

First MQ-25 Unmanned Air Warfare Center Installed Aboard Bush



From Naval Air Systems Command, Dec. 23, 2024

PATUXENT RIVER, Md. – The Navy recently installed the world’s first Unmanned Air Warfare Center (UAWC) aboard USS George H.W. Bush (CVN 77), where Air Vehicle Pilots (AVPs) will control future MQ-25 Stingray airborne operations.

This major installation was a multi-year effort coordinated across multiple ship availability periods and the ship’s deployment schedule.

The CVN-based control room, known as the UAWC, includes software and hardware systems that make up the first fully operational and integrated Unmanned Carrier Aviation Mission Control System (UMCS) MD-5E Ground Control Station (GCS). UMCS is the system-of-systems required for the MQ-25 air vehicle command and control and is critical to the unmanned aircraft

refueler's operations.

"CVN-77's UAWC lays the foundation for how the U.S. Navy will operate and control unmanned aircraft, and perhaps other unmanned vehicles, with UMCS," said Unmanned Carrier Aviation Program Office Manager Capt. Daniel Fucito. "These systems will initially support the MQ-25 but also future unmanned systems, such as Collaborative Combat Aircraft, that comprise the Air Wing of the Future."

The GCS, developed by the Navy, includes Lockheed Martin's Skunk Works Multi Domain Combat System (MDCX), the power behind the GCS, along with additional supporting equipment and hardware. The hardware installed in the racks and cockpits is the baseline for the production systems currently being fabricated for installation on CVNs 70, 71 and 76 beginning in fiscal year 2025.

"The support we received from all the organizations was incredible," said Gordon Carlon, acting UMCS CVN installation lead. "Our program is accomplishing things on a much faster timeline than any other normal startup program."

The program office's UMCS team worked with multiple program offices, systems commands and shipyards to integrate the UAWC into existing networks and the carrier architecture. The Naval Air Warfare Center Aircraft Division Webster Outlying Field Alteration Installation Team, AirWorks and Lockheed Martin assisted with the coordination and physical installation of the UAWC while Naval Sea Systems Command, Norfolk Naval Shipyard and CVN-77 organized schedules, equipment and logistics.

Early next year, CVN-77 will lead the first at-sea testing of the UAWC's operational networks, building on initial network testing with a simulated GCS that took place in January aboard USS Abraham Lincoln (CVN 72).

"This will be the first time the AVPs from Unmanned Carrier-

Launched Multi-Role Squadron (VUQ) 10 will operate the MD-5 from an aircraft carrier. They will use the actual GCS hardware and software aboard CVN-77 to communicate with a simulated air vehicle in the lab in Pax River," said Joe Nedeau, program office UMCS lead.

The program office is the lead systems integrator for MQ-25, working closely with its two prime industry partners, Boeing and Lockheed Martin, to integrate seamlessly the MQ-25 into carrier operations, including deck handling, taxiing and launch and recovery. When operational, MQ-25 will provide an aerial refueling capability to extend the range and flexibility of the carrier air wing.

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From SECNAV Public Affairs, Jan. 4, 2025

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USS Montana Arrives to New Homeport of Pearl Harbor



From Lt. J. G. Paul Fletcher, Commander, Submarine Force, U.S. Pacific Fleet Public Affairs, Dec. 27, 2024

JOINT BASE PEARL HARBOR-HICKAM, Hawaii – The Virginia-class fast-attack submarine USS Montana (SSN 794) arrived at Joint Base Pearl Harbor-Hickam following a change of homeport from Naval Station Norfolk, Virginia, Dec. 23, 2024.

Montana's arrival marks the ninth Virginia-class fast-attack submarine homeported at Joint Base Pearl Harbor-Hickam, and the submarine will be assigned to Submarine Squadron 1.

"We're all very excited to be here in Pearl Harbor and we appreciate the great welcome," said Cmdr. John Gilligan, commanding officer of USS Montana. "This crew did extraordinary work in Virginia to get to this significant milestone. It was an honor to go to sea with them. Now that we're here in the Pacific, we're ready and eager to get out there doing the work of the Navy."

Capt. Aaron Peterson, commander, Submarine Squadron 1, met the Montana pier side upon arrival to welcome the crew to their new home. "On behalf of the Pacific Submarine Force ohana, I enthusiastically welcome the officers and crew of the good ship Montana, with the warmth, culture, and spirit unique to the state of Hawaii," said Peterson. "I look forward to getting Montana's crew trained, certified, and out to sea to defend our nation, and our allies and partners from aggression."

