NAVSUP Continues to Refine Critical Supply Chain Support

Karen Fenstermacher, executive for strategic initiatives at NAVSUP

The pandemic has taught people around the world about the importance of efficient supply chains. They are even more critical for armed forces, as without reinforcement and supplies even formidable militaries can be stymied or defeated.

When the pandemic hit more than two years ago, Naval Supply Systems Command (Booth 1701), or NAVSUP, was already moving out with a wartime acquisition response plan.

“We were already underway, focused on what I’ll call our strategic portfolio of suppliers,” said Karen Fenstermacher, executive for strategic initiatives at NAVSUP. “That’s really our, our top 10, which reflects about 80-plus percent of our spend.”

COVID-19 largely shut down the United States by March 20, 2020, but thanks to those ongoing efforts, “by that weekend we were up and running with a survey mechanism to pulse our 900-plus suppliers,” she said.

The idea was to ensure NAVSUP had the necessary sensors or triggers “to do everything that we can to ensure that everybody that came into the crisis comes out of the crisis.”

The maritime supply base is prone to very cyclical demand, so “it was very important to keep a bead on the overall supply base, despite whether or not we had an active contract with these suppliers” by using a survey.

That tracked about 14 different dimensions, largely focused in

the beginning on the companies' access to personal protective equipment, or PPE, to enable them to get back to work. It also monitored how the impact on other industries, such as airlines and cruise ships, was affecting the defense industrial base, as many of those companies supply the airline and cruise industries as well.

Speeding Processes

The president invoked the Defense Production Act to help companies financially "and there were a number of other efforts that were underway to be able to provide the defense industrial base, in particular, with the opportunity to access monies," Fenstermacher said.

One such effort was to speed up the payment system so contractors could get paid sooner. Another used the NAVSUP survey to identify at-risk companies to have better access to business loans and investment dollars "to help these companies weather the storm, so to speak."

In recent years, the government has adopted a "whole of government" approach to build resilient supply chains and revitalize manufacturing, such as by expanding key capabilities and capacity, especially in critical areas such as semiconductors.

The ongoing chip shortage is another headwind faced by defense and other industries, but Fenstermacher says she's confident the whole-of-government approach will help, although there will continue to be supply chain challenges.

One of the few major pieces of legislation to be approved this year was the infrastructure bill, which includes $550 billion in new spending to improve the nation's roads, bridges, transit systems and internet access.

"That's going to be a piece of it [the whole-of-government approach]," Fenstermacher said. "Time will tell as the

infrastructure bill evolves and continues to execute, how that specifically impacts us. But I'm anticipating it to be in a positive way."

Roundtables

Another tool NAVSUP has employed are roundtables with industry. In 2021, NAVSUP held a session with its 50 top industry partners focused on speeding the end-to-end supply chain, particularly for repair turnaround time, and then followed that up by working with the individual companies.

"We found that to be tremendously successful," Fenstermacher said.

Roundtables help bring industry up to speed on what's been accomplished already in bolstering the supply chain and what's coming next. One pending effort will be to leverage public-private partnerships with aviation and ship repair depots.

"So, that's something that we have on the horizon and are beginning to prepare. We found it [using roundtables] to be a very effective way to communicate and to create these calls to action, if you will, that are required in our space," she said.

Kid-Friendly Expo Showcases STEM to Kick Off Sea-Air-Space 2022

(Left to right) Trisha Anand, 8, and Mary Bodoh, 9, enjoy playing with bubbles after a science experiment at STEM Expo 2022. *SOLARES PHOTOGRAPHY*

The 2022 STEM Expo, which kicked off Sea-Air-Space 2022 April 3, marked the largest crowd yet for the science- and fun-focused event, geared to students in the fifth to 12th grades.

The popular expo featured hands-on "mad science" demonstrations with dry ice, electricity, chemical reactions, robots, military animals and more, including nearly two dozen exhibits.

