

# Early Days in the Sea Services Helped Focus Their Careers, Women Leaders Say



Rear Adm. Megan Dean, director of government and public affairs at the Coast Guard, makes a point during the Women's Leadership session. *LISA NIPP*

NATIONAL HARBOR, Md. – Senior-level women from across the sea services shared personal and professional insights and anecdotes about their earliest days in the military, and what helped guide them to the tops of their fields, in a panel discussion on Women's Leadership on April 5 at Sea-Air-Space 2022.

U.S. Navy Capt. Emily Bassett, serving as moderator of the panel, also hosted the event on behalf of the Sea Service Leadership Association. Bassett is president of SSLA, the only nonprofit, national, volunteer-driven organization dedicated

to the promotion, advancement and mentorship of women in the U.S. Navy, Marine Corps, Coast Guard, and National Oceanic and Atmospheric Association.

"Today's event is a women's panel, but really it's about people," Bassett said. "It's not just about diversity of gender, it's about diversity of thought and it's about bringing our whole selves to the table. Today's focus will be women leaders ... who have made it to the top of their teams [and] who are willing to share their story."

Maj. Gen. Bobbi Shea is the legislative assistant to the Commandant of U.S. Marine Corps. Shea described herself as a "distracted youth" when she was a child growing up.

"I spent a lot less time in high school than ... I should have," Shea said. "So, I enlisted in the Marine Corps really not knowing what I was getting into. But I will tell you when I put my feet on those yellow footprints in Paris Island, I tell people it was like coming home. Coming home to place that I had never been before. The discipline, the challenges, the rigor, the teamwork – all of these standard, base concepts quite frankly were foreign to me growing up."

Shea said what she learned early on at boot camp was that meeting the challenges and standards was not so much about personal ambition, but "what you could bring to the team." She said this thinking, more than personal ambition, drove her behavior and informed how hard she worked and how hard she tried.

Rear Adm. Megan Dean, director of government and public affairs for U.S. Coast Guard, said she wasn't sure she was a good fit for the Coast Guard when she attended the U.S. Coast Guard Academy. Her feelings changed shortly after she graduated.

"I will tell you, I graduated, I got my commission. I showed up to my first unit, which was a 210-foot Coast Guard Cutter,"

Dean said. "Our mission was mainly search and rescue and law enforcement all up and down the East Coast to the Caribbean, and I will tell you that I felt like I fit – that my talents matched those of my chosen profession."

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## **HII Official: Company is Confronting Challenges of Inflation and Workforce**



Shipyard workers watch as the upper bow unit of the future aircraft carrier USS John F. Kennedy (CVN 79) is fitted to the primary structure of the ship, July 10, 2019, at HII Newport News Shipbuilding. *HII / Matt Hildreth*

NATIONAL HARBOR, Md. – A senior HII official said he is optimistic for the company's future, despite the increasing price inflation of materials and the difficulties of attracting skilled labor.

HII will "make the ships we deliver more effective and more protected" said the official, speaking on background to reporters at the Navy League's Sea-Air-Space expo at National Harbor, Maryland, as he addressed the challenges and concerns that also affect much of the shipbuilding industry.

The official said price inflation is affecting long-lead materials, not so much for ships nearing completion but for newer-construction ships recently started or those for which long-lead materials have been ordered. He said locking in a price is essential to avoid delays. In some cases, the sequence of building a ship has to be changed to avoid slowdowns in the build cycle.

The two-carrier procurement by the Navy for CVN 80 and CVN 81 allowed HII to lock in prices for materials for CVN 80; for CVN 81, the carrier is “not as exposed as it might have been” to price inflation. HII expects to lay the keel of CVN 80 this year and begin construction on CVN 81 as well.

The official said the Navy’s fiscal 2023 budget made good steps in funding to support the supplier base and developing skilled workers.

“Once they’re gone, they’re gone forever,” he said of suppliers who go out of business.

The workforce may even be a tougher issue because of the effects of the COVID-19 pandemic. HII never shut down during the pandemic, but some employees left the workforce and the number of applicants dropped significantly.

The official said that HII needs to get “labor back in the yard.”

The company is investing in developing talent and runs what it says is the premier apprentice school in the nation and perhaps the world. HII also is building shop facilities for high schools to attract students to skilled artisan programs.

