufacturing And Industrial Base Policy, told *DoD News*. "So it's critically important that we maintain our technological advantage within the U.S. industrial base and these institutes help us maintain that competitiveness in important technology areas, such as integrated photonics."

The award for the Integrated Photonics IMI should be announced early next summer, and the institute will have five years to become self-sustaining.

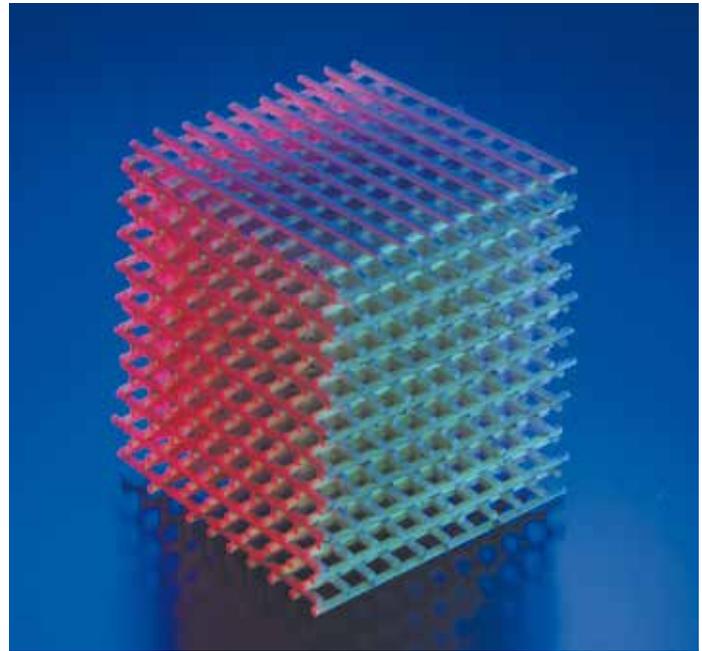
A tri-Service Defense Department subject matter expert team, augmented by civilian agency personnel, will conduct the IMI proposal evaluation and follow-on execution phase and will continue on to support the IMI's technical advisory board.

"Our strategy is for all these institutes to be of great value to not only the Department of Defense, but to other federal agencies, industry, and the nation as a whole," explained Adele Ratcliff, director of manufacturing technology in the Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy.

Federal Partners

In addition to private companies of all sizes, universities, and community colleges, the new IMI will have federal partners such as the Commerce and Energy departments, the National Institute of Standards and Technology, and the National Science Foundation.

Beginning in fiscal year 2016, according to a DoD fact sheet, the National Science Foundation will encourage researchers to submit grant requests for integrated photonics research in hopes of leveraging the improved photonics ecosystem.



Physicists at the Energy Department's Ames Laboratory developed the first model of a photonic band-gap crystal. Such crystals have the ability to control and filter light similar to the way semiconductors control electricity.
Energy Department photo

"Photonics makes good sense as an IMI for the DoD and our nation," Gudger said. "The conditions were right."

Commercial Potential, Defense Requirement

"One objective of the IMIs is to help break down entry barriers for promising technologies," Ratcliff continued. "For photonics technology you have a large commercial potential, a defense requirement, and a growing but fragmented industry that lacks standards and advanced manufacturing processes to be able to move from the laboratory environment to full-scale commercial applications."

The initial pilot IMI announced in August 2012 focuses on additive manufacturing, or 3-D printing. Branded as "America Makes," this Youngstown, Ohio-based institute is a consortium of more than 100 manufacturing firms, universities, community colleges, and nonprofit organizations.

The next two institutes announced in early 2014 were a broad consortium of businesses and universities with a hub in Detroit that focuses on lightweight and modern metals manufacturing, and an equally broad and diverse Chicago-headquartered consortium focusing on digital manufacturing and design innovation technologies.

The newest integrated photonics IMI will focus on developing an end-to-end photonics ecosystem in the United States, including domestic foundry access, integrated design tools, automated packaging, assembly and test, and workforce development.

Photonics Revolution

Activities under the IMI also will allow universities and small-to-medium enterprises to participate in the integrated photonics revolution.

DoD officials cited the following as impacts enabled by integrated photonics:

- Next-generation information processing, communications, and data storage enabled by integrated photonics will lower the costs of broadband access and the efficiency of long-haul, metropolitan, and local-area networks.
- Integrated photonics use in green data centers will enable 100 Gb/s speeds with less power per bit than current 10 Gb/s solutions, resulting in millions of dollars per year in energy savings.
- Significant reductions in size, weight, and power enabled by photonics-electronics integration will be critical for embedded computing systems for mobile platforms, image processing, and remote sensing.
- Integrated photonics will enable a several-fold increase in the dynamic range of detectors, resulting in the ability to “see through” complex media such as human tissue to significantly improve detection for some diseases.
- Advances in integrated photonics will lead to significant improvements in the ability to see through dust clouds of landing helicopters, avoiding crash landings, and saving warfighter lives.

“DoD is in the process of selecting another technical focus area for a fifth DoD-led IMI, to be announced in the coming months,” Ratcliff said.

Small-business Contracting on the Rise, Official Says

DEPARTMENT OF DEFENSE NEWS, DEFENSE MEDIA ACTIVITY

(OCT. 8, 2014)

Claudette Roulo

WASHINGTON—For the first time, the Pentagon has exceeded departmental goals for small-business contracting, a senior Defense Department official said last week.

Small businesses made up 23 percent of the Defense Department’s prime contracts in fiscal year 2014, receiving about \$53 billion in work, said Andre Gudger, director of the Office of Small Business Programs, in a *DoD News* interview.

“This year, the Department of Defense not only exceeded its goal, but it also is on course to exceed the federal-wide goal. ... That’s significant—that’s historical, in fact,” he said.

The department also exceeded its goal of 3 percent for contracts with small businesses owned by Service-disabled veterans—about \$9 billion in contract value—Gudger said. “There’s no one better than that group of people to know what we need and how fast we need it, and help us to reduce the barriers in acquiring it,” he said.

