BAE Systems to manufacture advanced Block 4 F-35 electronic warfare systems to defeat evolving threats

Release from BAE Systems

NASHUA, N.H. – April. 3, 2023 – BAE Systems has received $491 million in contracts from Lockheed Martin to produce state-of-the-art Block 4 electronic warfare (EW) systems for future Lot 17 F-35 Lightning II fighter jets, adding to the 1,200 F-35 EW systems it has delivered to date. The powerful Block 4 systems will accelerate the delivery of advanced EW capabilities to warfighters by combining adaptable hardware and incremental software updates.

“The Block 4 EW system will offer greater situational awareness, enhanced survivability and increased capabilities to counter modern threats, and is upgradable to address evolving threats,” said Lisa Aucoin, vice president of F-35 Solutions at BAE Systems. “Our adaptable EW system will help warfighters execute missions today and into the future, and

will reduce engineering and sustainment costs for the U.S. Department of Defense and its allies."

The Block 4 EW systems will include significantly upgraded hardware and software that improves sensing and signal-processing capabilities. New, high-performance sensors will boost the system's ability to detect difficult-to-observe threats and more threats simultaneously.

"Our modern facilities allow us to manufacture complex, intricate electronics at scale to deliver an affordable EW capability," said Chris Rossi, director of F-35 production at BAE Systems. "The flexibility of our active production line will allow us to seamlessly transition to the Block 4 design without skipping a beat."

The AN/ASQ-239 provides F-35s with fully integrated offensive and defense EW capabilities, including long-range threat warning, self-protection, and targeting support. It provides 360-degree, full-spectrum situational awareness and rapid-response capabilities—allowing the F-35 to evade, engage, counter, and jam threats, and reach well-defended targets.

BAE Systems is a leader in electronic warfare, and its strength is its people—a team of knowledgeable, intelligent, and resourceful engineers, project managers, and skilled workers committed to protecting those who protect us. As the company advances next-generation EW technology, it applies its engineering and production expertise as a force multiplier, maximizing its customers' investments in EW. BAE Systems' next-generation Storm EWTM spectrum warfare suite is built on a common core architecture that can be customized for multiple airborne platforms, and can be upgraded in the field with software updates.

The AN/ASQ-239 system is designed and manufactured at BAE Systems' facilities in Manchester, New Hampshire and Nashua, New Hampshire. Additional information is available at

www.baesystems.com/ew and www.baesystems.com/en-us/product/f-35.

Additional Information:

As a key partner on the F-35 program, BAE Systems contributes to the aircraft in many ways. Beyond electronic warfare, the company designs and manufactures the F-35’s active inceptor control stick, vehicle management computer, and other electronics. The company also designs and builds the aft fuselage and horizontal and vertical tails, as well as the wingfold for F-35Cs and the nozzle bay doors for F-35Bs.

Navy Studying Arming P-8A Aircraft with the AARGM-ER Missile

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NATIONAL HARBOR, Md. – The Navy is conducting an integration study for arming its P-8A maritime patrol aircraft with the AGM-88G Advanced Anti-Radiation Guided Missile – Extended Range (AARGM-ER), a Navy program official said.

Capt. Alex Dutko, program manager for Direct and Time-Sensitive Strike, speaking April 3 to reporters in person and remotely at the Navy League's Sea-Air-Space Expo in National Harbor, said the integration of AARGM-ER on the P-8A would be for external carriage on the aircraft's wing stations.

The AARGM-ER, the latest version of the anti-radar missile designed to neutralize or destroy enemy air-defense radar stations, is an upgrade of the AGM-88E AARGM and is designed for internal or external carriage. The ER version integrates the AGM-88E sensors and electronics with a new solid-fuel rocket motor and tail control. The ER has a diameter of 11.5 inches, compared with the baseline's 10-inch diameter.

The new version is designed to be carried internally in a weapons bay as well as externally. The AARGM-ER will be carried internally on the F-35A and F-35C versions of the Lightning II strike fighter and externally on those aircraft plus the F-35B, F/A-18E/F Super Hornet strike fighter, and the EA-18G electronic attack aircraft.

The AARGM-ER entered Low-Rate Initial Production (LRIP) during the fourth quarter of fiscal 2021 and has completed three of four Developmental Test firings. The fourth is scheduled for April. The second LRIP contract was awarded during the first quarter of fiscal 2022. LRIP 3 currently is in negotiation with Northrop Grumman, Dutko said.