HII has found that many potential workers who “walk in” for jobs don’t last because they did not realize how hard shipbuilding is. The company found that for workers who have been in the yard for 18-20 months, if they stay another two years, their earnings go up significantly and they settle into a long career.

Language also is less of a barrier for a prospective worker than might be presumed. HII instructs in both English and Spanish. The official said the company would love to hire more Mexicans with green cards and would welcome Ukrainian refugees to apply.

## CEO Appearance

“HII is well set up for the future,” said [Christopher D. Kastner](#), who became president and CEO of Newport News-based HII March 1. He met briefly with reporters April 5 at Sea-Air-Space 2022.

HII, the nation’s builder of aircraft carriers and co-builder of submarines, has a very deliberate strategy for the next five to eight years, with \$40 billion worth of orders on the books and recent acquisition of Hydroid and Alion, with which the company has expended into unmanned systems, autonomy, artificial intelligence, machine learning and sensors and anticipates growth of 7% to 9%.

With the recent acquisition, HII is now the lead developer of the Minotaur mission system that will be fielded on more systems, and will expand more into intelligence, surveillance and reconnaissance “on the edge” and counter-ISR as well.

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# Northrop Grumman Looks to Expand Fire Scout Missions



Sailors attached to Helicopter Sea Combat Squadron (HSC) 23, assigned to the Independence-variant littoral combat ship USS Jackson (LCS 6) and Naval Engineering Technology (NET) technicians perform ground turns on an MQ-8C Fire Scout on the flight deck of Jackson. *U.S. NAVY / Mass Communication Specialist 3rd Class Andrew Langholf*

NATIONAL HARBOR, Md. – With all 36 planned MQ-8C Fire Scout unmanned helicopters delivered to the Navy, the manufacturer, Northrop Grumman, is looking at expanding the range of missions the Fire Scout could provide.

Scott Weinpel, Northrop Grumman's business development official for the Fire Scout program, said the company will continue to support MQ-8C deployments on littoral combat ships. He also is looking forward to the MQ-8C's deployment on the Constellation-class guided-missile frigates; operation of the MQ-8C is included in the Capability Development Document for the frigate.

Weinpel also said the Fire Scout may have a role in operating from shore sites under the Expeditionary Advance Base Operations concept, including in a logistics cargo role.

Potential future roles for the MQ-8C include mine

countermeasures and anti-submarine warfare. The Coastal Battlefield Reconnaissance and Analysis Block II, is the next-generation MCM sensor for the MQ-8C (the Block I is flown on the older MQ-8B version).

A Bell 407 helicopter, acting as a surrogate for the MQ-8C, has demonstrated the capability to drop ASW G-size sonobuoys. Weinpel said the MQ-8C could be modified to carry an ASW torpedo, although carriage would result in some loss of endurance of the MQ-8C. The UAV also could monitor a sonobuoy field as an RF signal relay.

The MQ-8C currently flies with the Brite Stat II electro-optical/infrared sensor turret, the ZPY-8 radar, and the Automatic Information System.

Weinpel said the Navy so far has not indicated any plans to arm the MQ-8C, which has been tested to fire Advanced Precision Kill Weapon System rockets.

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**Corporate Cybersecurity  
Expert Says Think Like an  
Attacker to Improve  
Information Security**





“You’ve got to be able to take a punch in this environment,” said Lt. Gen. Matthew Glavy, the Marine Corps Deputy Commandant for Information. *LISA NIPP*

NATIONAL HARBOR, Md. – The U.S. government, military and private sector need to change the way they perceive cybersecurity and look at it from the attacker’s point of view, the global head of IBM’s X-Force said.

“I think that we will look back at 2022 as a tipping point for information security and the way we work with each other: private sector, public sector. Really, all of these silos which we’ve built up are meaningless for attackers,” Charles Henderson said April 5 during a panel discussion on maritime cybersecurity at Sea-Air-Space 2022.

“They care about their rules, not yours,” he continued. “All too often in information security, whether it’s public sector, private sector or somewhere in between, we tend to think of our own goals and not the goals of the attacker. I think if we’re going to be successful, we need to turn that on its head and start looking at everything through the eyes of an



attacker.”

All of the panelists agreed that keeping information secure is essential to maintaining an advantage over adversaries and keeping them from gaining an advantage.