Before completing its homeport shift from the east coast, Montana completed a post-shakedown availability at Newport News Shipbuilding and was re-delivered to the Navy in November 2024. "Through a great effort by the crew, working with our industry partners, we've completed our availability and rejoined the Fleet. We're ready to execute any task we're called upon to complete throughout the Indo-Pacific," said Gilligan. "The crew has been looking forward to executing this

change of homeport, reuniting with our families, and bringing the Montana community all together. We're thrilled to join the team here in Hawaii and stand ready to defend our nation."

Commissioned on June 25, 2022, at Naval Station Norfolk, Montana is the second warship to be named after the state, following the armored cruiser USS Montana (ACR 13). The boat is more than 377 feet long and can displace nearly 7,800 tons. Montana has a crew of approximately 140 Sailors and is capable of supporting various missions, including anti-submarine warfare, anti-surface ship warfare, strike warfare, and intelligence, surveillance, and reconnaissance.

The U.S. Pacific Fleet Submarine Force provides strategic deterrence, anti-submarine warfare, anti-surface warfare, precision land strike, intelligence, surveillance, reconnaissance, and early warning, and special warfare capabilities around the globe.

For more information, contact csp_pao@us.navy.mil or visit our website at <https://www.csp.navy.mil/>.

PNSY Delivers Texas as Battle-Ready Asset to the Fleet



By Portsmouth Naval Shipyard Congressional and Public Affairs Office, Dec. 19, 2024

KITTERY, Maine (Dec. 17, 2024)-USS Texas (SSN 775) successfully completed sea trials off the coast of New England this week, marking the successful conclusion of its Depot Modernization Period (DMP) at Portsmouth Naval Shipyard (PNSY).

The Texas Project Team, encompassing various trade workers, engineers, and material support personnel at PNSY, worked alongside the boat's crew to get Texas returned to the fleet battle-ready. Getting advanced systems and capabilities into the hands of warfighters at the tip of the spear is the ultimate goal, and PNSY's highly skilled workforce enabled Texas to get back in the fight.

PNSY's success in delivering Texas demonstrates how the nation's public shipyards are looking beyond traditional workflows to meet the Chief of Naval Operations' objective of putting more ready players – combat-ready platforms – on the field. “We used an aggressive strategy to have a ‘get real’ date and a ‘get better’ date to return this vital asset back to the fleet,” said Shipyard Commander Capt. Michael Oberdorf. “By moving ‘all ahead flank,’ with urgency and purpose, we were able to pull Texas’ delivery to the left from our agreed ‘get real’ date.”

Submarine Squadron Two, located at the shipyard, supported Team Texas and all they achieved while in a maintenance environment. “Texas represents a shining example of resilience and readiness, returning to the fight tougher and stronger than ever,” said Commodore, Submarine Squadron Two Capt. Jason Deichler. “The team faced every challenge with determination and delivered outstanding results, ensuring the submarine force remains the world's most lethal apex predator. Their exceptional teamwork, innovative maintenance practices, and tireless commitment to mission success set a new standard for

excellence.”

“Serving as Commanding Officer of Texas is an honor and a privilege. I have had the opportunity to lead and mentor the finest Sailors in the Navy [and] to work with talented members of the Texas project team,” said Commanding Officer of Texas Cmdr. Chad Ingle. “Kevin Belisle, Texas project superintendent, led an outstanding team at our Navy’s best shipyard. I am incredibly proud of what the officers and crew of Texas have accomplished. The depot modernization period has been challenging for the crew, and the last six months of testing have been extremely tough. The reward for the crew’s hard work is returning a fully repaired and modernized battle-ready submarine to the fleet,” said Ingle.

Attack submarines are multi-mission platforms enabling five of the six Navy maritime strategy core capabilities – sea control, power projection, forward presence, maritime security, and deterrence. They are designed to excel in anti-submarine warfare, anti-ship warfare, strike warfare, special operations, intelligence, surveillance and reconnaissance, irregular warfare and mine warfare. Attack submarines project power ashore with special operation forces and tomahawk cruise missiles in the prevention or preparation of regional crises.

A DMP is a maintenance and modernization period in which a Navy submarine is placed in dry dock and undergoes extensive repair and modernization. During a DMP, a submarine receives major overhauls, repairs, structural inspections, and mechanical and electrical system replacements.

As America’s leader for attack submarine maintenance and modernization, PNSY is enhancing critical warfighting capabilities by safely delivering first-time quality work enabling our undersea warfighters to be battle-ready when called upon.

US Navy Declares Initial Operational Capability for the Next-Generation Jammer Mid-Band System



An EA-18G Growler from VAQ-133 launches from USS Abraham Lincoln (CVN 72). (U.S. Navy photo)

From Naval Air Systems Command, Jan. 6, 2025

PATUXENT RIVER, Md. – The U.S. Navy declared initial operational capability for the Next Generation Jammer Mid-Band (NGJ-MB) system in December, bringing a quantum leap in capability over legacy systems with drastic increases in power, target flexibility and jamming technique for naval

aviation operations worldwide.