Operational Test of the AARGM-ER is scheduled for completion during fiscal 2024, with Initial Operational Capability slated for the first quarter of that year. Full-Rate Production is expected to begin in fiscal 2025.

The missile will be available for Foreign Military Sales with LRIP 4, with deliveries occurring in fiscal 2026. Dutko said that the Navy is working to expand a cooperative agreement with the Italian Air Force – which carries the AARGM on its Toronado strike fighters – to include the AARGM-ER version. He said that multiple countries have expressed interest in the AARGM-ER.

U.S. Goal: Maintaining Extended Presence in Arctic’s

Harsh Environment

NATIONAL HARBOR, Md. – U.S. Navy and Coast Guard officials say maintaining a reliable presence in the Arctic, by ship, aircraft or submarine, is crucial to protecting American interests and sovereignty in the High North.

However, Coast Guard Vice Commandant Admiral Steven Poulin said maritime patrol planes and ice breakers aren't enough to achieve his "top priority'' of forward presence in the Arctic's hostile environment.

Speaking on an Arctic strategy panel April 3, Poulin said consideration of the supply and repair needs of those systems and the care of the men and women who crew those systems requires investment in infrastructure to support forward basing. Both Poulin and another panel member, Vice Admiral William Houston, Commander of Naval Submarine Forces and the U.S. Atlantic Fleet, agreed there were three U.S. strategic objectives in the Arctic: sovereignty, safety, and security.

They also agreed that to accomplish them U.S. Arctic maritime operations must extend beyond Alaskan waters.

Allies and partners that share values like freedom of navigation, environmental concerns and the rule of law are needed, especially since the United States has only two ice breakers and no deepwater ports or air bases bordering the Arctic Ocean. Kodiak, Alaska near the Bering Sea, is a thousand miles from Alaska's Arctic coast.

Melting Arctic sea ice due to climate change has been opening new sea lanes, untapped fisheries, and previously unreachable petroleum, natural gas, and mineral deposits across the top of the world.
The Arctic is "an area of increasing human activity" and "increasing global competition, whether it's for resources, access or presence. And so, for us, the key is good governance, a rules-based order that increases stability for the region. It's also about protecting America's sovereignty and sovereign rights," Poulin said.

Russia has increased its military presence along its Arctic coast, reopening Cold War era bases and building several new ones. China, which styles itself a "near Arctic nation," has made several scientific expeditions in the region and has conducted at least one naval exercise with Russia inside U.S. territorial waters.

Houston said Navy submarines have plied polar waters since 1947, and U.S. submarines, aircraft and other surface vessels have conducted 100 exercises like ICEX and Northern Edge with the United Kingdom, France, and Canada among other nations' navies. U.S. submarines are now stopping in Tromso, Norway to pick up supplies and drop off and pick up crewmembers.

Both Poulin and Houston said communications at high latitudes was a challenge. The Navy is investing "a quarter of a billion dollars" in the Arctic where communications is absolutely key,

said Houston. “If you cannot communicate, you can get yourself in a lot of trouble.” The Navy has no surface vessels with ice hardened hulls. The Coast Guard’s first polar security cutter, a heavy, armed ice breaker, is not expected to be available for years. Poulin said the Coast Guard was hoping for delivery in Fiscal 2026.

Textron Developing New Unmanned MAGNUSS Minesweeping Technology

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ARLINGTON, Va. — The technology to sweep sea mines without endangering Sailors has made another advance with a recent contract award to Textron Systems Corporation for the development of the Magnetic and Acoustic Generation Next

Unmanned Superconducting Sweep (MAGNUSS) system for the Mine-Countermeasure Unmanned Surface Vehicle (MCM USV).

The MAGNUSS system includes a high-temperature superconducting magnetic source with an advanced acoustic generator, designed to defeat magnetic- and acoustic-triggered sea mines by spoofing them.

The $20.8 million contract award from the Office of Naval Research (ONR)-sponsored Future Naval Capability effort calls for the "development, fabrication, and demonstration" of the MAGNUSS payload, according to the Defense Department contract announcement, which also said that the payload "is expected to transition to the Naval Sea Systems Command program" for the MCM USV.

Textron earlier developed the Unmanned Influence Sweep System (UISS), a towed cable with a magnetic and acoustic minesweeping system designed to be deployed by an MCM USV. The UISS is a mission module of the Mine Countermeasures Mission Package for the U.S. Navy's littoral combat ships.

