Sea-Air-Space: DoD Yearns to Embrace AI, But How?

Shield AI co-founder Brandon Tseng, right, discusses AI with DoD officials including Marine Corps Major General Farrell Sullivan, left, and Brian Campo, U.S. Coast Guard. *Photo credit: Dan Goodrich*

Imagine if in 10 years the U.S. Department of Defense had one million aircraft, drones and other platforms powered by artificial intelligence. And, what if by 2045 that number had increased to 100 million?

That's the vision of former Navy Seal Brandon Tseng, who co-founded the AI technology company ShieldAI in 2015. Tseng, along with representatives from the Navy, Marines and Coast Guard, discussed how best to incorporate AI into the DoD

during the Monday afternoon session “Transforming Defense: The Power of AI and Robotic Autonomous Systems.”

Tseng believes for the armed forces, AI is as game-changing as nuclear and stealth capabilities. He said AI can currently accomplish about 98% of DoD missions and urged the audience to envision a DoD that’s no longer limited by the number of human personnel.

Of course, that can be easier said than done.

Rear Admiral Kurt Rothenhaus, chief of naval research, said the Navy and its fleet commanders are “hungry” to leverage industry AI capability for war fighting, readiness and operations, but there’s “a lot of learning and discovery that still needs to be done. We want to learn not just the kit, but also how you approach problem-solving.”

Rothenhaus said the Navy recognizes AI is like electricity – ubiquitous. But a key issue regarding naval AI operations is that “we operate in one of the harshest environments in the world, in the ultimate no-fail world of war at sea. It’s a different frame of reference than the commercial sector.”

Major General Farrell Sullivan, director of the USMC’s Capabilities Development Directorate and Department of Combat Development and Integration, said AI could help with two key USMC operational problems: supporting the closing of kill webs and making unmanned systems more survivable in a contested environment.

In the Coast Guard, Brian Campo, USCG chief data and artificial intelligence officer, said AI can be integrated into many missions that rely on massive amounts of data, including search and rescue and managing ports.

“We don’t have a lot of autonomous capabilities, but we are expanding,” he said. “We have a need and thirst for data.”

Campo said the breadth of the Coast Guard's missions is growing rapidly, beyond what even an expanded workforce can handle. He noted autonomous systems could operate in places where massive Coast Guard cutters can't, and AI data collection could help commanders better decide how to engage a ship in port and conduct law-enforcement activities.

Shelf Life

But there are also concerns about incorporating more AI into DoD operations. Tseng addressed one of them, noting that costs will "come massively down" as AI becomes more widespread. He said in order for the DoD to become a "good buyer" of AI technology, it has to rethink purchasing a 20-year capability.

For instance, he said, the Air Force uses smaller time frames for AI purchases compared to fighter jet purchases. And the Army is trying to buy AI platforms every two years, because that's the average shelf life of an AI system.

Campo said training personnel to use AI is another challenge.

"We can't make an AI officer at the O5, O6 level in two to five years. How do we bring in and train talent?" he asked.

At the USCG Academy, Campo said the goal is to offer trainees the opportunity to automate the tasks they do every day, and build a governance framework that helps them embrace AI in their jobs.

He also urged AI vendors to think about how to deliver their products as services.

"I want to buy a capability; I don't necessarily want to buy a product," he said, noting the Coast Guard may prefer to buy data rather than the platform used to deliver it. "What I really would love to understand is how can industry deliver the service I actually care about without the services I don't specifically have a need for?"

To better implement AI in the short term, Sullivan said he's considering two main levers: making existing platform more lethal, survivable, integrated and affordable; and creating more disruptive capabilities.

"We need better software pipelines, training mechanisms and algorithms," he said. "We have a sense of urgency to get after it. At the end of the day, AI is going to give a fire-team element the combat power of a battalion-sized element. Human-led operations and maneuvers are going to be massively augmented by AI."

Sea-Air-Space: HII, HHI Forge New International Collaboration

HII Executive Vice President and President of Ingalls Shipbuilding Brian Blanchette, left, and Won-ho Joo, chief executive of the naval and special ship business unit at HHI, sign the MOU. *Photo credit: HII*

In an April 7 morning ceremony, executives from leading shipyards in the United States and South Korea signed a memorandum of understanding designed to strengthen both companies' technology exchange and productivity.