“Next Generation Jammer Mid-Band improves our fleet’s warfighting advantage in the electromagnetic spectrum,” said Rear Adm. John Lemmon, Program Executive Officer for Tactical Aircraft Programs. “This system provides enhanced capabilities to deny, distract and disorient adversaries’ radars, protecting our naval aviators and allowing them to carry out their missions in contested airspace.”

The fleet got a preview of the jammer’s high-end capabilities during Abraham Lincoln Carrier Strike Group’s five-month deployment this year. [Electronic Attack Squadron \(VAQ\) 133](#) deployed with the system aboard the USS Abraham Lincoln (CVN 72), marking the first time Next Generation Jammer Mid-Band was used both deployed and in combat.

IOC signals that the design, testing and production of this capability meet the logistical needs of the carrier air wings and EA-18G Growler squadrons.

“What an incredible day for the U.S. Navy, our Australian partners, and the Airborne Electronic Attack (AEA) community,” said Capt. David Rueter, Airborne Electronic Attack Systems (PMA-234) program manager. “The achievement of NGJ-MB IOC is a positive reflection on the hard work, innovation and resilience from a dedicated team of government and industry professionals who have developed and fielded this critical capability to the warfighters.”

The NGJ-MB system, developed by Raytheon, an RTX business, is part of a larger NGJ system that will augment and ultimately replace the legacy ALQ-99 Tactical Jamming System currently used on the EA-18G Growler. NGJ-MB uses the latest digital, software-based and electronically scanned array technologies and provides enhanced AEA capabilities to disrupt, deny, and degrade enemy air defense and ground communication systems.

“NGJ-MB will boost our fleet’s ability to maintain spectrum

dominance. Yielding new capabilities is critical for addressing current and future threats. The era of isolated surface-to-air missile systems, which operate within a non-agile and limited frequency range, is behind us.” stated Lt. Cmdr. Michael Bedwell, EA-18G Naval Flight Officer and NGJ-MB Deputy Integrated Product Team Lead.

PMA-234 is responsible for acquiring, delivering and sustaining AEA systems, providing combatant commanders with capabilities that enable mission success.

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Future Attack Submarine USS Iowa Delivered to U.S. Navy



From the Navy Office of Information, Dec. 23, 2024

GROTON, Conn. – The U.S. Navy Submarine Force's newest attack submarine, the future USS Iowa (SSN 797) was delivered to the Navy on Dec. 22, 2024, marking the 12th battle force ship delivered to the Navy this calendar year.

SSN 797 is the 24th Virginia-class submarine (VCS) co-produced by General Dynamics Electric Boat (GDEB) and HII-Newport News Shipbuilding through a long-standing teaming agreement and the 13th attack submarine delivered by GDEB.

The boat's delivery represents the official transfer of the submarine from the shipbuilder to the Navy. The submarine and crew will now undertake a series of tests and trials before commissioning into active service and providing additional capability to the fleet.

"The Virginia-class submarine represents a Navy and industry commitment to deliver warfighting excellence to the fleet," said Capt. Mike Hollenbach, Virginia Class Submarine program manager. "Iowa is the second Virginia-class submarine delivered this year. With each delivery, the Navy continues to strengthen our Nation's undersea advantage."

Virginia-class fast-attack submarines provide the Navy with the capabilities required to maintain the nation's undersea supremacy well into the 21st century. They have enhanced stealth, sophisticated surveillance capabilities and special warfare enhancements that enable them to meet the Navy's multi-mission requirements.

Iowa is the sixth of 10 VCS Block IV configured attack submarines. NAVSEA will continue to put more players on the field—to ensure readiness for sustained high-end joint and combined combat.

SSN 797 is the fifth U.S. naval vessel, and first submarine, named after the Hawkeye State. Previous ships named USS Iowa

have included the highly decorated USS Iowa (BB 61), commissioned in 1943, which served in World War II and the Korean and Vietnam Wars.

SSN 797 was christened at GDEB shipyard in Groton, Connecticut, Jun 17, 2023, by the ship's sponsor, Ms. Christie Vilsack. The submarine's commissioning ceremony is slated for Apr. 5, 2025 in Groton.

Recognized as the Force Behind the Fleet, NAVSEA translates warfighter requirements into combat capability, enabling our Nation and our allies to project presence in peace, power in war, and assured access always.

<https://www.navy.mil/Resources/Fact-Files/Display-FactFiles/article/2169558/attack-submarines-ssn/>

SECNAV Names Navy's DDG 145 for Former Aircraft Carrier

From SECNAV Public Affairs, Jan. 3, 2025

NEW YORK – Today, Secretary of the Navy Carlos Del Toro named the Navy's newest Arleigh Burke-class Guided Missile Destroyer, the future USS Intrepid (DDG 145) aboard the former aircraft carrier which shares its namesake as the Intrepid Museum in New York.