Navy Rear Adm. John Okon, the head of the Warfare Integration Directorate (N2/N6F) in the Office of the Chief of Naval Operations, said “Cybersecurity is really about warfighting. It’s important that we get cybersecurity right, up front, if we’re going to be a lethal, agile and ready force.” To underscore its importance, Okon called cybersecurity “commanders’ business,” but he added that “everyone that puts their fingers on a keyboard has a role in responsibility and accountability for cybersecurity.”

Okon said the Navy Department needed to shift its culture from compliance to readiness. “Expect what you inspect. That’s walking the deck plates every day, looking at your network every day.” Making sure that the speed from when a vulnerability is identified to a patch is in place comes not in weeks, “but minutes or seconds.”

Lt. Gen. Matthew Glavy, the Marine Corps Deputy Commandant for Information, said the side that is able to maintain the information advantage “has an edge.” That edge could be system overmatch, a good prevailing narrative of “trusted, competent, delivered with trade craft,” or resiliency. “You’ve got to be able to take a punch in this environment,” Glavy said “and the side that can take that punch and either counterpunch or begin anew, creates an edge.”

The Marines are in the final stage of crafting a new information doctrine, Marine Corps Doctrinal Publication 8 Information “all founded on our warfighting construct of maneuver warfare.”

“Protecting your own backyard, you’ve got to have a good defensive perimeter and terrain that you can defend to ensure

your capabilities are available where and when you need them. That's job one for us," said Rear Adm. Mike Ryan, commander of Coast Guard Cyber. He said the Coast Guard was following the lead of U.S. Cyber Command, generating forces that allow the agency to provide the entire spectrum of capabilities to protect the homeland, ensure mariner safety and secure the \$5.4 trillion economic activity that arrives on U.S. shores by maritime commerce.

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## **Marine Corps CH-53K Set for Initial Operational Capability in 2022**



The CH-53K King Stallion. *LOCKHEED MARTIN SIKORSKY*  
NATIONAL HARBOR, Md. – The Marine Corps expects the CH-53K King Stallion heavy-lift helicopter to reach initial operational capability “in several months,” the Navy program manager said.

Marine Col. Jack Perrin, the program manager, said that the first fleet CH-53K squadron, HMM-461, will have four CH-53Ks by the end of April, the minimum number needed to reach IOC and the number needed for a detachment to deploy with a Marine Expeditionary Unit.

The first deployment of the CH-53K is set for 2024. The Corps plans to field 5.25 fleet HMM squadrons with CH-53Ks. Perrin said the “.25” is an extra four aircraft for one of the squadrons, with each of the other four squadrons to be equipped with 16 helicopters. Other CH-53Ks will be assigned to a fleet replacement squadron and test squadrons, while others will be in process through the maintenance pipeline.

The Marine Corps’ eight HMM squadrons equipped with the older CH-53E in recent years have operated with only 12 helicopters instead of 16 because of attrition over the years. Three of these squadrons will be de-activated in the course of the commandant’s Force Design 2030 plan.

The Marine Corps has a requirement for 200 CH-53Ks. Full-rate production is planned for 2023. Full operational capability is scheduled for 2029.

In addition to the two low-rate initial production CH-53Ks delivered in October and February, there are seven in the Lockheed Martin Sikorsky production line in Stratford, Connecticut. Currently 46 aircraft are under contract, including four for Israel. Long-lead materials are on order for another 14 CH-53Ks. Deliveries in 2022 will total four, followed by eight in 2023 and 16 in 2024. The production rate will reach two per month for the Marine Corps, plus one per month for foreign customers as needed.

Israel is the only foreign customer for the King Stallion so far. Potential customers include Germany, the Republic of Korea, and Switzerland, plus others who have expressed interest. Germany plans to run a competition that is expected

to occur in 2022.

Perrin, who has flown more than 30 different types of aircraft, said the CH-53K, with its digital flight controls, is the easiest aircraft to fly in his experience. The stability afforded by the flight controls enables the CH-53K to easily land in a degraded visual environment such as dust cloud. It also makes aerial refueling more stable and reduces swaying of an external load.