Minesweeping with Magnets

David Phillips, Textron Systems' senior vice president for Sea Systems and Land Systems said in a March 23 interview with Seapower that the MAGNUSS offered, "a different, unique way to sweep mines" with a modular "non-towed, zero-drag system that sits within the unmanned surface vessel and basically spoofs mines through acoustics and magnetics."

Phillips said that the UISS towed sensor sweep cable was less effective in shallow water because it can get damaged by or tangled or snagged in underwater obstacles, including such objects as crab traps. These factors affected the life of the tow cable, and hence a concern with the cost of replacing it.

He also said the UISS magnetic generator was heavily

influenced by the salinity of the water, with lower performance in low-salinity water. He noted that these factors would be of no concern with a payload within the hull of a USV that would no longer need to deploy and retrieve a tow cable.

Applying a magnetic field through water, the salinity affects the level of resistance, said Tim Livelsberger, Textron Systems' systems engineer for the project, during the interview. "The more salt you have, the easier it is for the power to flow through. The less salt that you have, the more power you need to generate to maintain that magnetic field.

"This technology simplifies the operations for the Sailors and increases the envelope where they can operate at and what salinity levels [they can operate in]," Livelsberger said.

Under the contract, Textron will be working to provide a low-risk, advanced development model of the MAGNUSS that will be put through a demonstration for the Navy using a company-owned Common USV like those the company delivered to the Navy for the UISS program.

Operational Testing

Phillips said that following the demonstration, options exist for furthering the Technical Readiness Level and the maturity into Engineering Development Models.

The MAGNUSS high-temperature superconducting magnetic source is built by American Superconductor and the advanced acoustic generator is built by General Dynamics Applied Physical Sciences.

Livelsberger said that the CUSV has gone through Initial Operational Test and Evaluation of the MCM mission package with the littoral combat ship with the UISS and the AQS-20 mine-hunting system.

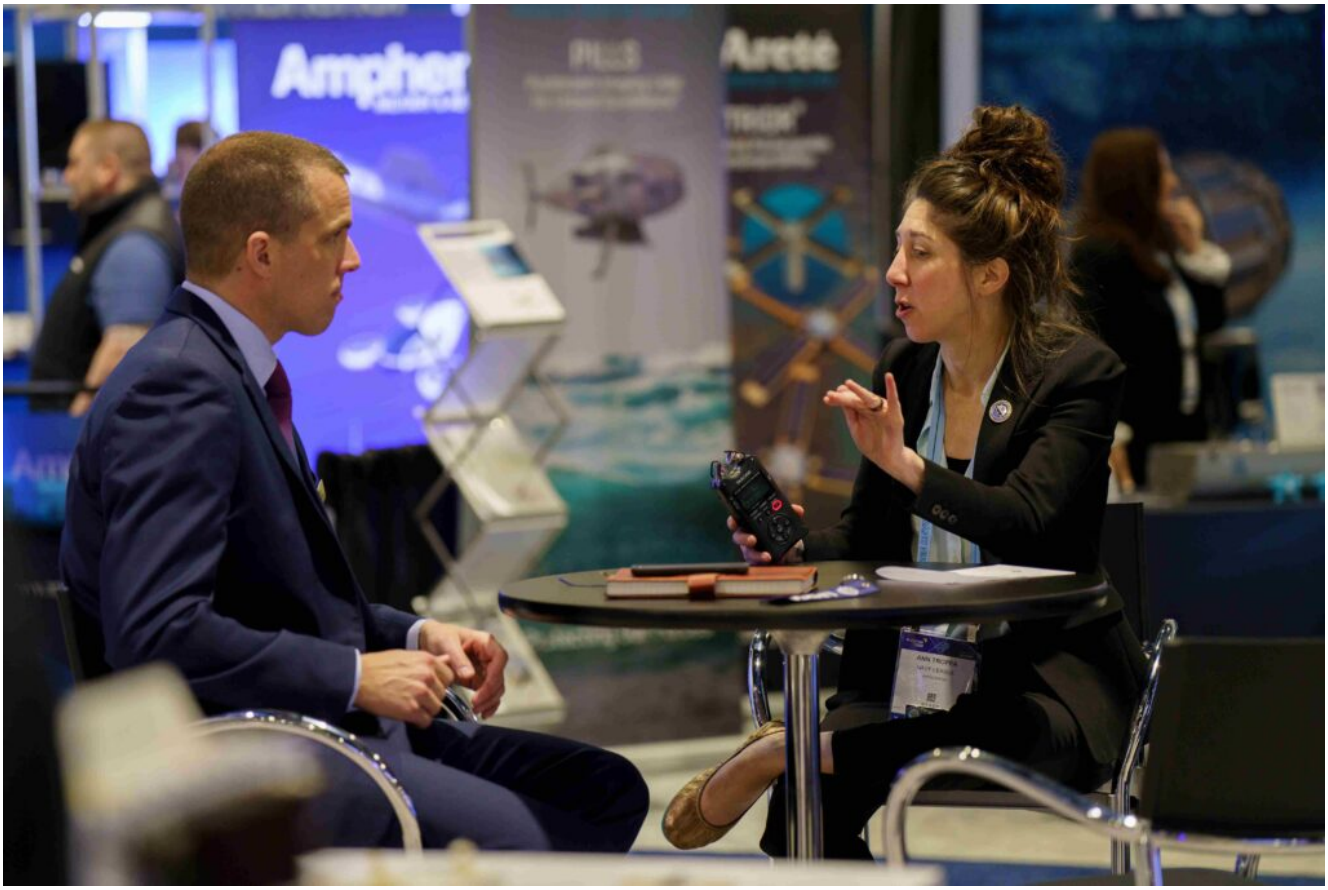
He said the Navy's requirements for the MAGNUSS were

