# Sea Services Feel More Prepared After Complicated 2017 Hurricane Season

NATIONAL HARBOR, Md. – What has been described as a complicated hurricane season brought new challenges for the maritime forces in 2017. With hurricanes hitting Texas and Florida in back-to-back months, it was the first year on record that two category four storms made landfall in mainland United States.

On top of that, islands such the Virgin Islands and Puerto Rico were hit hard by Hurricane Maria, causing massive wind damage and power outages.

While taxing at first, sea service leaders at the Hurricane Update Panel at the Sea-Air-Space Exposition April 11, said they were pleased with their combined efforts to help the affected areas during the time of crisis and feel more prepared for the expected above-average 2018 hurricane season.

The panelists collectively had years of storm relief experience but even that wasn't enough to fully prepare for the four major hurricanes in 2017.

Maj. Gen. Pat Murphy, director of the National Guard Bureau Joint Staff, led the National Guard's response efforts for Hurricane Sandy when it hit the Northeast in 2012. But not even Sandy could compare to Hurricane Harvey, Irma and Maria individually, let alone collectively.

"Hurricane Sandy was originally referred to as 'Super Storm Sandy,'" Murphy joked, "but since the summer of 2017, I've not heard it called 'super' anymore. Because it really paled in comparison to what happened in 2017. I would categorize Sandy as a different type of event and not to the magnitude of the

past summer’s events.”

Handling the historic meteorological events quickly became a joint command effort once Hurricane Irma and Maria left, according to Rear Adm. Jeffery Hughes, former commander, Expeditionary Strike Group.

“Relationships are absolutely critical,” Hughes said. “At no point in my near 30-year career have I ever placed a higher premium on relationships, because it drives that unity of effort.”

Hughes also was reassured that they had full control on when and where they were allowed to respond.

“At no point did I ever not have the authorities to allow me to respond immediately,” he said. “At no point was I waiting to say, ‘I would really like to do something, but I’m waiting to be told that I could.’ We had the authorities in place, and we had the unity of effort throughout the entire response team, from the federal and territorial level, to allow us to go in and save lives.”

However, the response effort didn’t go as smoothly as anticipated, at first. Most of the relief-related issues stemmed from Hurricane Maria’s damage to the Virgin Islands and Puerto Rico. The sea services successfully sent the needed resources to the islands, but the lack of power and the situation of the islands slowed down the distribution process.

Of course, lack of power wasn’t the only challenge for the relief effort. Murphy later pointed out the limited capability of Puerto Rico’s resources also made delivering equipment in a timely fashion difficult.

# Winter: F-35 Test Flight This Week Will Wrap Up SDD Flight Tests

NATIONAL HARBOR, Md. – The joint program manager for the F-35 joint strike fighter said the last test flight of the aircraft's system design and development (SDD) program is imminent.

Speaking April 11 to an audience at the Sea-Air-Space Exposition, Vice Adm. Mat Winter said, "the last SDD test flight event will occur this week, maybe even today."

Winter said the SDD program has accrued 9,000 flight and 67,000 test points. So far, 82 percent of the specification verification has been completed, with 100 percent completion scheduled by the end of the year.

Winter also said the program has "started some of the pre-IOT&E [initial operational test and evaluation]," with formal operational test scheduled for the fall.

Full-rate production, scheduled for the fourth quarter of 2019, will formally mark the end of SDD.

So far, the program has delivered 280 F-35s of all types out of a planned total of 3,220 aircraft for all nations involved in the program. All aircraft rolling off the line now are equipped with the Block 3F software, which brings all combat capability developed in the SDD program. The first post-3F software will be delivered in June, Winter said.

The Navy eventually will procure 353 F-35Cs and the Marine Corps will procure 273 F-35Bs and 67 F-35Cs.

The Marine Corps F-35B deployed with a detachment of Marine Fighter Attack Squadron (VMFA) 121 on board the USS Wasp last

month, and the USS Essex will take on board a detachment from VMFA-211 this summer for deployment. VMFA-211's F-35Bs will mark the first deployment of the 3F software. The USS America and the USS Makin Island will be the next amphibious assault ships to operate the F-35B.

The Navy's first operational fleet squadron, Strike Fighter Squadron 147 (VFA-147) is in F-35C training and is scheduled to become safe for flight in October, the same month it will conduct its carrier qualifications. The squadron is scheduled to deploy on board USS Carl Vinson.

The USS Abraham Lincoln will be the second carrier to deploy with the F-35C. This ship also will host the F-35C's at-sea IOT&E in August with Carrier Air Wing Seven.