Prime contracts are contracts in which the department contracts directly with the business, as opposed to subcontracting, where a second company is hired by a defense contractor to accomplish some part of the work.

Critical to Battlefield Dominance

This is an important accomplishment, Gudger said, because small businesses are critical to dominance on the battlefield.

“The department is very interested in technology innovation capability,” he said, “and traditionally, small business is the hub for innovation in technology.” This led DoD to focus on small businesses as mission enablers, Gudger explained, and the Office Of Small Business Programs serves as the principal advisor to the secretary of defense in all matters of small business.

“Small companies are typically very agile and nimble,” he said. “They are very responsive to new and emerging threats, new and emerging technologies, and new and emerging capabilities, so being more agile and nimble, they can bring and deliver products to the market faster.”

Perhaps even more critical in a tight fiscal environment is that small businesses drive competition and, in turn, drive affordability, Gudger said.

“If you go back to Better Buying Power 1.0, small business was specifically called out there, and it carried forward into Better Buying Power 2.0, and now we have Better Buying Power 3.0, and small business is continuing to be a focus, because there is a value proposition there,” he said.

The defense contracting community has accepted the challenge, Gudger added.

“In light of the perfect storm—a sequester, a continuing resolution, a shutdown, a furlough, a workforce reduction—it made it very difficult in a time of budget uncertainty to achieve small business goals. ... And so, you have to do things on purpose,” he said. “You have to plan.”

Improving Relationship between Government and Business

As the first director of the small business office to come from the private sector, Gudger said that the decision to bring in someone with his background was driven by President Barack Obama's focus on improving the relationship between government and business. The president has referred to small business as "the engine of job creation."

In sharp contrast to when he first arrived at the small business office—when, Gudger said, it seemed much of the department felt that small business contracting goals were basically another box to check—the Defense Department and the entire federal government now actively seek to contract with more small businesses, and more businesses in general.

Through an interagency collaboration program Gudger described as "fantastic," the government reached out to small businesses to generate awareness of shifting investment priorities, and they responded.

Looking for Modern, Capable Products

For example, in times of budget uncertainty, the department looks to Services for efficiencies, and looks for more modern, capable products to invest in, Gudger said. "We wanted small businesses to really be aware where the Department of Defense was going to make investments," he added.

The small business office oversees \$100 billion in spending, for products ranging from boots and clothing to supersonic aircraft, Gudger said, adding that small businesses play a role in every one of those contracts.

"There's a myth that small businesses don't build planes or ships or nuclear equipment," he said. "Our Virginia-class sub—a nuclear sub—is 70 percent built by or developed by small businesses at the prime contract level."

This arrangement led to the development of interoperable systems, Gudger said, which drove down costs while helping the Navy modernize and maintain its dominance in undersea warfare.

"Small businesses at the prime contract level can lead to a phenomenal outcome and lead to a capability that's the finest in the world," he added.

Navy and Marine Corps Honored with *Popular Mechanics'* Breakthrough Award for Innovation

NSWC DAHLGREN DIVISION PUBLIC AFFAIRS (OCT. 22, 2014)

John Joyce

NEW YORK—A Navy civilian engineer and two of his Marine Austere Patrolling System (MAPS) colleagues received a *Popular Mechanics* Breakthrough Award at a New York ceremony, the Naval Surface Warfare Center Dahlgren Division (NSWCDD) announced Oct. 22.

Popular Mechanics honored Eric South—the NSWCDD lead electrical engineer for MAPS—for his role in developing the system as an individual, wearable power management and distribution system, enabling Marines to patrol longer without resupply.

"It was an honor to participate in the Breakthrough Awards ceremony and to interact with groundbreaking scientists and engineers across the country," said South. "MAPS is a project that focuses on the idea of sustaining the power, energy, and water of dismounted troops. It's a culmination of government and contractor efforts, and we work very closely with Marines. Their direct feedback is what goes into the system design and improvement."

South collaborates on MAPS with Marine Capt. Anthony Ripley, science and technology lead at the U.S. Marine Corps Expeditionary Energy Office, and Phillip Jenkins, Naval Research Laboratory MAPS solar scientist, who were also honored at the Oct. 7 gala event.

"I was proud to accept the 2014 *Popular Mechanics* Breakthrough Technology of the Year Award for the Marine Austere Patrolling System [MAPS] on behalf of the Marine Corps Expeditionary Energy Office Team," said Ripley. "It was the culmination of many years of effort and collaboration between multiple organizations."

The system features an advanced solar panel and a water filtration system. It integrates flat-form batteries and provides a central source of electrical energy that can be adapted to any equipment's electrical requirements.

Common electronics the vest can power for Marines include gear such as radios, night-vision goggles, global positioning system, laptops, and universal serial bus-powered equipment.

"Marines' direct feedback is what goes into the system design and improvement," said South. "We are now partnering with OSD [Office of the Secretary of Defense] and the U.S. Army on next generation MAPS concepts. One day,

Marines and soldiers will be able to filter water on the move. Since they'll be able to generate, store, and manage their own power, warfighters won't have to carry around so many batteries. We will be able to extend our missions and lethality without relying as much on re-supply. That is why *Popular Mechanics* awarded MAPS a breakthrough award—and we're not done yet."

The next evolution of MAPS is called the Joint Infantry Company Prototype.

"The Joint Infantry Company Prototype will push the envelope further by integrating wearable systems that generate power from Marines' movement," said Ripley. "In the future, a MAPS-like system will sustain dismounted Marines during multi-day operations and reduce the need for energy and water re-supply in austere environments."

In addition to South, Ripley, and Jenkins, *Popular Mechanics* honored inventors of the world's first 3D-printed car, and a pre-made skyscraper. High school and middle school students were also recognized with the magazine's Next Generation Award for achievements that will help improve lives of the visually impaired, aging society, and more.

