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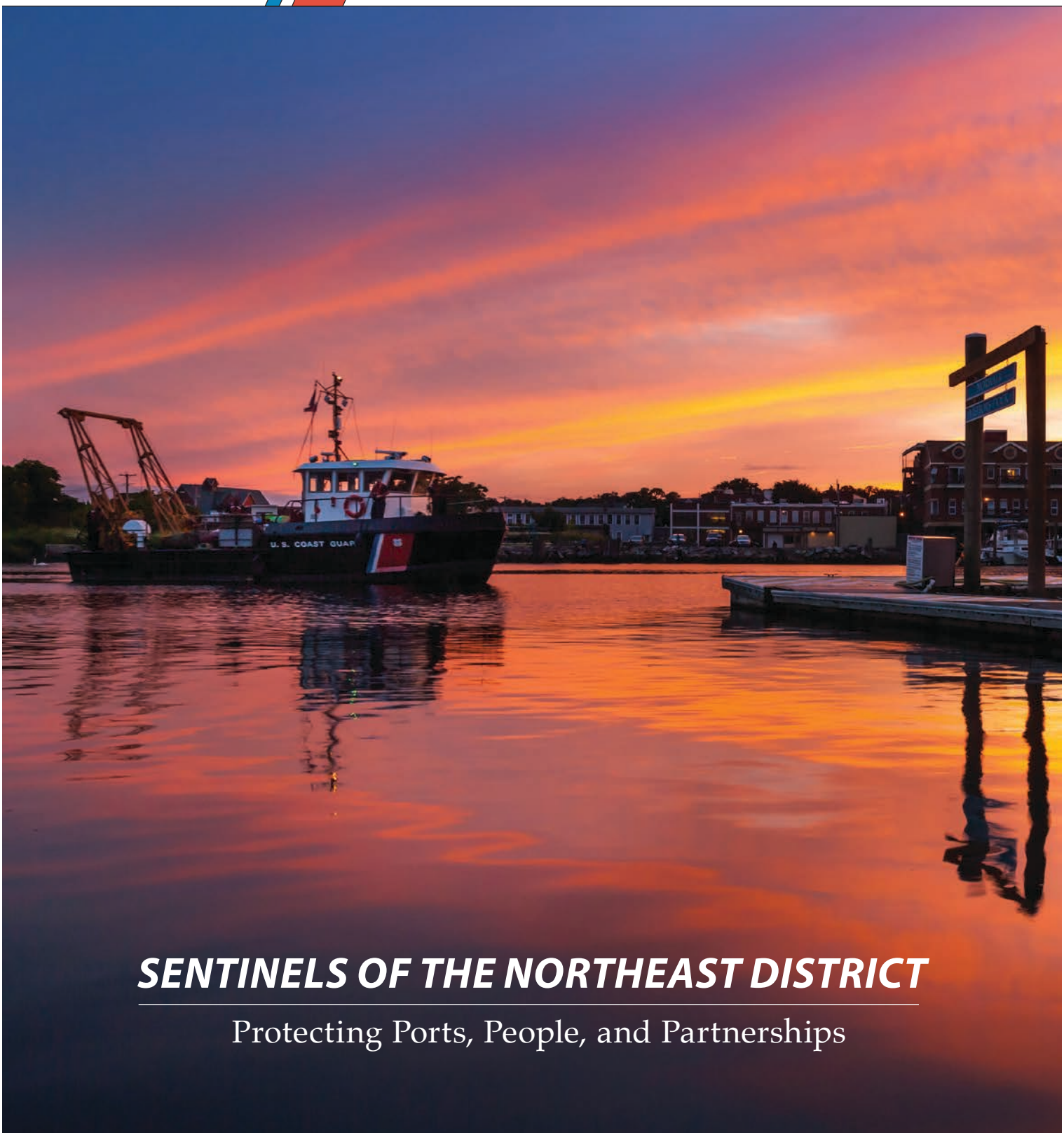

SENTINELS OF THE NORTHEAST DISTRICT

Protecting Ports, People, and Partnerships

CGC *Northland* transits Godthab's Fjord during Operation Nanook in August 2024. Nanook is the Canadian Armed Forces' annual series of Arctic exercises designed to enhance defense capabilities, ensure the security of northern regions, and improve interoperability with Allied forces. USS *Delbert D. Black* participated in the operation alongside the U.S. Coast Guard, Canadian, and Danish allies to bolster Arctic readiness and fulfill each nation's defense commitments. Navy Photo by Petty Officer 3rd Class Rylin Paul

PROCEEDINGS

Summer 2025 Vol. 82, Number 2

Safeguarding the MTS

Industry Focus

Success in Partnerships

On the Cover: A 49-foot Coast Guard buoy tender pulls into Connecticut's Norwalk Harbor at sunset. Based in Boston, the Coast Guard Northeast District's area of responsibility encompasses all of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, as well as portions of New York and New Jersey. The district's mission set includes maritime safety and security, environmental protection, national defense, and support to ensure economic prosperity.

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On Deck

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Champion's Note

The Champion would like to thank Senior Chief Jon Brice Hughes and Lieutenant John Pompay for their valuable assistance, and retired Coast Guard Captain Lexia Littlejohn for the opportunity to lead and represent the Northeast District.

Commander's Perspective

by Rear Admiral Michael E. Platt
Commander
Northeast District
U.S. Coast Guard

It is my honor to lead the dedicated men and women who serve in one of our nation's most dynamic and operationally demanding regions. Stretching from the Canadian border to northern New Jersey, the Northeast District covers over 2,000 miles of coastline and some of the world's busiest waterways. Every day, we stand the watch—safeguarding U.S. maritime interests, protecting lives, securing ports, and upholding the highest standards of discipline, ethics, and readiness. We put the mission and our people first, fostering action, accountability, teamwork, and an unwavering commitment to the Coast Guard's core values of Honor, Respect, and Devotion to Duty.

The Northeast District's operational

Champion's Point of View

by CDR Veronica McCusker
Chief, Reserve Force Readiness Division
Northeast District
U.S. Coast Guard

With great pride, I am honored to present this Coast Guard Northeast District issue of Proceedings. Rooted in the foundations of our national heritage, the Northeast District is the "birthplace of the U.S. Coast Guard."

The first revenue cutter, *Massachusetts*, was built in Newburyport, Massachusetts, in 1791 after Treasury Secretary Alexander Hamilton established the Revenue Cutter Service, one of the service organizations that comprise today's Coast Guard. Likewise, Little Brewster Island is the site of Boston Light, where the first colonial lighthouse was established in 1716. An operational lighthouse there guides mariners to this day.

Today, Coast Guard operations look very different from those of our

environment is fast-paced and ever-evolving. From executing search and rescue missions in the unforgiving North Atlantic to enforcing fisheries laws critical to a multibillion-dollar industry, we are at the forefront of maritime safety and security. As the region's first line of defense against illicit maritime activity, we protect critical infrastructure and ensure the resilience of our ports and waterways. Additionally, we work to safeguard the marine transportation system against potential cyber threats that may compromise this critical logistics node.

New England's fishing industry remains one of the most active in the country, and our enforcement efforts support its long-term sustainability while prioritizing safety. Meanwhile, New York and Boston ports serve as economic powerhouses, requiring a precise balance between security and commerce. As the maritime landscape changes, so must we. The increasing complexity of the marine transportation system and technological advancements demand agility and innovation. We leverage unmanned systems, data analytics, and enhanced operational tactics to sharpen our effectiveness and stay ahead of emerging challenges.

Our people are at the core of our success. Their professionalism, resilience, and dedication define the Northeast District and the Coast Guard. Our people embody the spirit of service that ensures we meet today's challenges and are prepared for tomorrow's. We will continue strengthening partnerships, embracing innovation, and upholding the legacy of excellence that defines the Northeast District. The maritime domain constantly evolves, but our commitment to safeguarding lives, securing our waters, and defending our nation remains unwavering.

I invite you to explore this issue of Proceedings, which offers a glimpse into our outstanding work. Semper Paratus!

precursor organizations, but the fundamentals endure, along with our core commitment to public service in the maritime domain. In this issue, Coast Guard members—active duty, reservists, civilians, and auxiliarists—embody the district's historic legacy, evolving to meet the challenges of an ever-changing environment. Guided by our core values, we remain Semper Paratus (Always Ready) and dedicated to our strategic priorities: family, assets, and mission.

The modern Northeast District area of responsibility stretches from the Canadian border, south to include the Port of New York and New Jersey. This edition of Proceedings reveals how our geographic location, international border, climate, industry, and history have shaped us. You'll gain insights into our organizational culture, international and local partnerships, and marine transportation system (MTS) oversight with articles that highlight the service's role safeguarding the MTS, including port complexities, cyber resilience, and GIS technology for emergency management. Other articles cover vessel regulation for wind energy, fishermen's well-being, and passenger vessel stability testing. They also highlight our partnerships in emergency response, innovation, search and rescue, and leadership development, while also paying tribute to a World War II hero.

The Northeast District's past informs the present as we steam forward to face the challenges of the future and welcome new horizons in operational and technological capabilities.

Our leadership's top priority was to ensure that every command in the district had an opportunity to contribute to developing the issue, which features content from field units, Northeast District staff, and Coast Guard scholars. My gratitude and praise go to the authors whose passion, professionalism, and expertise shine through each piece, as well as the editors, photographers, program reviewers, and our extremely supportive Coast Guard leaders. Additionally, my thanks to the editors of Proceedings for graciously guiding us through the project.

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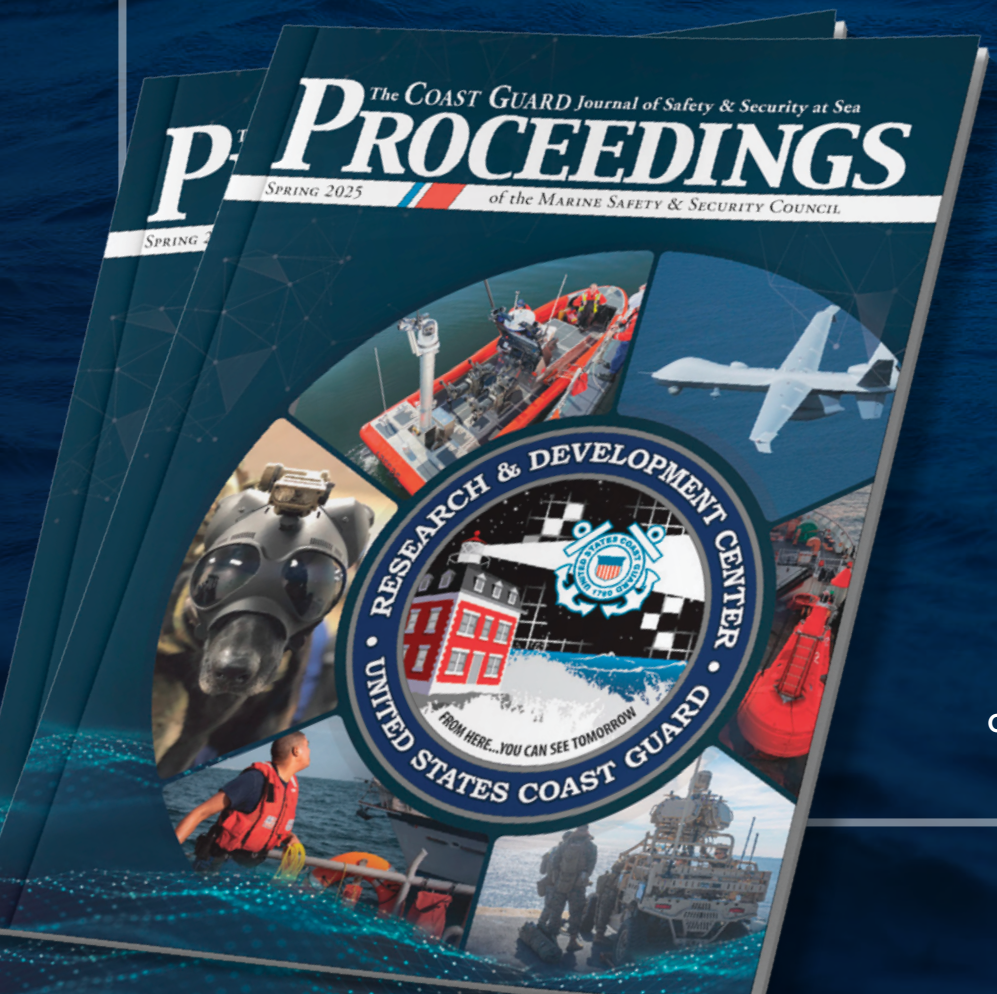

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Safeguarding the MTS

Managing Risk in the Nation's Most Consequential Port

by CDR Dan McQuate
Prevention Department Head
Sector New York
U.S. Coast Guard

With more than 20 million residents and about 64 million annual visitors, New York City is in many ways the nation's center of gravity and, in some ways, the world's. And, considering that 90% of the goods Americans use daily are transported via sea,[1] New York Harbor serves as a crucial conduit for trade. Yet, despite its importance, the harbor's role as the region's lifeblood often goes unnoticed by those outside of the maritime industry.