A performance by the U.S. Coast Guard Drill Team led the event, which also included a large and very popular version of the game Battleship; a nitrogen ice cream station, an edible version of some of the mad science experiments; and a unique building event with Tinker Man, who builds large, complex structures from children's toys.

"It is great to see so much attention at the booth," said Heather Deagle, a member of HII's STEM team. "These kids are the future. It is their talent and contributions that will

have an impact on shaping future technologies – and being part of this STEM event is a great opportunity to display our commitment to the education of these future generations."

The expo encourages students to pursue coursework and careers in STEM and reaches underserved communities to promote STEM education.

The "champion" sponsor for the event was HII, whose booth included everything from a 3D printer to a REMUS unmanned underwater vehicle. Sponsors included CACI, L3Harris, Raytheon Technologies and Lockheed Martin.

Through the years, HII has made numerous investments in STEM education programs; partnerships with local high schools, community colleges and technical schools to develop trade-based curriculum; summer internships for both students and teachers; and industry-leading apprentice schools at the company's two shipyards.

Q&A: Navy International Programs Office, Rear Adm. Anthony E. "Tony" Rossi, Deputy Assistant Secretary of the Navy, International Programs, Director, Navy IPO

Rossi, center, stands in front of an Foreign Military Sales-delivered Royal Saudi Naval Forces MH-60R with the RSNF aircrew at the World Defense Show 2022 in Riyadh, Saudi Arabia. *NIPO*

The Navy International Programs Office manages and implements international security assistance programs, cooperative development programs and technology security policy. Led by Rear Adm. Anthony E. "Tony" Rossi and Steve Bowdren, Navy IPO is a reporting unit to the Assistant Secretary of the Navy for Research, Development and Acquisition and is an Echelon II Command to the chief of naval operations. It supports regional combatant commanders' and Navy leadership's efforts to build

vigorous relationships with U.S. maritime security partners around the world. Rossi answered questions from Seapower *Deputy Editor Brett Davis.*

With all that's going on in the world, it seems NIPO's mission is more important than ever. To what extent do fast-moving threats, such as the war in Ukraine, affect your work?

Rossi: Our mission is to strengthen global maritime alliances, partnerships, and coalitions through security and technology cooperation. In today's environment, multilateral relationships are more important than ever, particularly in areas of defense and security. As part of the Department of Defense, NIPO's mission supports a whole-of-government approach to Russian aggressive actions toward Ukraine.

How does NIPO's work strengthen U.S. security?

Rossi: NIPO is a key player in strengthening relationships with our allies and partners while enhancing interoperability and increasing maritime domain awareness. Investing in these relationships is critical in defending sovereignty from authoritarian influence and coercion.

How would you characterize the current state of interoperability between the U.S. and its allies?

Rossi: First, I think it's important to define interoperability. I define it as platforms or systems that can operate together to complete a mission. That said, I think that the current state of interoperability between the U.S. and our allies and partners is always improving and expanding. Each year we hold cooperative exercises and execute cooperative deployments to test and prove our interoperability. For example, last year the U.S. Marine Corps conducted a first-ever cross-decked operation highlighting interoperability of the F-35B, underlining the strategic importance of the joint integration with the United Kingdom Carrier Strike Group. We also conducted multi-carrier

operations in several theaters.

What are some ongoing challenges as you seek to create greater interoperability?

Rossi: As we continue to integrate more of our systems, the challenge lies within tying distributed sensors with distributed effectors that identify and stop potential threats over various networks and architectures. This not only is an ongoing challenge, but it hinders the ability for greater interoperability with our allies, given that they may have different systems, architectures or data standards. Even if our allies have the same systems as the U.S., there are other technical impediments that create a challenge, not to mention training and logistics that also need to be addressed to have a viable and sustainable interoperable capability.

Rossi, center, stands with representatives from the Israeli navy, Ministry of Defense, Navy International Program Office,

and Office of Defense Cooperation as they tour the Israel's Haifa naval base. *Supplied by NIPO*

How important is it to have a full-spectrum approach for Foreign Military Sales, instead of just selling hardware?