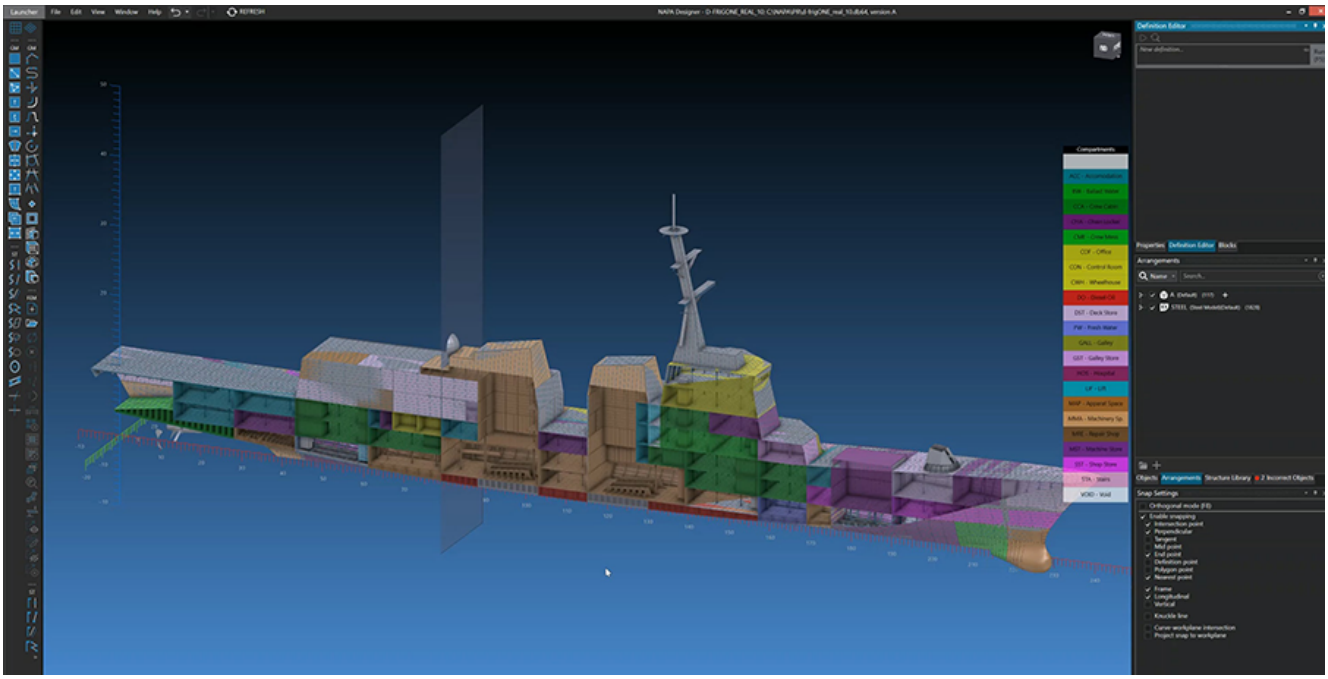
Details are limited on the MOU between U.S.-based HII (Booth 923) and Korea-based HD Hyundai Heavy Industries (HHI), but "we're open to wherever this relationship can take us," Brian Blanchette, HII's executive vice president and president of Ingalls Shipbuilding, said during the signing ceremony. "By working with shipbuilding allies and sharing best practices, we believe this MOU offers real potential to help accelerate delivery of quality ships."

Blanchette said the MOU will initially focus on technology exchange and component outsourcing for destroyers. "HD has an excellent supply exchange for destroyer programs, and we're

looking to leverage lessons learned," he said.

Won-ho Joo, chief executive of the naval and special ship business unit at HHI, said both companies share a commitment to cutting-edge technology. Blanchette said there isn't a firm timeline in terms of milestones for the MOU, but the companies plan to host a delegation in the near future to have a conversation about next steps.

Sea-Air-Space: How Accelerated Digitalization Improves Navy Ship Design



A digitalized ship cross-section from NAPA group. *Image credit: NAPA Group*

Other than the ability to navigate the seas, Navy ship design and cruise ship design don't appear to have much in common. But a Finnish company's software innovations for cruise ships are increasingly being used in Navy ships.

The maritime software from NAPA Group focuses on the holistic design of any floating structure, including ships and submarines. It encompasses everything from productions to operations and includes 3D models, engineering calculations, structure and stability.

“It locks in all of the design elements so there are no surprises during manufacturing that could be extremely costly,” said NAPA Group CEO Mikko Kuosa.