In 2023, an estimated $300 billion of waterborne cargo was imported or exported from the region[2,3] and more than 40 million passengers were carried[4] on more than 800,000 commercial vessel transits, according to Coast Guard figures. With estimates of up to one-third of the nation's gross domestic product located within 250 miles of New York Harbor,[5] this traffic is not just a reflection of New York's economic force, but also its central role in the broader U.S. economy. Surrounded by the nation's largest city and a global financial and tourism capital, Sector New York refers to New York Harbor as the "Nation's Most Consequential Port."

The harbor has hosted a robust maritime industry since before our nation's founding and each generation since has witnessed an ever-evolving Marine Transportation System (MTS). Today, that MTS continues to grow in size and complexity. The daunting task of ensuring the safety, security, and environmental protection of these waters, as well as those up to 200 miles offshore and up the Hudson River past Albany, New York, falls upon the captain of the port of Coast Guard Sector New York. While the captain of the port is assigned that responsibility by law and regulation, that individual and accompanying team cannot do it alone.

Projects Clear Path for Larger Ships

A harbor-deepening project was completed in 2016[6] and a project to raise the navigation clearance of the Bayonne Bridge between New Jersey and New York by 64 feet to allow Super Ultra Large Container Vessels (SULCV) to transit the port concluded in 2017.[7] Almost overnight, after completion of these projects, the first SULCV, up to 1,300 feet long and carrying up to 18,000 20-foot

The CMA CGM *Theodore Roosevelt*, a 1,200-foot container ship, passes under the Bayonne Bridge between New York and New Jersey on its maiden voyage to the United States on September 7, 2017. Coast Guard photo by Petty Officer 1st Class Sabrina Clarke

Responders prepare equipment to capture firefighting water discharged from the dewatering pumps in front of the motor vessel *Grande Costa D'Avorio* at Port Newark, New Jersey, on July 10, 2023. A fire broke out on the *Grande Costa D'Avorio* at the Port Newark Marine Terminal in New Jersey on July 5. Coast Guard photo by Petty Officer 3rd Class Mikaela McGee

equivalent unit containers, arrived in port. Arrivals of these vessels have grown ever since. While the captain of the port is charged with ensuring the safety of the port, all stakeholders have a role to play in this process. When it came to preparing for SULCVs in New York Harbor, a coalition of port stakeholders took charge. This coalition was led by the Deep Draft Working Group, which is a subcommittee of the renowned Harbor Safety, Navigation and Operations Committee.

The Deep Draft Working Group identified the potential hazards of the SULCV transits well in advance of completion of the projects. There were multiple simulations conducted at the Maritime Institute of Technology and Graduate Studies in numerous environmental conditions as the group developed guidelines for operating these larger ships in New York Harbor. As a result of this extensive work, these ships now use assist tugs from the Verrazzano Narrows to their berths to help control their movements. Further, they only transit around slack tide to reduce the effects of currents on vessels drafting up to 50 feet. Additionally, to ensure their safety and that of the MTS, they avoid situations where they would encounter other vessels in certain areas of the port and only transit in certain environmental conditions.

With their years of expertise in facilitating safe transits in the area, the highly skilled harbor and docking pilots help ensure these nonregulatory requirements are satisfied. The pilots can elect to not bring the ship into port, or the captain of the port can use their authorities to require that certain operating conditions be met. Many times, this authority is exercised by Coast Guard Vessel Traffic Service (VTS) New York, which maintains an around-the-clock watch to help ensure the safety of the waterways and can summon assist vessels in the event of an emergent situation that poses a hazard.

New Risks to an Established (Old) MTS

Addressing the operation of larger ships in the harbor is just one example of how the port community came together to address an emerging risk to an established MTS. While the Coast Guard, industry, and other government agencies cannot plan for every possible emergency, as society, technology, and the New York Harbor MTS evolves, the harbor faces an array of new risks that require innovative solutions and proactive management. These include, but are not limited to:

Even Larger Ship Traffic
The increase in vessel size has compounded the complexities of managing harbor operations. The scale of these ships necessitates meticulous planning and coordination to prevent accidents and ensure safe navigation. As the potential hazards related to navigating SULCVs in a 50-foot-deep channel continues, a study has been completed and a design agreement executed between the U.S. Army Corps of Engineers and the Port Authority of New York and New Jersey. Under this agreement, the harbor's navigation channels will be further deepened to 55 feet,[8] which will lead to even larger ships routinely transiting the harbor.

Renewable Energy Projects
The growing interest in offshore wind energy and other renewable energy solutions, such as the Champlain-Hudson Power Express cable, which will provide hydroelectric power from Canada to New York City, introduces additional vessel traffic related to project construction and maintenance. This influx of maritime activity adds a new layer of complexity to waterways management throughout the captain of the port zone and causes potential concerns regarding safe anchorages for vessels in emergency situations.

Autonomous Systems
The advent of autonomous systems, including aerial, surface, and subsurface vessels, introduces both opportunities and risks to the MTS. These technologies can increase efficiency, but they also introduce new and different variables that must be managed carefully. These risks could include an uncrewed vessel attempting to operate under the existing regulatory regime, an event sponsor that seeks to replace or supplement fireworks shows with uncrewed drone shows above the navigable waters of New York Harbor, or other novel uses. These technologies are also susceptible to use by nefarious actors.

Alternative Fuels
The shift towards alternative fuels for vessels aims to meet International Maritime Organization standards for air pollution and particulate matter. However, these new standards also challenge existing bunkering infrastructure, capabilities, and procedures. Additionally, the highly flammable, toxic, or cryogenic properties of some alternative fuels add new layers of complexity to the planning and response to emergency situations within the port.

Increased Use of Batteries
Lithium-ion batteries are being used more and more throughout society, including within the MTS. Not only are vessels using batteries as power sources for propulsion or in other ways onboard, large and small batteries—both new and old—are transported via water, which can present new hazards. Ferry passengers are transporting their battery-powered bicycles onboard, ships are exporting end-of-life batteries to recycling facilities overseas, and municipal waste streams that may inadvertently include batteries are moved via container throughout the harbor. With the New York City Fire Department responding to 268 battery-related fires in 2023,[9] it is only a matter of time until such an incident occurs on a vessel.

Increased Recreational Traffic
A cleaner harbor, while beneficial to the city and its residents, has led to a surge in recreational and human-powered watercraft. This increase in recreational traffic, which has an equal right to use the waterways as commercial vessels, further congests the MTS and requires enhanced management strategies to prevent accidents and ensure the safe coexistence of all users.

Cybersecurity Threats
Perhaps the most insidious risk is the ever-present threat of cybersecurity incidents. This includes not only cyberattacks, but also a plethora of other cyber-related risks that can be as simple as a technician inadvertently loading the wrong software update into a critical system that causes a malfunction when the vessel is underway. Unlike physical threats, cybersecurity risks are not always visible but can have profound consequences and very tangible impacts on maritime operations and infrastructure.

Managing Risk

Internally, the Coast Guard has adopted a risk management framework that includes a five-step process—identifying hazards, assessing hazards, developing controls and making decisions, implementing controls, and supervising and evaluating controls. While captains of the port do not always consciously follow this five-step process in managing risks to the port, it is a process that is nonetheless routinely used both locally and holistically across the nation in a layered approach.

This layered approach to identify and manage evolving and emerging risks helps ensure the safety, security, and environmental protection of the MTS, and begins years before a risk emerges within a port. The Coast Guard Deputy Commandant for Operations' Office of Emerging Policy uses strategic foresight to look over the horizon. It conducts workshops with Coast Guard members, industry leaders, other government agencies, academics, and other stakeholders to identify potential risks or opportunities and advise Coast Guard leadership

accordingly. Other Coast Guard Headquarters offices and units then develop plans to address these strategic challenges. This strategic foresight identifies big-picture concerns for the future that inform enterprise-wide regulations and policy. The regulations include a public comment period to allow everyone to be part of the rulemaking process, and policy is informed by subject matter experts, such as federal advisory committees, to address risk or develop tools to address risk in advance. However, no strategic foresight program can identify all risks that will arise on a national level, let alone on a local port level years in advance.

Because of this limitation, captains of the port are constantly communicating changing and emerging challenges within their area of responsibility up the chain of the command to ensure these challenges are compiled and addressed at a national level. New regulations, authorities, and policies can help the captain of the port manage these risks holistically, but as they say, "if you've seen one port, you've seen one port."

As a result, captains of the port have been given tools and authorities they can use to assess risk and address these challenges within their port. There are formal tools developed at the national level and employed locally, such as the Port and Waterways Safety Assessment and Waterways Suitability Assessment. These tools provide a structure for identifying risk factors and evaluating potential mitigation measures through expert input for the Coast Guard and private entities alike. When proper tools may not be available, new efforts are undertaken, such as the Coast Guard's current effort with a Port and Waterways Safety Board of Inquiry and maritime stakeholder dialogue. The Board of Inquiry is tasked with evaluating the risks to critical port infrastructure due to larger commercial vessels and increased traffic density over recent decades, which could lead to new risk evaluation and mitigation tools.

Captains of the port also develop solutions to challenges and share them with other units and pass them up the chain of command for possible adoption. One such example is a risk-based container targeting program that Sector New York developed to reduce risk to the port while better using resources. The notional idea of such a program is included in the National Container Inspection Program manual, and Sector New York took this idea and brought it to reality. With numerous container ship fires each year because of undeclared or misdeclared hazardous material, the risk-based targeting program focuses on deficiency trends and works with Customs and Border Protection's National Targeting Center to identify import and export containers with similar characteristics of the previously deficient containers. Random container inspections were leading to a less than 1% deficiency rate. To date, the risk-based targeting program has resulted in a 28% deficiency rate.

The Assistant Secretary of the Army for Civil Works, Michael L. Connor, speaks at the signing of a $20 million agreement with the Port Authority of New York and New Jersey on May 29, 2024. The signing of the agreement is the first step in a project to deepen New York and New Jersey Harbor and further economic growth in the region. Army photo by Brianna Clay

At the local level, there are also committees in place that help Sector New York ensure the safety, security, and environmental protection of the port. The Area Maritime Security Committee (AMSC), which helps ensure the security of the port, and the Area Committee, whose focus is on environmental protection, are both required by regulation. To focus on safety of the port, in Sector New York's area of responsibility there are two harbor safety committees. These include the aforementioned Harbor Safety, Navigation and Operations Committee (HOPS) which operates in the harbor itself, and the Hudson River Safety, Navigation, and Operations Committee (HRSNOC) that covers the Hudson River from the George Washington Bridge north to the Port of Albany. These committees have time and time again taken ownership of operations within the port to find nonregulatory solutions to difficult problems. HOPS and HRSNOC are not in place to advise the captains of the port, but these groups are indispensable to the safety of the waterways.

Coast Guard personnel and other government agencies routinely participate in these committees and in drills, exercises, and workshops to better understand the challenges of shared-use waterways and intervene where necessary and appropriate to help resolve issues. Diverse

stakeholders and viewpoints make these groups stronger.

Other entities within the port are also critical to ensuring the safety, security, and environmental protection of the port, as well as its reliability and resiliency. These include the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration, and the Maritime Administration, along with various state agencies.

Within the Port of New York and New Jersey, the Port Authority of New York and New Jersey is vital to the operations of many of the port's most essential facilities. The Port Authority provides knowledge, advice, information, and a critical boots-on-the-ground law enforcement presence across the port's numerous facilities that are vital to the regional and national economy. Likewise, the New York Police Department Harbor Unit, Fire Department of New York Marine Division, New Jersey State Police Marine Services Bureau, New Jersey Fire Boat Task Force members, and many other partners are critical to port operations. They provide on-water response and prevention capabilities and invaluable knowledge to the operations of the harbor through HOPS, the AMSC, Area Committee, or other regular interagency meetings.

These partners, efforts, and tools help the captain of the port identify and assess risk, but the steps do not require a formal process. Harbor-deepening projects have occurred throughout the nation over the past two decades to allow SULCVs to call on various ports, and the risks within each port are different. Because of this, despite the work conducted at the enterprise level, captains of the port ultimately must assess local risks and rely on local knowledge. The captain of the port Sector New York, in conjunction with port partners, did exactly that as the harbor was being deepened and the Bayonne Bridge was being raised. Just as port stakeholders came together during those significant efforts and continue coordinating on them, the Coast Guard will continue to rely on port partners to take ownership of the MTS. These partners not only identify and quantify concerns, but they also mitigate them while continually evaluating the effectiveness of those mitigations for the ever-evolving MTS.

Into the Future

While the harbor safety committees, AMSC, and Area Committee are three distinct groups, there is considerable overlap between each, as well as other entities that Sector New York works with on a regular basis that serve as invaluable force multipliers. Partnerships are key to everything the Coast Guard does and will continue to be crucial moving forward. Given the emerging challenges we are facing throughout the MTS, there must be an effort to better coordinate among these groups to be even more effective in addressing any challenge in the MTS. For example, by regulation, salvage and marine firefighting is currently addressed by the Area Committee. However, a vessel fire in a port could very well cause numerous safety concerns that a harbor safety committee would be best postured to address. Further, vessel traffic management during the initial incident and subsequent recovery of the MTS would likely follow the MTS Recovery Plan. This plan was developed as part of the Area Maritime Security Plan in consultation with the AMSC. Emerging challenges require new ways to think and act.