essentially the same as for the UISS.

Livelsberger said that one of the major challenges with using a super-conducting magnetic system is the interoperability of the MAGNUS with the CUSV, shielding the USV's instrumentation and electronic systems from the intense magnetic field generated by the source. He said the magnetic source leverages the technology used to degauss large warships.

Last year, Textron's CUSV was equipped with anti-submarine warfare identification and tracking systems to participate in the Robotic Experimentation and Prototyping Using Maritime Uncrewed Systems, a multi-national exercise conducted in Portugal.

Navy Commissions First LCS with New GE Composite Engine Enclosure



NATIONAL HARBOR, Md. – The littoral combat ship (LCS) commissioned April 1 is the first equipped with the new lightweight gas turbine engine enclosure designed by GE Marine to provide greater safety and more comfortable engineering spaces for Sailors, a GE Marine official said.

Steve Rogers, director of Marketing and Business Development for GE Marine Engines, told Seapower in an April 3 interview at the Navy League's Sea-Air-Space Expo in National Harbor, said that the Independence-class littoral combat ship USS Santa Barbara (LCS 32) is the first LCS to be fitted with the new lightweight composite-material enclosure for its engines.

"Traditionally what the Navy has used is a is a steel base on which it sits and then an enclosure with steel walls. So … loud, noisy, hot," Rogers said. "Now it's a single forward composite piece for the walls and the roof. So, you don't have rust maintenance and things like that. But more importantly, [there's] 60% less airborne noise in the engine room."

Rogers said the temperature of the enclosure walls, "is

anywhere from 25 to 50 degrees cooler. So, a lot less heat is being ejected into the engine room and the Sailors have more access, better access to the engine."

He said the composite enclosure is 2.5 tons lighter than the steel enclosure with the same footprint, providing ship designers with the flexibility to devote more weight capacity to fuel, payloads, or other uses. The new enclosure meets the Navy's standards for fire protection and toxicity.

The U.S. Navy will be installing the composite enclosures on its Flight III Arleigh Burke-class guided-missile destroyers and Constellation-class guided-missile frigates. The enclosure also is being installed on the Finnish Navy's Pohjanmaa-class corvettes.

Rogers said his company has seen no supply chain issues with producing the composite enclosure, pointing out that composite material is made five miles from the plant where the enclosure is made.

GE Marine Engines is working to improve the efficiency of its gas turbine engines while maintaining the same power output and reliability, Rogers said, also noting that the company is working to meet power requirements for warships to deploy such systems as laser weapons.

He said GE Marine Engines is expanding its global network – maintenance, repair, and overhaul (MRO) facilities and service technicians – to meet the requirements of its far-flung customers. The company maintains MROs in Canada, Germany, India, Italy, Japan, and South Korea.

Coast Guard Uses New Tech for Oil Spill Response

Kirsten Trego talks about the USCG – Oil Spill Response: Tech Effort on the Horizon in the exhibit hall.

When most people think of the U.S. Coast Guard, they envision daring rescues at sea. But the USCG has a variety of lesser-known but equally important duties, said USCG Capt. (Ret.) Kirsten Trego.

During the Monday morning presentation, "USCG Oil Spill Response: Tech Efforts on the Horizon," Trego discussed how the Coast Guard is the federal on-scene coordinator for oil-discharge cleanup in the coastal zone. That zone not only includes the nation's shores, but also rivers, waterways, the Great Lakes and more.