"For ten years, the Breakthrough Awards have unearthed and honored some of the most important innovations in America," said Ryan D'Agostino, editor-in-chief of *Popular Mechanics*. "This year, for the first time, we focus entirely on achievements that are having an immediate impact on our culture—the people, things, and ideas that are making a real difference right now. We are honored to be able to tell the world about them."

MAPS is being developed for the Marine Expeditionary Energy Office and directly supports the USMC Expeditionary Energy Strategy and Implementation Plan to, "deploy Marine Expeditionary Forces that can maneuver from the sea and sustain C4I [command, control, communications, computers and intelligence] and life support systems in place."

For more news from NSWC Dahlgren, visit <http://www.navy.mil/local/NSWCDD/>.

Defense Logistics Agency Presents Customer of the Year Award to PEO LCS

NAVAL SEA SYSTEMS COMMAND PUBLIC AFFAIRS (OCT. 23, 2014)
FORT BELVOIR, Va.—The U.S. Navy's Program Executive Office Littoral Combat Ships (PEO LCS) received the 2014 Defense Logistics Agency (DLA) Business Alliance Customer of the Year Award at a ceremony Oct. 22 at DLA headquarters.

The annual award, presented by DLA commander Vice Adm. Mark Harnitchek, is given to the organization that has most enabled DLA to achieve its joint mission, as determined by its field activities. PEO LCS was nominated by DLA's Land and Maritime System's office for its efforts to shift from using contractor supply support to having DoD-organic supply support management for the Navy's growing fleet of Littoral Combat Ships.

"The unique nature of LCS presents many sustainment challenges," said Rear Adm. Brian Antonio, program executive officer for Littoral Combat Ships. "I'm proud of the [Fleet Introduction and Sustainment] team for turning these challenges into an opportunity for successful collaboration with DLA."

To facilitate the transition from contractor to DoD supply support, PEO LCS's Fleet Introduction and Sustainment office (PMS 505) partnered with DLA to ensure the availability of critical spare parts in the stock system from the first LCS deployment to the ongoing sustainment of the platform.

The PMS 505 team, led by Stephen Benante, deputy principal assistant program manager for Sustainment Logistics, identified approximately 3,000 National Stock Numbers (NSN), including LCS Shore Spares, Contractor Demand, Critical Sea Frame, Planned Maintenance, and Coordinated Onboard Ship Allowance List (COSAL), to be included in the "lean forward" initiative. The rigorous, in-depth review allowed DLA to meet its targets for stock on hand/on contract, and ensured that DLA focused on the correct spares during the transition.

PEO LCS/PMS 505 has fully committed LCS supportability to the DoD Supply System, working with DLA and other stakeholders to construct a realistic delivery timeline and negotiate a complex Memorandum of Agreement between PMS 505, Naval Supply Systems Command (NAVSUP), and DLA detailing the exact roles and responsibilities of each entity.

Currently, PEO LCS is actively engaged in additional collaborative efforts with DLA and NAVSUP to include supporting the LCS mission modules and identifying the most efficient concept of operations for support to Preventative/Corrective Maintenance Availabilities.

The Program Executive Office for Littoral Combat Ships (PEO LCS) is responsible for delivering and sustaining credible littoral mission capabilities to the fleet. Delivering high-quality warfighting assets while balancing affordability and capability is key to supporting the nation's maritime strategy.

DLA provides the U.S. military, other federal agencies, and combined and allied forces with the full spectrum of logistics, acquisition, and technical services.

For more news from Naval Sea Systems Command, visit <http://www.navy.mil/local/navsea/>.

DLA Business Alliance Awards Honor 22 Private Industry Partners, Customers

DEFENSE LOGISTICS AGENCY NEWS (OCT. 24, 2014)

Amanda Neumann

The Defense Logistics Agency's relationship with its partners in private industry is crucial to supporting warfighters across the globe, DLA Director Navy Vice Adm. Mark Harnitchek said Oct. 22 during the 17th Annual Business Alliance Awards Ceremony at the McNamara Headquarters Complex.

"One of the guiding principles we have here at DLA is that relationships are key," he said. "We've got over 25,000 people working at DLA in 48 states and 28 countries. We've got nine supply chains that cover almost everything the warfighter needs, from food and fuel to medical and construction supplies, and last year we provided over \$36 billion in sales and services in fiscal 2014. But none of that happens without the great efforts of our partners in private industry."

Business Alliance Award candidates are nominated each year by DLA field activity commanders, Harnitchek said, adding that this year's winners have been vital to helping the agency meet its mission.

"It's a small token, but these awards distinguish those who have demonstrated outstanding contributions to our mission," he said. "I say it all the time, 'We don't make anything here.' You do that. We just work to get it out to our warfighters as fast as possible. And in addition, you're very mindful of cost. ... Without you, we simply couldn't do what we do. It's a real thrill to be able to recognize your outstanding efforts here today. You have demonstrated those efforts over and over. Together, DLA, industry, the Services, and the combatant commanders have built a flexible and responsive logistics network that is highly configurable to any need, anywhere."

As Operation United Assistance ramps up in West Africa, DLA will continue to rely heavily on its industrial partners to solve problems and achieve smart savings, Harnitchek said.

"This past year, we've had some tough times," he said. "We've dealt with an unpredictable fiscal environment with the sequester, the Budget Control Act and, of course, the government shutdown. But in spite of all that, we, together,

continue to grow our relationships and weather this storm together."

This year, there were 40 nominations, resulting in 22 awards in eight categories including Vendor Excellence, Outstanding Ability-One Program Vendor, New Contractor of the Year, Innovative Business Performer of the Year, Outstanding Readiness Support, Recognized Cost Saver, Department of Defense Customer of the Year, and the Commander's Choice Award.