New York Harbor's significance as a global maritime hub and complex and dynamic environment underscores the importance of collaboration and effective risk management. While the size and scale of the Nation's Most Consequential Port is different than many other ports throughout the country and around the world, they all have one thing in common: While the captain of the port is charged with ensuring the safety, security, and environmental protection of the port, identifying and managing risks at the port level is best addressed by all stakeholders working in concert, no matter the challenges.

About the author:

CDR Dan McQuate has more than 25 years of Coast Guard service. He has supported the Coast Guard's strategic missions of marine safety, port, waterways, and coastal security, and environmental protection since 2005 in Louisiana, Kentucky, Washington, D.C., and North Carolina. Since June 2022, he has served as the prevention department head at Sector New York.

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Innovating Prevention Approaches to Protect the MTS

Unleashing the marine transportation cybersecurity specialist

by Kevin Adams
Marine Transportation System Cybersecurity Specialist
Northeast District
U.S. Coast Guard

America's ports and associated infrastructure play a crucial role as key nodes in both U.S. and global supply chains. The Coast Guard has identified cyberthreats as the most significant risk to the marine transportation system (MTS) and is taking proactive measures to address these challenges. The establishment of the Coast Guard Cyber Command (CG CYBERCOM) reflects the importance the service places on these issues. CG CYBERCOM has created the Maritime Cybersecurity Readiness Branch and deployed cyber protection teams to combat the rising cyberthreats facing the MTS.

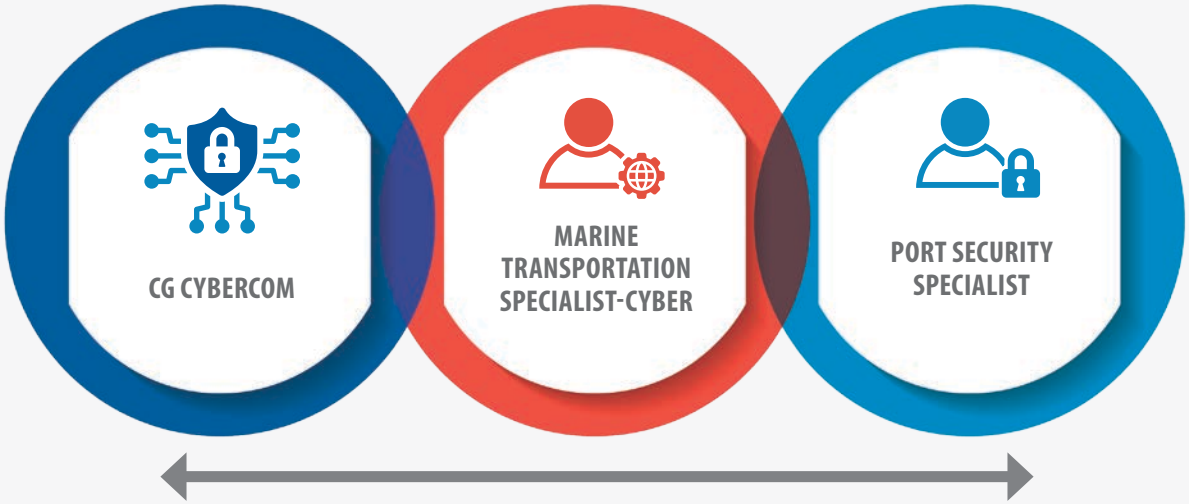
Recent data from CG CYBERCOM shows a persistent increase in cyberattacks in recent years. The Coast Guard is enhancing its cyber capabilities by introducing marine transportation specialist-cyber (MTSS-C) roles. These positions are strategically located throughout all levels of the Coast Guard and designed to promote tactical and operational collaboration with members of the MTS community and their respective Area Maritime Security Committees. These developments support the service's mission to strengthen, defend, and secure the marine transportation system.

The Coast Guard has established MTSS-C positions within its prevention activities to optimize mission impact and efficiency. This organizational structure promotes collaboration by aligning the MTSS-C role with the Coast Guard's ongoing efforts. Combining the technical capabilities of CG CYBERCOM with the physical security expertise of port security specialists, enhances the Coast Guard's cybersecurity initiatives.

Innovating the MTSS-C role to focus on risk management, governance, and supply chain interdependencies

Coast Guard illustration | iStock/Getty Images

Relational View and Roles of Coast Guard MTS Cybersecurity



Technical Domain

- Ones and zeros
- Technical analysis
- Network defense focus
- Threat tactics, techniques, and procedures
- Common vulnerabilities and exposures
- Incident response technical support

MTS Cybersecurity

- Technical & nontechnical elements of cyber
- Holistic approach
- Risk-based
- NIST Cybersecurity Framework 2.0 & community profile(s) focus
- Addresses maritime transportation system organizational governance challenges

Physical Domain

- Physical security
- Facility security focus
- Maritime security analysis supporting cyber-physical security

Kevin Adams, Coast Guard Northeast District

—while using the National Institute of Standards and Technology (NIST) 2.0 Cybersecurity Framework and U.S. Coast Guard Cybersecurity Community Profiles—represents a potential evolution of the MTSS-C role. This position is strategically placed to leverage the technical information from CG CYBERCOM alongside the physical security knowledge of the port security specialists. Together, these efforts provide technical and nontechnical applications of cybersecurity risk, governance, and supply chain interdependencies, enabling a comprehensive defense-in-depth strategy across both cyber and physical domains.

Understanding cybersecurity risk is essential for assessing the physical impacts of an MTS cybersecurity incident. Recognizing vital interdependencies and key nodes within port and facility network infrastructure and operations is critical for mitigating potential cyber impacts. For example, the disruptions caused by the COVID-19 pandemic and the May 2021 Colonial Pipeline ransomware incident highlight the vulnerabilities in today's "just-in-time" supply chain model, particularly concerning intermodal, bulk, and petroleum shipping. The consequences of disruptions from MTS-related cyber events are increasingly severe.

By focusing on risk-based prevention, the MTSS-C can collaborate with MTS community members to identify and prioritize areas of concern. This cooperative approach allows the MTSS-C to conduct risk-based physical domain impact assessments of MTS facilities and their operations. The Coast Guard Northeast District has partnered with Idaho National Labs to create a risk-based interdependency map linking the MTS and the energy sector's critical infrastructure. A thorough understanding of the MTS and its interdependencies is essential for accurate risk assessments.

Developing MTSS-C cyber risk assessment training is crucial for evaluating the importance of port operations, infrastructure, and nodes of critical interdependencies. This new skillset will enhance awareness and resilience within our MTS facilities.

Enabling Interoperability

NIST has produced various publications to assist organizations in evaluating cybersecurity and risk holistically. The NIST 2.0 Cybersecurity Framework and several Coast Guard Cybersecurity Community Profiles serve as foundational frameworks for supporting comprehensive evaluations of organizational cybersecurity programs and efforts.

NIST 2.0 is highly customizable and focuses on key areas of concern. One of its most flexible features is its ability to create crosswalks that integrate with the NIST framework—unlike many other cybersecurity frameworks currently in use—enabling interoperability across various organizations and programs. The Coast Guard Cybersecurity Profiles extend the NIST framework's reach to address unique areas of the MTS, such as maritime bulk liquids transfer, passenger vessels, and offshore facilities. Applying the NIST 2.0 Cybersecurity Framework and Coast Guard Cybersecurity Profiles within the context of technical findings, observations from CG CYBERCOM, and physical security concerns identified by port security specialists creates a more accurate perspective to support cybersecurity assessments that adapt to evolving operational and cyber environments.

The MTSS-C role fills a critical gap in linking CG CYBERCOM's technical capabilities and the Coast Guard's Port Security Program. The MTSS-C represents an additional capability to support the service's mission of defending and protecting the MTS from malicious cyberthreats. The MTSS-C can leverage insights and CG CYBERCOM research regarding technical observations and threat intelligence, combined with physical security challenges provided by our port security specialists, creating a holistic, needs-based assessment strategy with our MTS community members. By addressing the challenges faced by individual MTS organizations based on assessments and contextualized technical and physical security challenges, the MTSS-C role can create valuable opportunities to link technical, nontechnical, and physical domain security concerns, providing a holistic approach to MTS cybersecurity.

Working collaboratively to tackle the unique MTS cybersecurity challenges positions the MTSS-C to offer customizable, risk-based, NIST 2.0 Cybersecurity Framework assessments and best practices to facility cybersecurity professionals. This initiative will leverage the analytical expertise of the MTSS-C, offering valuable support to the MTS community. By adopting a holistic, risk-based, framework-driven approach, it will empower MTS cybersecurity professionals to advocate for organizational changes at both governance and technical levels, while providing crucial leadership and resource support for MTS cybersecurity programs.

Driving Innovation

The Coast Guard's MTS cybersecurity program has sparked innovative strategies for the MTSS-C's mission and role. The organization is dedicated to continuous innovation and focused on developing its MTSS-C skillsets and capabilities. The MTS cybersecurity program and the MTSS-C are poised to drive innovations within the prevention mission by integrating technical, nontechnical, and physical security elements of MTS cybersecurity into a cohesive, team-based approach. With the technical support and expertise of operational partners within CG CYBERCOM, we can enhance our collective mission impacts. The development of capabilities discussed in this article can serve as the next foundational growth platform for the MTS cybersecurity program.

Conclusion

By innovating in the MTSS-C's nontechnical, governance, policy, and risk-based advisory roles, we can effectively address the increasing threats facing the MTS subsector from the cyber domain. In doing so, we can fully realize and unleash the potential of the MTSS-C and the MTS cybersecurity program. These advancements will position the Coast Guard at the forefront of MTS cybersecurity, ready to fulfill our mission of hardening, defending, and protecting the MTS.

About the author:

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A Picture is Worth a Thousand Words

How embedded geographic information system operations enhance recovery operations

by LCDR Alfred Betts
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The Marine Transportation System (MTS) is vast, encompassing waterways, ports, and shore-side connections that facilitate the movement of people and goods to and from the water.

According to the U.S. Department of Transportation's Bureau of Transportation statistics, marine freight increases significantly every decade, with ferry transport experiencing rapid growth in response to land-transport congestion. More frequently, the U.S. military depends on a highly functional MTS, as it is critical to our national and economic security. About 99% of overseas trade enters or leaves the United States by ship. This waterborne cargo, and associated activity, contributes more than $500 billion dollars to the U.S. gross domestic product, generates more than $200 billion in annual federal, state, and local taxes, and sustains more than 10 million jobs, which results in more than $4.6 trillion in economic activity annually.[1]

Our ports are not just an avenue for movement of goods and people, they have evolved into societal ecosystems, where newer end users desire nearly the same level of access and use. Port areas that were once highly industrialized or home to hundreds of fishing or commercial vessels have made way for mixed-use waterfront areas with increased tourism, retail, residential, and event venues. Oftentimes, these new and exciting mixed-use hubs are just a short distance away from Marine Transportation Safety Act-regulated facilities that have demanding physical and cybersecurity requirements.

Maritime activities within the port of Boston, the largest container port north of New York, have changed significantly, including an increase in autonomous vessel activity, seaplanes, larger deep draft vessels, tug/barge work for petroleum products, and offshore wind support vessels. During the COVID-19 pandemic, there was an increase in recreational vessel activity and marine construction projects.

The MTS and associated waterfront areas will become even more complex when we overlay the forecasted impacts of rising sea levels and increased frequency and intensity of storms that impact our ports. This major confluence of competing demands requires that we adjust our actions to paint as comprehensive a picture of the MTS and all its users as possible. This information is

The Expansive Marine Transportation System

The U.S. Marine Transportation System includes approximately:

- 25,000 miles of navigable channels
- 250 locks
- 3,500 marine terminals
- 361 commercial ports
- 20,000 bridges
- Thousands of recreational marinas
- The Great Lakes and the St. Lawrence Seaway

Intertwined with those elements are approximately:

- 174,000 miles of rail connecting all 48 contiguous states, Canada, and Mexico
- 45,000 miles of interstate highways and 115,000 miles of supporting roadways
- 1,400 designated intermodal connections

While leaving the Port of Baltimore in the early morning hours of March 26, 2024, the Singapore-flagged M/V *Dali*, a neo-Panamax container ship, lost power before striking a Francis Scott Key Bridge support, causing the bridge to collapse. Coast Guard photo by Petty Officer 1st Class Brandon Giles


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crucial for captains of the port (COTP), who have vast federal and statutory responsibilities, but also for federal, state, and local port and industry partners, as well as the public that uses the MTS. Projected growth in trade also increases the demand on the MTS and must be safely handled and balanced with environmental values in order to ensure that freight and people move efficiently to, from, and on our waterfronts.