Kuosa, whose company is exhibiting in the Finland booth (PL 101), said NAPA contracts with most of the major shipyards and its software is used for over 90% of global shipbuilding. NAPA software has been used to design all of the big cruise ships, including Icon of the Seas, the largest cruise ship in the world.

Some of the trends in cruise ship design are being adopted by NAPA’s defense customers, Kuosa said. In particular, NAPA’s flooding simulation tool, which predicts within minutes how ship flooding will progress over time and how to maintain mission capability, has been used by cruise ships for 15 years and is now starting to be used in Navy ships. Electronic logbooks are also a cruise ship staple that are making their way to Navy ships.

In addition, NAPA is working on modernizing U.S. shipyards as part of the SHIPS for America Act. Asian and European shipyards already use NAPA software to accelerate digitalization, streamline design workflows, reduce costs and support innovation.

This includes using operational simulation and data at the design stage to inform decisions on new fuels and technologies. Kuosa said a trend in cruise ship construction is voyage optimization design that calculates how best to use wind propulsion for fuel efficiency.

Sea-Air-Space: USMC is Ready to be Tip of the Spear, but Needs Steady Funding, Smith Says

Commandant of the Marine Corps Eric Smith was the luncheon keynote speaker on April 7 at Sea-Air-Space. *Photo credit: Dan Goodrich*

The U.S. Marine Corps is expanding its expeditionary capability and investing heavily in neglected resources to improve its warfighting prowess and the lives and

effectiveness of Marines, but unpredictable funding from Congress is making that difficult, the service's leader said April. 7.

U.S. Marine Corps Commandant General Eric Smith was the luncheon keynote speaker at Sea-Air-Space and described the tools and constructs the service is using to project forces.

"I'll begin with what makes the Navy and Marine Corps team the premier expeditionary fighting force on the planet," he said. And that is the ARG/MEU, the Amphibious Ready Group/Marine Expeditionary Unit. An Amphibious Ready Group with an embarked Marine Expeditionary Unit is the coin of the realm," he said. "It's the Swiss Army Knife of the DoD inventory."

His top priority, he said, is restoring a "3.0 MEU presence worldwide." That means one ARG/MEU off the East Coast, handling the Mediterranean and the coast of Africa, one off the West Coast, handling the Indo-Pacific, and the "episodic deployment" of a MEU out of Okinawa, Japan. Three such ARG/MEUs is the minimum, he said, while the demand signal is for 5.5.

MEUs include light infantry, artillery, light armored reconnaissance, combat aviation, combat service support, medical support and command and control, and "operate as one. They blend themselves into a chainmail fist," he said.

The Amphib Fleet

One challenge for the Marines is reconstituting its amphibious ship fleet, which he said the USMC allowed to atrophy as it turned its attention to combat in Iraq in recent years.

"We didn't look back at our amphibs," he said. They weren't maintained because they hadn't been used in a decade, but "without those ships, Marines can't get to the fight."

The Corps has also been investing in equipment such as the

AN/TPS-80 Ground/Air Task-Oriented Radar, or G/ATOR radar, and the Navy/Marine Corps Expeditionary Ship Interdiction System (NMESIS), a remotely operated missile battery, as well as MADIS, the Marine Air Defense Integrated System, which provides the service's first organic air defense system.

"We used to be armed with a Stinger [missile], and that is not enough to get it done against the PRC," he said, referencing China.

Barracks Spending

The USMC is also moving to address longstanding issues with its infrastructure, namely rebuilding crumbling barracks as part of Barracks 2030, which Smith described as a "heavy lift" that will cost $5 billion over the five-year defense program.

It's difficult to plan such long-term efforts – 11 barracks renovations were started last year with another dozen planned this year – without steady funding. Members of Congress are supportive of these and other efforts, Smith said, but the reliance on continuing resolutions instead of passing new funding bills causes problems.

"I'll stay out of politics," he said. "But I will say we need predictable, on-time funding that only Congress can provide. Meaning, continuing resolutions aren't continuing anything, they stop our progress."

Sea-Air-Space: Fighting from the MOC Requires

Standardization, Speakers Say

Vice Admirals Kurt Thomas, Michael Vernazza and Craig Clapperton and Rear Admiral Susan BryerJoyner discuss what needs to be done to fight from the MOC. *Photo credit: Dan Goodrich*

The concept of "fighting from the MOC" will require much greater standardization of Maritime Operations Centers, in training, equipping, resupplying and data management and protection, speakers said at a panel April 7 at Sea-Air-Space.