DDG 145 honors the skilled, fearless crews of the four previous Navy ships to bear the name. This will be the fifth ship named Intrepid.

“It is deeply meaningful to stand aboard USS Intrepid—the

fourth vessel to bear the name, and whose proud legacy continues to inspire and remind so many visitors of the courage, resilience and sacrifice that define the U.S. Navy – and it is with profound respect that we also look to the future of our Navy from these decks,” said Secretary Del Toro. “It is my pleasure to announce that the fifth vessel named Intrepid will be an Arleigh Burke-class guided-missile destroyer, DDG 145, USS Intrepid, in honor of her past namesakes and the courageous service of all our Sailors globally from the South China Sea to the Red Sea.”

The first Intrepid was captured from the Barbary state of Tripoli in December 1803 where she sailed under the name Mastico. In February 1804, she then slipped into Tripoli harbor to set fire to the captured US Navy ship Philadelphia.

The second Intrepid was an experimental steam torpedo ram, operating from 1874 to 1892.

The third Intrepid was a receiving and barracks ship assigned to the Yerba Buena Training Station and Mare Island Naval Yard.

The fourth Intrepid, an aircraft carrier, served from 1943 to 1974. She supported the capture of the Marshall Islands in early 1944. In September, she struck targets in the Palaus and provided close air support to Marines on Peleliu. She helped liberate the Philippines and took part in the Battle of Leyte Gulf in October 1944, where her air wing helped sink or damage three aircraft carriers, four battleships, and a cruiser. She was later hit by multiple kamikazes. She participated in the invasion of Okinawa and attacks on mainland Japan. She was decommissioned in 1947 and recommissioned in 1952, becoming the first carrier to use American-built steam catapults. She supported NATO in the 1950s and 1960s, and recovered several NASA space capsules. Intrepid then joined Seventh Fleet to support combat operations off Vietnam, where she was lauded

for her speed in launching aircraft. In 1969, she returned to the North Atlantic, sailing there until decommissioning in 1974. She is preserved as a museum ship in New York City.

“We know this namesake ship will serve our Navy and our nation proudly as the former USS Intrepid did and continues to do, and we couldn’t be more thrilled that it begins its proverbial journey today at the Intrepid Museum,” said Intrepid Museum President Susan Marenoff-Zausner. “For all of its missions, the entire Museum team wishes the ships and its crew safety and success.”

Along with announcing the ship’s name, Secretary Del Toro also announced the sponsor for the future USS Intrepid (DDG 145) as Mrs. Betty Del Toro, who in her role as the ship’s sponsor will represent a lifelong relationship with the ship and crew.

Mrs. Del Toro is not only the wife of Secretary Del Toro but is also a lifelong supporter of the Navy and a steadfast advocate for Sailors and Marines. She served as a military spouse for 22 years, encompassing 17 military moves. She is passionate about matters that involve military families and children. Over the last three years, she has met with hundreds of service members, spouses and dependents.

“I am especially proud to serve as sponsor for a ship whose name embodies American courage and resilience,” said Betty Del Toro. “Having had the honor and opportunity to stand alongside my husband throughout his active duty Navy career and as the 78th Secretary of the Navy, I embrace this new role— one which emphasizes something that is deeply important to me; supporting Navy Sailors and Marines, and their families.”

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Cyber Horizon: AI, Sea Power, and a Potential Taiwan Conflict



Anduril's Sentry uses artificial intelligence to provide highly accurate, persistent autonomous awareness across land, sea and air. *Credit: Anduril*

In the evolving landscape of 21st-century warfare, the convergence of cyber capabilities, artificial intelligence (AI) and traditional naval operations presents unprecedented challenges and opportunities for the U.S. Navy.

As tensions in the Taiwan Strait escalate, the potential for a cyber conflict between China and the U.S. looms large, with far-reaching implications for global security and economic stability. As Commander Robert "Jake" Bebber argues in his article "Cyber Power is a Key Element of Sea Power" (Proceedings, December 2022), cyber capabilities are now inextricably linked to maritime dominance.

"China has employed cyber-enabled means to shift the balance of global sea power. Its broader neo-mercantilist campaign, spanning more than 60 countries, two-thirds of the world's population, links land, sea, financial, and digital corridors back to China," Bebber warned.

This strategy extends to critical maritime infrastructure, with Chinese influence over ports, logistics networks, and global telecommunications posing a significant threat to U.S. naval freedom of navigation and maneuver.