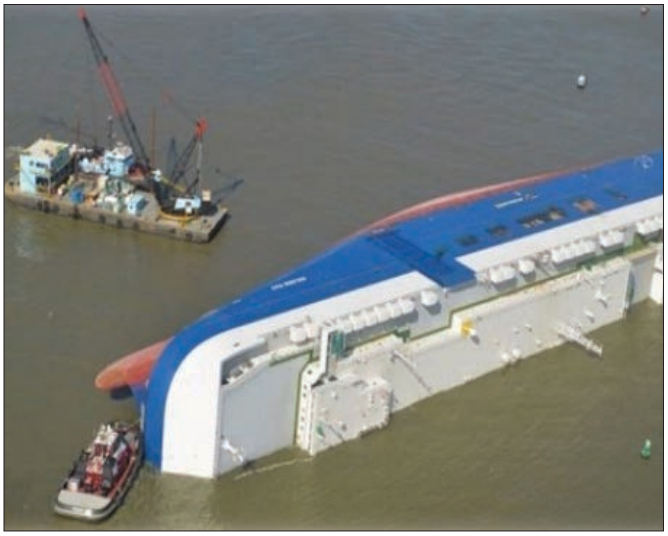
In the mid-2000s, following Hurricane Katrina's horrific impact on New Orleans and the Gulf Coast, the commanders of Coast Guard Atlantic Area and the Coast Guard Heartland District chartered the Maritime Recovery and Restoration Task Forces. In addition to the extensive recommendations implemented based on the task forces' findings, another key advancement followed.

The Coast Guard transitioned from a paper-based system of tracking the operational status and impacts to the Marine Transportation System to the Common Assessment and Reporting Tool (CART) in the early 2000s. The web-based application is used to document and report the status of the MTS after a significant disruption—human-made or natural. It provides a repository for MTS recovery information that can assist Marine Transportation System Recovery Units (MTSRU) in making recommendations to the COTP, Incident or Unified Command. CART has proven its worth during incidents such as Hurricane Sandy, the sinking of the M/V *Golden Ray*, and the 2024 collapse of Baltimore's Francis Scott Key Bridge. It also provided crucial information after hurricanes that have had significant impacts to our COPT zones.

Information Available in CART

The Common Assessment and Reporting Tool, or CART, is a repository of information that can assist Maritime Transportation System Recovery Units in making recommendations for a recovery plan. It provides:

- Timely and accurate information on pre-incident essential elements of information (EEIs) in a unit's area of responsibility
- A comparison of baseline EEI data to post-incident data during incident management to characterize the extent of the impact on the MTS
- MTS executive summary reports to facilitate decision-making and information-sharing with a wide range of MTS stakeholders.[2]

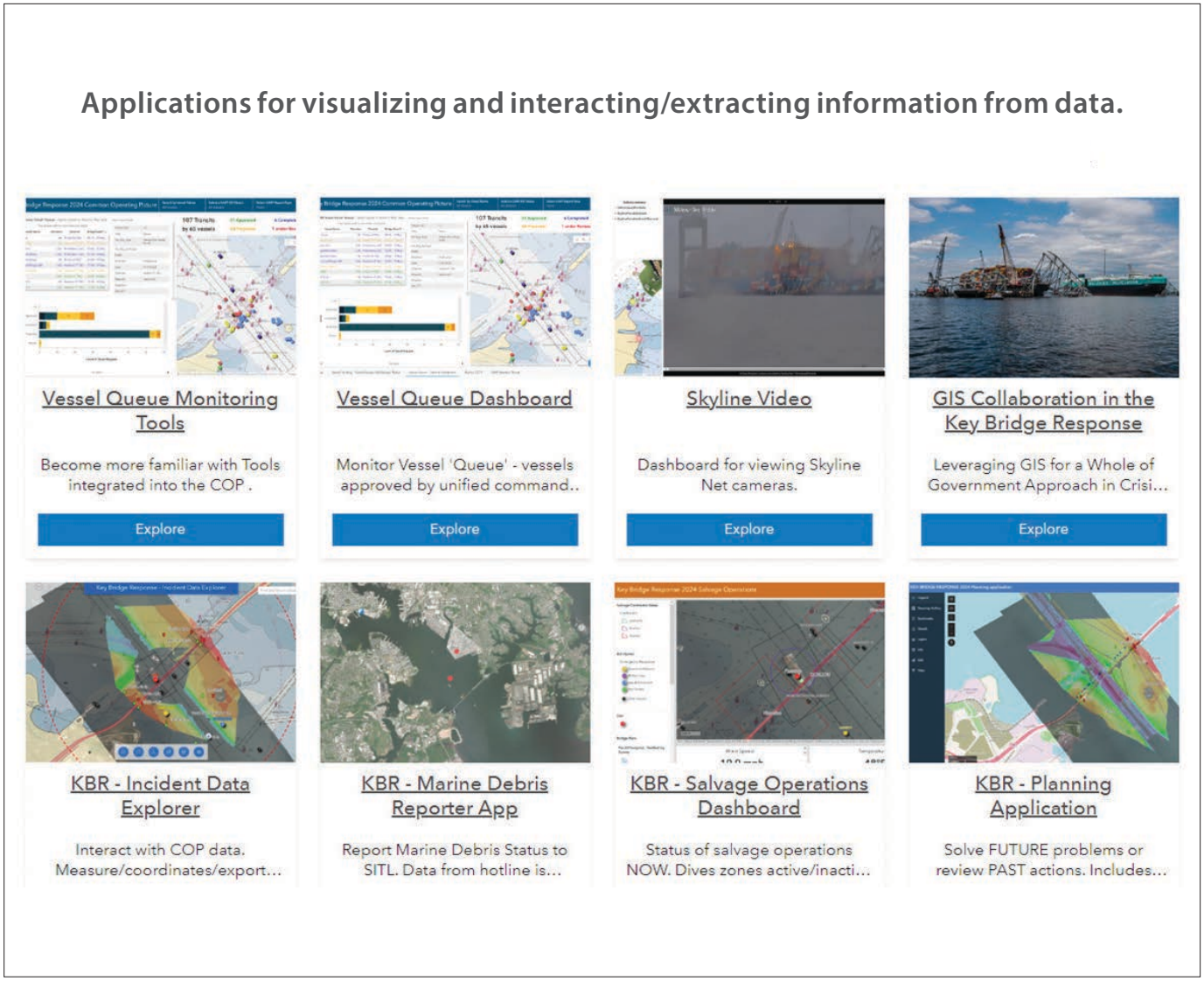


The roll-on/roll-off vessel *Golden Ray* lies on its port side after capsizing inside the St. Simons Sound near Brunswick, Georgia, in September 2019. A unified command, which included the Coast Guard, the Georgia Department of Natural Resources, and the Gallagher Marine Systems, was formed to ensure the safety of the public and responders and to facilitate the vessel's eventual salvage and safe removal. Coast Guard photo by Petty Officer 3rd Class Paige Hause

The CART executive summary (MTS-209), a report developed for each incident, is only available to Coast Guard personnel and stakeholders—local, federal, and state personnel—in the captain of the port zone affected by a marine casualty or pollution incident. The Coast Guard has experimented with several geographic information systems (GIS) applications. Unfortunately, these have had varying degrees of success, and they have not been able to be shared with port partners, nor have they been able to use port partner systems to get the most accurate and up-to-date information. As ports have migrated into highly interdependent ecosystems, and with the near-instantaneous ability to share data in our tech-savvy society, this has created the need to transition our extensive volume of data. We must compress it into digestible segments of knowledge for the MTSRU, COTP, and a variety of partners, to paint as comprehensive a picture as possible.

Reason for Change

In just 48 hours, Hurricane Sandy devastated coastal neighborhoods, causing numerous fatalities, damaging or destroying thousands of homes, and leaving an estimated $19 billion in damages. Hurricane Harvey submerged the Texas and Louisiana coasts with more than 50 inches of rain, resulting in nearly $100 billion in damages. These immediate impacts underscore the growing threat rising weather extremes pose like New York and Houston, and especially to our most vulnerable components and residents.



The Coast Guard's Arc-GIS Online Portal provides partnered collaboration that offers secure access to authoritative data for the full range of response partners. Coast Guard illustration.

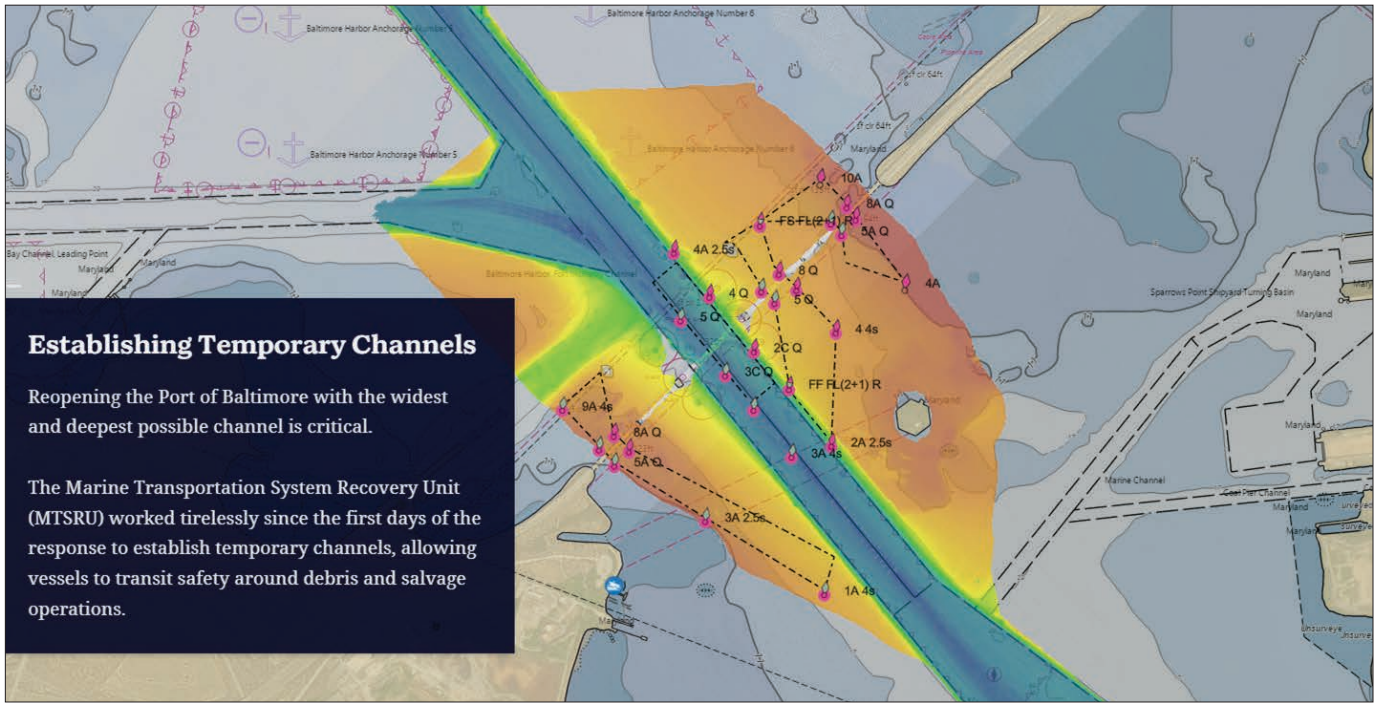
As seen with the devasting impacts from Sandy and Harvey in the United States, 90 percent of natural disasters involve a flood, according to the Federal Emergency Management Agency, making flooding the most frequent and most expensive type of natural disaster in the country. The agency's estimates suggest that by the 2050s, sea level rise and inland floods could impact 1 of every 10 people on Earth. By the middle of this century, between $150 billion and $450 billion each year will be spent globally on infrastructure, which accounts for 60% to 80% of spending on building resilience to damaging weather extremes, according to the McKinsey Global Institute.

To be ready for this next chapter, the Coast Guard needs to look no further than the exceptional response to the Francis Scott Key Bridge collapse for solutions.

A Path Forward

The response to the M/V *Dali* collision with Baltimore's Francis Scott Key Bridge in the Patapsco River provided an excellent learning opportunity for disaster response. The event that unfolded early morning hours of March 26, 2024, led to the loss of six lives and disrupted more than $15 million a day in commerce, an impact that affected not only Baltimore and the surrounding region, but global shipping. However, what emerged for Marine Transportation System recovery operations should help establish the standards for MTS operations moving forward.

Prior to the Key Bridge response, the Coast Guard and its partners managed response data via isolated systems. This resulted in challenges across many areas, including data quality, versioning and edits across multiple copies;



Coast Guard illustration

data sharing, email attachments and lack of access; and visualization challenges, static slide decks and printed maps. Partnered collaboration, a capability of the Coast Guard's Arc-GIS Online Portal, a mapping and analysis platform, has solved these challenges and provided secure access to authoritative data for the full range of response partners including private sector contractors and port stakeholders.[3]

Over the weeks that followed, the unified command and several key partnerships developed an extensive portfolio of GIS products, including a salvage operations dashboard, debris management site, and vessel transit and navigation information that were critical in the overall mission success. The variety of GIS tools and data integration allowed the Coast Guard, unified command, and port partners to have near real-time access to critical data.

Conclusion

The Coast Guard is making efforts to expand its enterprise GIS capabilities, and one key step was the 2024 Coast Guard Enterprise GIS Training Conference. The service's goal is to enhance collective geospatial capabilities through comprehensive training, knowledge-sharing, and collaboration among Coast Guard personnel involved in geospatial intelligence and operations. However, the tools, products, and data integration that made the Key Bridge response possible was no small feat and not a skillset or capability that readily exists within the Coast Guard Sector workforce structure. More needs to be done to help ensure our front-line field commanders are properly staffed, trained, and equipped to meet the emerging changes within our operating environment head-on.