Rossi: When FMS customers enter into an FMS case with the U.S., they aren't just purchasing a system. They're purchasing all the services that go with that system – training, spare parts, follow-on support, etc. We refer to this as the "total package approach," and it is our absolute advantage and strength in competing internationally. Eighty percent of the total cost of a platform or system over its lifespan is sustainment, spanning from equipment deployment to equipment decommissioning. A crucial element of any FMS contract we offer is sustainment: the provision of parts, services and training to ensure our product stays fully mission capable throughout its life cycle. There are international examples where this is not the case – a client nation's military receives shiny new equipment but is ultimately hamstrung by sustainment issues that hinder their ability to keep the equipment fully operational or render this capability moot.

What is the current operational tempo of the Foreign Military Sales program? Have there been more FMS transactions in recent months and years?

Rossi: If you look at FMS sales in the past few years, you would see the record-breaking $22 billion spike in 2018, which indicated the changing world as we transitioned out of the Cold War era. Since then, we have been averaging $11 billion-$12 billion in annual sales. In FY21, we had a 9% increase from the previous year, resulting in $12.41 billion in FMS execution. I would say that this has been maintained throughout the pandemic, and we are generally on track to reach it again this year. While we are maintaining our average, its important to note that FMS is a long and complex process, so most of these cases were in the queue before

COVID-19. We have seen countries reassessing their arms imports since the pandemic both positively and negatively. For example, Germany entered into a $1.7 billion FMS contract for P-8A aircraft and accompanying services and equipment.

Are you getting more FMS requests for certain types of systems?

Rossi: Tactical fixed- and rotary-wing aircraft remain most prevalent in FMS sales cases. However, in recent years, some allies have shown interest in acquiring state-of-the-art multimission surface ships and combat systems. This appears largely cyclic in nature, as some ally fleet assets are reaching the end of their lifespan. In addition, there has been a constant demand for weaponry and associated support systems.

What steps have you taken to speed up the process for Foreign Military Sales, and which has proven the most effective?

Rossi: The "Speed" initiative has been an ongoing effort at NIPO. Over the years, NIPO has been able to assess the FMS process and determine ways to compress the timeline. We have successfully been able to expedite delivery of coalition capacity and capability from when the requirement is understood to when the article or service is delivered. We have done this by implementing "tactical" fixes to tighten the process, but our major achievement to date has been in the area of disclosure policy.

Typically, developing this policy, a one-to-two-year undertaking, has begun after formal sales approval has been received. We now get a jump on the process – when it is deemed likely that an ally's sales case will be approved, we begin parallel development of disclosure policy. This could halve the time required for this phase of the FMS process.

We continue to reevaluate what we do and how we do it in the spirit of [Chief of Naval Operations Adm.] Gilday's drive for

the Navy to “get real, get better.”

Rossi, left, met with Director General Bang Guckcheol from the Republic of Korea’s Defense Acquisition Program Administration, located at the Washington Navy Yard. *NIPO*

What impact has the worldwide pandemic had on your operations, and have you made any permanent changes in response to it?

Rossi: While we recognize that the COVID-19 pandemic disrupted some planned production and delivery, we have seen at the height of the pandemic countries sign large contracts for major arms. INDOPACOM [Indo-Pacific Command], EUCOM [European Command] and CENTCOM [Central Command] portfolios experienced the greatest volume: INDOPACOM expects over $6 billion in

sales across nearly 500 FMS cases, EUCOM over $5 billion across over 500 cases and CENTCOM, $1.25 billion across 230 cases.

In terms of volume, we have actually seen about a 15-20% increase in sales and support during the pandemic. This includes LORs [letters of request] received, LOA/amendments [letters of offer and acceptance], third party transfer, international agreements, TS&FD [technology security and foreign disclosure] policy achieved, even partner/industry engagements.