AI has drastically altered naval warfare, placing the U.S. Navy at a critical juncture, according to Paul Scharre in "The Navy at a Crossroads" chapter of the book "AI at War," published by the Naval Institute Press. Global AI capabilities have expanded dramatically because of the military robotics revolution, which was fueled by exponential gains in data and processing capacity. Due to their superior vision, pattern recognition, prediction and optimization capabilities, artificial intelligence systems serve as a general-purpose enabling technology. Modern AI systems behave similar to computing or electrical power and are capable of performing a wide range of military missions.

AI helps with predictive maintenance in marine applications,

which lowers costs and boosts military preparedness. Additionally, it facilitates data analysis and intelligence gathering, improves logistics and streamlines procedures. With more autonomous support vehicles, these advancements boost military decision-making and combat effectiveness. According to Scharre, AI will mostly be used by unmanned combat systems in naval warfare. The technology is revolutionary for naval operations since it can save energy consumption while increasing operational effectiveness.

Lessons from Ukraine

The ongoing conflict in Ukraine has provided unexpected insights into the role of information warfare and cyber operations in modern conflicts. In a fall 2023 Cyber Defense Review article, authors Chris Bronk, Gabriel Collins and Dan Wallach present several key findings that challenge pre-war assumptions and highlight new dimensions of warfare. With respect to cyber operations and infrastructure resilience, they found that contrary to expectations, Russian cyber activities had less strategic influence than anticipated. This challenges assumptions about the centrality of cyber efforts in kinetic warfare. Ukraine's digital infrastructure has shown remarkable resilience, attributed to better preparation and support from the global IT industry. Private sector companies like Google and Microsoft have played significant roles in Ukraine's cyber defense.

Regarding cyber tactics, while large-scale cyberattacks were less impactful, the conflict has seen an evolution. Russian activities have largely been confined to "wiper" attacks that delete critical data and ransomware operations. The integration of cyber capabilities with traditional kinetic operations suggests a more nuanced approach to warfare. In addition, the conflict has underscored the pivotal role of unmanned autonomous vehicles in intelligence, surveillance, and reconnaissance operations. Both cheap commercial drones and more sophisticated unmanned aircraft have proven

effective, transforming battlefield situational awareness.

Information warfare has emerged as a crucial aspect of the conflict. Ukraine has effectively dominated the narrative for public support through social media platforms, highlighting its importance in modern conflicts. On the other hand, unexpected communication challenges faced by Russian forces, including failures in encrypted communications, led to the use of unsecured methods, which Ukrainian forces exploited. The growing importance of open-source intelligence has also been demonstrated, with online images and videos providing comprehensive views of the war.

These findings suggest that while cyber operations remain important, their effectiveness can be mitigated by well-prepared defenses and resilient systems. The conflict highlights the increasing importance of information warfare, drone technology, and the integration of cyber capabilities with traditional military operations, with significant implications for future conflicts.

With the defense sector at the forefront of this technology transformation, private sector innovation is becoming more and more important in future naval warfare and cyber operations. Private corporations such as Anduril Industries and Accrete are prime examples of how AI and cutting-edge technology are changing military capabilities, especially in the naval sector.

Anduril's-Lattice AI platform transforms the way threats are viewed, evaluated and fought by combining data from several sensors to deliver real-time battlespace awareness. Its technologies also include AI-driven battle management systems, counter-drone systems and unmanned systems for improved underwater surveillance – all of which are essential for dealing with new aerial threats. With applications ranging from predictive maintenance to optimal logistics and intelligence gathering, these developments are consistent with

Paul Scharre's conclusions regarding AI's powers in perception, pattern recognition, prediction, and optimization.

In a similar vein, Accrete is using AI to automate decisions. Accrete's AI agents are well-known for their ability to reason, learn, forecast and make decisions at scale. They also produce knowledge graphs that condense human tacit knowledge and semantically unite complex data. Based in New York and first established as Mindfire in 2017, Accrete provides services to sectors such as supply chain risk management, social media story analysis and IT service management. Accrete's AI agents are improving decision-making in the public sector, just like Anduril's technologies are helping revolutionize naval and cyber operations. With significant ramifications for strategy, security, and operational effectiveness, these developments collectively highlight the vital role that private sector technology plays in developing both military and civilian capabilities.



Attendees observe the Anduril Sentry Tower during the NavalX SoCal Tech Bridge's Electric and Unmanned Logistics

Demonstration on Marine Corps Air Station Miramar, San Diego, California, June 23, 2021. *Credit: U.S. Marine Corps | Lance Cpl. Krysten Houk*

A Future Cyber War

In a future cyber war, there is a hypothetical but potential scenario involving Taiwan.

China might launch a sophisticated cyber-economic assault as an opening move. This strategy would likely aim to disrupt Taiwan's critical infrastructure, including power grids, banking systems and telecommunications networks. The goal would be to effectively isolate the island and cripple its defenses before any kinetic operations begin.

