

# Unmanned Systems Earning Their Spot in Sea Services' Toolboxes

NATIONAL HARBOR, Md. – Unmanned and autonomous systems aren't new to the armed forces, but in many ways the tools are still evolving and, along with that, the sea services are evolving alongside them to determine their proper place in their toolboxes.

Rear Adm. David Hahn, chief of naval research and director of innovation, technology requirements, and test and evaluation, likened the sea services' unmanned needs to deciding which 14 clubs you need to win the Masters.

"Today, as we look at the tools provided, most of those legacy tools require a lot of human interaction. Do we think that the unmanned tool set that we can provide our Navy and Marine Corps is ready to go in the bag? Do we think that we're going to get an expert result ... by completing the job? Not just a better drive, not just a better putt, but completing it all across that kill chain."

Hahn said here has been "tremendous success" with platforms, like larger unmanned underwater vehicles, but often they increase the need for manpower. His No. 1 ask for an unmanned system today would be an unmanned vessel that can sea at sea for 70 days without intervention that operates in concert with other maritime vessels.

As these systems progress, they are going to grow in their autonomous capabilities, said Rear Adm. Mark W. Darrah, program executive officer for Unmanned Aviation and Strike Weapon for the Navy, migrating into stochastic behaviors through machine learning that will enable them to do their own mission planning.

“We have to set the parameters for what it will base its decisions on,” he said. “There’s a lot of work that needs to be done there.”

Currently, there is a healthy appetite in the Navy for what unmanned and autonomous systems offer.

“I will tell you, when I arrived we had an \$850 million contract for ISR [intelligence, surveillance and reconnaissance] services in theater. In three years, we were at ceiling,” he said.

And, at the same token, very sophisticated unmanned systems that are flanked by poor legacy systems would be akin to driving a Lamborghini at 25 mph, he said, so the Navy must focus on improving the entire kill chain, not just the platform.

Brig. Gen. Christian Wortman, vice chief of naval research, commander, Marine Corps Warfighting Lab, Office of Naval Research, said he’s focused on Commandant Gen. Robert Neller’s orders to be “faster, more effective, more responsive.”

Instead of homing in on a certain vehicle or vessel, he said his needs today center on defending networks, and any autonomous system that enhances the Marine Corps’ sense of environment that it’s operating in.

Though the Coast Guard has had a lot of success with the unmanned systems it has deployed, Rear Adm. Michael Ryan, assistant commandant for capability, said it is still working to leverage all they have to offer.

“The Coast Guard is probably late to the table in some regards. ... We are working diligently to close those gaps. These are a force multiplier,” he said.

Though the service now has the funding to integrate more unmanned assets into its portfolio, Ryan said the Coast Guard

has to be careful on how it applies its funds, capabilities and labor to maximize mission effectiveness.

“Our mission set, our area of operations are ripe for leveraging this type of capability and technology,” he said.

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## **Navy’s New LCAC Hits the Water**

NATIONAL HARBOR, Md. – The Navy’s newest ship-to-shore connector, the LCAC 100 (Landing Craft, Air Cushion 100), entered its first testing in the water April 10, a Textron official said, and is on path for delivery this summer.

In an April 11 interview with Seapower, Scott Allen, vice president of Marine Systems for Textron Marine and Land Systems in Slidell, Louisiana, said the underway test was an important milestone that brings the LCAC 100 class closer to service entry.

The lead craft in the new class, LCAC 100, will go through Builder’s Trials later in April and then will be prepared for the Navy’s acceptance trials, Allen said. The craft will be delivered to the Navy in the summer for further testing in at the Naval Surface Warfare Center in Panama City, Florida.

The LCAC 100 class is being procured by the Navy to supplement and eventually replace the older LCAC class that has been in service for decades. The LCAC 100 has many features that improve operation and maintenance, especially through use of composite materials.

The new LCAC is driven by two Rolls-Royce MT7 engines, a

derivative of the AE1107 that powers the V-22 Osprey tiltrotor aircraft. The MT7 provides 5,300 shaft horsepower as compared with 3,945 for the engine on the older LCAC.