About the authors:

LCDR Betts is the chief of Emergency Management and Force Readiness at Sector Boston. His operational assignments include enforcement chief of Sector Maryland-NCR, command duty officer at Sector New York, and enforcement chief of Marine Safety Unit Texas City. Additionally, he has served at Training Center Yorktown and the Leadership Development Center. He graduated from Virginia Military Institute in 2008 and was commissioned through the Direct Commission Officer program in 2009. He holds a master's degree in journalism from Columbia University.

Thomas Vitullo is a Coast Guard civilian at Sector Boston, bringing executive-level disaster experience from his time with the American Red Cross. With a 30-year active-duty Coast Guard career, he has developed strong leadership and management skills, achieving a distinguished record in disaster response and relief operations. His expertise spans the maritime industry, training analysis, security, law enforcement, and crisis management.

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Industry Focus

It's Our Mission

Safeguarding fishermen from despair and addiction

CAPT Clint Prindle
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On July 10, 2023, Coast Guard Station Chatham launched its ready boat to assist a commercial fisherman in distress off the coast of Massachusetts. It was a mild New England summer day with a light breeze from the east. The crew faced a 20-mile journey, but contrary to the dramatic scenes often portrayed in movies, there was no raging storm or towering surf to navigate. The fisherman, though in need of assistance, was aboard his vessel, alert, and in stable medical condition.

Chatham is a small town, but it has a monumental reputation in the world of search and rescue. From the beginnings of the U.S. Lifesaving Service and its precursor, the Massachusetts Humane Society, to present day, the lifeboat station at Chatham is a proud reminder of the Coast Guard's history and its mission to save all souls in distress on the sea. Big stories come from the big seas just off the coast of this little town. In the shade of this legacy, the humility of the Coast Guard crew crossing the bar that day is a quiet contrast to the larger-than-life legends of before.

Nevertheless, 20 miles off the coast, a 19-year-old fisherman needed them more than anything.

The initial report came across the radio to the Coast Guard command center in Woods Hole. The master reported that a crewman aboard the fishing vessel was cleaning fish on the back deck when he lost his balance and accidentally cut his left arm. Three others onboard were able to stem the flow of blood by applying direct pressure with a bandage, but they needed to get him to a hospital. Station Chatham's rescue boat 45766 was en route, and the two vessels would meet just off the coast.

The details left out of the initial radio call stunned the crew from Chatham. The injury wasn't accidental, and it wasn't just the left arm. The truth was that the young man had sliced both radial arteries to end his own life. The crew from Station Chatham rushed the man to a hospital ashore, and he is alive today thanks to their efforts.

It's not uncommon for commercial fishermen to mask the severity of a mental health crisis when they call for help. These distress calls often come over open radio waves for the entire maritime community to hear, and while the stigma of mental illness is not bound to fishermen alone, this is a small community where everybody knows everyone. It's understandable the master may have minimized the injury as accidental and didn't want to announce a possible suicide attempt for all the

The Centers for Disease Control rates commercial fishing as an industry with one of the highest suicide rates. Addressing the mental health of these individuals is as much a part of the Coast Guard's mission as ensuring their physical safety. Fishing Partnership photo by Dan Orchard

The Coast Guard works with vessel masters and local organizations to help address addiction and dispel the stigma surrounding mental illness in the fishing industry. Srdjanns74 | Istock/Getty Images

world to hear. Unfortunately, this scenario plays out too often, and because its nature is frequently masked, the true magnitude of suicide in commercial fishing is unknown. Whether it's a young man who cuts his own wrists, or fishermen who have intentionally jumped off their vessels, suicide in the fishing fleet is an epidemic grossly underreported, in part, from this natural desire to save those involved from the shame.

Despite only accounting for the suicides we know of, mental health within the commercial fishing community is in a dire state. The Centers for Disease Control rates commercial fishing as an industry with one of the highest suicide rates. Flagging an overall suicide rate of 130.1 per 100,000 in 2021, commercial fishermen are 56% more likely to die from suicide than the average person in the United States.[1]

The opioid epidemic is a further strain on fishermen's mental health and affects the community at an alarmingly disproportionate rate. A 2021 nationwide study reported that commercial fishermen are four times more likely to die of opioid poisoning than the surrounding non-fishing community.[2] In Massachusetts, the disparity is far worse—fishermen are 11 times more likely to die from overdose than the statewide average.[3]

While managing mental illness and addiction is never easy, a life at sea aboard fishing vessels creates additional challenges. The grueling, hazardous work in an often-unforgiving sea with rolling decks and cold water creates considerable workplace stress. The close quarters with little-to-no personal space limit opportunities to exercise coping skills. But mostly, it's the isolation that affects those in despair. With deep sea fishing taking men and women hundreds of miles offshore, often for weeks at a time, fishermen are forced to disconnect from all their support back on land. In times of personal crises, fishermen often don't even have a way to call for help. Asking the master to curtail the trip, taking a commercial loss measured in tens of thousands of dollars, is unfathomable for most in need of urgent support. So, despair festers.

While the Coast Guard has always endeavored to safeguard those at sea, the primary line of effort has historically been through promoting vessel safety. Safe vessels make for safer voyages, consequently preventing loss of life at sea. However, when the threat to safety lies in the mental and behavioral health of those that take to the sea, rigorous vessel safety measures such as validating life rafts and immersion suits does little to preserve these vulnerable lives. Keeping mariners safe is the crux of the Coast Guard's mission, even when it means protecting them from their own inner demons. Addressing the mental health of commercial fishermen is a Coast Guard mission.

Throughout New England, the Coast Guard is addressing mental illness and opioid addiction alongside a coalition of partners. In New Bedford, Massachusetts, one of America's largest fishing ports, the Coast Guard has partnered with the city's Waterfront Task Force, participating in outreach events to dispel the stigma of mental illness. The Coast Guard works with vessel masters on how to identify and address personal crises at sea, coaching masters to be active in responding to their crew's needs, and getting those in distress ashore with as little impact as possible.

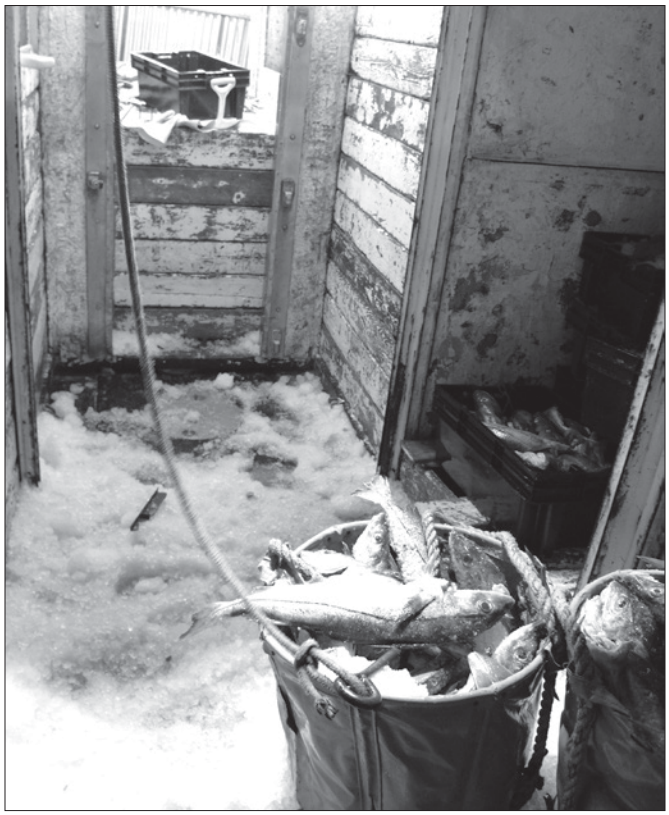
The Coast Guard also collaborates with Fishing Partnership Support Services, a nonprofit dedicated to prioritizing the well-being of fishermen. Coast Guard leaders participate in Fishing Partnership's first aid training sessions and advocate for universal naloxone carriage. The most significant improvement we have made, working with New Bedford's Waterfront Task Force and Fishing Partnership, was deploying naloxone, often referred to by the brand name Narcan.

New Bedford has a significant problem with

opioids—in 2022, the city had double the statewide rate for overdose fatalities.[4] Leading up to and through 2022, the New Bedford waterfront district ranked as the top area in the city for overdose-related 911 calls. However, since the Waterfront Task Force began posting emergency naloxone kits along the waterfront in late 2022, the number of overdose emergencies there has dropped significantly. From September 2022 through September 2023, the New Bedford waterfront did not experience a single overdose fatality. In addition to naloxone deployment, Coast Guard teams host events at stations in fishing ports and build joint relationships with commercial fishermen in hopes that they can intervene before situations become crises.

By advocating for a policy[5] that lets vessel captains report the discovery of narcotics on board and request Coast Guard assistance in disposing of them, the service is helping remove some of the barriers that prevent fishermen from reaching out for help. Whether the crisis aboard is drug-fueled or not, when a fisherman needs help, the Coast Guard wants to get the call as early as possible, and the service is backing that message up with action.

Combatting mental illness is difficult, but the Coast Guard's role is not complex. Building trust within the commercial fishing community is the essential first step. Fishermen must know they can call the Coast Guard at the outset of a developing problem and trust they're going to get support. The Coast Guard must continue messaging that naloxone should be in every vessel's first aid kit and does not imply condoning the presence of drugs. Additionally, when a vessel master calls asking for help getting one of their crewmembers ashore for urgent mental health care, the Coast Guard needs to treat that medevac just as urgently as if the patient presented a visible, physiological injury.



By nature, deep sea fishing forces fishermen to disconnect from their support systems, often worsening an individual's despair. The Coast Guard works with vessel masters to identify and address personal crises at sea and actively respond to their crew's needs. Fishing Partnership photo by Dan Orchard

Almost one year after Station Chatham rescued the 19-year-old fishermen from his suicide attempt, another call came into the Woods Hole command center. The call was direct and there was no mincing of words. A 34-year-old fisherman suffered an apparent fentanyl overdose aboard a fishing vessel 12 miles south of Cape Cod. The master knew his crewman had overdosed, and he told the Coast Guard in plain terms what was happening. The master had attended one of Fishing Partnership's first aid trainings and learned how to employ naloxone, which was issued at the training.

The master, who was able to resuscitate his crewmate with naloxone, safely transferred him to a Coast Guard helicopter. The fisherman survived the ordeal but likely would not have if the vessel's first aid kit didn't contain naloxone. The next day, the Coast Guard coordinated with Fishing Partnership to have the vessel's first aid kit replenished. While both this patient and the 19-year-old off Chatham survived, it is clear how crucial this collaboration has become in ensuring the safety of fishermen.

About the author:

CAPT Clint Prindle is a response and intelligence officer with 26 years of service and three previous commands, including command of Coast Guard Sector Southeastern New England, where he first focused on fishermen wellness. He serves as the chief of staff at Coast Guard Northeast District. He holds an M.S. in strategic intelligence and is a graduate of the Air Force Air Command and Staff College.

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Small Passenger Stability Tests

Why they are crucial for commercial vessels

by CWO4 Jonathan Shipperley
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The town of Montauk is located on the easternmost point on Long Island, New York's south fork. A storied tourist destination, it is famous for its fishing, surfing, and beaches. It is also, among other things, the inspiration for Peter Benchley's book, *Jaws*. On September 1, 1951, it became famous for another reason.

The *Pelican*, a 42-foot passenger vessel with twin gasoline engines and a flying bridge, had set sail that morning from Montauk with 64 people on board who were ready for a day of fun and fishing. Several hours later, the *Pelican* capsized, killing 44 passengers and the captain. It was an unprecedented tragedy that spurred the Coast Guard to implement new stability and inspection regulations, the essence of which are still in effect decades later.

Today, all U.S.-flagged vessels in the United States that operate on navigable waterways and carry more than six passengers for hire are required to be inspected by the Coast Guard. Regulations define small passenger vessels as vessels under 100 gross tons (GT). Small passenger vessels that carry under 150 passengers are regulated under 46 C.F.R. Subchapter T, and small passenger vessels that carry over 150 passengers or have overnight accommodations for more than 49 passengers are regulated under 46 C.F.R. Subchapter K, known respectively as T and K boats. The specific number of passengers that can be carried is further regulated by a vessel's construction, length, lifesaving capabilities, and, particularly, the results of a stability test. But it was not always this way.

In 1951, only passenger vessels over 15 GT were inspected by the Coast Guard, regardless of how many passengers could be carried on board. Consequently, many passenger vessels of that era were specifically built to come in under 15 GT, including the *Pelican*, which was 14 GT. The only limiting factor in determining how many passengers a vessel could carry at that time was the captain's judgment that the ship could be operated safely, and that each person had access to a lifejacket. The captain was not required to have any sort of vessel training, let alone a merchant mariner's credential.

Saturday, September 1, 1951, fell on Labor Day weekend, often considered the unofficial end of summer. Montauk was a popular destination for fishermen and the train that ran from New York's Penn Station directly to Montauk was dubbed the "Fisherman's Special." On that day, more people than usual boarded the train including nearly 400 fishermen. When the train reached Montauk about three hours later, a mass exodus of eager fisherman rushed to the Fishangri-la docks to secure a spot on one of their favorite boats. The *Pelican* was a favorite for many anglers, and they liked the captain. Worried that there were already too many fishermen aboard, some passengers hid in the forward cabin, remaining unseen until the *Pelican* was already on its way.