"If something happens, we're the best prepared," she said.

The USGS has a 30-person team dedicated to oil-spill

responses. One of the team's focuses is working with the oil and gas industry, state and local governments, federal agencies and academia to research how oil spills are evolving and how best to deal with them.

Trego said these research initiatives include the Great Lakes Oil Center of Expertise, which is dedicated to research, training and testing focused on freshwater and cold-weather conditions during an oil-spill response.

The Coast Guard is also increasingly relying on uncrewed systems to more quickly and safely respond to spills, Trego said. New technology like sub-surface remote sensing uses long-range autonomous underwater vehicles to detect oil under ice in the Great Lakes. There is also an air focus, including remote-sensing unmanned aircraft systems (UAS).

"And where the fun is, is the NOAA MESDIS Marine Pollution Surveillance Program from space," Trego said. Remote-sensing UAS can see oil spills from space, characterize them and report the data.

Trego anticipates more UAS involvement in oil-spill responses in the future. "In the changing landscape of more oil exploration and more risk, traditional methods are no longer viable," she said. "When spills happen, we need to be ready and available to handle them."

Panelists Discuss Challenges in Navigating Space as a

Warfighting Domain

Space may have been the final frontier for the Starship Enterprise, but it's the current frontier for the worlds' fighting forces. As nations race to conquer this military high ground, the U.S. Department of Defense and private industry are increasingly working together to ensure American warfighters' place in space now and in the future.

During the Monday afternoon panel, "Space: The 5th Warfighting Domain," four representatives from the military and industry discussed the following questions from moderator Theresa Hitchens, a reporter with Breaking Defense, and audience members.

We've heard a lot about how the threat environment is changing. What keeps you up at night in that regard?

VADM Jeffrey Trussler, USN, deputy chief of naval operations for information warfare, N2/N6, Office of the Chief of Naval

Operations/Director of Naval Intelligence, said he's concerned about both the expanded use of the RF spectrum and China's efforts in space.

Because the Navy is reliant on RF, it needs to look at the best ways to use the RF spectrum as the space layer proliferates, he said.

Meanwhile, China has made its intentions for space supremacy public knowledge, and that's earned the attention of the Department of Defense.

"I've never seen a department more focused on an adversary and what we need to do," Trussler said. "The work we're doing in space, we're going to move out and move out fast."

Derek Tournear, PhD, executive director, Space Development Agency, discussed resiliency. His company launched 10 satellites on Sunday as part of its effort to put hundreds of small satellites in the sky rather than a few large ones that are easier to shoot down. Tournear said Space Development Agency is also concerned about common mode failures, especially cyberthreats, RF spectrum threats, and supply-chain threats.

Steven Butow, director, space portfolio, Defense Innovation Unit, said from a commercial standpoint, economic security and national security are intertwined. That makes it important to work across all levels of government for financial stability.

How do you deal with overclassification?

Butow said an argument can be made that moving fast is more effective than locking down information for long periods of time.

"Industry knows how to lock down information, but also how to release it and commoditize it," he said.

Ed Zoiss, president, space & airborne systems, L3Harris

Technologies, said a private company can be a matchmaker when its customers are working on similar classified technologies.

Trussler believes the problem isn't just overclassification. "Even our simple acquisition processes give information to China," he said. "It's about how we share information and doing it right. It's not as simple as overclassification."

Tournear made the case for selectively releasing information. "We can't deter if can't talk about it. Thirty years ago, we couldn't say 'national reconnaissance office,' but the Soviets already knew we had it," he said. "We need to make sure we know what we need to protect, but also talk about what we're doing so there's a deterrence factor."

LEO (low earth orbit) has thousands of satellites. How concerned are you about debris, signal interference and collision?

"Two thoughts: Space is congested, and space is big – it depends on the orbital regime," Tournear said. There can be unintended consequences to mitigating congestion, but he believes that policies that promote being a good steward in your orbital slot can be effective.

Butow pointed out that there are more planes in the U.S. airspace than satellites in LEO, but the planes are regulated. That's why he thinks it's important that a space traffic commission be formalized and adopted on a global scale.

Transition Connection

Provides Career Support for Service Members

Over a million men and women serve as active-duty members of our military, with an additional 800,000 in reservist roles. Every year, approximately 200,000 of those service members transition out of the military and into civilian roles. That transition is not always easy.

