Newport News Shipbuilding Part of 4th Industrial Revolution

Newport News Shipbuilding contractor Andrew Blair, from Birmingham, Alabama, cuts into the deck aboard the aircraft carrier USS John C. Stennis (CVN 74), in Newport News, Virginia, June 17, 2021. *U.S. NAVY / Mass Communication Specialist Seaman Thomas Willis*

NATIONAL HARBOR, Md. – The advances in shipbuilding technology and investments in facilities, training and tools is helping Newport News Shipbuilding (NNS) – a Huntington Ingalls Industries (Booth 1323) sector – keep up with the demands of the present and prepare for the future, according to its president.

"We are busier than we have been in my 34 years [with NNS], said NNS President Jennifer Boykin, speaking to reporters Aug. 2 at the Navy League's Sea-Air-Space Expo in National Harbor, Maryland.

NNS currently is building or overhauling 34 ships, including 27 at the shipyard in Newport News, Virginia, and 14 elsewhere at other sites.

That capacity is enabled by new technology, including additive manufacturing, laser scanning, augmented reality, 5G shipyard connectivity and data analytics.

Boykin said NNS has the capability to use additive manufacturing to produce components of more than 600 pounds. The capability is awaiting certification from the U.S. Navy to use on its ships.

She also pointed out that the third Gerald R. Ford-class aircraft carrier, the future USS Enterprise (CVN 80), is the

first aircraft carrier being built by workers using digital tablets.

With these new technologies, Boykin noted that “many refer to this as the Fourth Industrial Revolution.”

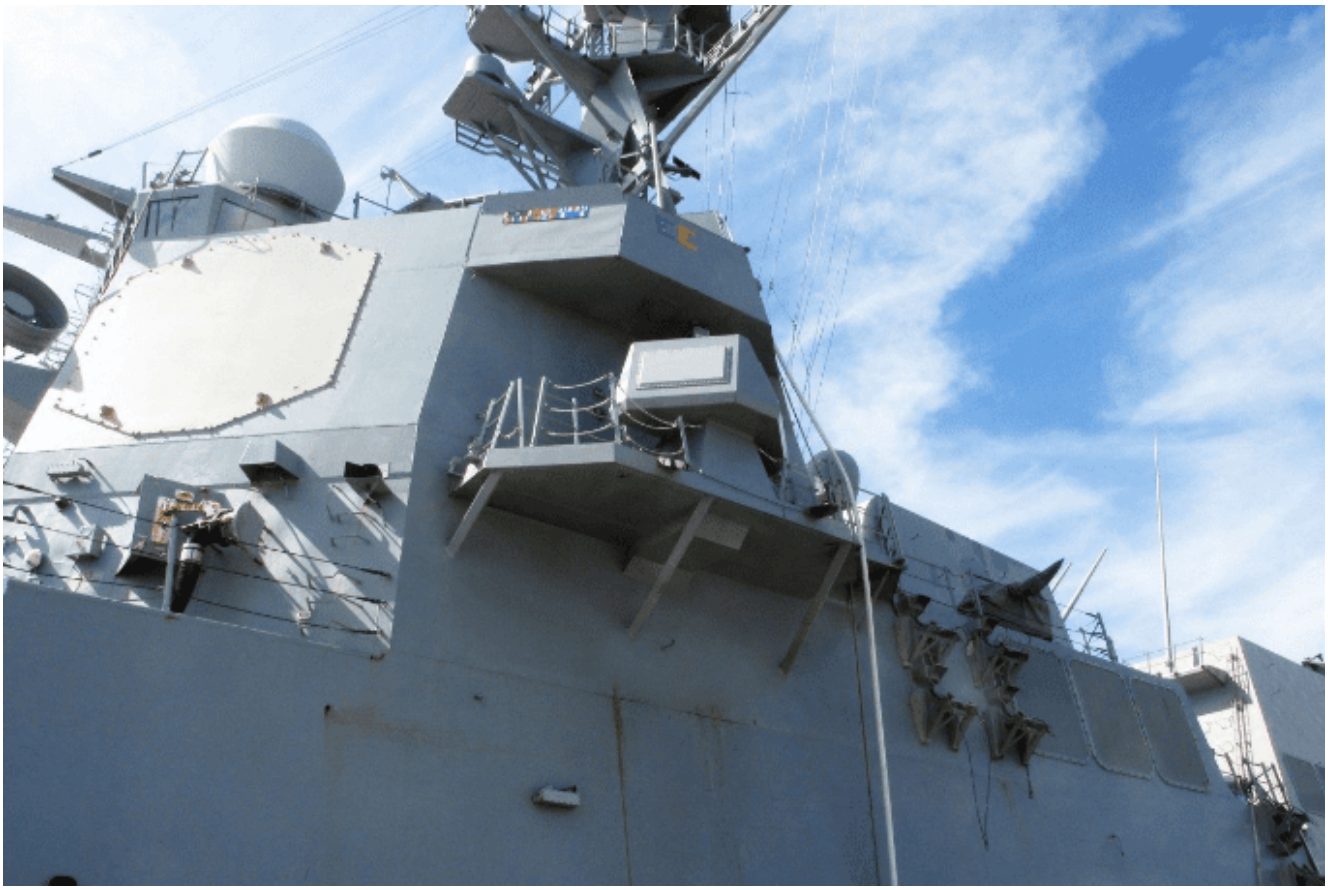
NNS has invested $1.9 billion in physical plant infrastructure since 2016. Those funds have been devoted to submarine facility expansion, a joint manufacturing and assembly facility, a new 310-ton crane replacement, machine shops, foundry and steel fabrication improvements, new automation, and digital infrastructure throughout the shipyard.

NNS builds nuclear-powered ships including Ford-class aircraft carriers and – teamed with General Dynamics Electric Boat (Booth 1023) – Virginia-class attack submarines and Columbia-class ballistic-missile submarines. NNS also conducts refueling and complex overhauls of Nimitz-class aircraft carriers and depot-level maintenance and refueling of some Los Angeles-class attack submarines.

The shipyard is on track to deliver two Virginia-class submarines and re-deliver the Los Angeles-class attack submarine USS Helena to the fleet in 2021.

Asked about what would be needed in terms of shipyard investment to increase capacity to build three Virginia-class submarines per year if so funded, Boykin said significant investment across the submarine construction enterprise – including the supply chain – would be required.

Lockheed Martin Delivers 100th SEWIP 2, Starts Deliveries of SEWIP Lite to Navy



Lockheed Martin is now delivering the Surface Electronic Warfare Improvement Program (SEWIP) Lite as SWEIP Block 2 deliveries reach 100. *LOCKHEED MARTIN*

ARLINGTON, Va. – Lockheed Martin's deliveries of electronic warfare capabilities to U.S. Navy now include Surface Warfare Electronic Warfare Improvement Program (SEWIP) Lite as deliveries of (SEWIP) Block 2 reaches 100, a company official said.

SEWIP Lite is a scaled version of SEWIP Block 2 designed for installation on smaller warships such as the Navy's littoral combat ships (LCSs) and the Coast Guard's new offshore patrol

cutters now under construction. SEWIP Lite operates with the same hardware software and same inboard processing as SEWIP Block 2.

“SEWIP Lite now is in production” said Joe Ottaviano, director for Maritime and Air Cyber/Electronic Warfare at Lockheed Martin Rotary and Mission Systems, in an interview with Seapower. “We’ve delivered several of those already. Some are on the way for installation on LCS.”

Ottaviano said that some international customers have expressed an interest in SEWIP Lite, designed for ships smaller than an Arleigh Burke-class destroyer which have size, weight, and space limitations. Block 2 currently is planned for the Constellation-class frigate.

The SLQ-32(V)6 SEWIP Block 2, including SEWIP Lite, is being installed on all active U.S. Navy surface combatants. Block 2 is in its second five-year full-rate production run.

“We’re going through tech refresh now,” Ottaviano said. “A lot of the open-architecture things we had put in place over the years is allowing us to tech refresh SEWIP, our submarine programs, our airborne programs at a pretty rapid pace, every couple of years without causing a huge development cycle.”