The *Pelican* was originally built as a recreational vessel in 1940, and the manufacturer recommended no more than 30 people be carried on board at one time. That day, there were 62 passengers and two crewmembers on board. Accounts from the few survivors stated they thought the vessel probably had too many passengers on board, but they trusted the captain and decided to stay. Some passengers stayed because they feared if they disembarked, it would be too late to get a spot on another fishing vessel.

The Coast Guard's Marine Board of Investigation, which convened as a result of the marine casualty, stated the *Pelican* was overloaded, highlighting that if it was subject to inspection standards, the Coast Guard would have limited the vessel to about 20 passengers.

"This opinion is based primarily on the fact that, without any previous structural damage to her hull, the craft actually did capsize and that the capsizing can be attributed to no other cause than the presence on board of a human and consequently a shifting cargo above the waterline of approximately four tons."[1]

The *Pelican* left port at approximately 8:30 a.m., motored past Lake Montauk, rounded Montauk Point, and headed for Frisbie Bank, a point in the Atlantic Ocean about a mile off the south shore of Long Island and approximately 11 miles from Fishangri-la. This area was one of the captain's favorite fishing spots, and the weather was still good. In 1951, weather forecasting was not as precise as it is today, so the most recent weather report was from the previous evening. This, along with weather observations from other ships farther out, was

voluntarily transmitted via radio. That was the full extent of the forecasting available that day.

When the *Pelican* finally arrived at Frisbie Bank around 10 a.m., the weather to the northeast was already building. An hour later, when the captain decided it was getting too rough to stay, the seas had already increased to six feet. When the captain hit the vessel's starter, the starboard engine roared to life, but the port engine refused to work. The overloaded *Pelican*—with only one engine, rough seas, and the wind building to nearly 30 knots—started to head for home at approximately two knots.

> ***The board is of the opinion that this incident is a clear and unequivocal example of the lack of adequate legislation for the safety of passengers, many of whom apparently go aboard under the impression that some governmental agency has insured that proper safety standards have been met.***
>
> *—U.S. Coast Guard Marine Board of Investigation report, 08 October 1951, p. 13*

At 12:30 p.m., the *Pelican* had yet to round Montauk Point. Heavy rain had started and sea conditions were worsening. By 1:30, the *Pelican* finally made the turn at Montauk Point, allowing the captain to begin the long port turn that would eventually lead them home to Fishangri-la. Unfortunately, the area known as "The Rip" was in a strong ebb tide. Combined with the increased sea state, a strong northeast gale, heavy rain, an overloaded vessel, and only one engine, the *Pelican* was essentially stuck in place, not making way and not turning quickly enough to avoid waves slamming broadside on the starboard side. Each time a wave hit on the starboard side, it caused the *Pelican* to roll to port. Unfortunately, most of the passengers had gathered on the port side to avoid the waves coming over the starboard side, this extra weight on the port side negatively affected the vessel's center of gravity and caused the rolls to port to become more severe. A succession of increasingly larger waves pounded the starboard side of the *Pelican*, and at around 2:10, the largest wave struck. The *Pelican* rolled one last time and never righted itself, capsizing the vessel. Only one passenger was wearing a lifejacket.

The Coast Guard's Marine Board of Investigation blamed the vessel's captain for the tragedy.

"From the facts adduced, it would appear that the owner and operator of the *Pelican*, if alive and able to defend himself, would be subject to serious charges of gross and criminal negligence."[2]

In its report, the board recommended that Congress consider legislation to prevent a disaster like the *Pelican* from happening again. This recommendation was eventually acted upon. On May 10, 1956, President Dwight D. Eisenhower signed H.R. 7952 – An Act to Require the Inspection and Certification of Certain Vessels Carrying Passengers – into law. The act defined a passenger-carrying vessel as any vessel that transports more than six passengers for hire, closing the 15 GT loophole once and for all, and required that each vessel undergo inspection.

Stability Testing

Today, every small passenger vessel is issued a stability letter by the Coast Guard in accordance with 46 C.F.R. 178.210 for T boats and 46 C.F.R. 170.120 for K boats. This letter identifies the vessel, when and where the stability test took place, what type of stability test was conducted and, most importantly, the maximum number of passengers and/or cargo allowed on board.

If the vessel has multiple decks, the letter also stipulates how many people, if any, are allowed on each deck. This maximum number of passengers is further broken down by the specific configuration of the vessel, and that is based on the length of railings, fixed seating and deck space. For the purposes of passenger count, one passenger is allotted 30 inches of rail space, with some exclusions for congested or unsafe areas, 10 square feet of deck area—with similar exclusions for areas that are not fit for passengers, such as interior passageways or toilet spaces—and 18 inches of width for seating. The length of rail measurement may not be combined with either seating or deck space requirements. The total number of passengers from these calculations is the maximum number of passengers a vessel can legally carry, provided it does not exceed the stability letter's calculations.

So, how does a boat owner get one of these stability letters? The answer is a stability test which is required

Coast Guard CWO4 Glen Browning checks measurements near Captree State Park, New York, during a simplified stability test on a new passenger vessel built by Henriksen Boat Designs. Coast Guard photo by Bill Grossman

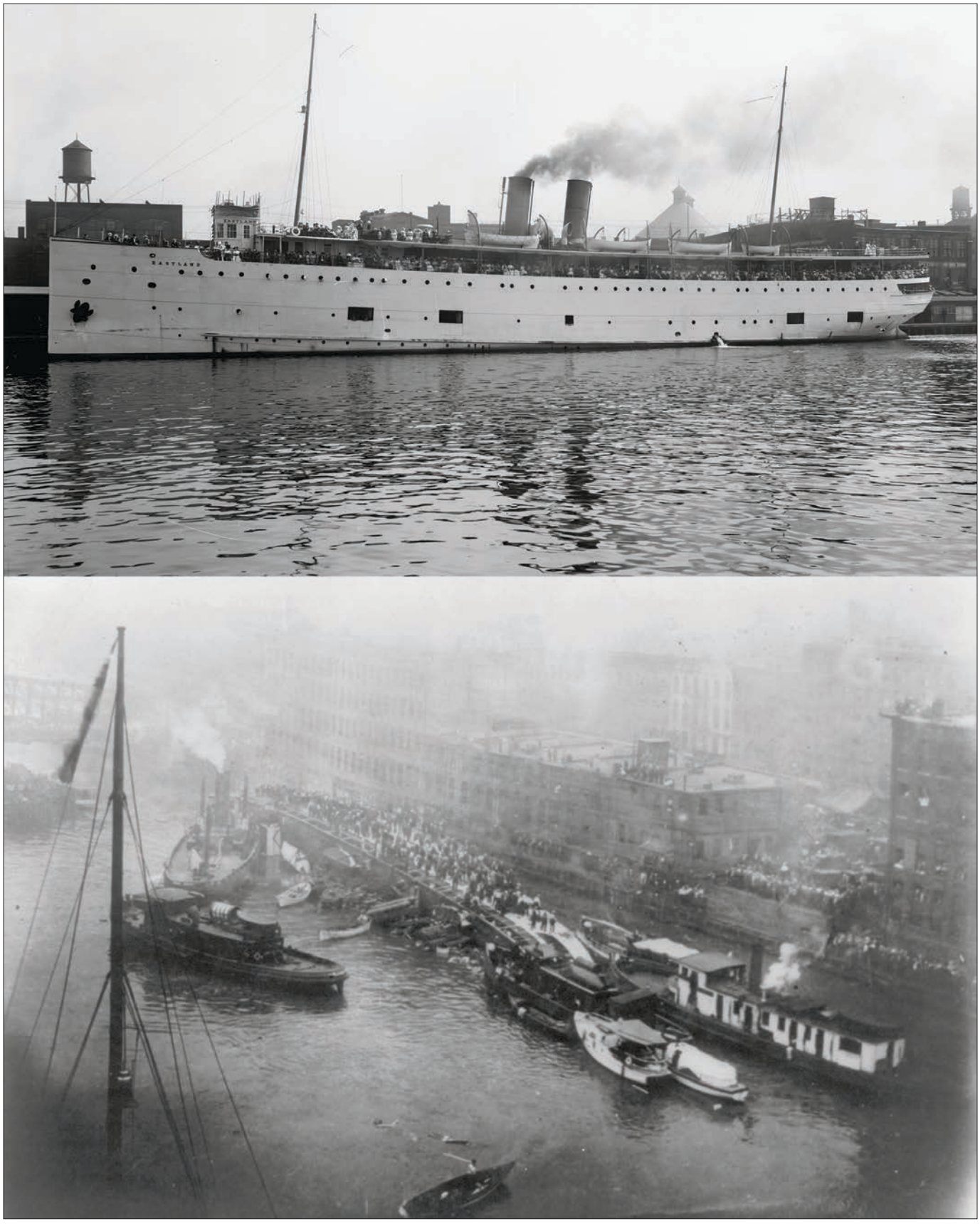
for all U.S.-flagged commercial vessels. The test is good for the life of a vessel, unless major changes are made which affect its weight. In those instances, a new test may be required.

There are generally two types of stability tests approved for small passenger vessels: simplified and incline. An incline stability, or incline experiment, is generally conducted on larger vessels, is required for K boats, and can be used on all T boats. The incline experiment results in greater accuracy than a simplified test and is performed by a naval architect who submits detailed design calculations for approval to the Coast Guard's Marine Safety Center (MSC). A Coast Guard marine inspector oversees the test to ensure the measurements and calculations are accurate and that the test is conducted according to the approved plans. The results are then submitted to the MSC for final approval and issuance of the vessel's stability letter.

Many small passenger vessel owners and operators opt for the simpler, more cost-effective simplified stability proof test. This option is less complicated, as it does not require a naval architect, and there is no need to create or submit plans to the MSC. However, because it is less precise than an incline experiment, there are several conditions placed on the use of simplified stability proof tests to maintain an equivalent level of safety, with the calculations being more conservative to err on the side of caution.

For example, the simplified test is prohibited for any T boat over 65 feet long, designed with more than one deck above the bulkhead deck (excluding a pilothouse), or traveling internationally with more than 12 passengers. The vessel also must be a monohull or a non-sailing flush-deck catamaran. There are additional requirements for subdivision, sailing vessels, and other unique vessels that fall outside the scope of this article.

Briefly, and in the simplest possible terms, both stability tests involve moving a series of known weights, such as concrete blocks, sandbags, and barrels of water, on a vessel and measuring the resulting change in the heel angle—the degree to which a vessel inclines transversely—to determine the vessel's stability characteristics. Weights are moved to one side of the vessel to simulate what would happen if passengers simultaneously decided to move to one side of the vessel, say on a fishing trip or whale-watching excursion. Wind heel and wave action are also accounted for. If the vessel does not heel past a predetermined point marked on the hull, then the vessel passes the stability test. The way this is achieved is slightly different for each test. The incline



In the top photo, the SS *Eastland* is docked in Cleveland around 1911. At bottom, the *Eastland*, a passenger tour ship, rolled over while docked on the Chicago River in July 1915, killing 844 passengers and crew. Library of Congress photos

experiment has the greatest degree of accuracy, which is why it is required on certain vessels. In contrast, the results of the simplified stability proof test usually come with a slight reduction in the passenger count to compensate for the decreased accuracy.

Currently, the Coast Guard determines the average weight of a person to be 185 pounds, but from the 1960s through 2011, the assumed average passenger weight (AAPW) was 160 pounds. For vessels on protected routes—sheltered waters generally free of special hazards, such as most rivers, lakes, and harbors—the AAPW could be as low as 140 pounds if the vessel carried a mix of men, women and children. Those weights established in 1960 were out of date, so, in 2011, new regulations implemented the 185-pound rule. Vessels had the choice to conduct a new stability test or reduce their passenger count accordingly, and new stability letters were issued to all vessels.

SS Eastland

Changing course slightly, an article on vessel stability would not be complete without taking a moment to remember the SS *Eastland*. By no means was the *Eastland* a small passenger vessel, coming in at 1,961 GT, but is most certainly relevant to the world of passenger vessel stability. The *Eastland* capsized at its dock in Chicago in 1915 and 844 died. Many factors were at play on the day the vessel capsized. Built in 1903, the *Eastland* did not meet the owners' desired speed of 22 knots, so a few months after construction it returned to the shipyard for modifications. That is where the stability problems started.

The original plans were designed for the vessel to achieve 20 knots, carry a large quantity of fruit, and up to 500 passengers. During the modification, a heavy air conditioning system was installed, machinery systems were moved, and the boilers were upgraded, all to make the vessel faster. After the modifications, the vessel sailed with an incredible 3,000 passengers. In successive years, cabins were added and taken away and wooden flooring was replaced with poured concrete, which added tons of weight. The smokestacks were altered, and various other structural changes were made to the vessel. To top it all, the vessel's ballast system was inadequate and added to the free-motion effect when the vessel rolled.

It is well-known that if structural changes are made to a vessel that affect its weight, it will affect the vessel's center of gravity and stability. The *Eastland* showed several times it wasn't safe, as it often listed 10 degrees. On one voyage, it listed an astounding 25 degrees before righting. It seemed every time this happened, the passenger count was lowered slightly. The vessel was sold, so the original owners may have been aware of the issues. Ironically, the final straw for the *Eastland* stemmed from new regulations attempting to make passenger vessels safer.