In the Vendor Excellence category, awards are presented to businesses with superior product quality, on-time delivery, exemplary customer service, reliability, dependability, consistency, and accuracy. They included:

- Sea Box Inc. (small business)
- CFM International (large business)
- SZY Holdings LLC dba Ever Ready First Aid & Medical Supplies (women-owned small business)
- J2 Systems and Supply LLC (Service-disabled veteran-owned small business)

Awards for the Outstanding AbilityOne Program Vendor are presented to nonprofit agencies affiliated with the AbilityOne program that exhibit extraordinary customer support, superior product quality, and on-time delivery. They included:

- Lighthouse Works Inc. (NIB)
- Peckham Industries (SourceAmerica)

GNU Technology, Inc., a small disadvantaged business, was named New Contractor of the Year for exceeding expectations on its first DLA contract in fiscal 2014. After DLA's request to expedite delivery, GNU successfully performed first article testing on a product two weeks ahead of schedule, which resulted in no quality or delivery issues.

The Innovative Business Performer of the Year award is presented to vendors that implement progressive business practices, such as prime vendor and tailored logistics support solutions. They included:

- JGB Enterprises Inc. (small business)
- National Fuels Corporation (large business)

The Outstanding Readiness Support Award recognizes extraordinary customer support directly applicable to a crisis or contingency situation. They included:

- Atlantic Diving Supply Inc. (small business)
- Lubwell Corporation (large business)
- Olgoonik Technical Services LLC (small disadvantaged business)

- Transcendence Incorporated (small disadvantaged business and Service-disabled veteran-owned small business)

The Recognized Cost Saver Award is given to vendors whose efforts result in cost savings to the government. They included:

- Sage Energy Trading LLC (small business)
- Washington Gas Energy Services Inc. (large business)

The Program Executive Office for Littoral Combat Ships was named DoD Customer of the Year for its support of DLA business initiatives to ensure LCS platform success.

Four people were recognized in the Commander's Choice category for their support on programs affecting DLA's mission success. They included:

- Jeremy Traxler, senior accounting technician, Defense Finance and Accounting Service, Columbus, Ohio
- Navy Capt. James B. Poindexter III, acting director, Medical Logistics Division, Defense Health Agency
- Mary McGovern, Association of Procurement Technical Assistance Centers
- Julie Praiss, vice president, Tactical Aircraft and Weapons Support, the Boeing Company

Two DLA employees were recognized for their work with small businesses. Sheryl Woods with DLA Disposition Services was named the 2014 Outstanding DLA Small Business Professional of the Year. As the sole focal point for all DLA Disposition Services small business decisions, her efforts helped DLA Disposition Services meet and exceed its small business and socioeconomic goals. Renee Griffin with DLA Aviation was named the 2014 Outstanding DLA Acquisition Professional Supporting Small Business for awarding more than \$7.9 million in contracts to small businesses, exceeding her small business goal by more than 100 percent.

Harnitck concluded the ceremony by providing the winners with personalized flags made by DLA Troop Support in Philadelphia.

Stinger Upgrade to Increase Service Life, Capabilities

U.S. ARMY MATERIEL COMMAND NEWS (OCT. 29, 2014)

Kevin Jackson

McALESTER, Okla.—Work to extend the service life of Stinger Block I missiles and expand their capabilities on the battlefield began at McAlester Army Ammunition Plant, said officials here.

The nearly \$11 million project for Cruise Missile Defense Systems from Redstone Arsenal, Alabama, calls for workers to replace aging components that are susceptible to degrada-

tion, said Tommy Hendrix, industrial specialist, Precision Munitions Division, Ammunition Operations Directorate at McAlester Army Ammunition Plant, or MCAAP.

Billed as the Stinger Service Life Extension Program, the work will extend the service life for 2,005 missiles in the Defense Department inventory for another 10 years. MCAAP will upgrade 850 Stingers for the Army, and 1,155 for the Marine Corps.

In addition to replacing components to extend the service life, MCAAP will also install a warhead section equipped with a Target Detection Device, commonly known as a proximity fuze. The Target Detection Device provides increased effectiveness against unmanned aerial system threats.

Work is expected to continue through 2016, Hendrix said.

During the preparatory stage, MCAAP worked with the Cruise Missile Defense Systems to refine the scope of work, design the production layout to maximize the workflow, determine workforce requirements, and ensure subcontracts are in place with vendors who will provide critical components and develop the necessary classification to transport the munitions.

The project calls for MCAAP to disassemble the aging FIM-92E Stinger and install a new flight motor, proximity fuze warhead section, gas generator cartridge, o-rings, and desiccant cartridge.

The upgraded Stinger—also a Block I—will be redesignated as the FIM-92J.

As part of the project, MCAAP workers are required to examine each Stinger missile on the Guided Missile Intercept Aerial (GMIA) test equipment before disassembly. Components that successfully pass the examination—such as the guidance section, launch motor, tail fin, launch tube, and container—will be used in the upgrade along with the new parts.

“We worked to incorporate Lean practices into the project before work began,” said Kurtis Lund, management analyst, Continuous Improvement Division at MCAAP. “The intent was to error-proof the work by taking steps to produce an efficient production flow.”

MCAAP will demilitarize the components not used in the upgrade or will be retained for future use.



Emma Thomason, an explosives operator from the Industrial Operations Division, Ammunition Operations Directorate, gets hands-on training with the disassembly of an FIM-92E Stinger, from Matthew Thomas, an electronic integration system mechanic.

U.S. Army photo

Once the assembly is complete, each missile will undergo final Guided Missile Intercept Aerial inspection, continuity, and leak testing before being repackaged for delivery to the customer.

The Stinger Reprogrammable Microprocessor, or RMP, entered production in 1985, and was delivered in 1989. The Stinger RMP Block I is an upgrade to the original Stinger RMP, and was delivered between 1996 and 2005.

The Stinger is a short range fire-and-forget infrared/ultraviolet missile system that is both shoulder fired and mounted on a variety of air- and ground-based platforms. It can be used against a variety of low-flying unmanned aerial systems, cruise missiles, rotary wing, or fixed wing threats.