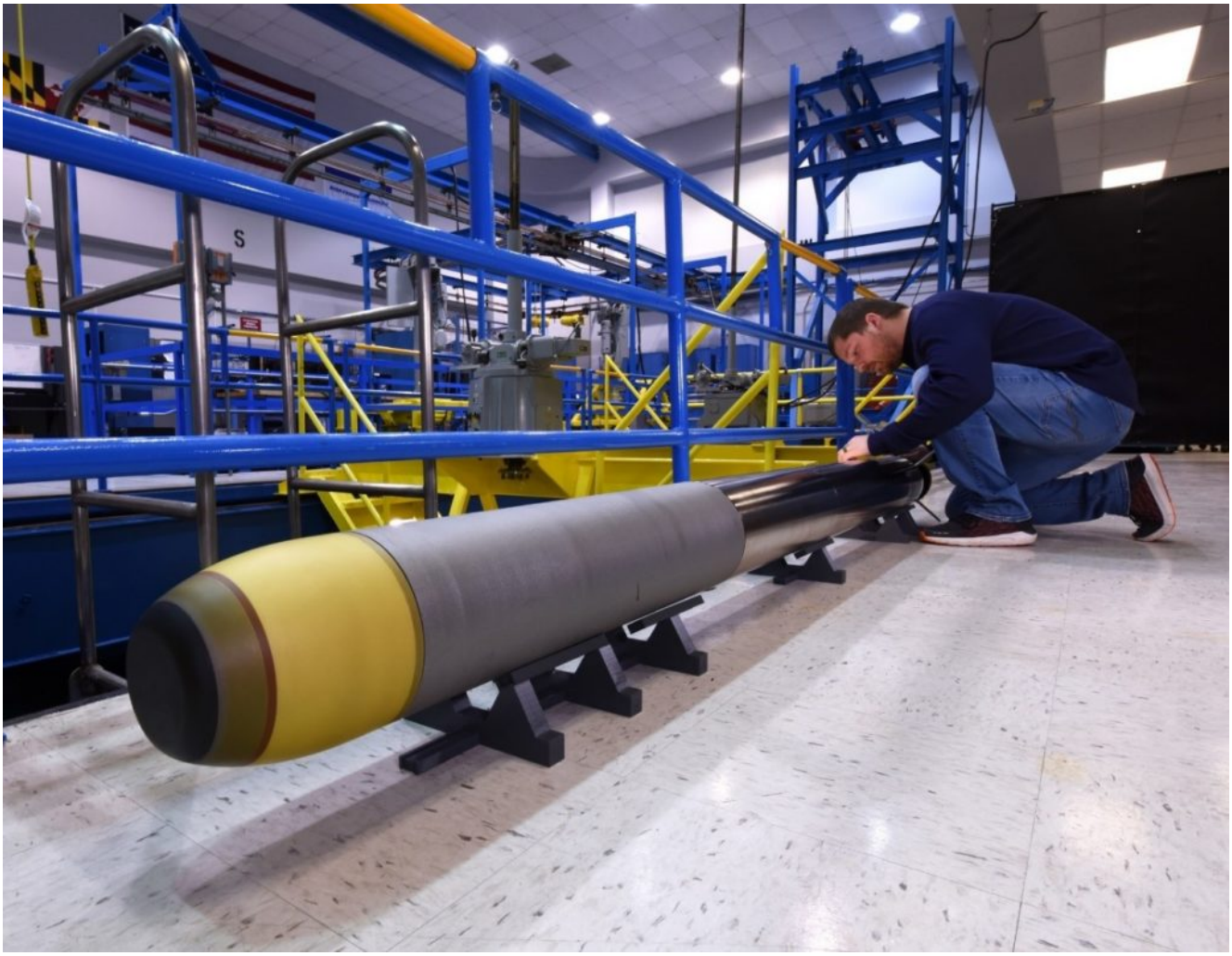
Lockheed Martin is continuing to work with the Navy as they integrate the [electronic attack] Block 3 portion into [SEWIP]. Block 3 is a Northrop Grumman program.

“Block 2 brings the foundation of the Navy’s EW battle management – the displays, integration, the sharing of EW information across the fleet, and providing the enterprise protection,” Ottaviano said. “It actually cues Block 3 and helps drive its response.”

He said the SEWIP is now tightly integrated into the Aegis Combat System.

“Now we can do everything we need to do passively,” he said.

Northrop Grumman Preparing Response to RFP for Navy’s Very Light-Weight Torpedo Program



The U.S. Navy is expected to issue a request for proposals soon for the Very Light-Weight Torpedo. *NORTHROP GRUMMAN*

ARLINGTON, Va. — Northrop Grumman expects the U.S. Navy to issue a Request for Proposals in August or September for

the Very Light-Weight Torpedo (VWLT) Program, company officials said.

The Navy's VLWT program RFP was delayed from an expected January issuance, now expected to be issued this summer. Northrop Grumman has used the delay to refine its planned manufacturing processes, adapt robotics to the processes, and press for ways to reduce manufacturing cost.

The RFP will be for taking the non-production-designed VLWT prototype – designed by Penn State Applied Physics Lab (APL) – into a production design. and develop it as an All-Up Round it to be suitable for manufacturing. Other Transactional Authority will be used to deploy the torpedo to the fleet.

APL developed the Counter Anti-torpedo Torpedo (CAT), a defensive weapon for use by aircraft carriers to defeat incoming submarine-launched anti-ship torpedoes. Five aircraft carriers were fitted with CAT launchers. The Cat was the first new-design U.S torpedo since the 1980s with the development of the Mk54 Lightweight Torpedo.

Early in the CAT design process, its potential as a multi-mission torpedo was noticed, said David Portner, Northrop Grumman's senior program manager for undersea weapons, in a July 28 interview with *Seapower* magazine.

The offensive variant that will be the subject of the RFP, the Compact Rapid Attack Weapon (CRAW), involved a software change to make the CAT into an anti-submarine weapon, Portner said.

The hardware-enabled, software-defined VLWT would be equipped with advanced electronics and processing power, with the software enabling the same weapon to serve in an offensive or defensive role.

The nine-foot-long VWLT is one third of the size of the Mk54 – the Navy's most advanced light-weight torpedo – and weighs just over 200 pounds, compared with the 608-pound Mk54. With

this weight advantage, a platform can carry more torpedoes or carry the same number at longer ranges and give the platform more endurance. The VLWT could be carried by surface, airborne, and undersea platforms, manned and unmanned.

The Mk54 is known to carry a 96.8-pound warhead. Portner said he was not at liberty to discuss the size of the VWLT's warhead, but he said its power has everything to do with the warhead's design, which he said will give it lethality against modern submarines.

Portner said the VLWT could be carried by such anti-submarine aircraft as P-8A maritime patrol aircraft, MH-60R helicopters and MQ-8 Fire Scout unmanned aerial vehicles.

During an Advanced Naval Technology Exercise in 2018, Northrop Grumman demonstrated the deployment of a VLWT from a surrogate helicopter simulating a Fire Scout.

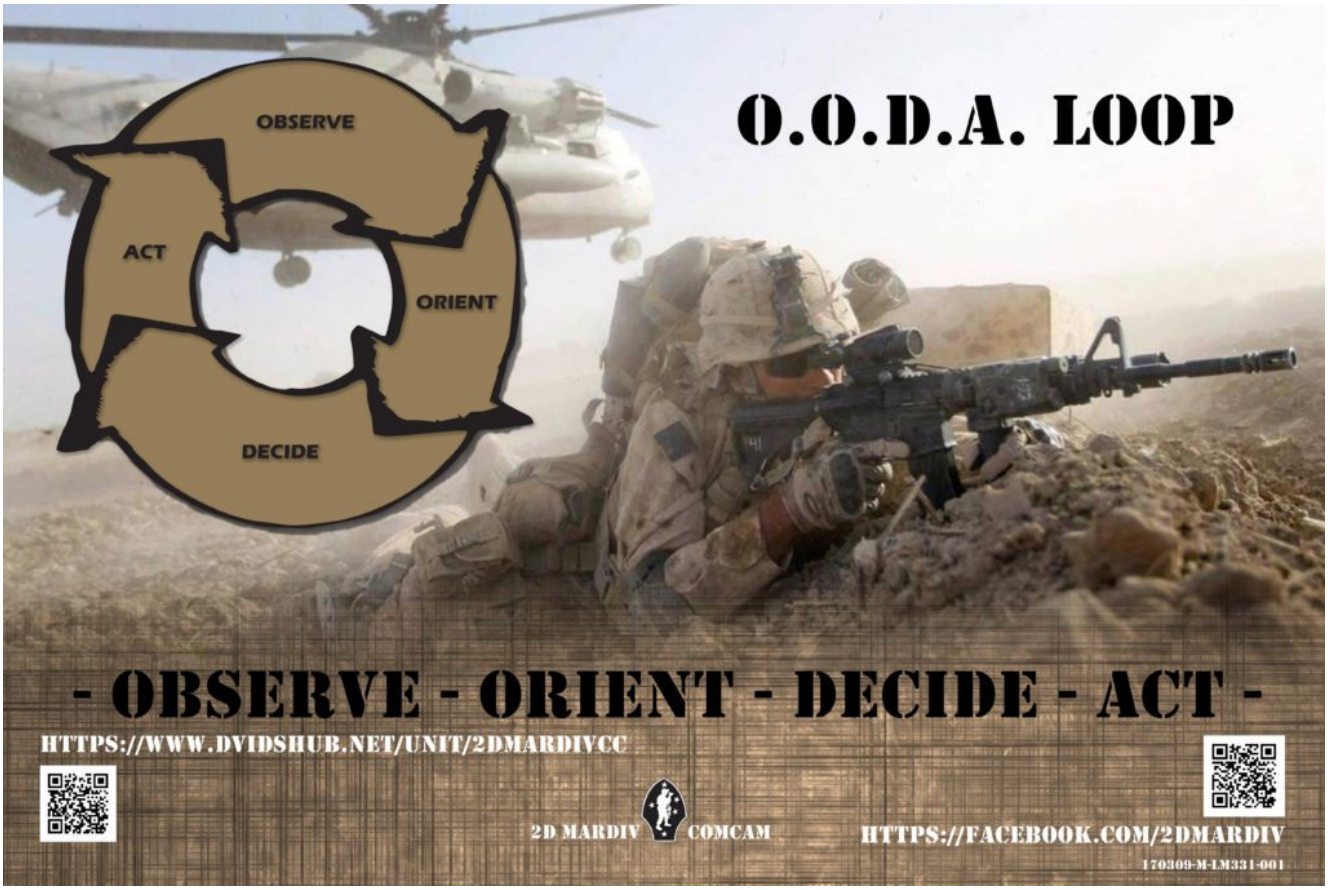
The torpedo is fitted with a parachute to reduce the shock of impact with the water. The VLWT also could be fitted with a glide wing kit similar to the one on Boeing's HAAWC (High-Altitude Anti-submarine Weapon Concept), which is in development to extend the launch range and altitude as well as precision guidance for the Mk54 torpedo.