In 1912, the RMS *Titanic* sank, and regulations were implemented in 1915 to increase the number of lifeboats aboard a vessel. The owners of the *Eastland* complied, adding lifeboats to the top deck—an estimated 15 to 20 tons of weight.

In July 1915, more than 2,500 passengers piled on to the 265-foot ship for a chartered trip. The ship had taken on provisions and a full load of coal that day in preparation, all stored in the port side hold. As the passengers embarked, the ship began to list. The chief engineer attempted to fix the issue by ballasting. The crew also attempted to shift passengers from one side of the vessel to the other, and even ordered some to go below decks to lower the center of gravity, likely leading to more deaths. However, the vessel continued to list. The captain decided to ignore this issue and cast off the lines, preparing to get underway. A few moments later, the ship listed enough that water poured in through open hatches on the port side. The subsequent down flooding added to the list of the vessel, which capsized shortly thereafter.

Criminal and civil trials took place soon after the disaster, holding the vessel owners and crew responsible. However, no one was found guilty, as it could not be proven that the crew had acted negligently. Regulations soon followed, giving the newly created Coast Guard greater responsibility over the inspection and stability of vessels. Today, any vessel that has an aggregate weight change of 2% is required to either have new stability calculations performed, or a new stability test completed.

Conclusion

Although the sinking of the *Pelican* over 70 years ago and the *Eastland* more than 100 years ago were both tragic maritime disasters, they led to one positive outcome: the implementation of a series of new regulations. Following the *Eastland* disaster, new stability regulations and increased Coast Guard oversight were introduced, while the *Pelican* tragedy led to the closing of the 15 GT loophole, significantly improving the safety and stability of small passenger vessels. These regulations have undoubtedly saved thousands of lives in the years sincewwwwww

About the author:

Originally from England, CWO4 Jonathan Shipperley has served in the Coast Guard for 28 years, mainly in the prevention field. He has been stationed all over the country and overseas and is the author of several thriller novels featuring the Coast Guard, which can be found everywhere books are sold.

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Protecting the North Atlantic Right Whale and Beyond

Market solutions to offset the cost of on-demand fishing gear

by Eleanor Garcia
Living Marine Resources Analyst
U.S. Coast Guard

In September 2022, Monterey Bay Aquarium's Seafood Watch issued a recommendation to avoid purchasing American lobster caught with pots in the U.S. Atlantic, specifically the Gulf of Maine and Georges Bank. While the website claims the lobster stock in this region is "healthy and overfishing isn't occurring," the fishery "poses a risk" to the endangered North Atlantic right whale, citing entanglement in fishing gear as the leading cause of serious injury and death.[1] Restaurants and meal delivery services quickly removed American lobster from their menus in an attempt to protect one of the world's most endangered marine mammals.[2]

Simply refraining from purchasing American lobster, however, is not just damaging to local and state economies, it may not effectively contribute to protecting whales. In contrast, use of new "ropeless" or on-demand fishing gear offers a balanced solution that protects the right whale and the livelihoods of Maine and Massachusetts lobster fishers. It is unfair, though, to put the financial burden solely on fishers when purchasing new on-demand gear. Instead, we should explore solutions such as implementing an on-demand gear seafood certification modeled on the dolphin-safe labeling program.

Additionally, creating voluntary contribution programs for the commercial and recreational boating communities represents a mutually beneficial solution. Mariners have a shared interest in limiting the use of traditional fishing gear to reduce instances of prop fouls—propeller entanglements with fishing lines, ropes, and debris—which can cause irreparable damage to propulsion systems. While these interventions might not prove timely enough to help save the North Atlantic right whale from extinction, investment in on-demand and other future gear modifications will benefit other endangered species, as well as members of the boating community.

Factors Contributing to Right Whale Morbidity

According to the National Oceanic and Atmospheric Administration's (NOAA) Fisheries website, the North Atlantic right whale is one of the world's most endangered large whale species with fewer than 370 estimated individuals remaining.[3] During the 1800s, whalers heavily hunted the species, deeming them the "right" whales due to the fact that they float to the surface once killed.[4] As a migratory species, right whales can be found as far south as Florida, where they birth calves, to as far north as Canada, where they predominantly feed on plankton.[5]

Despite strong conservation efforts since 1935, the North Atlantic right whale population is still small, with only about 370 whales remaining in the wild, as of 2025. Right whales typically slowly skim feed plankton at the surface or subsurface, making them prone to being hit by ships or entangled in fishing gear. Want to help the population out? Check out the Whale Alert app, which helps map where these endangered whales are swimming in places like Stellwagen Bank National Marine Sanctuary: http: //www.whalealert.org. NOAA photo

ENDANGERED NORTH

NOAA FISHERIES

CANADA

UNITED STATES

FORAGING

CALVING

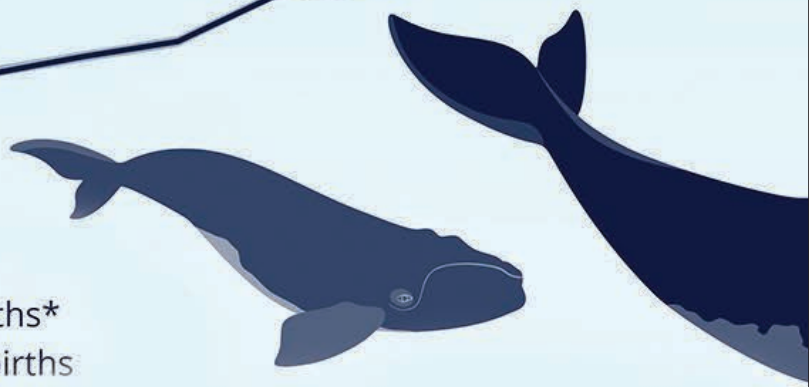
Primary threats

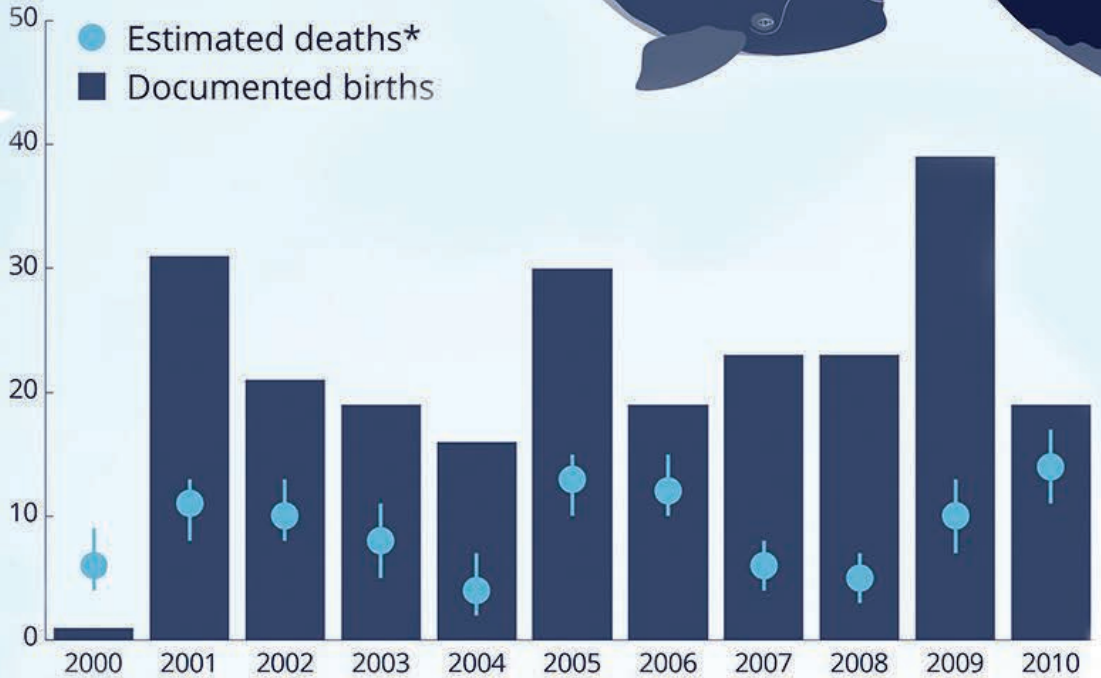
Vessel strikes

Fishing gear entanglements

318 WHALES 2000

477 WHALES 2010





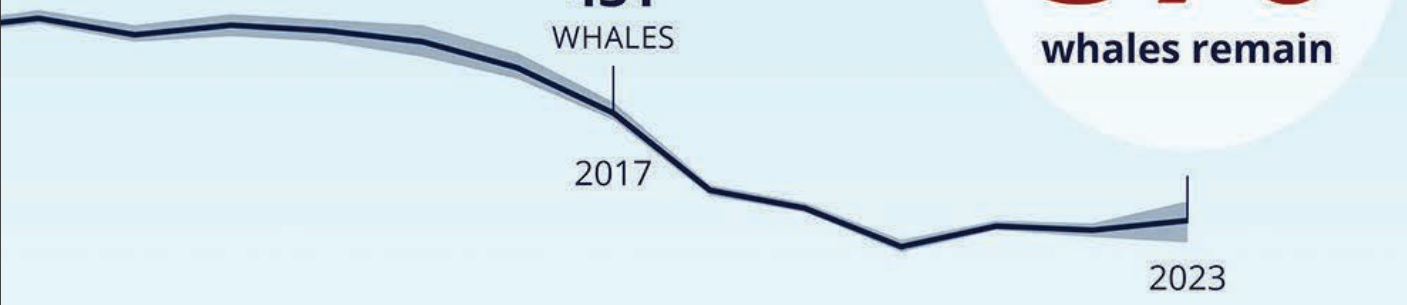
Updated October 2024

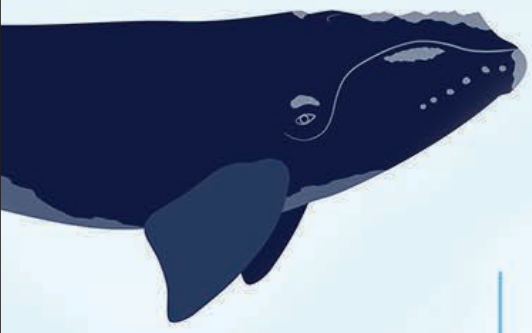
ATLANTIC RIGHT WHALE
POPULATION STATUS

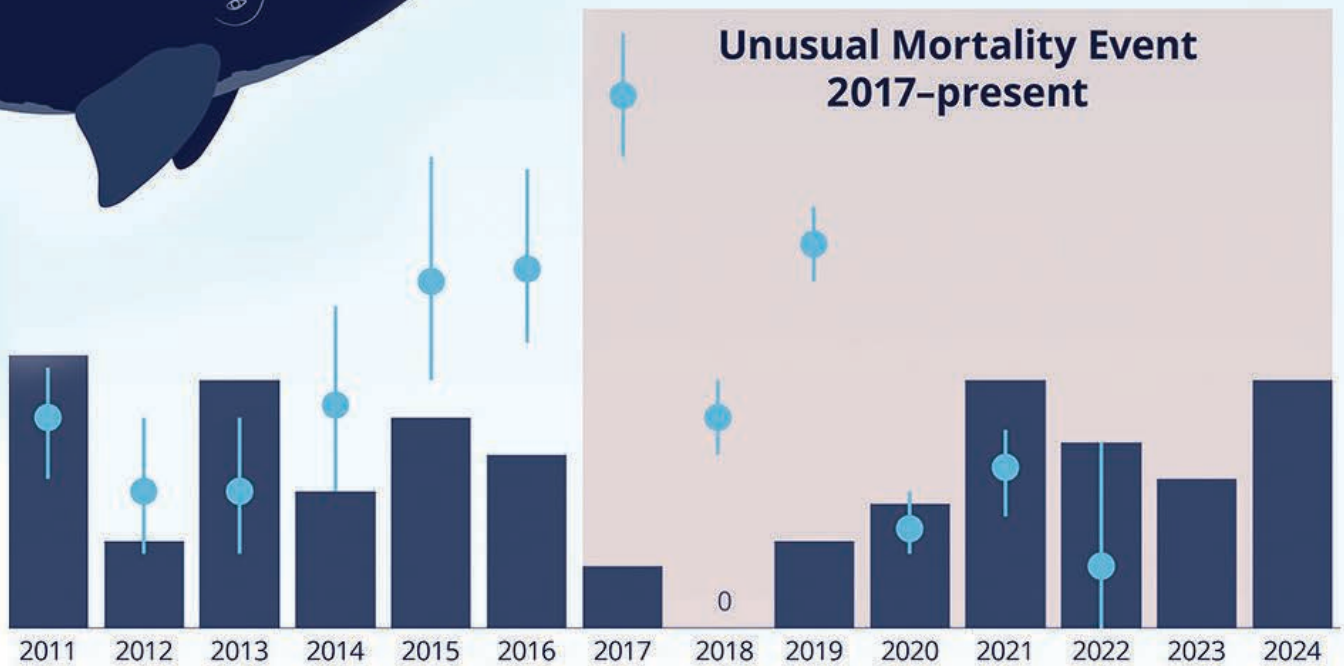
Approximately

370

whales remain







*Total deaths not estimated for the last 2 years due to lag in data processing and analysis.