Stinger missile testing and stockpile reliability work transferred to MCAAP in 2010, from the Red River Munitions Center, in Texarkana, Texas, which was shuttered by the 2005 Base Realignment and Closure Act.

“Our precision munitions capabilities are becoming well-known to our customers and potential customers,” Hendrix said. “We receive requests for estimates weekly—whether

it’s for maintenance or demilitarization. We believe this aspect of our business will continue to grow.”

McAlester Army Ammunition Plant is the Department of Defense’s premier bomb- and warhead-loading facility. It is one of 14 installations of the Joint Munitions Command, and one of 23 organic industrial bases under the U.S. Army Materiel Command, which include arsenals, depots, and ammunition plants. MCAAP is vital to ammunition stockpile management and delivery to the joint warfighter for training and combat operations.

AFMC Selects Hill for Excellence

75TH AIR BASE WING PUBLIC AFFAIRS (OCT. 31, 2014)

Richard W. Essary

HILL AIR FORCE BASE, Utah—Hill was selected as Air Force Materiel Command’s choice for the Commander-in-Chief’s 2015 Annual Award for Installation Excellence.

This award recognizes the outstanding and innovative efforts of the people who operate and maintain U.S. military installations. Each year one installation from each Service is selected for this honor. Installation excellence enables better mission performance and enhances the quality of life for ser-

vice members and their families, according to a Department of Defense news release.

“Being selected to represent our command is an incredible honor for Team Hill,” said Col. Ron Jolly, 75th Air Base Wing and installation commander. “Whether we are deploying combat-ready airmen around the world, providing exceptional medical care for our beneficiaries, or championing activities to bed down F-35 operations, this recognition is a testimony of Team Hill’s hard work and commitment to our nation’s security.”

Hill will compete against other Air Force-level command winners for the award. An inspection team will visit each finalist base, and the winners are traditionally announced in the spring.

Nearly 10 of Hill’s units and programs brought home “best” in Department of Defense, Air Force, AFMC, and Air Force Sustainment Center recognition during the award period including: the military treatment facility, dental services, fire department, environmental and energy programs, housing management, communications, sexual assault prevention and response, and public-public, public-private partnerships.

Team Hill has much to be proud of during the award period, officials said. Along with the exceptional recognition, the installation embraced AFSC’s “Art of the Possible” culture that led to a number of successes and cost-savings’ initiatives.

Some of those include:

- Hill completed approximately 5,300 flight plans for local depot-maintenance and tenant aircraft missions and received a 99 percent customer-service satisfaction rating with zero discrepancies from those units.
- The chapel organized weekend retreats for Hill’s families and single airmen to focus on resiliency skills before, during, and after a deployment.
- The Hill clinic created a new satellite pharmacy to decrease wait times by 400 percent. It also collaborated with a nearby health department to develop a civilian flu vaccine program that was benchmarked by the Air Force.
- The fire department completed 1,100 emergency responses, protecting people and base facilities.
- The Sexual Assault Prevention and Response office conducted 11 education and outreach activities on- and off-base, involving more than 2,000 participants.
- The communications directorate led the Air Force’s third largest network migration and resolved more than 2,600 trouble tickets.

- The 629th Munitions Squadron, which is the busiest munitions inspection operation in the Air Force, executed more than 5,000 shipments to units worldwide.
- Contracting awarded nearly \$18 million worth of contracts to fix a hangar roof and renovate a facility that will directly support Hill’s ability to reach “initial operational capability” for the F-35 Lighting II. Additionally, Hill began 33 construction projects related to the F-35 worth \$111 million.
- The base’s environmental program validated a laser paint-removal system for the C-130 Hercules that strips paint seven times faster than previously accomplished.
- Hill’s use of solar arrays and municipal landfill methane gas saved the Air Force nearly \$674,000 annually.
- The Enhanced Use Lease Office administered the largest EUL project in the DoD—three projects to date worth \$83 million—at no cost to the government.
- Team Hill partnered with the community to host one of DoD’s largest air shows, which enabled 550,000 spectators to witness firsthand the pride and precision of the Air Force.

Open Architecture Cuts Cost, Promotes Competition, Official Says

DEPARTMENT OF DEFENSE NEWS, DEFENSE MEDIA ACTIVITY
(NOV. 5, 2014)

Cheryl Pellerin

WASHINGTON—Adopting open architectures in systems that the Defense Department buys from industry can reduce costs and facilitate competition, the assistant secretary of defense for acquisition said here yesterday.

Katrina G. McFarland was the morning keynote speaker at Defense Daily’s 2014 Open Architecture Summit, which focused on open architecture in military acquisition.

Open architecture is a system in which the specifications are made public to encourage third-party vendors to develop add-on products. In defense acquisition, the term extends to creating separate modules in a larger system, each of which can be updated to modernize the entire system without rebuilding it, and the modules can be produced by different vendors, promoting diversity and competition at the module or component level.

Acquisition Strategies Implement Open Systems Architecture

McFarland said 75 percent of Defense Department acquisition strategies implement open systems architecture across all Services and Defense Agencies. “The importance that we place on it is not just in word only, it’s in action,” she added. “This department is seriously engaged in trying to understand how to help our program managers and our depart-

ment and our industry look at open architecture and its benefits," McFarland said, "and understand truly what our objectives are related to intellectual property and making sure that we're doing it based on the best interest of national security relative to a business case."

According to the August 2014 *Guidelines for Creating and Maintaining a Competitive Environment for Supplies and Services in the Department of Defense*, developing an open system may be less expensive than traditional systems because of reductions in material cost, the use of commercial standard interfaces, and the more effective maintenance and modification possible over a system's life cycle.

Open systems architecture also may be used to overcome barriers to competition by applying open standards and open business model principles, the *Guidelines* book reports.

McFarland told the audience that confusion exists in the defense industry about intellectual property and open systems architecture. "The government has no interest in pursuing intellectual property when it's the 'secret sauce' of a company," she said, "but ... we are very interested in what I could call the interfaces."