Portner said the VLWT also could be deployed from a vessel such as a littoral combat ship by way of an unmanned surface vehicle or unmanned underwater vehicle. He said the light weight of the CRAW, compared with the MK54, would enable a platform to carry more weapons the same distance or the same number of weapons to a greater range or endurance.

Portner said in a December interview the Navy already has demonstrated that the legacy Surface Vessel Torpedo Tubes that fire Mk46 and Mk54 light-weight torpedoes could be fitted with internal sleeves to accommodate the smaller-diameter VLWT, but a new launcher could be developed to house a larger number of VLWTs. He also said one or more VLWTs could be fitted to an

Anti-Submarine Rocket in place of a MK54 torpedo if the Navy decided to do proceed with that.

Q&A: Charles “C.J.” Johnson-Bey and Jandria Alexander, Booz Allen Hamilton



A poster created using digital illustration software to advertise the “observe, orient, decide, and act” cycle (OODA LOOP) in order to inform Marines and Sailors of the importance of the decision making process. *U.S. MARINE CORPS / Lance Cpl. Alexander N. Sturdivant*

Dr. Charles “C.J.” Johnson-Bey is a leader in electromagnetic technology solutions for Booz Allen Hamilton’s commercial and defense clients. Based out of the company’s Belcamp, Maryland,

office, he develops and executes innovative technology strategies that reflect evolving markets and technology dynamics.

J*ohnson-Bey has more than 25 years of engineering experience spanning cyber resilience, signal processing, system architecture, advanced prototyping and hardware. In leading Booz Allen's engineering and science community, he inspires leaders and promotes innovation, collaboration and sharing of intellectual capital across the firm.*

Prior to joining Booz Allen, he was a research engineer at Motorola Corporate Research Labs and Corning Inc. In *addition, he taught electrical engineering at Morgan State University. He also worked at Lockheed Martin Corp. for 17 years, where he galvanized the company's cyber resources and led research and development activities with organizations including Oak Ridge National Laboratory, Microsoft Research and the GE Global Research Center.*

Johnson-Bey is a co-principal Investigator of the National Science Foundation's Engineering Research Visioning Alliance, which identifies bold and societally impactful engineering research directions that will place the U.S. in a l*eading position to realize a better future for all. He serves on the Whiting School of Engineering Advisory Board at Johns Hopkins University and the Electrical and Computer Engineering Advisory Board at the University of Delaware. He is also on the Cybersecurity Institute Advisory Board for the Community College of Baltimore County.*

Johnson-Bey received both an M.S. and Ph.D. in electrical engineering from the University of Delaware and a B.S. in electrical and computer engineering from Johns Hopkins University.

Charles “C.J.” Johnson-Bey. *BOOZ ALLEN HAMILTON*

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As a cybersecurity leader focused on Navy-Marine Corps clients and cross-market research and development, Jandria Alexander guides the implementation of innovative, technology solutions that drive transformational business growth. She’s a subject matter expert on cybersecurity engineering and assessments, resilient platforms and space systems, infrastructure, and multidomain mission systems.

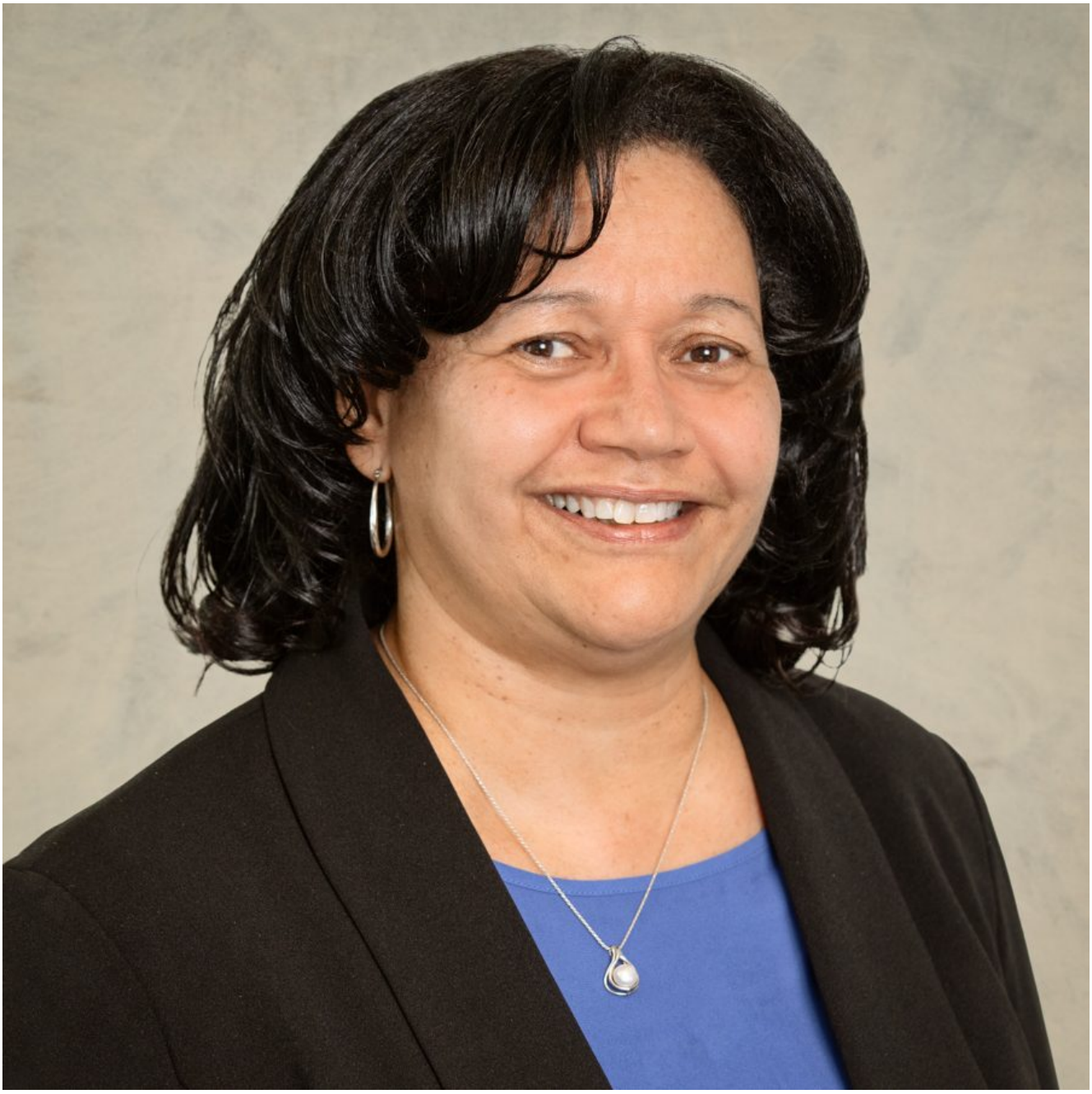
A nationally recognized cybersecurity expert, Alexander has participated in several National Academy of Sciences studies related to cybersecurity research and new aviation technologies. In 2014, she was appointed by former Virginia Gov. Terry McAuliffe to serve on the bipartisan Virginia Cyber Security Commission to expand the state’s economic footprint in cyber technology and protect critical infrastructure from

cyber threats. She led the effort's unmanned systems cyber-security industry, government and academia consortium.

Over the length of her career, Alexander has provided cybersecurity and digital transformation leadership, market strategy and solution development for the Department of Defense and the intelligence community as well as many civil and commercial organizations. Prior to joining Booz Allen, she was a cybersecurity leader in engineering and technology at a federally funded research and development corporation.

She holds a B.S. in computer science from Brandeis University and an M.S. in information systems from American University.

Johnson-Bey and Alexander discussed unmanned systems' technical and operational challenges with Senior Editor Richard R. Burgess.



Jandria Alexander. *BOOZ ALLEN HAMILTON*

With the Navy's Project Overmatch in progress and having released its Unmanned Campaign Plan, what is the nature of some of the technical challenges the service is trying to overcome?

JOHNSON-BEY: There's always an accelerated trend of technology that catches us by surprise, with technology being used in an unexpected way, creating a new set of problems. In cyber, for one example, when you get things too integrated, you actually introduce some vulnerabilities that you hadn't thought about before. All these things have multi-dimensions to them. I like

being in this space, because there's always a new problem to tackle and it challenges you to think outside the box. And the more we collaborate on these challenges, the smarter we get.

Unmanned maritime systems seem to bring more challenges, from preventing boarding to cyber intrusion and keeping communications, navigation and targeting networks open. How can command and control be sustained in a communications-denied environment?

JOHNSON-BEY: A new book that came out in mid-March — "2034: A Novel of the Next World War," [by Elliot Ackerman and U.S. Navy Adm. James Stavridis] — talks about the future, 2034, and war in the South China Sea. It talks about cyber and how we handle it. The Chinese have a capability that we did not expect and that wipes out our comms. How do we deal with that? The reason why I bring that up is because it forces you to think about how we're pushing ahead with new technology, but what if something just comes out of the blue and we have no comms? The new technology we've become reliant upon to carry out missions is suddenly not available. For example, the F-35 [strike fighters] are taken over [by cyber intrusion], the ships at sea are taken over, no comms; so, it's really interesting.

The U.S. Navy has been thinking about the challenges of operating in a communications- or GPS-denied environment. What do you think of these challenges?