Compared with the older LCAC, the new one features two gear boxes versus four and two lip bands versus four. The engine drive shafts, propulsor shrouds, variable-pitch propellers and impeller housings are all made of composite material, which reduces corrosion and, accordingly, maintenance.

The LCAC 100 is designed to operate with a crew of three versus the four on the older craft. It is designed to carry a 74-ton load, including an M1A1 tank with a mine plow attached.

So far, Textron is under contract to build nine LCAC 100s, 100 through 108. The latter eight currently are under construction at Textron's facility in Slidell. LCAC 101 is scheduled to be delivered by the end of April. LCACs 101 through 108 will be the first to enter fleet service, with 101 through 106 used to establish initial operational capability.

Allen said Textron is preparing to respond by the end of April to the Navy's request for proposals for follow-on production.

Japan is the only other nation that operates LCACs and is a possibility for a foreign sale of the new LCAC.

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## **VR Training Making Major Strides, Still Room to Improve**

NATIONAL HARBOR, Md. – The future of virtual reality (VR) and augmented reality (AR) in terms of training and new

innovations is still an ongoing process, experts from the Navy, Marine Corps, industry and academic fields said during the Innovation in Training Through Video Games Panel at the Sea-Air-Space Exposition April 10.

While these fields are making great strides incorporating and expanding VR capabilities, costs and connectivity still prove to be "big constraints."

Lucien Parsons, director of the Mixed/Augmented/Virtual Reality Innovation Center and professor at the University of Maryland, curbed panel attendees' expectations when it comes to fully incorporating VR and AR training. Dubbed the "Debby Downer" by moderator Cmdr. James Phillips, Parsons pointed out the costs for fragile, user-unfriendly technology is still as high as a million dollars. Granted, that's quite the drop from \$300 million nearly 30 years ago, according to Parsons.

"I've worked on a game that costs \$100,000 to make, and I worked on a game that almost cost a \$100 million," Parsons said, applying his real-life experiences. "What you're aiming for makes a very big difference in what your budget is."

For the military, the "game" they are aiming for is a simulation that is "reliable, realistic and reusable," according to the three service officials on the panel.

Col. J. Bollock, director of the Training and Doctrine Command and capability manager, Integrated Training Environment, outlined the Army's future solution for VR training, synthetic training environment (STE). Unlike the current model, STE will fully incorporate live, VR and AR training.

"The STE will provide immersive and intuitive capabilities that keep pace with a changing operational environment," an accompanying video brought by Bollock stated. "Giving commander's the ability to overcome today's limitations and take on the challenges of tomorrow."

“In focusing on training simulations, we can really enhance human training and performance,” said Dr. Kendy Vierling of the Marine Corps Training & Education Command’s Future Learning Group.

Parsons concluded his remarks by assuring that successful VR integration is very possible, but only if designers focus on designs and usability, avoid building a “multiverse” and never underestimate the serious concerns of security.

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## **Navy to Shock-Test GE’s New Composite Engine Enclosure**

NATIONAL HARBOR, Md. – The new composite engine enclosure designed by GE for the LM2500 engine used on several classes of Navy ships is going to be shock-tested in the near future, a company official said. The company touts the enclosure as advantageous for the future frigate as well.

The lightweight enclosure is designed to replace the steel enclosure for the LM2500, which is the engine used on Arleigh Burke-class destroyers, Ticonderoga-class cruisers, the amphibious assault ships USS Makin Island and USS America, and slated for follow-on ships. It is 50 percent lighter and reduces noise, improves cooling, and provides more safety access than the current steel enclosure.

In an April 11 interview with Seapower, George Aiszus, GE’s military marketing director, said that in a comparison test the lightweight enclosure with the engine was 60 percent quieter at four decibels and 25 to 50 degrees cooler, improvement which would greatly improve working conditions for the crew.

Aiszus said the Engineering Change Proposal is in works with the Navy and Bath Iron Works to have the new enclosure installed on DDG 128.

He also said that the lightweight enclosure would be ideal for the Navy's future frigate, because weight would be an important factor in its design, which would need the speed provided by the LM2500.

The LM2500 and its derivatives is the only gas turbine engine on Navy ships that has been shock-tested.