Owning Interfaces Allows Department to Compete

Owning the interfaces and the architecture allows the department to compete, the assistant secretary explained.

"Conceptually, you're trying to get your program managers ... to understand when they design their functional architecture that they have to take into account what they must go after in terms of ... modularity so they can build and change in that area," McFarland said. "You should have a logic behind what you're doing, and it should be based on a business case, and you should be able to articulate where you consider those threats to be most prevalent so you can [determine] how to address that interface."

In terms of defense exportability, she added, "I'm very interested in ensuring that when I build something I know will have export trade related to it."

"Because of our relationship with other nations," she added, "I want to make sure I've protected the ability of those countries to implement their aspects [of open architecture] as well."

Guidelines Offer Information on Acquisition Practices

McFarland said the *Guidelines* book offers good information about the use of open architecture in military acquisition practices.

"In that book you will find ... highlights of what we believe people need to think about, ... and we give examples throughout the document of how [open architecture] works to the benefit of industry, to the benefit of the government, and most importantly, to the benefit of national security," she said.

The book advises that "the essence of OSA is to take the long-standing engineering practice of modularization and adding to that the rigor of ensuring those modules can be separated from each other in a well-orchestrated manner."

These technical practices, the book adds, "provide the power to acquire components of a system from separate sources and yield a business model that facilitates competition. OSA enables increased opportunities for competition of systems upgrades and competition at the subsystem level to improve innovation."

Even fielded systems can create a competitive environment or open-systems architecture, McFarland said, adding that many defense companies "are looking to try to find a way to create their systems in a new form, bringing about improvement in their systems to the performance of the threat, and doing it through open systems architecture."

Better Buying Power 3.0

The department's Better Buying Power 3.0 initiative emphasizes such innovation and technical excellence while remaining focused on continual improvement, the assistant secretary told the audience.

"Better Buying Power now addresses the reality of our future," she added. "What we're seeing in front of us is that we need to refresh our technological superiority, ... improving our engineering skills, improving our workforce skills writ large, bringing about a closer relationship with industry at the conceptual level of our requirements, opening the door before we've decided on the final set of requirements [so] industry is able to provide us their inputs without having it be a conflict of interest."

Areas Being Considered for Future Strategies

The assistant secretary said that areas being considered for the military's future strategies include electronic warfare, long-range air-to-air missiles, radars operating in nonconventional bandwidths, counter-space capabilities, longer range and more accurate ballistic and cruise missiles, improved undersea warfare capabilities, and cyber and informational operations.

"These are not trivial," she said. "These are challenges, these are innovations, and we're talking with the senior leadership in each of our largest defense industries, and we're talking about them through the lens of addressing current and emerging threats."

The idea of open architecture for the Defense Department also is not trivial, McFarland said.

"It's a means of achieving our needs," she added, "and all of us have seen evidence over time of how well that provides us the opportunity to resurge."

DoD Civilian Awards Recognize Distinguished Service

DEPARTMENT OF DEFENSE NEWS, DEFENSE MEDIA ACTIVITY

(NOV. 7, 2014)

Amaani Lyle

WASHINGTON—The Defense Department today recognized eight of its more than 800,000 civilian employees with awards for their commitment to public service and their personal and professional integrity.

Jessica L. Wright, undersecretary of defense for personnel and readiness, described the recognition as "monumental" in her remarks at the Pentagon auditorium ceremony, where she presented the 59th Annual Department of Defense Distinguished Civilian Service Awards and the 10th Annual Department of Defense David O. Cooke Excellence in Public Administration Award.

"You have broad and deep impact on the DoD and the people [who] work at the DoD," she said.

The Distinguished Civilian Service Award is the highest recognition the Defense Department can give, and is presented to a small number of civilian employees whose careers reflect exceptional devotion to duty and significant contributions of broad scope in policy, scientific, technical, or administrative fields that increase effectiveness and efficiency, officials said.

For non-managerial career civilian employees with three to 10 years of civilian federal career service, the David O. Cooke Award recognizes future federal executive potential that exemplifies the namesake's talents. Cooke's efforts across his 55-year federal career, which included 45 years in DoD, earned recognition as a public official who championed a cooperative spirit and improved operations, officials said.

Leading With Integrity, Creative Thinking, Passion

Wright noted that Defense Secretary Chuck Hagel recently spoke about the importance of attracting, developing, and motivating quality people as DoD evolves.

"You lead with integrity, you lead with critical thinking, and you lead with passion," Wright said to the civilian award winners.

As a 35-year soldier and the first female maneuver brigade commander in the Army, Wright offered her personal thanks for civilians' "heavy lifting" and dedication. "As a military member, I knew that the military would not be a success without the great civilian workforce of our department," she said. "Thank you for the support you give the men and women of our armed forces."

Michael Rhodes, director of administration and management for the Office of the Secretary of Defense, noted each recipient's unique contributions to the DoD.

"They've had distinctive accomplishments throughout their career, regardless of the length of tenure, but they all have that common quality: ... their unwavering commitment to public service," he said.

2014 Award Winners

Audrey M. Goral, operational test engineer at the Air Force Operational Test and Evaluation Center, Edwards Air Force Base, California, earned the David O. Cooke Excellence in Public Administration Award.

Distinguished Civilian Service Award recipients are:

- Juan A. De Jesus, director of electronic commerce, Army Financial Management Command, Office of the Assistant Secretary of the Army
- Terry Duncan, director of communications systems, National Reconnaissance Office
- John Holmes, senior scientist, Underwater Electromagnetic Signatures and Technology Division, Naval Surface Warfare Center
- Patrick McCormick, director, distribution current operations, Defense Logistics Agency
- John Miller, demonstration branch chief, Office of the Chairman of the Joint Chiefs of Staff, Office of the Deputy Director for Cyber and Command, Control, Computers and Communication Integration
- Dennis Taitano, deputy assistant secretary of the Navy for financial operations
- John Wallace, technical director, U.S. Army Aberdeen Test Center

New Technology to Reduce Soldier's Load

ARMY NEWS SERVICE (NOV. 12, 2014)

David Vergun

WASHINGTON—Current and future developments in energy production promise to lower the soldier's combat load and reduce the logistical footprint, said an Army systems expert.