Drawing from the lessons of the Ukraine conflict, as outlined in "The Ukrainian Information and Cyber War" by Bronk, Collins and Wallach, we can anticipate such an attack would be multifaceted. It might include wiper attacks, ransomware to deny access to essential systems, and targeted disruptions of command-and-control networks. The authors note in Ukraine, contrary to expectations, such attacks had limited strategic impact due to robust defenses and international support. However, China, learning from Russia's experiences, might employ more sophisticated and overwhelming tactics.

The U.S. response would likely involve a multi-domain approach, leveraging both military assets and partnerships with private sector innovators. The Crowd Strike 2024 Global Threat Report claimed, "We're seeing the birth of a new kind of warfare, where economic disruption, cyber-attacks and kinetic operations are seamlessly integrated."

In this scenario, technologies from private sector innovators could prove crucial. Autonomous underwater vehicles could enhance the Navy's undersea surveillance capabilities, potentially detecting and countering Chinese submarine activities near Taiwan. Counter-drone systems might be vital in defending U.S. ships from swarms of autonomous Chinese

drones, a threat highlighted by the extensive use of drones in recent conflicts in Ukraine and the Red Sea. Data-fusion platforms drawing input from multiple sensors could be instrumental in managing the complex, multi-domain nature of such a conflict.

The scenario would likely also involve intense information warfare, as seen in Ukraine. Both sides would attempt to control narratives, influence global opinion and maintain morale. The U.S. and Taiwan might leverage open-source intelligence and social media platforms to counter Chinese propaganda and disinformation campaigns.

This hypothetical Taiwan scenario underscores the evolving nature of modern warfare, where cyber capabilities, AI-driven systems and traditional kinetic operations are increasingly intertwined. It highlights the critical role of private-sector innovation in national defense and the need for robust, resilient systems capable of withstanding and responding to sophisticated, multi-faceted attacks.

The economic implications of a cyber conflict, particularly in a Taiwan scenario, would be profound and far-reaching. In Bebbler's article in U.S. Naval Institute Proceedings from July 2017, "China's Cyber-Economic Warfare Threatens U.S.," he mentions three key sectors at risk – the semiconductor industry, undersea cable networks and maritime shipbuilding, sectors critical not only for economic stability but also for maintaining military technological superiority.

The semiconductor industry is particularly vulnerable. Taiwan produces more than 60% of the world's semiconductors and 90% of advanced chips. A disruption in this supply chain, as noted in "The Ukrainian Information and Cyber War" by Bronk, Collins, and Wallach, could severely impact various industries from smartphones to automobiles and – critically– advanced military systems. For the U.S. Navy, this could mean a significant setback in maintaining its technological edge in

areas like AI-driven systems, advanced radar and communications technologies.

Undersea cable networks, through which more than 95% of intercontinental internet traffic travels, represent another critical vulnerability. Cyber-attacks targeting these networks could disrupt global communications, including vital military command and control systems.

The maritime shipbuilding industry, crucial for naval power projection, is also at risk. Cyber-attacks could delay vessel construction, compromise design integrity or introduce vulnerabilities into ships' systems. This threat is particularly significant given the long lead times and high costs associated with naval shipbuilding programs.

The globalized nature of modern supply chains further exacerbates these vulnerabilities. As seen in the Ukraine conflict, disruptions in one sector can have cascading effects across multiple industries and nations. For naval readiness and national security, this means a cyber-attack on seemingly unrelated sectors could indirectly impact military capabilities. Moreover, the economic warfare aspect of cyber conflicts can include tactics like financial market manipulation, intellectual property theft and strategic acquisition of key technologies and resources. These activities, while not directly targeting military assets, can erode a nation's economic advantages and, by extension, its ability to sustain long-term military operations.

In summary, the economic dimensions of cyber warfare extend far beyond immediate financial losses, potentially reshaping global economic landscapes and fundamentally altering the balance of military power. Understanding and mitigating these risks is crucial for maintaining both economic stability and national security in the age of cyber conflict. As AI and cyber capabilities continue to evolve, the U.S. Navy faces both enormous challenges and unprecedented opportunities.

Success in future conflicts, particularly in a scenario involving Taiwan, will depend not just on ships, aircraft and submarines, but on the ability to dominate the invisible digital domain that underpins modern naval operations. In his Jan. 27, 2021, address to the Naval War College, Admiral Michael Gilday, the former Chief of Naval Operations, summarized the situation succinctly.

“The navy that masters AI and cyber warfare will control the seas of the 21st century,” he said. “Our mission is to ensure that navy is the United States Navy.”