The MOCs are purpose-built for fleet commanders, but that makes them difficult to coordinate, said Vice Admiral Karl Thomas, the director of Naval Intelligence, who moderated the Monday panel on "Fighting from the MOC."

"We would like to have them all configured in a standard manner … so we can modernize them in a better way," Thomas said. "There's a little tension in that, but it's a good tension. In the pace of the fight today, we need to modernize."

MOCs are how the Navy executes fleet-level warfare and facilitates mission command at lower echelons, but the Navy is seeking to use them as the centerpiece for the type of distributed warfare likely in the vast Pacific.

“We will treat and resource MOCs like the warfighting systems that they are, capable of operating on a decentralized and global battlefield just like all other weapons systems,” the Navy’s 2024 Navigation Plan says.

Vice Admiral Michael Vernazza, commander of Naval Information Forces, said his team is working with Navy personnel officialsto conduct a manpower review of each MOC, starting in the Pacific, focusing on the exact manning each will need to carry out the seven joint tasks outlined in the chief of naval operation’s Navigation Plan.

“By 2027, all fleet headquarters, starting in the Pacific Fleet, will have ready MOCs certified and proficient in command and control, information, intelligence, fires, movement and maneuver, protection, and sustainment functions as assessed by our MOC Training Teams,” the NAVPLAN says.

Investments

Admiral Susan BryerJoyner, director of the Warfighting Integration Directorate, said the main investment that needs to be made to be ready for 2027 is cloud infrastructure and supporting “zero trust” technology to make sure data going into and from MOCs is protected, and available to commanders who need it.

Data visualization doesn’t need to be standard, “but what does need to be standard is the data that underpins it,” BryerJoyner said.

“Every commander should not be able to pick and choose what data he or she wants to use for a specific warfighting function, because as soon as you start to add that variability

in, now different commanders are going to see different things and come to different conclusions," she said.

"This shift from MOC as a commander's personalized way of fighting to a more standardized way of feeding into the joint force, is the journey that we're going on now," she said.

Sea-Air-Space: Readying our Platforms: Admirals Focus on 80% Combat Surge Ready

Admiral Jim Kilby, left, moderates the panel "Ready our Platforms" on April 7. *Photo credit: Dan Goodrich*

U.S. Navy type and system commanders discussed their efforts to achieve a combat surge readiness (CSR) of 80% during the

opening panel of the Navy League's 2025 Sea-Air-Space Expo in National Harbor, Maryland.

Speaking in an April 7 panel – moderated by Acting Chief of Naval Operations Admiral Jim Kilby – were Vice Admiral Daniel Cheever, commander, Naval Air Forces; Vice Admiral Robert Gaucher, commander, Naval Submarine Forces; Vice Admiral Brendan McLane, commander, Naval Surface Forces; Vice Admiral Carl Chebi, commander, Naval Air Systems Command; and Vice Admiral James Downey, commander, Naval Sea Systems Command.

"Combat surge ready-certified units meet a minimum condition requirement for material condition, training, manning and munitions," Kilby said, noting the type commanders on the panel were designated the single accountable officers "to ensure their respective forces achieve 80% CSR."

Kilby laid out the task for his admirals to achieve 80% CSR despite the scheduling, materials, workforce, maintenance availabilities and operations tempo challenges for the fleet, necessary to ready the fleet to meet potential combat with potential adversaries such aa China.

He pointed out that the current drive for readiness began in 2018 when then-Defense Secretary James Mattis directed the service to turn around the dismal readiness of its F/A-18 Super Hornet strike fighter fleet of 250 ready jets and increase the number to 341, a level sustained during the years since. By changing its maintenance practices, the Navy achieved the goal in one year. With that inspiration, other Navy communities, such as the surface and submarine forces, have adopted changes to their maintenance and logistics practices to increase the readiness of warships and submarines.

Kilby said the CSR rates for submarines, surface warships and aircraft carriers today are 67%, 68%, and 70%, respectively.