Current technology could allow soldiers and their vehicles and equipment to one day passively capture solar energy, which will automatically charge batteries used for network communications and other tasks, said Maj. Mark Owens.

Owens, a system coordinator at the Office of the Assistant Secretary of the Army for Acquisition, Logistics & Technology, spoke at an Operational Energy forum today, in the Pentagon.

Now in research and development is an apparatus soldiers would wear to reduce musculoskeletal injury and increase performance. The device would also generate energy for batteries when the soldier is walking downhill and "braking," he said, much like energy-regeneration braking used in electric vehicles.

Another possible similar development in the future would use the oscillating motion of a soldier's rucksack to capture energy—up to 50 watts worth—Owens said. "You obviously wouldn't want to oscillate when going down a mountain, so it could be locked in place."

A similar passive-energy collection device could be in a vehicle seat. The weight of the soldier could generate power, he said.

Someday, thermal electric devices could line soldiers' armor, producing a mild air-conditioning effect of cooling down a soldier by about five degrees Fahrenheit, he said. It would have an added benefit of reducing water intake and the associated weight of carrying a lot of water.

Smart textiles could someday route energy through the fabric of the soldier's combat uniform, reducing the need for cables and other devices connecting the battery and networking communications, he offered.

Why the Army's sudden increased interest in reducing weight and increasing energy efficiency?

New network communications gear worn by soldiers keeps getting heavier and heavier, he said. The Army predicted that in the future, the power needed to generate these de-

vices will increase from the current seven to 10 pounds, to 14 pounds for a 72-hour mission.

That doesn't seem like much, but the effect of new gear dismounted soldiers carry makes the load heavier and heavier, Owens said. At some point, the Army began to ask itself, "is the juice worth the squeeze?"

Consider that during World War II and Vietnam, the average soldier hauled about 36 pounds of stuff, he pointed out on a slide. During operations in Iraq and Afghanistan, that load increased to 75 pounds.

"If you have loads for dismounted infantrymen of from 70 to 140 pounds, you begin to degrade their ability to maneuver, degrade their situational awareness, and there's tremendous impact to the musculoskeletal system, with increased probability of injuries and long-term consequences," he said.

Owens was quick to point out that much of that added weight increased the chances of soldier's survivability on the battlefield in the form of increased situational awareness through better communications and more effective firepower. However, at some point, a soldier can only carry so much, so there has to be a sweet spot.

To get to that spot, the Army in 2009 started looking at how technology could contribute to decreasing the soldier's load from a power perspective, since food, water, and body armor were already at their limits in possible weight reduction, he said.

In 2003, 90 percent of the batteries purchased by soldiers were non-rechargeable, he said. So, if a soldier went out on patrol, he'd come back with maybe 60 percent of the charge still in his batteries, but toss them and get new ones for the next day's patrol, just to be on the safe side.

The Army is reversing that trend today, with lithium-ion rechargeable batteries that are more powerful, weigh less, and come with charging stations, he pointed out. The newer batteries also last about 25 percent longer.

The chargers that were used in 2003 couldn't be run by solar or vehicle power. Also, he said, they were less rugged than the ones now being produced that can use alternate energy sources, and can run off AC or DC current.

Another problem is that the 2590 batteries soldiers have been wearing, while powerful, are also a potential safety hazard when penetrated by rounds or shrapnel. They're

“not something you want to have on your body when that happens,” he said.

An Army program of record for 2016 through 2020, will result in better battery and charging technologies getting out to soldiers in the field, Owens said. For example, rechargeable batteries that are flattened out and flexible with charge indicators on them will be worn by soldiers to supply their network communications and other gear.

Universal charging stations are part of that program, capable of operating off alternative energy sources or even drawing energy from partially charged batteries, he added.

For more ARNEWS stories, visit <http://www.army.mil/ARNEWS>.

Research Laboratory Honors Top Scientists, Engineers

AIR FORCE NEWS SERVICE (NOV. 13, 2014)

Derek Hardin

WRIGHT-PATTERSON AIR FORCE BASE, Ohio—Air Force Research Laboratory honored 12 outstanding scientists and engineers at the 2014 AFRL Fellows and Early Career Awards Banquet recently for their exceptional contributions to advancing technologies for the warfighter.

Eight were awarded Fellow status, the laboratory’s highest award for career contributions, which has only been given to a total of 172 AFRL personnel since the program’s inception in 1987. This represents just 0.2 percent of AFRL’s professional technical personnel. In addition to this high honor, Fellows are awarded a two-year research grant of \$300,000.

Four received Early Career Awards for superlative work in fundamental or applied science and technology within seven years of earning their highest advanced degree.

The distinctions recognize the elite of an already impressive workforce charged with creating the Air Force of the future, according to Maj. Gen. Tom Masiello, commander, Air Force Research Laboratory.

“This is, by far, the highest honor we can bestow on you in AFRL ... Your relentless commitment to excellence in research and development has not gone unnoticed,” Masiello told the honorees. “We fly, fight, and win because AFRL people possess an unmatched level of technical expertise and achieve a level of performance that is second to none.”

The exclusive group, considered to be among the nation’s best and brightest scientists and engineers, Masiello said, directly contributed to the development of advanced technolo-

gies that keep the U.S. Air Force the greatest in the world. “Each of you epitomize the American spirit,” he added.