JOHNSON-BEY: A lot of old technology is pretty doggone robust, and it had to be. So, we can't get too far ahead of ourselves. I'm a technologist through and through with a Ph.D. in electrical engineering. I've been doing this a long time. But the thing I will say is that we don't want to become too reliant on our technology or the latest technology, and I think that's where innovation comes in. You get innovative when you have constraints. If I don't have any constraints, then I don't need to be innovative. I can just do what I want

to do when I want to do it. But the U.S. and its allies have long been used to using the electromagnetic spectrum to communicate when they want, wherever they want and for however long they want. That's no longer going to be the case. So, we really do need to think about how we complete the mission in a denied or congested environment. The solutions might not be brand new technology but might be an innovative use of some technology that we've had in the past.

Security [of electronic systems] is always an issue and we really look at it from that OODA [observe, orient, decide, act] loop. How do we increase the speed of decision-making for U.S. forces and our allies and decrease if for our adversaries? Part of that is to address it from the OODA loop in the constrained or denied or congested environment. The speed of decision-making saves lives. So, we're developing and investing in technologies that are looking at the security in that space. We're also looking at swarms in that space, distributed platforms, AI [artificial intelligence], distributed processing and processing at the edge. So, we are investing in those areas. Jandria [Alexander] actually has led one of our projects in there last year.

ALEXANDER: The key point to your question is what happens in war. We can leverage alternate communication systems, but our goal is the communications at the tactical edge, from platform system to platform system.

As mentioned, complexity and threats increase with mission operations and communications across multiple UAVs groups, as well as unmanned and autonomous systems across domains. Platform systems in air, ground or undersea are critical part of force operations. As such, rapid data processing or sensor and RF data become differentiators. We've focused on increasing autonomous processing in a secure manner at the tactical edge and secure cross platform communications, whether they be large or small. If we can provide edge processing in a fashion that's secure, design against a common

architecture that’s driving our solutions, and be able to add advanced artificial intelligence and machine learning algorithms to process different data sets, in an extensible and modular fashion, we are able to efficiently increase capabilities without having to rebuild complete systems from scratch.

From an operational perspective, we’re able to respond quickly based on the algorithmic results processed on the platform. In a world of increased connectivity, cybersecurity needs to be addressed as an integral part of all architectures and built into the systems, including edge systems. Integrated security provides functionality and assurance that we can detect anomalies in parameters and processing that could throw off the compute cycle and exhaust the local resources degrading or disabling necessary platform functionality. And all of a sudden, we get into a situation where we can’t operate. So, we want to be able to make sure we monitor those inputs, and we look for anomalies in the different types of data input. Once we do that, we can be a little more confident about the processing that’s occurring at the platforms.

For each area in platform systems – communications, processing, algorithms and cybersecurity – there are technologies and best practices that support optimal and modular system development. Booz Allen has taken that problem set and divided it into the various functions bringing subject matter experts together into cross-functional project teams. The resulting systems are then able to incorporate integrating our solutions, third-party solutions and government solutions.

What is edge processing?

ALEXANDER: Platform systems range from manned to unmanned systems, including very large airborne to undersea platforms of various sizes. The platform systems have various sensors and functionality to support the mission. As data is collected on the platforms, edge processing allows for rapid analysis,

decision support and specific maneuvering locally without having to transmit the data to a data center for central processing. During contested operations, the tactical asset is the edge. We want to be able to make computing decisions and react to those computing decisions based on what occurs at the edge for onboard sensors on the unmanned system as opposed to sending all the data back to a ground system. The local processing enables autonomous operations at the edge.

JOHNSON-BEY: Getting into denied environments, you've got to get innovative, so if you cannot get back to the [data] cloud or if you cannot get [the platform] back or time won't allow, how do we do that computing right where you need it with information that you need to get the mission completed?

Does this create a weapons release authority problem for the man in the loop if you don't have the central command there to some degree?

ALEXANDER: That's right. So, we have to be flexible. We have to recognize that there's a combination of manned and unmanned systems and decision points. As we become more comfortable and have more results and training our confidence and ability to trust the behaviors [of the unmanned systems] will increase. During situations where the volume of data and the need for rapid decisions are critical, edge processing and autonomy provide options that were not previously available. Systems have matured little by little. It's not going from totally manned to totally unmanned, but it's that combination, human in/on the loop, where there's a recommendation and acknowledgment and recommended course of action.

JOHNSON-BEY: I've heard the term "human on the loop" instead of "in the loop." [Humans] are "on the loop," where they're helping to make the decisions as needed. But the way things are moving, we need to be able to, in some instances, operate at the speed of computation because – particularly with things like hypersonics or getting so much data – when you look again

at that OODA loop, it could just be that you can't make a decision fast enough, so you're going to need some AI and autonomy. You're going to have some overall decision-making, but you are going to have to have some trust or some delegation of the ability to complete a mission done at the edge or where communication is congested or denied.

ALEXANDER: The other point is, it's not only the speed but it's also the volume. We have much better sensors right now. We're collecting so much data that the time to process has to rely on automation. We have to figure out ways to streamline and synthesize the data to make decisions. Credibility of data also is an aspect. We want to be able to weigh the sources and understand which inputs are most trusted to rate and weigh the results. We need AI/ML [machine learning] algorithms that have been trained on actual and synthetic data sets. In an ideal case, the data processing is based on rich data sets, where we have full information; in the worst case, we have limited and lower quality information. The challenge is to develop an edge processing capability that can optimize operations.

JOHNSON-BEY: One of the things we're investing in is, for example, the project that Jandria's been working: platform agnostics, so a system can go on an unmanned aerial system, an unmanned underwater system, an unmanned surface system or an unmanned ground system. That unmanned piece is going to grow if the Navy wants to reach 355 ships or that next-generation Navy capability. So, what we're looking at is how do we help a naval system grow into the unmanned space so that we can advance our capability, ability to make decisions and our ability to complete the mission with the unmanned aspect.

ALEXANDER: That brings up another good point. Large aerospace satellite systems, for example, used to take 20 years to build and deploy. We are transitioning to building constellations with disaggregated functionality. The key is to build smaller satellites – with more specialized function – that collectively perform complex missions. As we break up

functionality, we build systems faster. They can be simpler and more secure. We can then integrate those data outputs from the various functional systems to support advanced decisions and assorted missions. Every platform doesn't have to be all or nothing across every domain. Edge processing can also help with collecting additional or specialized data sources. Specialized platform systems can collect the unique data source provide it to the processing platform and then as the data gets synthesized, the mission advances.

Are micro-satellites part of the solution?

ALEXANDER: Absolutely. We have many examples in communication systems, with platforms that perform certain functions but may be perishable in the long term and don't persist beyond short-term operations. As disposable assets, we don't need them to be as rigorous.

How is your company supporting Project Overmatch and other programs?

JOHNSON-BEY: Project Overmatch is something that the Navy is focused in on and that goes everywhere from networks like the tactical grid to the infrastructure that deals with computer storage and tech stacks to the data architecture and then the tools and analytics like AI and ML and those different applications. So, what we're focusing in on and investing in are these specific areas so that we can get some minimum viable products out. As the Navy grows its capabilities, we're going to be able to provide some of these solutions to them. And then, as we all get smarter, we will continue to improve. It's about speed, getting something useful out quickly, something I really do believe saves lives. So, we're focused on being able to make decisions quickly, to field things quickly, to be very nimble in order to get from idea to deployment efficiently. We're looking at how do we do things in a very quick way and demonstrate it in the marine environment and in the environment in which it will be used.

We're also looking at the challenge in a multi-domain aspect and how to create products to help the Navy complete its missions.

ALEXANDER: So, we're tracking Project Overmatch very closely. This includes solutions for the enterprise as well as the tactical edge. The tactical edge is exactly the piece we've been talking about – the edge processor – that is one piece of the overall architecture and mission. Beyond the technology, is how the technology is integrated into legacy as well as future systems, as well as the training and the governance around it. Those are other parts that will drive adoption ultimately resulting in more successful mission capabilities.

Where is your company's support to the Navy directed?