Cheever noted achieving the 80% for Super Hornet strike

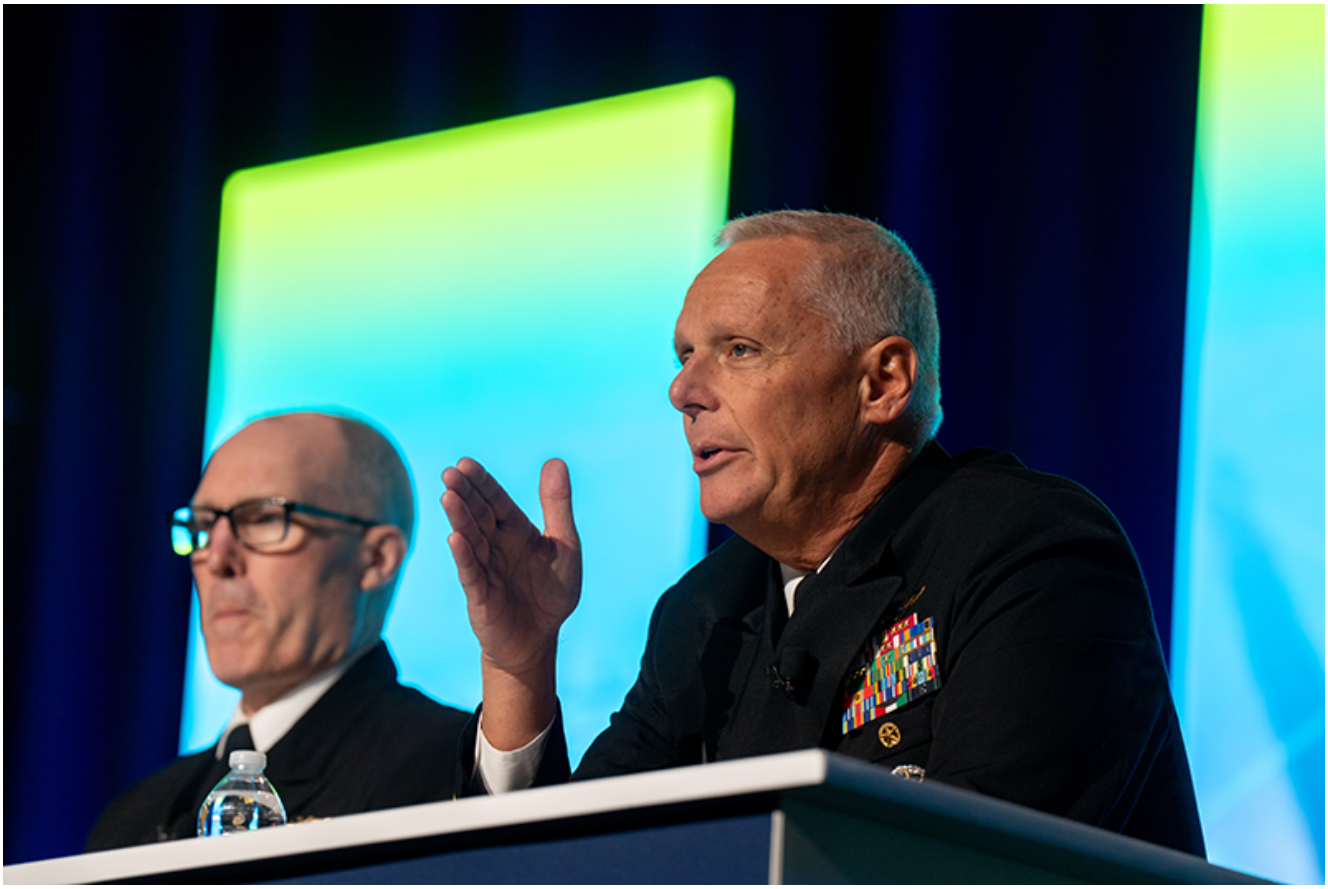
fighters was an “all-hands effort all the time” and involved extensive partnering with the defense industry. He defined CSR as such: “If we go to war, we have everything we need.”

Chebi said the CSR effort has since expanded to included 22 other types of Navy and Marine Corps aircraft and that the effort to achieve the CSR goal was a “team effort” that had to be focused on data versus stories.

He recounted the Navy “had to be told to do that,” referring to the strike fighter readiness initiative, but that “we developed the playbook. It worked.”

He said the Navy still had challenges with improving CSR in joint programs because it cannot control all aspects of the initiatives.

McLane credited the aviation community with the inspiration for the surface community to similarly focus on readiness. His efforts include CASREP [casualty report, a term for systems degraded or broken] burn-down, restoring ship systems to full capability, and getting ship maintenance availabilities (repair periods) finished on time. An innovative approach to availabilities is to bring ships in more often for shorter period, a method that increases a ship’s likelihood of completion on time. A recent set of 100-day availabilities of were completed 100% of the time, he said.