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## **Congressmen: 355 Ships Still Important, Naval Safety Prime for Oversight**

NATIONAL HARBOR, Md. – At a breakfast session hosted at the Sea-Air-Space Exposition April 11, Reps. Rob Wittman, R-Va., and Joe Courtney, D-Conn., co-chairs of the House seapower and projection forces subcommittee, focused on boosting the Navy's sea power, now enabled by the most recent National Defense Appropriations Act and omnibus bill.

After some reports of the Navy's 355-ship plan being a soft target for the service to reach, the congressmen discussed the importance of having a number as a measure to guide awareness on the Navy's needs.

As the Navy ramps up, it must carefully balance what assets get built and in what amount, said the congressmen, noting that submarines are often a stand-alone investment with fewer other appropriations needs, versus an aircraft carrier, which

requires investments across the board.

Wittman said enabling sea power comes down to aligning the authorization process with the appropriation process and creating certainty.

“There has to be certainty within the requirement and design realm for ships and I believe we are there,” he said. That means no continuing resolutions and appropriations bills that are completed on time. Through 2019, Wittman forecasted few issues with this, but once sequestration rears up again in 2020-2021, Congress may have a challenge in enabling stability again.

“We have to have a visualization for people outside the realm of the Navy, outside the realm of the Department of Defense to say, ‘What does this Navy even look like?’” said Wittman, explaining the value of having a specific number for the future fleet. “Without a number, there is nowhere to go.”

Wittman and Courtney also discussed potential congressional recommendations for the Navy after two deadly collisions in the Pacific area of operation in 2017.

“There is no way how we can possibly explain to families how this happened. It was totally preventable,” said Courtney, who acknowledged the Navy has already implemented some of the recommendations from a comprehensive review after the USS John S. McCain and USS Fitzgerald incidents.

“Our subcommittee will take definitive action. ... The oversight of Congress is how it works the best,” said Wittman.

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# LX(R) Transitions to LPD Flight II

NATIONAL HARBOR, Md. – The transition from the LPD 17 amphibious transport dock ship to the LX(R) amphibious ship replacement took a slight twist earlier this week when the nomenclature for the new ship was changed, according to program manager Capt. Brian Metcalf.

James F. Geurts, assistant secretary of the Navy, Research, Development and Acquisition, has announced the term LX(R) will be phased out and the next-generation amphibious ships will be known as LPD Flight II, Metcalf noted during a presentation at the Naval Sea Systems Command at the Sea-Air-Space Exposition April 11. The program itself, and the number of ships, will remain the same, Metcalf said. Only the designation will be changed.

Plans call for building 13 Flight II ships to bolster an LPD 17 class of 13 ships, he said. The LPDs, which Metcalf said can serve as airport, seaport, and provide the transport and deployment of some of the Marine Corps' heaviest equipment, offers "some combat capability not provided by many ships in the Navy."

During an update of the overall program, Metcalf noted that the 11th LPD 17 ship, Portland, was set to be commissioned on April 18. It will deploy in 2020. But as part of its post-shakedown availability after commissioning, the ship will be outfitted next summer with the next-generation-capability laser weapon system for testing by the fleet and the Office of Naval Research.

The next ship in the class, Fort Lauderdale (LPD 28), is 18 percent complete and is expected to be delivered in 2021. The future LPD 29 will have its keel-laying in early 2019. Both

ships were congressional add-ons that expanded the class to 12 and are considered transitional ships to what is now LPD Flight II, which will begin with LPD 30. LPDs 28 and 29 will employ a series of design and capability changes from previous ships in the class to make for a smoother transition to the new class, he said.

LPD 29 will be the first ship to employ the Enterprise Air Surveillance Radar (EASR) that originally was intended for the first LX(R). The radar will be installed after the ship is delivered in 2023, Metcalf said.

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## **Maritime Gala Celebrates the Sea Services**

NATIONAL HARBOR, Md. – An Irish Tenor, country star Lee Greenwood and all four of the sea service chiefs helped the Navy League celebrate the sea services and their families during the inaugural Maritime Gala at the Sea-Air-Space Exposition April 10.