The 2014 AFRL Fellows Inductees are:

- Dr. Paul Antonik, Air Force senior scientist for connectivity and dissemination, Information Directorate
- Dr. Charles Cross, chief, Turbine Engine Division, Aerospace Systems Directorate
- Paul Kervin, senior research physicist, Directed Energy Directorate
- Ralph Kohler, principal engineer, Information Directorate
- Stephanie Miller, chief, Radio Frequency Bioeffects Branch, 711th Human Performance Wing
- Dr. Alan Ohrt, principal mechanical engineer, Munitions Directorate
- Dr. Kevin Priddy, chief, Avionics Engineering Division, Air Force Life Cycle Management Center
- Dr. Gregory Vansuch, technical advisor, Systems Technology Office, Sensors Directorate

The 2014 AFRL Early Career Award winners:

- Dr. Tiffany Jastrzembki, cognitive research scientist, 711th Human Performance Wing
- Dr. Derek Kingston, unmanned aerial vehicle team lead, Control Science Center of Excellence, Aerospace Systems Directorate
- Dr. Frederick Leve, research aerospace engineer, Guidance, Navigation and Controls Group, Space Vehicles Directorate
- Dr. Janet Wolfson, senior mechanical engineer, Munitions Directorate

Five former AFRL commanders returned historically to honor the award winners at the National Museum of the U.S. Air Force—among them was retired Maj. Gen. Dick Paul, who served as AFRL’s first commander from 1997-2000. Paul is also responsible for conceiving and leading the initiative to combine the four Air Force legacy laboratories—Armstrong, Philips, Rome, and Wright—into a single entity.

In his keynote speech, Paul celebrated AFRL’s heritage and acknowledged significant science and technology budget and personnel cuts in the late 1990s as key drivers in the transformational decision to consolidate laboratories with distinct missions and cultures under one roof.

“Many, many people participated in defining AFRL,” Paul said, adding their collaboration, teamwork, and sense of purpose set a solid foundation for the organization that still today is charged with envisioning the future Air Force.

"I was never more proud to be a part of something," Paul said of his participation on the team of military and civilian airmen "who put aside their biases and past loyalties and resolved to work together to create a single laboratory that would serve the Air Force well into the future."

Honoring the Fellows and Early Career Award winners, Paul said, "We need to remember that the essence of our excellence is not organizational structures. It's the people, past and present. We indeed stand on the shoulders of giants," Paul said, speaking of visionaries like inventor Thomas Edison, Gen. Henry "Hap" Arnold, and the Air Force's first chief scientist, Dr. Theodore von Karman.

Paul concluded by saluting the award winners, "our current giants ... men and women who epitomize technical excellence and who lead in the quest to provide the world's best technologies to the world's best Air Force."

DoD Seeks Future Technology Via Development Plan

*DEPARTMENT OF DEFENSE NEWS, DEFENSE MEDIA ACTIVITY
(DEC. 3, 2014)*

Amaani Lyle

WASHINGTON—The Defense Department seeks technology and innovative ideas as part of its Long Range Research Development Plan within the Defense Innovation Initiative, a broad effort that examines future capabilities, dominance, and strategy, a senior DoD official said Nov. 24.

The newly released LRRDP Request for Information will provide a way for DoD technology scouts to collaborate with industry, academia, and the general public to explore topics and ideas to better identify the "art of the possible," said Deputy Assistant Secretary of Defense for Systems Engineering Stephen P. Welby.

"We're interested in getting the broadest set of folks, the brightest minds we can find, to come help us on this effort," Welby said. "We're hoping that by casting this wide net, we'll be able to harness the creativity and innovation going on in the broader ecosystem and help us think about the future department in a new way."

Domains of Interest

Specific military domains of interest, he said, include space, undersea technologies, affordable protective systems against precision-guided munitions threats, air dominance and strike capability possibilities, ecologically and biologically inspired ideas, and human-computer interaction. "We expect the topics and ideas that come back will inform our science and technology planning and we're mining that whole space," Welby said.

He described a "small, agile team" of bright government officials who've been charged to engage industry, academia, not-for-profits, small businesses, and the general public to help the department explore future possibilities. Inputs will also be accepted from allies and international partners who may have unique perspectives or contributions to the effort.

Officials expect the seven-month study to yield results in time to brief the defense secretary by mid-2015 and influence future budget and offset technology decisions, Welby said.

DoD's Future

"The key opportunity out of this whole effort is to start a discussion," he said. "We're asking questions about people, business practices, but particularly ... about technology, what we need to drive the future of the department."

Deputy Secretary of Defense Robert O. Work will oversee the program as part of the overall effort to explore how technology can be incorporated with future DoD strategy and capabilities.

Pentagon officials noted a justified urgency in reviewing the future systems and architectures to maintain dominance over competing investments around the globe.

"There is no better time to look at the long-range strategy we're taking to invest in technologies that will make a difference," Welby said.

Capability Breakthrough in the 1980s

During the 1980s, Welby said, DoD found itself facing the Soviets and recognized there was a better way to confront the issue rather than a "tank-versus-tank" military buildup.

"The big breakthrough in that time period was introduction of precision weapons ... and technology that allowed us to replace quantity with very precise technology-driven capabilities," Welby said.

That, he said, has been the key driver in the way the nation has conducted itself in the national security environment for more than 40 years.

"People have understood our playbook," Welby said. "Adversaries are now building systems that look to blunt particular United States' advantages and we'd like to revisit that."

Efforts in 1973 included the original Long-Range Research and Development Plan, which ushered in nascent digital

technologies, early iterations of global positioning systems and the beginnings of the future Internet.

Today, he said, DoD faces challenges posed by globalization and technologies driven by both the military and commercial sectors.

“We’re now asking broader questions like, ‘How does the United States maintain its ... lead against the entire path of technology and innovation going on globally?’” Welby said.

Maintaining a compelling U.S. advantage in technology is critical, he said.

DoD’s long-range plan, Welby said, will focus on “near-peer competitors,” state actors and a broader scope of conventional deterrence, namely key technologies that will enable the protection of U.S. interests and freedom of movement, and deter future aggression into the 2025 timeframe.