Vice Admiral Daniel Cheever makes a point during the morning panel on Monday. *Photo credit: Dan Goodrich*

Addressing problems with amphibious assault ship availabilities, McLane said a focus on planning 120 days in advance is inadequate, recommending locking in the plan 500 days in advance and awarding the contract 350 days in advance. Noting recent problems with quality assurance, he recommended involving the original equipment manufacturers rather than necessarily hiring the lowest bidder.

Ships Ahoy

Downey, speaking of new construction ships, noted 12 ships were delivered in 2024, and 92 ships were under contract, 56 of which were under construction. He said he is focused on planning milestones, trying to order materials two years ahead of the construction start of a ship. For improving availabilities, more predictive data are needed, he said.

Gaucher said his goals are to complete submarine availabilities on time and make them ready for combat. He

noted the Navy's four shipyards have room for 10 attack submarines in maintenance but currently have 17 submarines in or awaiting availabilities.

The "just-in-time" parts delivery concept does not work well in practice for the submarine force, he said, recommending instead a "just-in-case" stockpiling concept for parts.

Gaucher said the Navy's shipyards need more structural engineers, not just mechanical and electrical engineers.

He also said the submarine force's inventory of Mark 48 torpedoes has increased by two per boat, and he expects another increase by two within six months.

Sea-Air-Space: RTX's Barracuda Mine Destructor in Ocean Testing

Raytheon has been putting its Barracuda mine neutralization system in autonomous mission testing. *Photo credit: Raytheon*

Raytheon, an RTX company (Booth 911), has been putting its Barracuda mine neutralization system in autonomous mission testing, the company said in an interview with *Seapower*.

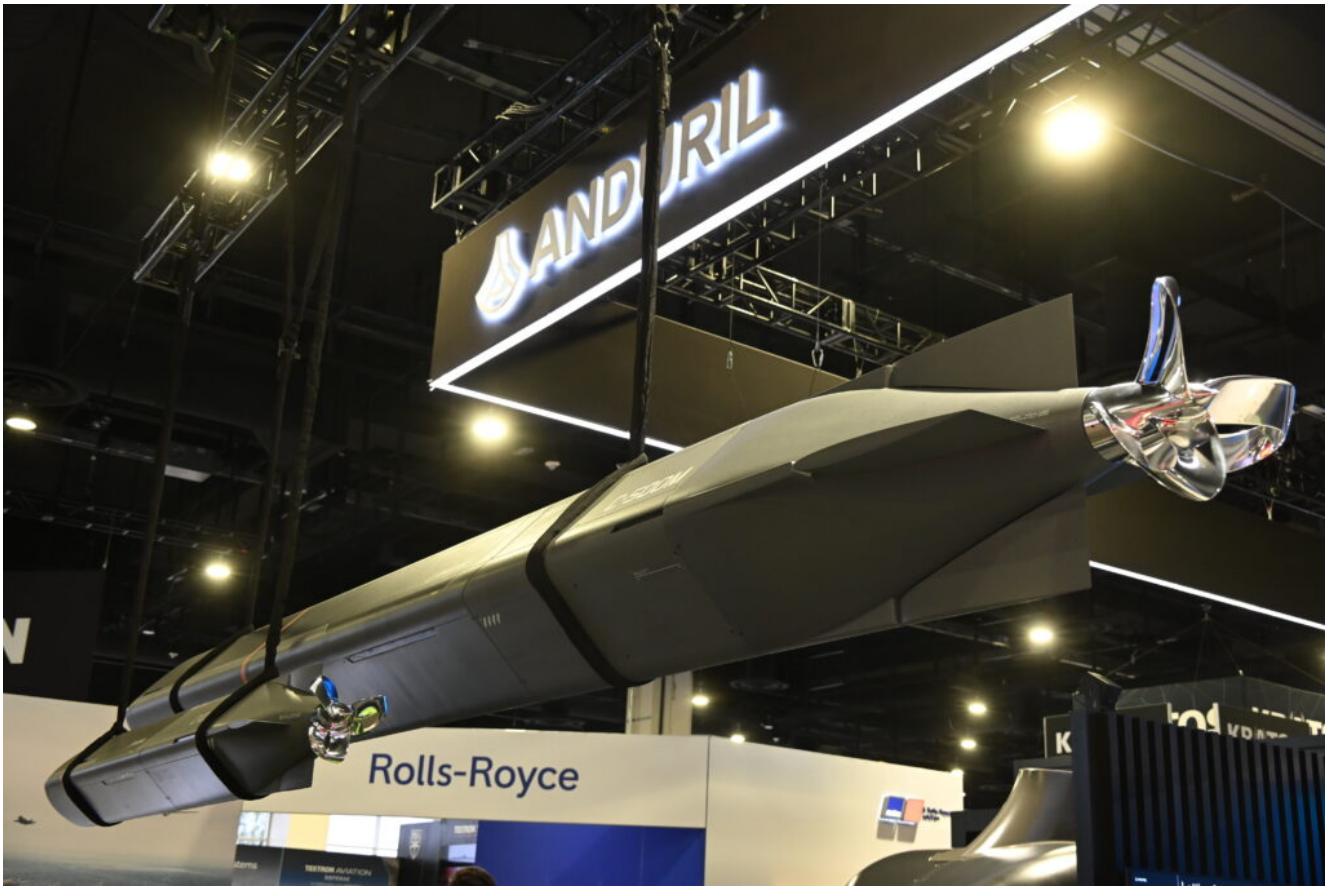
The Barracuda is a 26-pound, 48-inch-long anti-mine device housed in a tube the size of an A-size sonobuoy tube. When launched, the device is propelled by four small water jets that take the device to the datum of a suspected sea mine detected by the AQS-20C towed sonar. An acoustic communications data link buoy is released to which the device is tethered. Target updates, such as GPS coordinates, are transmitted to the device, which approaches the sea mine. A sonar and a camera mounted in the nose of the device enables a man-in-the-loop operator – for now – to confirm the mine. The device then is steered to the mine and detonated. Each Barracuda is a one-shot charge.