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## **DoD Addresses Supply Chain Woes Both Pre- and Post-Pandemic**



Karen Fenstermacher, with Naval Supply Systems Command, talks

during the Supply Chain Risk Roundtable. *SOLARES PHOTOGRAPHY*  
NATIONAL HARBOR, Md. – The COVID pandemic has spiked consumer interest in supply chain issues. But for the Department of Defense, supply chain problems have existed for decades, said panelists during the Supply Chain Risk Roundtable held April 5 at Sea-Air-Space.

Chris Espenshade, director of small business for Naval Supply Systems Command, kicked off the roundtable discussion with an examination of the issues affecting global supply-chain resiliency. Everything from big data analytics to port closures and border delays impact the supply chain, he said. Specifically, lack of depth and competition among suppliers is hampering cost and quality.

“For example, today, 90% of our missiles come from only three sources,” Espenshade said.

Shortages in energy, labor and raw materials are key drivers of supply-chain disruption. In particular, Espenshade said, environmental issues, climate change and natural disasters, global health and pandemic response, social unrest, trade and tariff policies, and political unrest and terrorism have resulted in increased cost and price inflation.

As a result of President Biden’s February Executive Order 14017 on America’s Supply Chains, the Department of Defense is actively building a deeper understanding of its supply chains and industrial base capabilities, with a holistic approach to resilience, Espenshade said.

But there are two key issues, said Kurt Wendelken, vice commander for NAVSUP.

“There are a limited number of suppliers, and we’re fighting obsolescence on a daily basis,” he said. “Both of these need to inform how we think about procurement and if cost is the right solution.”



Both Wendelken and Karen Fenstermacher, executive for strategic initiatives for NAVSUP, emphasized the “one Navy” concept when communicating with suppliers.

“The Navy is really 19 navies. We have very well-carved stovepipes in the Navy. But we want to have a single Navy voice to industry on the key challenges we’re facing and our strategies to work together,” Fenstermacher said.

This includes creating a conversation during the acquisition process about how the Department of Defense is going to sustain the systems it’s purchasing. “The acquisition policy is tremendously complex and voluminous,” Fenstermacher said. “One thing that’s exciting is the low-cost framework we’ve established.”

From an industry standpoint, supply chain has traditionally been thought of as a back-office function, but now has come to the forefront. “I see that both as a challenge and a great opportunity,” said Clark Dumont, senior director of global procurement for BAE Systems.

Panelists also emphasized the importance of including small businesses in the supply chain.

“We’re open for business; the money is there,” said Jimmy Smith, director of the Department of the Navy Office of Small Business Programs. He noted that last year, the Department of Defense spent \$17.1 billion on small-business programs.

In particular, Smith mentioned the DoD’s Mentor-Protégé Program, a partnership between large and small manufacturing businesses.

“The government will give a large partner up to \$3 million to help a small business partner, but in many cases I can’t find partners from industry to do this,” Smith said. “I encourage you to step forward and take this opportunity.”

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# Panelists: Tackling Challenges, Building Trust Will Proliferate Unmanned Capabilities



Vice Adm. Scott Conn (middle) discusses issues during the Unmanned Advancements in Warfighting session. *SOLARES PHOTOGRAPHY*

NATIONAL HARBOR, Md. – As unmanned systems continue to proliferate on the battlefield, understanding of their value has increased accordingly. They are force multipliers and perform dangerous missions that otherwise would place human operators in harm's way. Their capabilities are increasing exponentially it would seem, as new technologies emerge and

are incorporated into the inventory.

But these impressive tools come with a new set of challenges as well, which a panel of uniformed and industry experts addressed during a April 5 discussion at Sea-Air-Space 2022.

“Risks involve things like communications, logistics, training and infrastructure,” said Dr. Andrew Mara, the moderator, vice president for Federally Funded Research and Development Centers at the Center for Naval Analysis.

Vice Adm. Scott Conn, the Deputy Chief of Naval Operations for Warfighting Requirements and Capabilities, outlined the ongoing work of the service’s unmanned task force. Their job, he said, is to find ways to solve key operations problems across all domains.

“I’m a firm believer [that] some really clear, innovative solutions are going to come from the fleet,” Conn said. “Give them the tools. Let them learn. Let them provide us in the Pentagon and industry with feedback.”

As he described the ongoing work with unmanned undersea vehicles, gliders, surface vessels and other platforms, DARPA’s Dr. Kenneth Plaks emphasized the importance of having human operators trust their robotic assistants.