As we emerge from COVID, the Navy as a whole is now assessing lessons from operating largely remotely over extended time, and there are many positives. I can tell you NIPO aptly met the challenges of working from home and was even able to ramp up to meet a surge in business. Now we, like many organizations, are looking to how we return to the workplace more while keeping what worked during COVID and changing what didn’t.

Mayflower Autonomous Ship to Attempt Second Ocean Crossing With AI Captain

The Mayflower Autonomous Ship begins its first, ill-fated Atlantic Ocean crossing attempt. / *IBM*

Roughly a year after a mechanical problem forced it to turn around, the Mayflower Autonomous Ship is poised to cross the Atlantic, traveling autonomously from Plymouth, United Kingdom, to Plymouth, Massachusetts.

The voyage will showcase IBM's AI Captain, the artificial brain of the operation that allows Mayflower to chart its own course across the ocean and see and avoid obstacles along the way. That's what sets Mayflower apart from other unmanned surface vessels, says Ray Spicer, vice president for defense and intelligence at IBM Federal.

"I think the key difference is the autonomous part," he told *Seapower* in an interview. "In a perfect world, we're gonna set this baby on its way from Plymouth, U.K., and not have to interfere at all. We'll just watch it with pride as it sails along and makes its own decisions based on how well we trained it. And then it appears in Plymouth, Massachusetts, at the end of the journey."

The project is led by marine research nonprofit ProMare, with IBM as lead technology and scientific partner.

The boat, a catamaran, originally set out on the voyage last spring but was forced to turn around when a connector for the onboard generator failed, filling the interior with exhaust fumes. No one was hurt – there's no human aboard – but the boat was slowed significantly so the team decided to turn it around.

The brains of the boat, the AI Captain, worked fine and continues to do so, Spicer said. The system was trained using millions of images to recognize potential hazards, from seagulls to paddleboarders to buoys.

"We taught it to recognize objects, and the more experience it gets doing that, the better the training," Spicer said. "When we put it out there, if it ran into something that it didn't recognize, then we taught it, OK, that's a seagull … make sure you recognize that in going forward. I would say anytime that it encounters something that we didn't anticipate, we can see it from the camera, and we can teach the system what it is actually looking at."

The Mayflower conducts sea trials in March 2021. / *IBM*

AI and COLREGS

Once underway, Mayflower will rely on its artificial intelligence and sensors to abide by COLREGS, the laws that govern ship movement on the seas.

Human operators have to be updated on COLREGS after switching from shore assignments to sea assignments to make sure they're current, but that's an easier process with an AI system.

Sailors and other human operators "always had to go through COLREGS, pass the test, make sure you were current, you were refreshed. With an AI/ML [artificial intelligence/machine learning] system like this, you just feed it the COLREGs one time, it chews them up and it won't forget," Spicer said.

The 3,200-mile trip from Plymouth to Plymouth is expected to take 10 to 12 days, depending on weather and other conditions that might pop up.

Mayflower carries visual sensors, infrared, cameras and a navigation system that allows it to use dead reckoning if it loses satellite connection.

"It's also mapping the environment as it goes, because really the primary purpose of the vessel is to do oceanographic research," Spicer said. "So, it's listening to underwater sounds and it's taking temperatures and [measuring] salinity and all kinds of things in the environment," including measuring the amount of microplastics in the ocean.

Once it arrives on the East Coast of the United States, Mayflower is expected to take a victory lap that could take it from Norfolk, Virginia, to Washington, D.C., to Boston.

Flexible AI

The Mayflower's brains are descended from IBM's pioneering work in artificial intelligence and machine learning,

including the Deep Blue chess computer that beat Garry Kasparov to Watson, the AI system that won on “Jeopardy!” in 2011.

“The interesting part to me is we took technologies that were already existing within IBM, and we just adapted them to this vessel,” Spicer said, including an operational decision manager used in the financial industry to verify credit card transactions.

“You swipe your credit card, and it runs hundreds of algorithms to make sure you’re you, and you’re not a bad guy, and then it lets the transaction go through. We use that same technology, we just adapted it to this use case,” Spicer said.