An engineering development model (EDM) of the of torpedo-like munition has been going through two months of contractor testing in Narragansett Bay, said Bill Guarini, Raytheon's director for Requirements, Capabilities in the company's Naval Systems and Sustainment Unit. For the tests so far, the Barracuda is tethered to its controlling craft.

The contractor testing will continue through 2025 into 2026, Guarini said, with tests against a variety of mine shapes, including bottom, tethered, and near-surface mines. Development Testing to begin in 2026 and Operational Testing to be conducted in 2027, with low-rate initial production also scheduled to begin that year. Raytheon will provide 85 EDMs of the Barracuda for the Navy's tests.

The Barracuda is designed for both surface and air launch. The weapon will be deployed on the Mine Countermeasures Unmanned Surface Vehicle deployed on some Independence-class littoral combat ships. Separately from Raytheon, the Navy is having a Barracuda launcher developed for the MCM USV. A sonobuoy air-launch cannister also is a potential launcher for the Barracuda.

Sea-Air-Space: Anduril Introduces Copperhead AUV-Launched Torpedoes



Anduril’s Copperhead AUVs on display above the company’s booth at Sea-Air-Space. *Photo credit: Brett Davis*

Anduril Industries (Booth 1623) took another step in advancing undersea warfare with the announcement of its Copperhead family of autonomous underwater vehicles (AUVs), including torpedoes, the first to be designed for launch from autonomous systems.

Anduril’s Copperhead AUV family currently includes two variants, a 12.75-inch diameter version with a dry weight payload of 100 pounds, and a 21-inch diameter with a dry weight payload of 500 pounds. These can be used for a variety of undersea missions, such as intelligence, surveillance, and reconnaissance, teaming with its Seabed Sentry sensor system, or locating objects such as a downed aircraft, said Shane Arnott, Anduril’s chief engineer, in an April 4 news conference. The Copperheads can carry a variety of sensors, such as sonar, magnetometers and chemical detectors.

Arnott said the Copperhead M version of either the 100 or 500 size is equipped with a warhead to serve as a torpedo. The

company’s Dive-XL AUV can carry dozens of Copperhead 100-Ms of multiple Copperhead-500Ms, a company release said.

He said the Copperhead M can be produced in much greater quantities and at less cost than traditional torpedoes such as the Mark 48 and Mark 54 currently used by the U.S. Navy. The Copperhead, which can travel at speeds in excess of 30 knots, also can be deployed from a Group 4 or 5 unmanned aerial vehicle.

Arnott said the Copperhead already has been tested in water.