Transition Connection is an important hiring and networking event that links everyone in the military community, from enlisted service members to veterans to military spouses and civilians, with organizations looking for the caliber of employees that come from having a strong military connection.

Navy League CEO Mike Stevens kicked off the event, introducing Dr. Ernie Rosado, Director of Military Outreach for Columbia Southern University. The Navy League has recently partnered with Columbia Southern to offer a new scholarship for military

spouses that grants 60 credit hours towards any degree program at CSU.

“You folks are critical in this next process for all these folks that are transitioning,” said Rosado. “I know you will match that individual that has been protected by the military for years. And now they’re stepping out and they’re by themselves with their families. So, help them out. Let’s do a good job today,” he said.

During the four-hour event, members of the military had the opportunity to meet with some of the leading employers seeking to make offers to individuals that are either transitioning out of military service, trying to find a job that offers flexibility for military families on the move, or looking for out-of-the box options and support for civilian employment.

First time participants from American Systems commented on the big turnout and were excited to assist service members with the hiring process. “We support a number of different types of programs throughout the country and enterprise,” said Ed Wakeley and Chris McBeth of American Systems. “I support mostly Navy waterfront programs,” commented McBeth. “So engineering, training of getting ships ready to get back out to the South China Sea.”

Amazon, a regular Sea-Air-Space participant, have pledged to hire 100,000 transitioning service members, veterans, and spouses over the course of five years, said representatives John Pierce and Matt McGury. “As transitioned service members and advocates, we’re here to help answer questions [and] give guidance,” said Pierce. He also stressed that many of the roles at Amazon are a good fit because they utilize similar skill sets. “A lot of our data center positions are cleared facilities […] operations mission critical facilities, very similar for military individuals. The skill sets that they offer work very well within our teams and the jobs that we have,” Pierce said.

Laura Hatcher, a 31-year Navy veteran turned photographer, wasn’t at the event to hire, but to provide professional headshots to attendees at no cost. “This is my second career, and the majority of my clients are transitioning veterans,

because that’s what I went through,” Hatcher said. “I understand it. And I love these kinds of events, mainly because you get to stay in the community and [help] a lot of people that are looking for jobs,” she said.

HII Dedicated to STEM

Amidst a maze of colorful exhibition booths, a bustling stream of kids and parents explore cutting edge tech, including 3D printers, tablet-controlled robots, rocket testing stations, and hands on (literally!) electricity experiments.

America’s largest shipbuilder, HII, is at the center of it all with a huge variety of interactive exhibit stations and lots of smiles from their enthusiastic staff. Grant Ronquillo and Kelsie Rountree (mechanical engineer and trade school

coordinator for HII, respectively) both talked about the fun being at the Navy League Expo, grinning as they watched kids learn how to weld in a virtual reality simulator.

President and CEO of HII, Chris Kastner, also spoke with Seapower about HII's dedication to STEM, including a rigorous internship program. "We have a good conversion rate from our interns, especially our technical interns, because we actually give them real work to do when they come into the company," he said. "They're not just doing busy work."

But ultimately, HII's focus is on the benefit to the larger community.

"If we don't invest our communities, in STEM, and make sure we have technical talent that can work in the shipyards, then we're not doing the right thing for the community," said Kastner.

Building a City

The Exhibit Hall under construction.

Armchair experts and motivational speakers the world over are fond of saying that Rome wasn't built in a day. Less an historical account of Roman expediency, the saying is meant to convey the idea that great things take time. Civilizations don't happen overnight. And certainly, building a city represents a commitment to an idea.

The sprawling city you see before you here at Sea-Air-Space 2023 also wasn't built in a day. But close. It took three.

Last Thursday, these exhibit halls were empty shells. Footsteps rang across football-field expanses, voices echoed, and dust motes – not bands – played in ballrooms. We got to work. Everyone, from Navy League staff to contractors and vendors, to exhibit builders, to operations and logistics experts rolled up their sleeves and began the process of turning nothing into something. And not just any something, but something amazing.

The exhibition booths themselves are an incredible feat on

their own. They showcase possibilities, and in many cases, fantastic realities of technology and innovation that will bulwark our sea services and support their missions in the years to come. The panel discussions and other events are built as well, and not only with the physical infrastructure of microphones, lights, speakers, and chairs. Our Navy League team built these events with dedication, with people, and with a commitment to an idea.

Our idea is this: What if we amass the best and brightest together for three days once a year, put our collective heads together, and create real solutions that affect the viability of our seapower. What if we change our world. What if.

Welcome to our city.