By the end of 2024, the F-35 is scheduled to be operational on eight amphibious assault ships and four aircraft carriers.

Winter said the prices for Lot 10 F-35s, being delivered in 2018, are: F-35A, $94.3 million; F-35B, $122.4 million; and F-35C, $121.2 million.

He said that for Lots 14/15, "all three will be under $100 million."

The current production rate for the F-35 is seven to nine per month. The goal for full-rate production is 12 to 15 per month.

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# New Technologies Drive Demand

# for More Power Aboard Ships

NATIONAL HARBOR, Md. – The rapid growth of power-hungry new technologies and the accelerating drive for directed-energy weapons is requiring the Naval Sea Systems Command (NAVSEA) to put increasing efforts into new means to generate, control and store electrical energy aboard Navy ships, the director of the electric ship office said April 11.

Although NAVSEA has been working on providing electrical power to Navy ships for more than a century, what is different from the past are the "notion of directed energy," and the need for higher power radars and other sensors that reach out farther, said Stephen P. Markle, director and program manager of the electric ship office.

So the concern for designing new ships is "not only the hull, but at the end of the day, it's a combat system. The real focus has to be on the warfighting capability," Markle said at a briefing at the Sea-Air-Space Exposition.

Markle noted the extensive effort in his office over the last several years on meeting the higher energy demands for the DDG 51 Flight III ships, with the powerful SPY-6 radars and other sensors. That was in addition to the ongoing work on the energy requirements for the still undefined future surface combatants, which he said would be a "family of systems," including both large warships and unmanned vessels.

Markle referred the industry representative in the audience to the upcoming 2018 Naval Power and Energy Technology Development Road Map, which would describe "the product areas we're interested in."

Those include control, energy storage, generators, motors, prime movers and power converters.

A major problem with electrical energy on warships, he noted,

was the frequent and massive surges in power demands with activation of sensors, which requires means to stabilize the electrical systems.

There also are increasing needs to reduce the size of the electrical generators and to meet the demand for directed-energy weapons – such as lasers and the proposed electromagnetic railgun – that require instant bursts of massive amounts of power and much greater ability to store energy, he said.

Current batteries able to provide those high-levels of power would be too large, so they are experimenting with new batteries made with lithium iron and phosphate, and with fly wheels, Merkle said.

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# Accelerated Acquisition Taking Shape, Producing Results

NATIONAL HARBOR, Md. – The upbeat tone for a panel discussion on accelerated acquisition April 11 was set at the start when Vice Adm. David C. Johnson declared that "accelerated acquisition is not just a theory, but something we're doing today."

Johnson, the military deputy assistant secretary of the Navy for research, development and acquisition, went on to cite the rapid movement of the Long-Range Anti-Ship Missile from concept to testing in three years and the truncated procurement process for the new frigate, which is expected to have contract award by 2020.

Speaking at the panel at the 2018 Sea-Air-Space Exposition, Brig. Gen. Joseph Shrader, commander, Marine Corps Systems Command, described a similarly reduced process for the new armored reconnaissance vehicle to replace the aged Light Armored Vehicles, and Rear Adm. Douglas W. Small, program executive officer, Integrated Warfare Systems, mentioned the accelerated action to field a new shipboard laser weapon system.

Michael W. Derrios, senior procurement executive and head of contracting for the Coast Guard, touted the high-speed movement toward procurement of a new polar icebreaker, which was finally authorized and partially funded by Congress last year.

Johnson and other officials on the panel attributed their ability to move quicker on acquisition to new authorities from Congress and process-cutting directives from the Navy and Marine Corps leadership and from James F. Guerts, the new assistant Navy secretary for research, development and acquisition, who brought a record of accelerated procurement from his previous position with the Special Operations Command.

“These new approaches make maximum use of the new authorities” from Congress and the service chiefs, Johnson said.

Panel member also listed a top-down drive to decentralize acquisition authority and to delegate decision-making down to the program managers, cultural changes to shed old habits and policies, and a greater willingness to take the risk of failure for pushing new systems.

William P. Bray, deputy assistant Navy secretary for research, development, test and evaluation, said his office was studying “how do we create change in culture so we don’t go down old roads.”

The panelists discounted the risk associated with rapid

acquisition, with Schrader saying the actions were “not just rolling the dice” but taking “intelligent risks” based on knowledge of the requirements and available technology. Shrader mentioned the series of advanced technology demonstrations the Marines have held, in cooperation with the Navy, to find promising innovation and putting them in the hands of young Marines for field testing.

Small said of his office, “we are absolutely rigged for speed. … Getting rid of layers helps a lot.”

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# 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.