“I can see a future where it’s a human on the loop that says, ‘OK, go take care of that threat and let me know when it’s done,’ and it just does it.”

Plaks also mentioned the emergence of swarms of as many as 1,000 robotic vehicles and how managing them would require critical human command and control.

“We can accelerate unmanned in all domains,” said Dave Johnson, vice president of strategy at L3Harris, alluding to several projects in the works that would conduct live fire, counter-mine and other systems.

“There is a real progression of unmanned capability,” Johnson said.

It is important to keep in mind the missions that can be enhanced when developing unmanned platforms, said Jeffrey Hoyle, vice president of maritime systems at Elbit Systems of America.

“We need to continue to build trust, putting weapons on unmanned surface vehicles to do the types of things that platforms can do under guidance,” Johnson said. “The way to do that is to continue with this campaign of prototyping and experimentation. Extending reach, increasing lethality and enhancing the survivability of our people and existing platforms are the things we’re focused on.”

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## **From Screens to Subs to AI: Scenes From the Show Floor**



Jacob Nibali uses a FLAIM Systems Virtual Reality firefighting tool at the LEIDOS booth. *SOLARES PHOTOGRAPHY*

NATIONAL HARBOR, Md. – From hands-on demos to stadium-quality video screens, more than 300 exhibitors are presenting the latest defense technology to Sea-Air-Space attendees. Here are some of the highlights from the Prince George's Exhibit Hall, which will be open today from 9 a.m. to 3:30 p.m.

**General Dynamics** (Booth 1023) is showcasing its Columbia-class nuclear submarine. This replacement for the aging Ohio class of ballistic submarines is scheduled to be delivered to the U.S. Navy in 2027, said Greg Rose, General Dynamic's chief of public affairs.

The Columbia class, which will be built into the 2040s, is similar in design to the Ohio class, but with some significant changes, Rose said. At 560 feet long with a displacement of nearly 21,000 tons, the Columbia-class fleet will be the largest submarines ever built in the U.S. They also will have a fuel core that lasts the life of the ship, eliminating the need for a mid-service refueling.

At Booth 737, **Leidos** has a replica of Sea Hunter, which along with Sea Hawk, are the first autonomous unmanned surface vessels used by the U.S. Navy.

The carbon-fiber craft have software that allows them to navigate the “rules of the road on the sea,” said Leidos representative Matthew Garner. Sea Hunter recently completed a trip from San Diego to Pearl Harbor in Hawaii, completely unmanned. Together, Sea Hunter and Sea Hawk have logged more than 40,000 autonomous miles, Halley said.

There will likely be future iterations of Sea Hunter, Garner said, noting the U.S. Navy is calling for 150 ships in its 500-ship fleet to eventually be unmanned.

**SAIC** (Booth 803) conducted a demonstration of its virtual mission center Tuesday afternoon, communicating entirely virtually with a mission center in Aurora, Colorado.

“Traditional operations centers need people to perform the functions, but our mission center allows networking in a virtual environment across the entire planet,” said Gardner Congdon, SAIC’s director of extended realities domain.

SAIC uses virtual reality and tactical software for its virtual mission center, which is currently a use case for the Space Force, Congdon said.

**L3Harris Technologies** (Booth 1037) is giving demonstrations of its new BNVD Fused Binocular Night Vision Goggle. The goggles fuse image-intensified tubes with a thermal camera to help detect heat and overlay. This is particularly useful for identifying hidden targets like someone in camouflage in the woods, said Leith Ames with L3Harris.

Visitors to the booth can see the goggles in action, with both visual and thermal images captured on a screen in real time.

**HII** (Booth 1322) is using its booth to showcase its rebranding



from Huntington Ingalls Industries to HII. Along with models devoted to the company's traditional background in shipbuilding, there are also exhibits of autonomous vehicles and other technologies.

Director of Communications Greg McCarthy pointed out displays of Odyssey, HII's new suite of advanced autonomy solutions that can turn any ship or vehicle in any domain into an intelligent, robotic platform.

HII is also debuting integrated digital shipbuilding. USS Enterprise CVN-80 is the company's first digitally designed aircraft carrier. Enterprise is currently in the keel-laying phase of construction, McCarthy said.