The event featured remarks from Marine Corps Commandant Gen. Robert B. Neller and was highlighted by the presentation of awards to honor service and business leaders whose devotion to duty deserved special recognition.

“We are so excited to have you here in celebration of all our sea services and their families,” said Navy League National President Alan Kaplan in his opening remarks.

John McDermott, founder of the Irish Tenors, sang the national anthem after the U.S. Navy Ceremonial Guard presented the colors, and Greenwood performed “Wind Beneath My Wings” prior

to the gala dinner. He concluded the event with an encore performance of patriotic songs, including his signature "God Bless the U.S.A."

Prior to introducing Neller as the keynote speaker, Chief of Naval Operations Adm. John Richardson offered a few words of thanks to the Navy League for the gala and the exposition as a whole.

"What a fantastic event, Sea-Air-Space in 2018, the biggest, the best, the most attended ... people fighting for the opportunity to come and join this team here at Sea-Air-Space," he said. "That wouldn't happen without the Navy League, just one of the so many things they do for the sea services."

In introducing Neller, Richardson described the commandant as "an innovative thinker; he is moving the Marine Corps into new territory to make sure that they continue to be relevant in this new era that we're moving into with smart machines, digital communications, everything. He's leading the way intellectually. Far more than that is you would never, ever hope for anybody else to go into a fight with you."

Neller prefaced his remarks by noting, "This is an interesting year; there is a lot to talk about."

Specifically, he addressed the theme of this year's Sea-Air-Space: "learn, compete, win."

"That speaks to the heart of our naval force," Neller said. "As Marines, we like to think of ourselves as innovative. Innovation is a hallmark of our Corps and it remains so today. Your Marines are learning through testing and evaluation of new technology to gain advantages over our competitors, our rivals. And there is competition; we are in a competition right now.

"We are not at war; we're competing below the level of conflict, but make no mistake about it – we're competing every

single day, whether it be in cyber, information or electronic warfare, command and control, engineering, manned and unmanned teaming, robotics, additive manufacturing, trying to figure out how to leverage artificial intelligence. Those competitions go on every single day.

“Advancements in those areas that many of you are involved in, and can help us with, will help propel us into the future, enabling us to compete,” Neller said, addressing the gala attendees from industry. “We don’t want to compete on the battlefield –we want to dominate the battlefield.”

At the same time, Neller noted, the nation’s competitors have evolved and are increasing their capabilities.

“They are not standing by and watching us,” he said. “They want to dominate the battlespace, so it is essential that we, our military, our civilians, our leadership, our political leaders, our business community, all work together to keep our capability at a competitive advantage that we must have. We don’t know when the next fight is coming, but we have to be prepared in case it does.

“We need to drive innovation and come up with new advanced equipment where we can continue to dominate the battlefield. ... So this is an exciting time. We are always in continuous competition. We always must be ready to compete, learn and win. We have to win.”

Following Neller’s remarks, the Navy League honored several service and business leaders who Kaplan noted, “exemplify what it means to be a leader in their field.”

Outgoing Coast Guard Commandant Adm. Paul F. Zukunft received the new Semper Paratus Leader Award for his more than 40 years of service to the country. He was presented the award by retired Vice Adm. Jay Donnelly, who called the commandant “a Sailor’s Sailor.” Zukunft will be retiring next month.

Coast Guard Capt. Holly R. Harrison was presented with the U.S. Naval Sea Cadet Corps Distinguished Alumni Award. "She is a shining example of how the Sea Cadet program introduces young people to a lifetime of exemplary service," said gala co-chair Bruce Mosler of Cushman & Wakefield.

Harrison was the first woman to command a Coast Guard cutter in a combat zone and the first to be awarded the Bronze Star. "I can trace the beginning of my Coast Guard career to when I joined the Naval Sea Cadet Corps in the fall of 1986," she said after accepting the award.

Frank Bisignano, chairman and CEO of First Data Corp. received the Teddy Roosevelt Award. "He epitomizes steadfast business leadership," said gala co-chair Tom Higgins of First Data.