The ship’s systems generate a data tree, so researchers can see why it made a given decision at any point along its route.

Ultimately, the AI Captain could be used for much more than just piloting a small boat across an ocean.

In a video series about the Mayflower project, Brett Phaneuf, managing director of the program, said he envisions it one day guiding spacecraft on other worlds.

“Years from now I’d love to see our AI Captain on another vessel in an ocean on Europa or orbiting another planet. That would be ideal, and I don’t know if I’ll live to see it, but this is the start.”

Spicer agrees, saying, “I think the sky’s the limit. I mean, we’re talking about an application of a surface vessel, but think about underwater, think about in the air, think about space. We’ve gotten lots of interest from organizations like NASA and NOAA [the National Oceanic and Atmospheric Administration] … this [the Mayflower] is just the tip of the iceberg, I think.”

Center for Maritime Strategy Hosts Ribbon Cutting

Navy League CEO Mike Stevens, Rep. Elaine Luria (D-Virginia), former Chief of Naval Operations Adm. John Richardson, Navy League President David Reilly and Center for Maritime Strategy Dean Jamie Foggo cut the ribbon on the new CMS. *NAVY LEAGUE / Brett Davis*

ARLINGTON, Va. – The new Center for Maritime Strategy at the Navy League of the United States held its ribbon-cutting opening ceremony on Jan. 31, with the center's first dean, retired Adm. Jamie Foggo, saying it will provide thought leadership and advocacy for all the sea services and advocate for a strong industrial base to build the needed platforms that support them.

"Ninety percent of the world's traded goods go via the sea …

there are a lot of actors and factors out there that threaten these sea lines of communication," Foggo said during the ceremony at the Navy League building in Arlington, Virginia.

He noted the last National Defense Strategy called out five adversaries: China, Russia, Iran, North Korea and violent extremist organizations, all of which remain formidable opponents.

Foggo cited a speech by former Chief of Naval Operations John Richardson about the narrow margin of victory at Midway, which turned the tide in the Pacific in World War II.

"With adversaries surrounding us and our interests, resources tight, and lots of domestic concerns at home, the margins to victory in any future conflict may once again be razor thin," Foggo said. "It's our goal in the Center for Maritime Strategy to help the maritime services in collaboration with our leadership in the administration and Capitol Hill, think through this and come up with a winning combination of strategy, force structure, and resources."

Rep. Elaine Luria, D-Virginia, a two-decade Navy veteran, speaks at the CMS ribbon cutting. NAVY LEAGUE / Brett Davis

Congressional Viewpoint

Rep. Elaine Luria, D-Virginia, a 20-year Navy veteran and vice chair of the House Armed Services Committee, was the keynote speaker at the event.

"We need a real center like this who can think through and justify" the Navy's needs, including the number of ships required to fulfill its mission, Luria said.

In the days of President Theodore Roosevelt, a former under secretary of the Navy who supported the founding of the Navy league, shipbuilding was robust, Luria said, and "that was part of the American psyche."

The message about the importance of the sea services needs to "get outside of this room" and be part of the "dialogue with the American people."

Attendees at the event included active-duty admirals, congressional staffers, retired flag officers, naval attaches from allies and partners from around the world, representatives from prestigious think tanks and leaders from industry.

Center for Maritime Strategy Dean Jamie Foggo discusses the new center's logo. NAVY LEAGUE / Brett Davis

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DARPA Selects BAE Systems to

Advance Autonomy Software for Multi-Domain Mission Planning

BAE Systems will further develop software enabling semi-autonomous, multi-domain mission planning under a new DARPA contract. *BAE SYSTEMS*

BURLINGTON, Mass. – BAE Systems Inc. has received a $6.5 million Phase 2 contract from the U.S. Defense Advanced Research Projects Agency (DARPA) to further develop software that will enable semi-autonomous, multi-domain mission planning. The Phase 2 award under the Adapting Cross-Domain Kill-Webs, or ACK, program follows a successful Phase 1 demonstration.