Moving forward, the U.S. Navy must continue to invest in cutting-edge technologies, foster partnerships with innovative companies and develop adaptive strategies to navigate the interconnected realms of cyber, economic and kinetic warfare.

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Baltic Convergence: Region Emerges from Backwater to

Potential Battleground



The San Antonio-class amphibious transport dock ship USS New York (LPD 21), enters the port of Gdynia, Poland during the exercise Baltic Operations 24 (BALTOPS), June 18, 2024. *Credit: U.S. NAVY | Mass Communication Specialist 2nd Class Jesse Turner*

Operators, strategists and policy experts met in Gdynia, Poland, for the 2024 Littoral Op-Tech workshop earlier this year. The symposium, conducted at the Polish Naval Academy on the shore of the Baltic Sea, examined threats, challenges and opportunities in the Baltic Sea, which have been amplified since Russia's invasion of Ukraine.

While presentations addressed emerging technologies and warfighting capabilities to fight and win in the extreme littoral maritime environment of the Baltic Sea, much of the discussion explored the dynamic geopolitical situation, which is even more relevant due to the juxtaposition of Russia's aggression in Ukraine and the 75th anniversary of the NATO

Alliance. The event was sponsored by Saab AB, MBDA, BAE Systems and EmbeddedArt.

The workshop focused on the convergence of strategy, policy, technology, operations and tactics. First and foremost was the geopolitical significance of Poland and the Baltic Sea.

Like other Baltic countries, Poland has memories of Russian incursions and occupation. Poland shares a land border with Belarus, Ukraine, Slovakia, Czechia, Germany, and the Russian enclave of Kaliningrad (only 90 minutes from Gdynia by road). It also shares a maritime boundary with Denmark and Sweden. The distance between Poland's naval base at Gdynia and Sweden's base at Karlskrona is about 200 nautical miles.

"The Littoral OpTech series of workshops are about learning from each other," said retired Swedish navy Captain Bo Wallander. "While littoral environments and maritime traffic varies, all navies that defend or operate in coastal waters share some similar challenges."

The war in Ukraine has had a profound impact on Poland and its neighbors. As host, Rear Admiral Tomasz Szubrychat, the academy's director commandant, commented on the important timing of the event.

"All of the Baltic Sea is part of the EU and NATO, except for Russia," Szubrychat said. "Each country has its own perspective regarding the complex threats in the Baltic. If we put each nation's knowledge together, and exchange ideas, we can have a more complete picture of the Baltic maritime security."

Rear Admiral Włodzimierz Kulagin, chief of Armaments Branch of the Polish Navy Inspectorate, said having the workshop in Poland while there is a war going on at its eastern border is a statement of solidarity.

The region is a very complex operating environment, Kulagin said. "We have an enormous challenge of detecting threats in

all dimensions; many non-state actors; a growing maritime infrastructure; and increased maritime commerce and traffic, and its importance for the Baltic Sea nations, but also the Russian economy.”



U.S. Marines with Combat Logistics Battalion 8, Combat Logistics Regiment 2, 2nd Marine Logistics Group, prepare to set out a General-Purpose High Speed Unmanned Surface Vehicle known as the “Reckless,” during exercise Baltic Operations 24, (BALTOPS 24) Camp Berga, Sweden, June 12, 2024. The watercraft is manufactured by Hydronalix, a technology company specializing in small surface robotic systems in austere conditions. Credit: *U.S. MARINE CORPS | Lance Cpl. Kanoa Thomas*

Kulagin spoke of the requirement for employing new technologies. The operational calculus has been adjusted with the entrance of Finland and Sweden into the NATO alliance, and the added value for defense, deterrence and mutual security cooperation in the region, he said. “Enhanced cooperation and exchange of information to build maritime situational awareness is a starting point for each country. The crucial

factor remains the same: our military reaction time.”

Kulagin noted Ukraine is not presently a member of any alliance and is fighting alone on the battlefield against a great military power. “But Ukraine as a country is not alone, because we – the countries represented here at this conference – are here.”

Kulagin pointed out that Poland is a logistics portal at the frontline. He also said Poland is participating in NATO task groups, operations and exercises, as well as the Combined Maritime Force (CMF) in the Persian Gulf, “to show our colors,” and demonstrate Poland’s commitment to this vital multi-national effort.

“The NATO strategy concept is about the prosperity and freedom of navigation,” Kulagin said. “And this is this is exactly the reason that we decided to join the combined maritime forces in the Gulf.”

Crucial for Security

After many years of being somewhat of a backwater, the Baltic Sea is now crucial for European and world security.

Professor James Bergeron, the political-military advisor for NATO’s Allied Maritime Command in Northwood, United Kingdom, talked about how NATO is celebrating its 75th anniversary, but is still evolving, and continues to be both stable and “new, fresh and vulnerable.