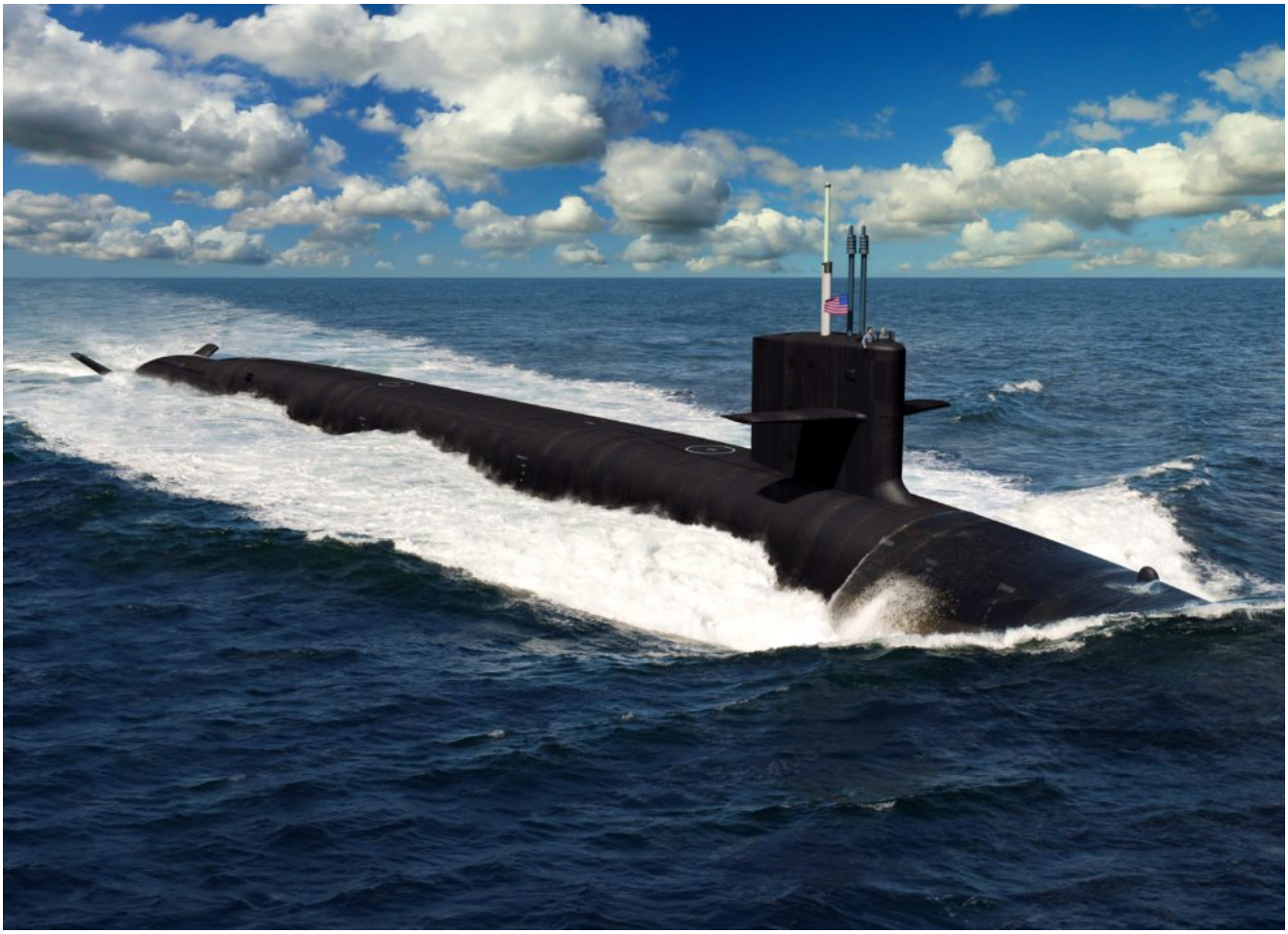
ALEXANDER: We support all the Navy echelons. We support the warfare centers focused on technical solutions and prototypes. We support program offices across Navy System Commands, the Echelon II systems commands – Naval Information Warfare Systems Command [NAVWAR], Naval Air Systems Command, Naval Sea Systems Command. Overmatch is certainly one of those programs that is occurring at all of the levels.

JOHNSON-BEY: One other thing to drive home is that we also are working with the Office of Naval Research [ONR]. We have multiple programs there and we are looking to increase our collaboration with them. We think that is certainly important. That's where you start getting in with the new ideas, new capabilities, the innovation, and we think that's a perfect place for us to be. We do a significant amount of work with ONR today, and we're looking to increase that as well as with the warfare centers but particularly with ONR. Fun fact: Our relationship with the Navy goes back 80 years continuously.

ALEXANDER: We are engaged with our clients to provide thought leadership and diligent execution. Critical initiatives have many aspects. There's often a policy piece, an acquisition

piece and a solution piece. We want to make sure that our solutions align with the missions and provide enhanced operations and that the policies consider all of the various stakeholders and the overall strategic intent. We collaborate across our program and functional teams to address mission requirements. This allows us to leverage the perspectives that are needed, collect lessons learned and bring our innovation leads to solve the emerging problems of our clients.

Sea-Air-Space 2021 Prequel: Post-Columbia Sub Construction Capacity Will Help Relieve SSN Shortage



An artist’s rendering of the future Columbia-class ballistic missile submarines. *U.S. NAVY*

ARLINGTON, Va. — The nation’s submarine construction capacity built up for the Columbia-class ballistic-missile submarine (SSBN) program eventually will help the U.S. Navy to increase production of attack submarines (SSNs) to alleviate a shortage of attack boats, according to Navy and shipbuilding officials.

Under current planning, the Navy’s force structure studies have shown a need 70 SSN. The service currently fields about 50 SSNs, which are heavily used by regional combatant commanders, being only able to meet about 50% of their deployment requirements.

The Navy is building two Virginia-class attack submarines per year, and soon both, in the Block V version, will be equipped with the Virginia Payload Module, which will add cruise missile capacity and hypersonic missile capability to the force, among other payloads.

The Navy would like to procure three SSNs per year but currently is constrained by budget capacity to two per year while the Columbia-class SSBN is under construction. The Columbia program is a once-in-a-generation recapitalization program for the nation's strategic deterrent force.

"We're working very closely with industry to make sure we're making the right long-term decisions, said Rear Adm. Bill Houston, director, Undersea Warfare, Division, Office of the Chief of Naval Operations, who has been selected to be the Navy's next commander, Submarine Forces, speaking in a pre-recorded webinar of the Navy League's Sea-Air-Space Prequel.

"We also have to look at it from a budget aspect [and] maintenance capability," Houston said. "What our concern is that if you go to three [SSNs] per year in trying to peak out [the submarine force] with Virginia – with a 33-year life of ship – when you start building three per year, you're ending up with a force structure of 99. So, as we're reconstituting Columbia, and building two Virginias per year, when [construction of] the last Columbia hull commences in '35, we're going to have significant capacity then. So, we have the capability to go to three per year right now. The issue is that we've got Columbia under construction, so we're just doing that balancing right now. Working with industry right now to make sure that stability that's out there for [submarine builders], we're trying to avoid those peak/troughs.

"As part of our private [shipyard submarine maintenance] plan, that workforce is highly skilled and we can't go from periods when we have the private industry doing maintenance and then it's not doing maintenance, because that is a fragile skillset," he said.

Houston pointed out that stability in work orders is key to shipyard health and performance.

“We’re capable of going to three Virginias [per year] right now, [but] it would impact Columbia, so we’re concentrating on doing the Columbia and two Virginias per year,” he said. “We’re looking [at] how we can get up to three, but we’re sure that when that last Columbia hull is under construction, we’re going to have significant capacity.”

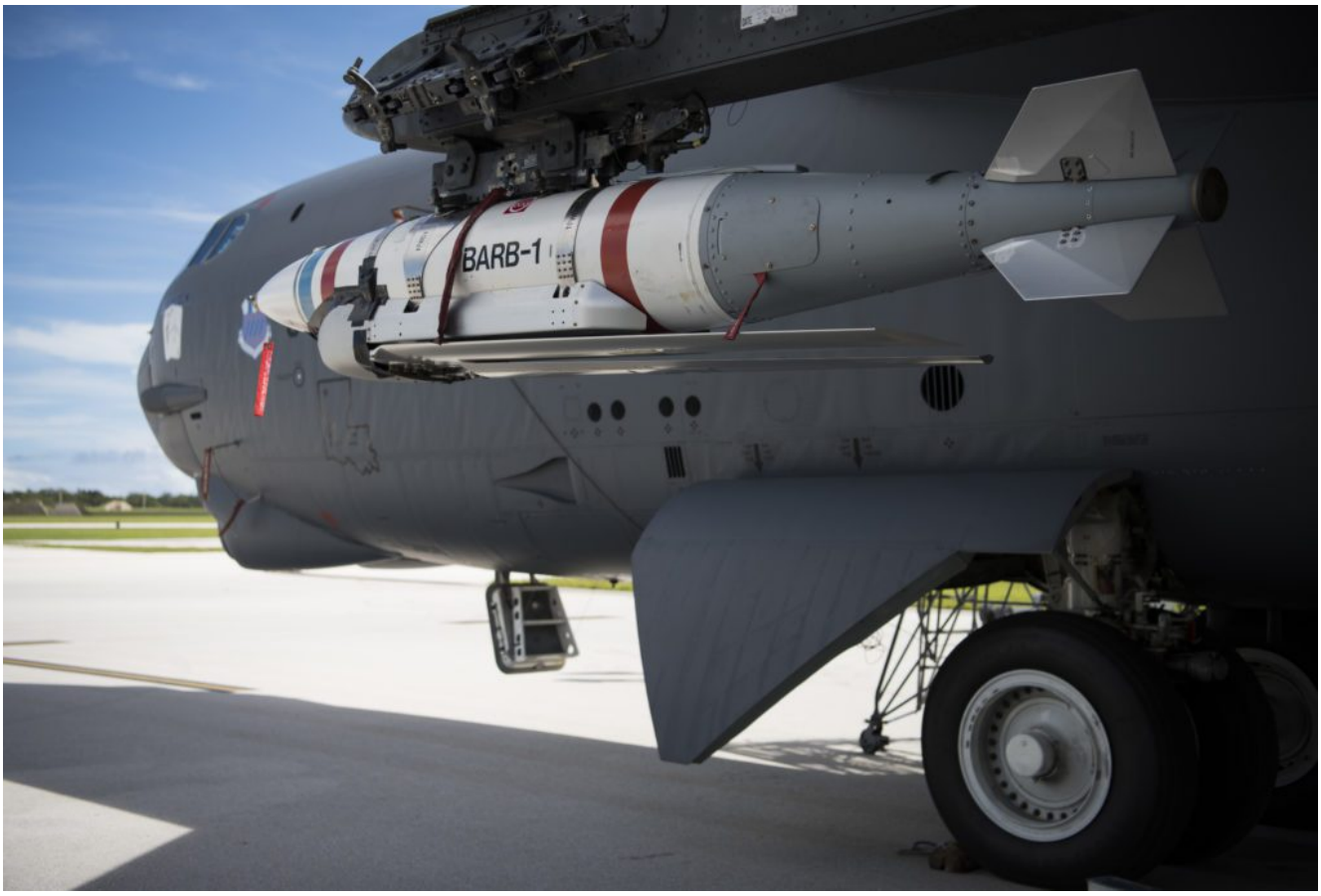
Houston noted that a Block V Virginia SSN displaces 10,000 tons submerged, equating to about half that of the Columbia SSBN, so every Columbia equates to two Virginia SSNs in displacement. Accordingly, with one Columbia and two Block V Virginias under construction, “we’re essentially building the equivalent of four Virginias,” he said.