As part of Phase 1, BAE Systems' FAST Labs research and development organization, along with teammates Carnegie Mellon University and Uncharted Software, created software called the Multi-domain Adaptive Request Service. The Phase 1 demonstration highlighted the software's ability to update a plan in real time during a live exercise by ingesting information feeds to track the state of planned tasks, and then generating options to adapt the plan to insert new tasks. The Multi-domain Adaptive Request Service software adapts a plan with 100s of missions to insert tasks against new targets, requiring only fractions of a second per target added.

Under Phase 2, BAE Systems will continue to mature and advance the software to scale up the capabilities designed to help operators make informed decisions by automatically identifying available assets across domains, and then rapidly assessing the costs and benefits of using those assets when adapting mission tasks. Phase 2 is a step toward the ultimate goal of the program: demonstrating the techniques in a full scale, operationally realistic setting.

“Autonomy is a critical enabler for multi-domain mission planning,” said Chris Eisenbies, product line director of the Autonomy, Controls, and Estimation group at BAE Systems. “The Phase 2 award will focus on advancing the software designed for military operators to leverage battlespace resources from across various domains, including space, air, land, and sea, for more effective, efficient missions.”

The software builds on BAE Systems’ robust autonomy portfolio and 20-year history pioneering autonomy technology. Work on the ACK program is being performed at the company’s facilities in Burlington, Massachusetts and Arlington, Virginia.

Coast Guard Rings in Birthday at Sea-Air-Space

Coast Guard and Navy League officials celebrate the service’s 231st birthday on Aug. 4. *NAVY LEAGUE*

NATIONAL HARBOR, Md. — The U.S. Coast Guard celebrated its 231st birthday on Aug. 4 and Commandant Adm. Karl Schultz and service officials said it is increasing cooperation with international partners, working with industry on energy projects such as wind farms and making changes to increase diversity and guard retention.

“I think it’s an exciting time for us,” Schultz said, telling the audience at Sea-Air-Space 2021, “let us figure out where we can team up with you.”

Ann Castiglione-Cataldo, director of international affairs and foreign policy, said the service is working to build capable

partnerships around the world to tackle such issues as illegal, unreported, and unregulated fishing and climate change.

“All coast guards are grappling with this,” she said.

Rear Adm. John Mauger, assistant commandant for prevention policy, said his office is working to maintain safe use of the waterways for all users, which includes working with states and localities on installing coastal wind farms and assisting with commercial space launch operations.

There are currently only five wind turbines active off of Rhode Island and two in Virginia, Mauger said, but many more projects are in the works, and the service is advising on their location to help maintain access to waterways.

Commercial space launches are also coming to the fore. The Coast Guard helps keep waterways clear near launch sites. In the old NASA days, that just meant monitoring areas in Florida and Texas, but commercial space launches can occur from many more places, including floating platforms.

The Coast Guard has had issues with retaining female Coast Guard personnel, said Michel Godfrey, the director of civilian human resources, diversity and leadership. At one point, retention rates past the 15-year mark for women lagged behind men by 10%, but recent efforts have cut that to 3%.

One such effort is the parental leave program, which pulls in Coast Guard reservists to temporarily replace service members on maternity leave.

“They come back and they are a stronger member of the Coast Guard,” Godfrey said.

Schultz said, “Talent management is where we win or lose in the Coast Guard.”

After the presentation, Navy League National President David

Reilly and CEO Mike Stevens presented Schultz with the Admiral Arleigh Burke Leadership Award, the Navy League's highest honor. He then celebrated the Coast Guard's founding by Alexander Hamilton with a cake.

IBM Leverages Hybrid Clouds and AI to Enable New Technology

Ray Spicer, shown here in IBM's space in the Maryland pre-function lobby, says the company is focusing on hybrid cloud computing and AI. *NAVY LEAGUE*

IBM is leveraging hybrid cloud computing and AI – what it calls augmented intelligence – to create new technology systems, such as its Mayflower unmanned surface vehicle, capable of making its own decisions while far from port.