“We started with 12 nations, when nuclear war was a distinct possibility, almost too distinct,” Bergeron said. “Later, with the fall of the Berlin Wall and the collapse of the Soviet Union, Cold War ended, we shifted to crisis management operations, we focused on everything but Russia. The magic of the institution is that it always feels like two steps away from collapse. We redesign it every five years, but in its essence, it does not change.”

For many years, Bergeron said the NATO maritime battlespace was the Atlantic and Mediterranean; the Black Sea and Baltic Sea were peripheral. "With the accessions of the former Soviet states, and most recently the accession of Finland and Sweden – which has changed the strategic importance of the Baltic – NATO now has to seriously consider the deterrence and defense of its allies and the water space of the Black Sea and Baltic Sea."

Captain Jon Wessenberg, Finland's defense attaché to Poland, said his navy has a simple purpose. "We are here to fight and save our country. We have that in our mind all the time. Now that we are a member of the NATO alliance, we are here to fight for our collective countries."

Wessenberg said the sea lines of communications in the Baltic are critical for Finland. "Ninety percent of our traffic, by volume and value, goes by sea. It is the sea that allows Finland to live and survive. It's the reason why we have a navy."

Now, Wessenberg said, the balance of power in the Baltic has changed. In the Cold War, Russia and its Warsaw Pact nations were the dominant factor in the Baltic Sea. It was not the highest priority for NATO. The situation today has changed. Russia stands alone, and is isolated at St. Petersburg and Kaliningrad, with its sea lines of communications threatened by NATO.

"The overall political strategic situation here in Baltic is unfavorable for Russia. They are backed into a corner. And it's because of Finland and Sweden joining NATO," Wessenberg said. "For many years we have prepared for a long war alone. Now it's quite nice to be part of the alliance."

Brigadier General Patrik Gardensten, deputy commander of the Royal Swedish Navy, voiced a similar sentiment.

"As a nonaligned state for hundreds of years, we have had to

rely on building a strong independent defense force to manage threats on our own in our area of operation. Even though our close defense cooperation with Finland always had made us stronger together.”



Private Wesley Van Meggelen of the Very Shallow Water Team of the Royal Netherlands Navy Maritime EOD detonates a charge June 10, for a training exercise during exercise Baltic Operations 2015. *Credit: U.S. NAVY | Mass Communication Specialist 2nd Class John Callahan*

Although Sweden had participated in NATO’s “Partnership for Peace” since 1994, the Russian invasion of Ukraine demonstrated to the country that a real threat to its security was imminent, and the nation applied for full membership in the alliance.

“The threat in this environment, both conventional and hybrid, projected by Russia today and tomorrow must be handled,” Gardensten said.

Technology Challenges

Addressing the technology front, Eric Olsson, a retired Royal Swedish Navy officer representing Embeddedart AB, said unmanned and autonomous systems face challenges in all domains, but he emphasized the increased difficulties of operating unmanned systems underwater.

“We need autonomous vehicles on the surface to be the communication link between subsurface vehicles and the above water networks and be the link to the kinetic effectors to bring effective power into the battle space,” he said.

Olsson foresees the use of artificial intelligence-based decision making to improve the navigation of unmanned underwater vehicles, and to better manage the amount of data and information to transfer between the sensor and operators.

Dr. Roger Berg, the director of technology management at Saab Kockums, is responsible for research and development, university collaboration, technology strategies and product management. He talked about “disruption” and the innovation or business models that have drastically changed the market or market behavior.

“We have seen in Ukraine a lot of these different kinds of disruptions in technology, systems, tactics, and how things behave,” Berg said. “It has changed warfare forever.”

Berg said the vulnerabilities of GPS positioning have been countered by new kinds of precision navigation and timing; inexpensive drones have replaced exquisite sensors and weapons delivery systems; and hand-held devices can now call for fire support in a fraction of the time it used to take to get permission to shoot.

In addition to its status as a frontline warfighting environment, the United States also looks at the Baltic Sea as a realistic laboratory for trying out new technologies and warfighting concepts.

The Department of the Navy has used Small Business Innovation Research funding to have Marines test and evaluate small, low-cost unmanned surface vessels from Green River, Arizona-based Hydronalix, for sensing, mobile gateway buoys to connect underwater sensors with above water networks, and logistics support in austere operating conditions.

Hydronalix CEO Anthony Mulligan discussed how disruptive technologies innovative capabilities don't have to be exquisite or expensive, and can be integrated into exercises to allow warfighters to try them. Mulligan's company exemplifies the value of the SBIR program, which invests in small companies to quickly develop and test new technologies and concepts in exercises like BALTOPS, Archipelago Endeavor in Sweden and Freezing Winds in Finland.

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