“So, the capacity is there,” he said. “It’s more about the stability and avoiding the peaks and troughs.”

“I think our industrial base is somewhat fragile as we’ve gone from low-rate production in the 90s to now a two-per-year Virginia, a two-plus-one Virginia and Columbia,” said Kevin Graney, president of General Dynamics Electric Boat, whose company, teamed with Huntington Ingalls Newport News Shipbuilding, is building the Columbia-class SSBN. “That’s requiring us to bring in an awful lot of new suppliers across the industrial base in order to support that.”

Graney also said Electric Boat has been investing in additional facilities including construction halls and laid-out space in Groton, Connecticut, and Quonset Point, Rhode Island; upgrading a floating drydock from which the Columbia will be launched; and purchasing a new transport barge. The company has invested “about $250 million in training programs over the last five years and we’re developing active learning shipyards within the shipyards that have proven effective in improving our proficiency.”

Navy Orders Quickstrike-Extended Range Glide Kits for Sea Mines



A Quick Strike extended range mine hangs from a B-52 on Andersen Air Force Base, Guam, as part of Valiant Shield 18, Sept. 16, 2018. *U.S. AIR FORCE / Senior Airman Zachary Bumpus*

ARLINGTON, Va. – The U.S. Navy has awarded Boeing a contract for the design and production of wing glide kits for Quickstrike-Extended Range (QS-ER) aerial-delivered sea mines.

The Naval Sea Systems Command awarded the $58.3 million contract to Boeing for the design and production of non-functional wing glide kits, glide kit prototypes articles and

glide kit shipping containers, according to a 20 July Defense Department announcement.

The banded-on kits will be designed to convert Quickstrike aerial-delivered sea mines into Quickstrike-Extended Range variants. Upon launch, the wings of kits extend and provide a glide capability to the mines that extend their drop range and provide a protective standoff range from enemy defenses to the launching aircraft. The mines will be able to glide approximately 40 nautical miles from the launching aircraft when dropped from 35,000 feet.

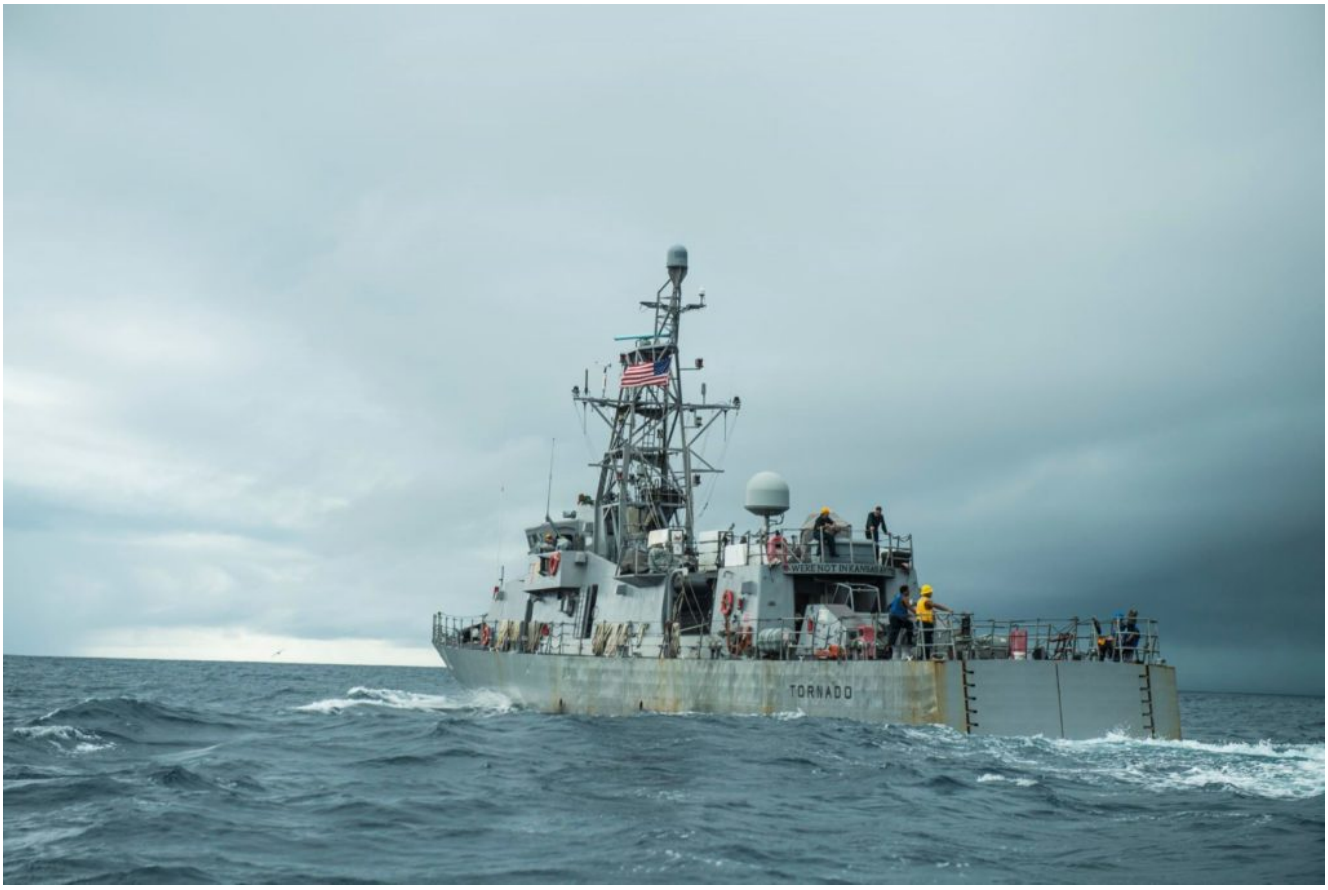
In addition to the wing kits, the QS-ER will be equipped with the precision-guidance kit used by the Joint Direct-Attack Munition. The QS-ER also is equipped with sensors – including acoustic, magnetic and seismic – to detect passing ships and submarines.

Both the Navy and Air Force have aircraft that can deliver mines, including the F/A-18E/F Super Hornet strike fighter and B-52 Stratofortress heavy bomber. The mine-delivery capability is expected to extend to the Navy's P-8A Poseidon maritime patrol aircraft, which has replaced the mining-capable P-3 Orion.

U.S. interest in offensive mining has increased in recent years in the era of great power competition and the increasing naval capabilities of China and Russia.

Surface Boss: Navy

Considering Light Amphibious Warships for Junior Officer Command



The Cyclone-class coastal patrol ship USS Tornado (PC 14) conducts a man overboard drill Sept. 16, 2020. *U.S. NAVY / Mass Communication Specialist 3rd Class Dan Serianni*

ARLINGTON, Va. — With the Navy planning on decommissioning its remaining Cyclone-class coastal patrol ships over the next two years, the opportunities for junior officers to command ships early in their careers are drying up. A new ship now being planned for the fleet may provide a solution to the problem.

Most Navy warships — destroyers, littoral combat ships (LCSs), amphibious transport dock ships and dock landing ships — are commanded by surface warfare officers with the rank of commander. The forthcoming Constellation-class frigate likely will be the same. Cruisers are commanded by captains who

previously have commanded a smaller ship.

In an earlier era, such as World War II, many small warships, such as destroyer escorts, were skippered by lieutenant commanders. Antelope-class patrol gunboats during the Vietnam War were commanded by lieutenants. Today the Coast Guard has many ocean-going cutters, such as Sentinel-class fast response cutters, that give lieutenants early command experience. Command at sea for a junior officer has been shown to produce a more mature, experienced mariner accustomed to facing hard decisions that require sound judgement.