Ray Spicer, a retired U.S. Navy rear admiral who is now vice president of defense and intelligence at IBM, says "hybrid cloud and AI is where the company is really focused these days, very heavily."

Rather than concentrating data into one large cloud, IBM is able to work with various types of clouds, whether they are personal or public, small or massive.

"Having all those clouds being able to uplink together is the way to go," Spicer said.

A hybrid cloud scenario allows the company to "containerize" apps that can pluck the data they need from a cloud where it resides, which "allows you to move the workloads to the data"

rather than the other way around.

An example is the computing system Watson, which famously won on “Jeopardy!” in 2011. It has only gotten smarter since then and has been broken into component segments aimed at different markets, from financial operations to customer service to health care.

This sort of flexibility contributed to Mayflower, which leveraged technology from other industries. For example, software aimed at enabling rapid fraud detection can also be used to help Mayflower make rapid decisions on the high seas.

This sort of AI is helpful for things like collision regulations, or colregs, the rules of the sea, Spicer said. Sailors forget them from time to time and have to be retrained, but “you teach AI one time, and it doesn’t forget.”

US Facing ‘Pearl Harbor Moment’ From Cyber Attacks, Vice Adm. Trussler Says

Vice Adm. Jeffrey Trussler says cyber attacks are something that now threaten every American. *NAVY LEAGUE / Lisa Nipp*

NATIONAL HARBOR, Md. — Vice Adm. Jeffrey Trussler, deputy chief of naval operations for information warfare and director of naval intelligence, said cybersecurity threats to the United States are such that “frankly, where we sit today in 2021, we ought to be having one of those Pearl Harbor moments without the Pearl Harbor.”

Trussler spoke on a panel at Sea-Air-Space 2021 panel on "Cyber Today's Fight, Tomorrows Capabilities," along with Rear Adm. Michael Ryan, commander of U.S. Coast Guard Cyber Command, Karen Van Dyke, director for positioning, navigation, and timing and spectrum management at the Department of Transportation, and Ryan Roberts, senior manager of cyber and strategic risk at Deloitte.

Trussler said cyber attacks – such as the one that disabled the Colonial Pipeline, affecting the flow of oil along the East Coast and Southeast – shows that the threat is no longer just about defense and security, but "you could be impacted personally from anywhere around the world, based on our dependency on technology … I'm worried that enough people aren't hearing, wow, it's a new world."

Ryan said the Coast Guard is issuing an update to its Cyber Strategic Outlook and wants to embrace innovation on the cybersecurity front, which is where industry can help.

"We understand the value of partnerships, particularly with those in the room," he said.

Van Dyke said from her point of view, a big fear is the jamming and spoofing of Global Positioning System signals.

"It's a weak signal coming from space," she said of GPS, and "it doesn't take much power to jam GPS over a wide area."

Jamming is a temporary threat, but spoofing can actually permanently disrupt communications, as a GPS user might lose access to their receiver for good.

"This is an increasing concern," Van Dyke said, and DoT is working with the Department of Defense to counter these and other threats.

Roberts said automation will take on a larger role when responding to future cyber attacks, as eventually humans will

be too slow.

If a major attack happens “and we convene a committee to decide what we’re going to do, we’ve already lost,” he said. “Over time, we’re going to have to remove that human in the loop and get to autonomous decision making.” It’s a scary thought, but “humans are not going to be able to respond quickly enough.”

Interagency cooperation is key to fighting cyber attacks, the panelists said. Trussler said he learned new things just by being on the panel, and said “Sea-Air-Space has done a really good job” in bringing together different viewpoints.

Ryan said the Coast Guard is already working with commercia shipping ports to assess their facilities so they can harden their infrastructure.

That’s a niche area for the service, he said, “but reflective of the fact this is a joint fight.”