Sea-Air-Space: First P-8A Overhauled by L3Harris to Be Delivered in 2025

A P-8A Poseidon assigned to the “Red Lancers” of Patrol Squadron 10 takes off on a search and rescue mission flight. *Photo credit: U.S. Navy | Mass Communication Specialist First Class Ashley Guire*

The first P-8A Poseidon maritime patrol aircraft to be overhauled by L3Harris (Booth 937) is scheduled to be delivered back to the U.S. Navy this year, a company official said.

L3Harris was awarded an indefinite delivery/indefinite quantity contract in September 2024 from the Naval Air Systems Command (NAVAIR) for depot-level maintenance, overhaul, and repair of the Navy’s fleet of P-8As, which will number 135 upon completion of the service’s planned procurement, said Jason Lambert, president of Intelligence, Surveillance and Reconnaissance at L3Harris. The program is scheduled to continue through September 2029.

“NAVAIR’s No. 1 priority is aircraft availability, and it’s an honor for us at L3Harris to support the Navy to ensure the P-8 aircraft is mission-ready,” Lambert said.

Lambert said the company currently has four P-8As in its workflow, with a capability to induct a minimum of nine aircraft per year, and the potential capability to induct 12 aircraft the first year. The work will be accomplished at the company's facility in Waco, Texas.

He said the contract allows processing foreign P-8 aircraft along with U.S. Navy aircraft.

"The Navy awarded the ID/IQ to both L3Harris and AAR," he said. "AAR previously had this program. The Navy decided to go with a dual source, so the Navy determines the allocation of the aircraft across our two companies.

"L3 has provided decades of modification and sustainment support on the P-3 Orion, the predecessor of the P-8 platform across multiple customers including the U.S. Navy, NOAA, and the [defense] ministries of Brazil, New Zealand, and the Republic of Korea ,and we're very honored to extend our long-lasting support to the U.S. Navy by supporting this next-generation Poseidon fleet," Lambert said.

Sea-Air-Space: New Pit-Stop Approach Can Cut Engine Overhaul from Months to Days, FMD Says

Fairbanks Morse Defense workers overhaul an engine using the “pit stop” method. *Photo credit: Fairbanks Morse Defense*

Imagine if a Navy ship could pull into a pit stop like a race car, get its engine overhauled and be back on the seas in less

than a month. That’s what the team at Beloit, Wisconsin-based Fairbanks Morse Defense (Booth 1537) envisioned years ago, and now it’s a reality.

“Maintenance has traditionally taken way too long and cost too much money,” said Keith Haasl, FMD’s president of service and technology.

Haasl notes that a traditional Navy ship engine overhaul, including disassembly, inspection, repair, and reassembly, can take up to nine months. But FMD’s pit-stop approach can take as little as 26 days for ship service generators and 38 days for main propulsion engines.

Haasl said FMD did its first pit stop in early 2024 on a ship service generator. Since then, FMD has overhauled eight generators and three main propulsion engines on landing ship, dock-class vessels using the new approach.

“It’s been really successful. The fleet likes it. Our partners at NAVSEA [Naval Sea Systems Command] like it, and we sure like it,” Haasl said. “It’s revolutionized the way the Navy is doing maintenance and how NAVSEA is structuring their Class Maintenance Plans.”

Rethinking Strategy

Basically, FMD’s pit-stop approach involves rethinking the entire engine overhaul strategy.

Historically, ship engines have been overhauled using an “open and inspect” method. “It was really like incremental discovery. You open up the engine on the ship, take the measurements, inspect it, write the report, go to the customer for approval, get the replacement parts, install them, and then reassemble the engine,” Haasl said. “All of this is going on while there’s sanding and painting and welding on the ship, which increases the risk of engine contamination.”

The pit-stop approach begins with technicians bringing a standardized kit of original equipment manufacturer parts, which are replaced onsite no matter what the engine's condition. These parts are included in the kit because they're essential to engine performance.

The parts that are removed from the ship's engine are taken to the FMD facility, where they're refurbished, inspected, and certified in a controlled environment. These parts are then used in the next standardized kit for an engine overhaul on another ship. This helps save time and costs by avoiding supply-chain issues and ensuring replacement parts are always available as needed.

The pit-stop approach also reduces engine overhaul time and costs in other ways.

"We're doing work pier side, so there are no docking costs. The costs of parts are significantly lower because we're remanufacturing parts that might have been replaced with new parts under the old method," Haasl said. "All of those efficiencies we can gain are tremendous."