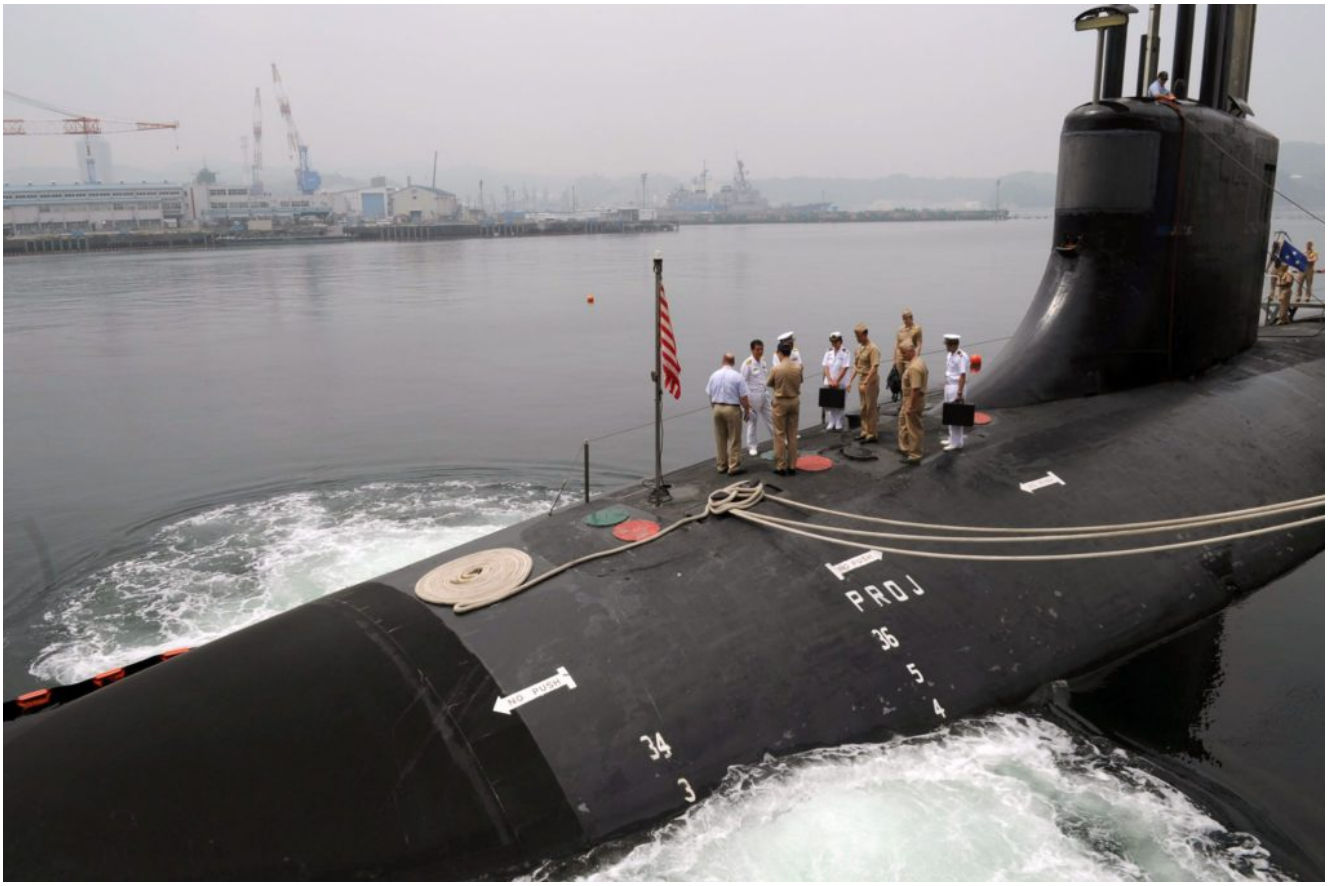
Vice Adm. Roy Kitchener, commander, Naval Surface Forces, was speaking July 22 to reporters at a media roundtable when asked about the diminishing opportunities for lieutenants and lieutenant commanders to gain experience in command of a ship.

“I think about that a lot,” Kitchener said. “I’m a big believer in early command opportunity if you’re truly trying to develop good COs [commanding officers] at the O-5, O-6 [commander, captain] level. It really gives them a broader understanding of the force.

“One of the things we’re looking at right now, tracking pretty closely, is the Marine Corps’ initiative for the LAW, the Light Amphibious Warship,” he said. “I see that as perfect opportunity for early command for our future officers. I think that’s a great mission for them. Right now, I think on that we’re on track.”

Kitchener said he has “looked a little bit at about LCS, but not where I want to talk about my thoughts on it, but I do think the LAW is something perfectly suited for [early command].”

Sea-Air-Space 2021 Prequel: Next-Gen Attack Sub Will Be Ultimate Apex Predator, Admiral Says



USS Seawolf, shown here in Japan in 2009. The Navy aims to combine the Seawolf-class's speed and payload, Virginia-class acoustics and sensors and Columbia-class longevity into the next-generation nuclear-powered attack submarine, the SSNX. *U.S. NAVY / Lt. Cmdr. Greg Kuntz*

ARLINGTON, Va. — The U.S. Navy's next-generation nuclear-powered attack submarine, SSNX, will combine the best technologies and capabilities from earlier submarines to produce the finest hunter the world's oceans have ever seen,

according to the service.

“We’re looking at the ultimate apex predator for the maritime domain,” said Rear Adm. Bill Houston, director, Undersea Warfare, Division, Office of the Chief of Naval Operations, who has been selected to be the Navy’s next commander, Submarine Forces, speaking in a pre-recorded webinar of the Navy League’s Sea-Air-Space Prequel.

Houston said the SSNX has “got to be faster, carry a significant punch, a bigger payload, a larger salvo rate. It’s got to have acoustic superiority and simultaneously we’re going to work on operational availability with respect to maintenance and life of the ship.

“We’re taking what we already know how to do and combining it together,” he said.

The Seawolf-class SSN, which entered service in the late 1990s, “has incredible speed and payload,” he said. “We’re going to take that Seawolf trait of payload and speed; we’re going to take Virginia class acoustics and sensors; and then we’re going to take Columbia’s [nuclear-powered ballistic-missile submarine, or SSBN] operational availability and life of ship.

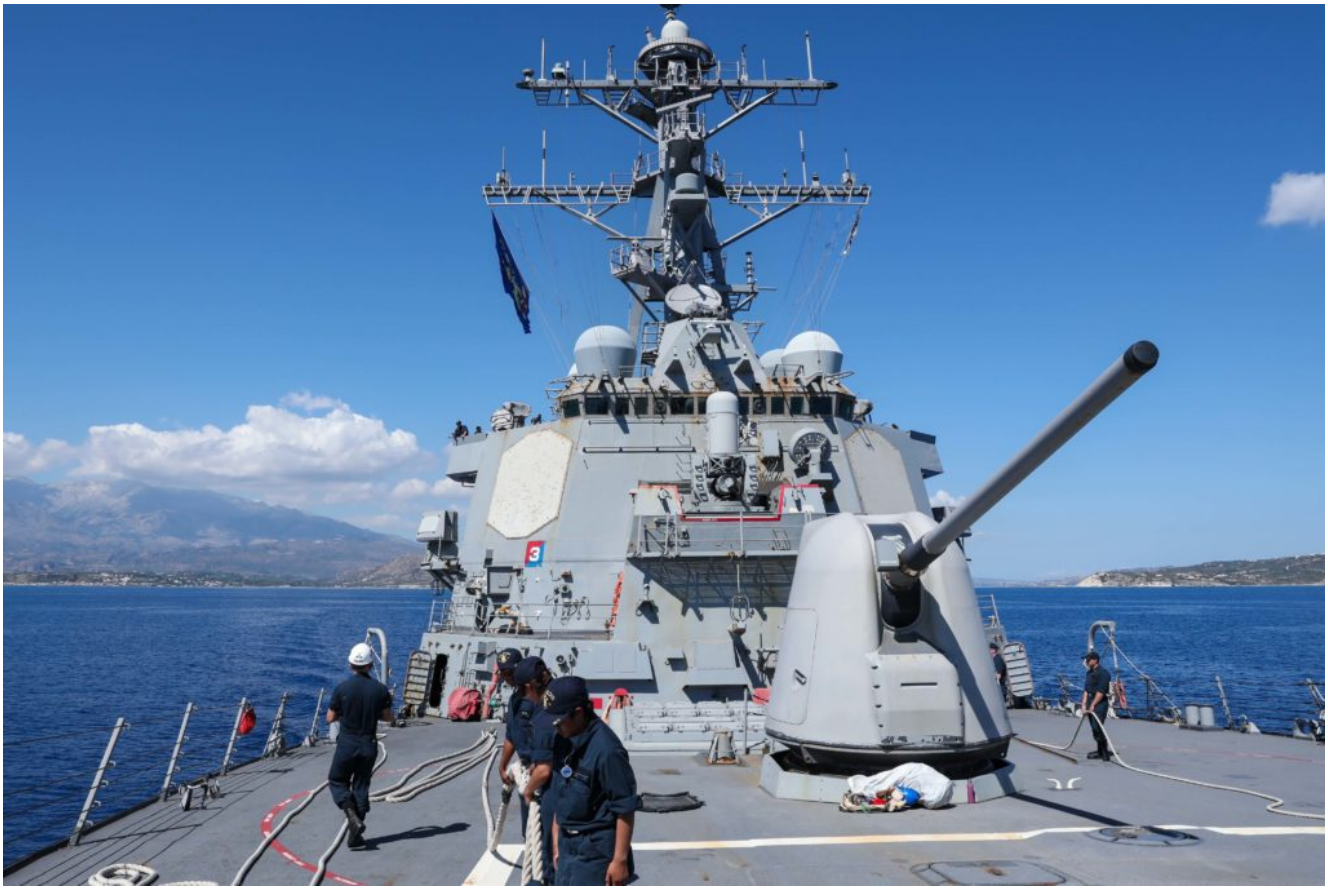
“We’re going to put that all together [for SSNX] – the apex predator – because it really needs to be ready for major combat operations,” he said. “It’s going to need to be able to go behind enemy lines and deliver that punch that is going to really establish our primacy. It needs to be able to deny an adversary’s ability to operate in their bastion regions.”

Houston said that the Navy is “confident we’re going to be able to do that because we’ve already built that on those platforms. We know how to do that. We just have to mesh it together with one platform. The systems we have, with electronic design, the tools, the stuff that we’ve already developed, we’re going to capitalize on that.”