Saildrone Voyager: A Unique Solution for 24/7/365 Maritime Domain Awareness

The Saildrone Voyager, a 33-foot sailboat-like vehicle primarily powered by wind and solar energy. *SAILDRONE*

According to the U.S. Coast Guard’s 2020 “Illegal, Unreported and Unregulated Fishing Strategic Outlook,” IUU fishing has replaced piracy as the leading global maritime security threat. Saildrone uncrewed surface vehicles (USVs) have sailed

more than 500,000 nautical miles collecting valuable data about the marine environment for fisheries research, climate science, and ocean mapping. Now, a new class of Saildrone vehicles equipped with radar, 360-degree cameras, Automatic Identification System (AIS) and proprietary machine learning algorithms makes Saildrone a unique solution for combating IUU fishing, narcotics interdiction, and other maritime domain awareness (MDA) activities, anytime and in any ocean.

The Saildrone Voyager is a 33-foot sailboat-like vehicle predominantly powered by wind for propulsion and solar energy for electronics, communications, and navigation. With an average speed of up to five knots, the Saildrone Voyager can operate continuously in the open ocean for up to 180 days while producing a minimal carbon footprint. Saildrone USVs can be deployed and retrieved from any oceanside dock and transit autonomously to and from the operating area.

Global Fishing Watch uses a combination of publicly available AIS data and satellite imagery to expose areas of illegal fishing activity. The Voyager fuses optical data and machine learning to detect targets that are otherwise not transmitting their position in real time. These detection events are then fused with other data sources – AIS and acoustics – to deliver a fully informed picture of the surrounding maritime domain. Stationed strategically, a group of Voyagers can deliver 24/7/365 protection of marine assets.

Saildrone possesses the world’s largest data set of images of the open ocean. Tens of millions of images, collected by the Saildrone fleet deployed all over the world during more than six years of operational missions, have been annotated with human analysis highlighting anything of interest – vessels, birds, icebergs, etc. With this enormous data set, Saildrone’s ML model automatically recognizes objects in real time, providing unprecedented situational awareness to remote command centers.

In October 2020, Saildrone performed a successful 30-day demonstration of MDA capabilities for the U.S. Coast Guard off the coast of Hawaii. Each week highlighted a specific real-world use case for persistent MDA: general traffic monitoring, IUU fishing, search and patrol and port security. Additionally, Saildrone USVs can conduct long-duration intelligence, surveillance and reconnaissance missions enabling narcotics interdictions.

Saildrone USVs also carry a robust payload of oceanographic and meteorological sensors for continuous high-resolution environmental monitoring above and below the sea surface. Optional sensors include an Acoustic Doppler Current Profiler (ADCP), which can help to identify conditions in which a loitering vessel might drift into a protected area, and multibeam sonar for high-resolution ocean mapping, necessary for improving safety of navigation.

Data is transferred in real time via a secure satellite network. Saildrone data can be viewed in the proprietary Saildrone Mission Portal or linked directly into existing architecture, for example, Minotaur via an API interface. The Saildrone Mission Portal provides a variety of tools – overlays of satellite products, model GRIB files, and ingestion of other assets such as ships, buoys, tagged animals, or other autonomous platforms – for on-the-fly mission analysis and fleet management.

Saildrone USVs are rugged and have a proven track record of performing long-duration missions in remote areas and extreme conditions. The Saildrone fleet has logged more than 13,000 days at sea in some of the most extreme weather conditions on the planet. They have tracked fish in the North Sea, surveyed ocean eddies off Africa, air-sea heat transfer in the Gulf Stream and discovered a shipwreck in the Gulf of Mexico. They have crossed the Atlantic Ocean in both directions, sailed up to the Arctic ice edge setting a northern latitude record for an autonomous vehicle of 75.49°N and survived Southern Ocean

storms to circumnavigate Antarctica.

The robustness of the underlying core components, a wind-powered vehicle capable of long-duration missions and a machine learning-based approach to vessel detection, makes Saildrone an ideal solution for persistent maritime domain awareness in any ocean.