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## **Assistant Commandant: Marines Must Be Ready to Fight China, Other Adversaries Directly**



Sgt. Maj. Troy E. Black speaks during a panel discussion at the Marine Corps Force Design session. *SOLARES PHOTOGRAPHY*  
NATIONAL HARBOR, Md. – The assistant commandant of the Marine Corps said the service must always be prepared for a direct war with China or any other adversaries during a panel discussion at the Navy League's Sea-Air-Space symposium here on Tuesday.

In initial comments while moderating a panel including three other top service officials on the subject of Marine Corps force design, Gen. Eric Smith said it is not wise to assume the United States won't go to war with China.

"The pacing threat is China," Smith said. "People will say, 'Well, you're not going to fight China.' Hey, that's not for you to say. That's not for me to say. There's a plan required to fight the adversaries who may threaten this country – North Korea, China, Russia, violent extremists. We don't get to say, 'Hey, we didn't think that was going to happen, so we didn't build a plan.' You always pace off the fastest runner even if you don't think that's who you're going to beat in the final

match. You pace off the faster runner and then you pivot to the runners who may not be that fast, and then you're good."

Smith said it is vital the Marines continue to be the nation's naval expeditionary force. "We are still America's crisis response force," he said. "We will seize or defend advance naval bases and conduct land campaigns in the furtherance of fleet operations."

A naval expeditionary force is vital to provide an alternative to deterrence besides nuclear weapons, Smith argued.

"Our part of the joint warfighting concept [is] we deter," he said. "When you're talking about a nuclear-armed peer adversary, you don't want nuclear deterrence to be your only deterrence. ... You want to deter forward [and] thwart every nefarious action that's happening. You want to thwart it from its infancy. You have to be forward deployed from a naval expeditionary force to do that."

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## **Controversial EABO Concept Has Potential but Will Be Vetted, Speakers Say**



Brig. Gen. David Odom, Director of Expeditionary Warfare, OPNAV N95 addresses questions during the Expeditionary Advanced Base Operations session. *SOLARES PHOTOGRAPHY*

NATIONAL HARBOR, Md. – The Marine Corps' concept of deploying small, lightly armed but highly mobile units into isolated locations within an adversary's weapons engagement zone – called Expeditionary Advanced Base Operations – has the potential of quickly getting forces into a strategically vital area in response to an evolving threat when no other U.S. military assets are available, a senior Marine officer said April 5.

In addition to being a response to a threat, the concept also could serve as a deterrent by making an adversary stop to think before taking offensive actions, Maj. Gen. Benjamin Watson, Commanding General, Marine Corps Warfighting Laboratory, told an audience at Sea-Air-Space 2022.

Although the EABO proposal has been controversial, partly because Marine Corps Commandant Gen. David Berger is executing a dramatic restructuring of Marine forces to facilitate it,

sharply cutting heavy weapons like tanks and towed artillery, and reducing total end strength.

But Watson emphasized EABO is “a naval concept,” which was approved by both Berger and Chief of Naval Operations Adm. Michael Gilday, and would directly involve Navy assets, including aircraft carrier battle groups.

And EABO “is a concept. It’s not proven yet,” and will be tested repeatedly and in increasing detail in the future, Watson said, which was reinforced by other officials on the panel.

Brig. Gen. David Odom, director Expeditionary Warfare on the Navy staff, echoed both the naval aspects of EABO and the intensity of the experimentation process that lies ahead. Odom cited a number of recent exercises, including Nobile Focus, which involved two Marine expeditionary units, Navy surface action ships and Japanese Self Defense Forces. That exercise and further trials tested one of the critical challenges of the EABO concept – how to support and sustain these isolated units.

The sustainment and support question must be addressed by substantial “engineering” work, including procuring new amphibious ships and unmanned systems, Odom said.

The Marines are strongly urging production of a light amphibious warfare ship, which would be much smaller and more nimble than existing amphibs. The new Navy budget proposed delaying starting the LAW program.

Tim Kao, vice president of data science at the Center for Naval Analysis, noted the challenge of sustainment is created by the development of precision anti-ship missiles and other systems by potential adversaries such as China, which prohibit past supply procedures like those used in Operation Desert Storm.

And Kao said in considering EABO, "You really have to think through how we contribute to deterrence."

Retired Rear Adm. Jamie Barnett, vice president of Global Communications Solutions at Viasat, said his firm's extensive and growing fleet of communications satellites could help the EABO units by providing the secure connections to keep them from being isolated.