The admiral explained that the SSNX is timed to capitalize on the ‘very robust” design team for the Columbia-class SSBN when that program is ramping down amid production of the SSBNs.

“We’ll be ramping up in SSNX because we’ll have the design and the RDT&E [research, development, test and evaluation] done,” Houston said. “It takes a significant amount of time and effort for that RDT&E to develop this apex predator. That’s what we’re going to do over the next decade working on the systems for SSNX. We’re very confident we can get there. It’s a daunting task, but the team is more than capable of doing it.”

Sea-Air-Space 2021 Prequel: Lawmakers, Analyst Say Navy Needs a Battle Force Ready for 2025, Not 2045



Sailors assigned to the Arleigh Burke-class guided-missile destroyer USS Ross (DDG 71) stow lines as the ship leaves port in Souda Bay, Greece, July 19, 2021. *U.S. NAVY / Mass Communication Specialist 2nd Class Claire DuBois*

ARLINGTON, Va. — The U.S. Navy urgently needs to modernize its battle force in order to meet the near-term challenges of China and Russia if it is to continue to dominate the maritime domain and protect the freedom of the seas, two Congress members and a naval analyst said.

“We as a nation must become a sea power again,” said Dr. Jerry Hendrix, a retired Navy captain, former director of Navy History and Heritage Command, and now vice president of the Telamus Group, speaking in a pre-recorded webinar of the Navy League’s Sea-Air Space Prequel event. “We’re facing a rising global competition right now. This [2022] budget quite frankly in reading of it, is just unserious. It’s unserious in that amount that was funded there and it’s as unserious in the terms of cutting back forces just as we should be adding forces, trying to keep the defense industrial base primed and, in fact, expanding. So, when we actually cut back on the

number of surface combatants we're building, we're sending a mixed signal to the industrial base when we ought to be singing as a chorus right now about what is needed."

Hendrix said the U.S. government "seems to be leaning toward a budget that is purely focused on 10 to 15 years out when, in fact, we've just had a significant warning from an outgoing retiring four-star [Adm. Phil Davidson, former commander, Indo-Pacific Command] that really the threat can exist six years from now. So, how are we going to meet that near-term threat? That calls for us to be looking at how we modernize and extend the lives of the platforms we have now, which is what we are not doing as a Navy or Department of Defense."

Rep. Mike Gallagher (R-Wisconsin), a member of the House Armed Services Committee, also speaking in the webinar, said the Navy needs to "build a battle force for 2025, not 2045. As Adm. Davidson has warned, we may have six years or less before the PRC [Peoples Republic of China] takes action against Taiwan. We could have just years to prepare for a war that could decide the course of the 21st century, and that war would be waged, first and foremost, by the sea services. So, we can't pay lip service to the idea of naval supremacy anymore, we have to earn it. We have to do better if we want to avert disaster and – make no mistake – that is where our present course leads us. We have to act with sense of urgency to advocate for, to build, and resource American seapower before it's too late."

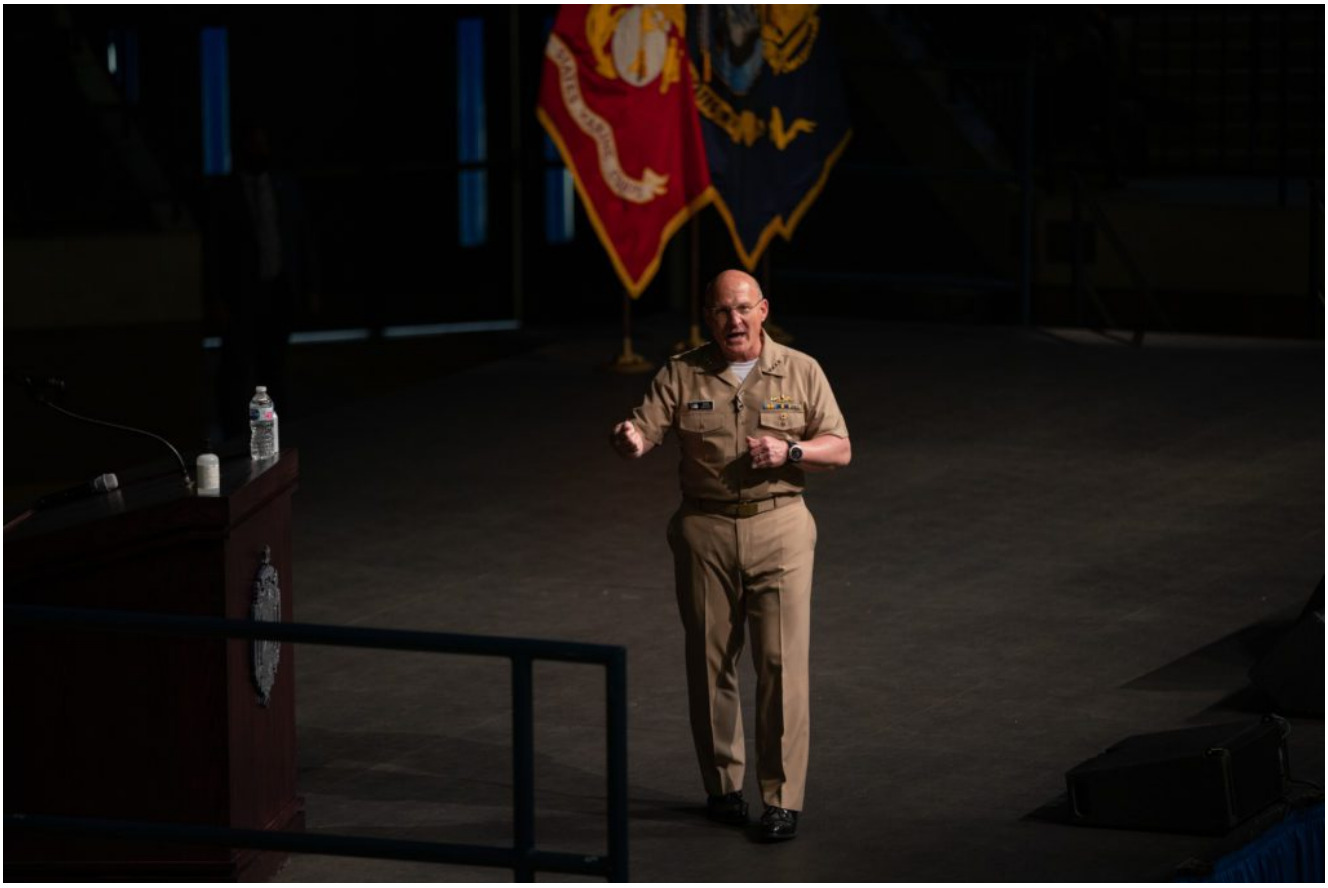
Gallagher said Congress needs "to be honest with the American people about the stakes, what it's going to cost, and the hard choices we have to make. If we fail to reverse the current trends, we're going to wake up one day and we will either have lost a war or thrown Taiwan under the bus and, in so doing, destroyed American military deterrence in the process."

"We need to take swift action to improve our fleet architecture to respond to the threats that China poses

today," said Rep. Elaine Luria (D-Virginia), vice chair of the House Armed Services Committee, also speaking at the webinar, noting the need to ready the battle force for 2025, not just 2045.

"The position we find ourselves in is no fault of today's naval leadership. We've really lost a generation of shipbuilding – ship classes that haven't been built to the same quantity or capability that was initially intended. There is a bigger debate going on in Congress about what the future Navy, the future force structure looks like, and I, myself, was quite disappointed with this [2022] budget from the Navy that in fact did not grow the fleet … and proposed to decommission more ships than it was going to build" in 2022.

Sea-Air-Space 2021 Prequel: CNO Describes the Fleet of 2025



Chief of Naval Operations (CNO) Adm. Mike Gilday speaks to 1st Class midshipmen during his visit to the U.S. Naval Academy in April. *U.S. NAVY / Midshipman 1st Class Tommy Brophy*

ARLINGTON, Va. – The Navy's top officer has described what he sees the U.S. Fleet will look like in 2025, a benchmark which he says the Navy will have made investments so that the fleet will have made notable strides with fielding increased combat capability.

CNO Adm. Michael Gilday, speaking in a prerecorded webinar of the Navy League's Sea-Air-Space Prequel, listed some of the major platforms and weapons that will make the fleet more capable by 2025:

Under the sea:

- "All of our Block III and IV [Virginia-class attack submarines] should be delivered by 2025 with an undersea weapon that is more lethal and has greater range."

On the sea:

- “We [will be] just on the cusp of delivering our first Constellation-class frigate.”
- “We will be delivering the [Arleigh Burke-class] Flight III DDGs in earnest.”
- “We are investing in a longer-range weapon, the Maritime Strike Tomahawk that gives us range and speed to reach out and touch an adversary.”
- “We believe that we will be delivering the Zumwalt-class destroyers with a hypersonic missile capability.”

In the air:

- “We’ll have half of our [carrier] air wings [with] a fourth- and fifth-generation mix [of strike fighters], which analysis has shown to be quite effective against our adversaries. Tied in with that is a longer-range air-to-surface missile that gives us greater reach and greater punch.”
- “Our P-8s [maritime patrol reconnaissance aircraft] we are investing in with an upgrade.”

“All of that is coming into play by 2025,” the admiral noted. “So, we do have an investment strategy that incrementally gets us to a more capable, lethal fleet — not necessarily a bigger fleet — unless we saw a rise in the [budget] topline.”