Bisignano is the founder of the 100,000 Jobs Mission, a coalition of 170 firms that have hired nearly 450,000 veterans. As chairman and CEO of First Data, he is a steward of the First Data Salutes Program, providing opportunities and support for returning military and their families.

In a special presentation, Kaplan also honored Navy League Staff Vice President for External & Governmental Affairs Sara Fuentes with the Navy League National President's Award for her legislative affairs work on behalf of the organization.

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## **Arleigh Burke Program Pushes Ahead, With First Two Flight**

# III Ships Under Contract

NATIONAL HARBOR, Md. – The DDG 51 program is moving ahead rapidly, with 12 ships under contract, including the first two of the substantially improved Flight III ships, the program manager said April 10.

The detail design on Flight III is “just about done and we’re on track to start construction,” with work on DDG 125 expected to start at Huntington Ingalls Industries (HII) in May, and DDG 126 at Bath Iron Works later this year, said Capt. Casey Moton. “We have a good, stable design” that was approved by both yards last year with fixed-price contracts.

The major change for Flight III is the AN/SPY-6 Air and Missile Defense Radar (AMDR) “which will bring a significant improvement in missile defense,” Moton told a Naval Sea Systems Command briefing at the Sea-Air-Space Exposition.

The Flight III design also required some “enabling changes” needed to accommodate the combat changes and to restore life expectancy margins to match the current Arleigh Burke destroyers, he said.

Those included expansion of the deck house, widening the hull above the water line to improve stability and thicker “inner-bottom scantling” to increase hull strength and to lower the center of gravity to offset the heavier SPY-6 radar antenna, he said. The design also included a major increase in air conditioning capacity and electrical energy, to support the more powerful radar.

Integrating the AMDR with the Aegis combat system “is going smoothly” with tests in Hawaii and elsewhere, he said.

The cost of the new class of ships is expected to be \$1.7 billion to \$1.75 billion for the first ships, which is expected to drop with later ships, as has happened throughout

the DDG 51 program, Moton said.

The program office now is focusing on executing the latest multi-year production contract, which will buy 22 ships through fiscal 2023, he said. That contract calls for three ships a year for each year, except 2020.

A total of 65 Burkes have been delivered, with another about to transfer to the Navy, Moton said.

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## **Navy Renames LCS Program Executive Office to Reflect Broadened Portfolio**

ARLINGTON, Va. – The Navy has renamed Program Executive Office Littoral Combat Ship (PEO LCS) as Program Executive Office, Unmanned and Small Combatants (PEO USC), in a move to encompass the PEO's broadening portfolio of responsibilities.

The name change was ordered in a March 13 memorandum by James F. Geurts, the assistant secretary of the Navy for Research, Development and Acquisition.

“Since the creation of PEO LCS in July of 2011, the organization's portfolio has grown beyond its original focus on the development, procurement and sustainment of LCS; its associated mission modules; and related systems,” Geurts said in the memo. “Today, PEO LCS oversees the acquisition of the littoral combat ship (LCS) and its associated mission modules, as well as mine warfare systems, unmanned maritime systems, the future Frigate (FFG(X)) and the Multimission Surface Combatant (MMSC), an LCS variant for international customers.

This represents four distinct shipbuilding product lines in development or under construction, 10 unmanned maritime systems, and 15 ACA T or pre-A CAT programs. The name PEO LCS no longer adequately reflects the breadth of its portfolio nor the full importance of its work.

“The Littoral Combat Ship and its mission capabilities remains a critically important shipbuilding program,” he said. “With the introduction of FFG(X) and MMSC in the near future and our burgeoning fleet of unmanned surface and subsurface vehicles, this new name more accurately represents the work on platforms and systems that are key enablers for the future fleet through all phases of warfare. Their continued organization under a single PEO will allow improved program execution, alignment and agility today and into the future.”

The PEO USC includes the following program offices: Unmanned Maritime Systems (PMS 406), LCS Mission Modules (PMS 420), Mine Warfare Systems (PMS 495), Littoral Combat Ships (PMS 501), LCS Fleet Introduction and Sustainment (PMS 505), Frigate (PMS 515) and International LCS (PMS 525).