Since 2017, scientists estimated that more than 20% of the right whale population has sustained injury and faced sickness, or death.[6] In addition to injury from fishing gear entanglements and vessel strikes, right whale mortality has been associated with changing weather patterns, changes to ocean temperatures and salinity, and ocean noise. As ocean temperatures rise, right whales appear to be following their prey, moving to locations with fewer protections against vessel strikes and gear entanglements. Finally, anthropogenic ocean noise from ships, construction, and energy exploration can interfere with right whale communication, affecting their ability to find food and mates while avoiding predators and other hazards.[7]

Lobster's Economic and Cultural Importance in Maine and Massachusetts

In contrast to right whales, the American lobster population is thriving in the Gulf of Maine and Georges Bank. This bottom-dwelling species is found predominantly on rocky, sandy, or muddy bottoms in inshore waters from Maine to Cape Cod, Massachusetts. Data collected by the Atlantic States Marine Fisheries Commission indicates that the American lobster population has been increasing since 1982 despite an annual increase in the number of lobsters caught over the same time period.[8] While research indicates that rising ocean temperatures and changes in salinity may be influencing local populations, leading lobster stocks originating in the Southern New England to migrate north, the overall abundance of lobster can be attributed to cooperative management and robust fisheries regulations that have been in place since the early 2000s.[9] In fact, Patrice McCarron, executive director of the Maine Lobstermen's Association, claims that "lobster is one of the most sustainable fisheries in the world due to the effective stewardship practices handed down through generations."[10]

The American lobster fishery plays a vital role in Maine, contributing not just to the state's economy, but to its culture. In addition to the 5,000 licensed fishers, Maine's lobster industry employs more than 12,000 people and contributes more than $1 billion to the state's annual economy.[11, 12] Moreover, a 2008 study found "lobster culture" greatly influences the state's coastal tourism industry, noting that "lobster is an iconic element of Maine's coastal tourism experience, along with touring small villages, lighthouses and viewing the indigenous wildlife."[13] Whale watching also plays a large role in both the Maine and Massachusetts economies. A recent Emerson College and National Marine Sanctuary Foundation study indicated that whale watching operations in vicinity of the Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts contributes $76 million in labor income and $182 million in sales annually to the local community.[14]

Potential Policy Option: On-Demand Fishing Gear

To balance protecting right whales while also allowing lobster fishing to continue, NOAA Fisheries' collaborative Atlantic Large Whale Take Reduction Team is working on a solution involving fishing gear modifications using breakaway technology or innovative ropeless or on-demand traps.

On-demand lobster traps allow fishers to use time-release or acoustic technology to locate traps and activate attached carbon dioxide canisters that inflate flotation devices that allow fishers to retrieve the traps.[15] This technology removes the need for the long, vertical rope that connects the trap sitting on the ocean floor to a buoy at the surface, which lobster fishers traditionally would use to locate and retrieve their traps. NOAA Fisheries maintains a "Gear Library" consisting of various donated on-demand prototypes from environmental and academic organizations that fishers and researchers sign out and test, and the Massachusetts Division of Marine Fisheries completed a yearlong Ropeless Fishing Gear Feasibility Study in 2022 to assess "fishing, legal, regulatory, technological challenges and opportunities."[16]

Costs Associated with On-Demand Fishing Gear Substitution

While the use of on-demand gear seems to offer the best compromise between all stakeholders, cost appears to be the largest obstacle to implementation. Massachusetts' feasibility study identified that "most lobster fishermen are owner-operators and profit margins are often thin across segments of the industry," making it difficult for fishers to pay the estimated $200,000 to $400,000 to swap out their traditional gear for new on-demand gear.[17] Commercially available on-demand traps currently cost up to $8,000 each.[18] Recent research, however, suggests the cost of on-demand gear will likely decline as more fishers adopt the technology—production of the traps will become cheaper due to economies of scale and learning.[19] Furthermore, while time release is less expensive, more expensive acoustic versions could have other cost-saving features such as the ability to collect information such as trap count, which would enable fishers to know the optimal time to return to their traps once filled, reducing overall fishing costs with respect to fuel and crewmember time.[20, 21]

Additional Advantages: Protecting Other Species and the Boating Community

While widespread use of on-demand fishing gear may not prove timely enough to protect the current right whale population, it will almost certainly help protect other endangered species, as well as members of the

boating community. Sea turtles, for instance, become entangled in fishing gear with enough frequency that NOAA Fisheries has created a hotline for mariners and others to call emergency responders.[22] Moreover, the same on-demand or ropeless technology can be used in many other fisheries. Scientists are currently researching use of this alternative gear in the Dungeness crab fishery off the West Coast of the United States having found similar entanglements with humpback whales and the existing traditional crab traps.[23] Finally, recognizing the maritime space is shared by marine life and fishers, commercial mariners and recreational boat owners may find the substitution of on-demand fishing gear for traditional particularly appealing in preventing prop fouls that can cause damage to boats' and ships' propulsion systems.[24]

Proposals to Improve Costs to Fishers

As the largest obstacle to implementing this policy alternative appears to be the high cost of substituting on-demand for traditional lobster traps, for which lobster fishers currently bear the cost burden, I propose using a combination of policy instruments to offset the cost burden on lobster fishers. These strategies would best be achieved through expanding the gear conflict conversation to the broader public, particularly seafood vendors, restaurants, and consumers, as well as recreational and commercial mariners.[25] NOAA Fisheries developed an adaptive management plan to deploy this new technology in collaboration with fishers and other stakeholders in the Atlantic Large Whale Take Reduction Team. This plan aims to monitor progress and allows for institutional and social learning about the new fishing gear, which could be another mechanism for providing equitable cost-sharing possibilities.

On-Demand Gear Seafood Certification

Understanding that some environmentally-conscious

A North Atlantic right whale identified as Fenway swims next to her calf in the Gulf of St. Lawrence. NOAA Fisheries photo by Allison Ogilvie

Scientists from NOAA Fisheries Service approach a young North Atlantic right whale they disentangled from fishing gear in January 2013 off the coast of Cape Canaveral, Florida. These whales can be found as far south as Florida and as far north as Canada. NOAA Fisheries photo


PRO

consumers may be willing to pay more for lobster caught using on-demand technology, providing those consumers with a certification is a powerful market incentive for fishers to voluntarily substitute their traditional gear for on-demand.[26] Economists have studied people's willingness to spend money to protect "charismatic megafauna" such as whales since the 1970s.[27] Certification schemes, such as the Marine Stewardship Council (MSC) and Forest Stewardship Council, empower consumers to make informed choices by providing a "guarantee" their product was sustainably harvested.[28] The dolphin-safe certification program could serve as a model for a future on-demand fishing gear certification.

In the 1980s, dolphins were often unfortunate bycatch victims in the eastern Pacific Ocean yellowfin tuna fishery. For reasons still unknown, tuna are often found directly below dolphin pods in the water column, so fishers would use purse seine nets to encircle dolphin pods in hopes of catching the tuna below.[29] After biologist Samuel LaBudde secretly filmed these practices in an undercover operation on behalf two nonprofits, airing the footage on television and testifying before Congress, consumers boycotted tuna, leading industry to develop dolphin-safe fishing practices. To deter fraudulent labeling, Congress passed the Dolphin Protection Consumer Information Act in 1990, which codifies strict labeling requirements, including use of fishery observers onboard vessels to ensure compliance, and a penalty of up to $100,000 for each mislabeling offense.

While other certification programs have had limited success, at least in the United States, the dolphin-safe certification and labeling, in conjunction with other bycatch reduction efforts, has led to a 99% decrease in dolphin net entanglement.[30] Unlike MSC and other certifications which are overseen by industry, the dolphin-safe certification is enforced by NOAA Fisheries, a U.S. federal agency.[31, 32] Moreover, while the scope of MSC is broad, covering many global fisheries, the dolphin-safe certification within the United States is narrow, making it more manageable to govern. Any on-demand gear certification, therefore, modeled on the dolphin-free certification should be limited to U.S. fisheries and should be enforced through NOAA Fisheries with large penalties for fraudulent labeling.

Voluntary Contribution Program for Commercial and Recreational Mariners

In addition to a certification option, policymakers should look to expanding the participation of other actors that share the same physical spaces as lobster fishers, namely other mariners. Recreational and commercial mariners may also have a strong interest in promoting the substitution of traditional lobster traps for on-demand or ropeless technology. Just as whales may get entangled in the vertical lines of lobster traps, so do vessel propellers. Vessels that inadvertently run over marine debris such as seaweed or fishing lines can suffer prop fouls. These, at the very least, can be inconvenient to mariners who need to untangle the hazard from their prop, shaft, or rudders.[33] At worst, the entanglement can cause monetary damage or disable the vessel, leaving its passengers stranded at sea.[34] While statistics on the overall frequency of prop fouls is unavailable, the instances are so ubiquitous amongst the boating community that it has prompted a new market for installed propellor line and net cutting systems.[35] It stands to reason that any mariner who has experienced a prop foul would have a strong incentive to help decrease the overall number of hazards, like vertical fishing lines going to lobster pots. It is also worth mentioning that mariners forced to cut entangled fishing lines inadvertently contribute to the problem of ghost gear and present an economic loss to fishers. Leaving fishers no way to retrieve their lobster pots, the lost fishing, or "ghost," gear will continue to trap and kill marine wildlife on the ocean floor.

Boat owners and operators must register their vessels in compliance with state and federal laws, typically on a semiannual basis. If not federally registered with the Coast Guard, boat owners operating all recreational and commercial vessels are required to register and renew their registrations with the state.[36, 37, 38] Offering the option to make a voluntary donation upon registration renewal could help supplement the cost to fishers purchasing new gear using on-demand technology. This voluntary donation would mirror what many state Department of Motor Vehicles offices facilitate for people registering their motor vehicles.

For example, the state of Florida offers its residents "Helping Sea Turtles Survive" personalized license plates for an extra $20 upon initial registration.[39] According to their website, the proceeds from these voluntary contributions "serve as the primary source of funding" for the Florida Fish and Wildlife Conservation Commission's Sea Turtle Program, which manages permitting for coastal construction and protection of turtle nesting sites, among other things.[40] Additionally, proceeds fund a Sea Turtle Grants Program that awards more than $300,000 annually to coastal county governments, educational institutions, and nonprofit groups for turtle research, conservation, and educational programs.

Conclusion

Intervention attempts may prove too late to save the North Atlantic right whale population, which arguably never fully recovered from the 19th century's whaling industry and continues to be threatened by additional factors such as vessel strikes, ocean noise, and rising ocean temperatures. However, innovations in fishing

gear including on-demand technology could prove beneficial to preserving other marine wildlife populations while protecting fishers' economic interests and the boating community at large.

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The views herein are those of the author and are not to be construed as official or reflecting the views of the Commandant or of the U.S. Coast Guard.

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Success in Partnerships

Canadian Engagement

A history of partnership

by Joseph Boudrow
Incident Management and Preparedness Advisor
Northeast District
U.S. Coast Guard

The Coast Guard Northeast District and the Canadian Coast Guard Atlantic Region maintain a strong decades-long partnership. Both coast guards share similar responsibilities including search and rescue (SAR), oil and hazardous materials (hazmat) release response, ice breaking, and aids-to-navigation maintenance. Both countries benefit greatly from joint responses to SAR and pollution incidents along a shared border in the North Atlantic Ocean. To maintain this relationship, routine interactions such as exercises, meetings, and visits occur regularly.

During SAR operations, the two coast guards routinely

Shortly after taking command of the U.S. Coast Guard's Northeast District, RADM Michael E. Platt, center left, met with his Canadian counterpart, Canadian Coast Guard Atlantic Region's Assistant Commissioner Gary Ivany, center right, in October 2024. RADM Platt, and a U.S. Coast Guard delegation toured the Canadian Coast Guard base in Dartmouth, Nova Scotia, as well as two of the larger Canadian ships. Coast Guard photo

assist each other with both air and surface assets and coordinated efforts between Joint Response Coordination Center (JRCC) Halifax and Regional Response Coordination Center (RRCC) Boston have saved numerous lives. During the 2021 F/V *Atlantic Destiny* response, two U.S. Coast Guard aircraft assisted Canadian responders in saving the lives of all 31 crewmembers from the sinking fishing vessel. The Canadian-flagged vessel was in Canadian waters off the coast of Nova Scotia when it began to sink, and SAR was coordinated by JRCC Halifax.

The submersible *Titan* was lost in RRCC Boston's SAR area of responsibility in June 2023, but Canadian assets from Newfoundland quickly responded to support the U.S. Coast Guard in the response efforts. Annual SAR training is also conducted in Passamaquoddy Bay, and in the Bay of Fundy, between Maine and New Brunswick, involving U.S. Coast Guard Station Eastport, Maine, the Canadian Coast Guard Rescue Training Center, and the Canadian Coast Guard Auxiliary.

How it Began

The coast guards' cooperation on pollution response dates to 1972, when the need for an international marine pollution contingency plan for Canada-United States adjacent waters was recognized in the agreement between Canada and the United States regarding Great Lakes water quality. From this agreement, the Canada-United States Marine Contingency Plan for Spills of Oil and Other Noxious Substances, better known as the Joint Contingency Plan (JCP), was signed on June 19, 1974. In September 1983, these efforts expanded beyond the Great Lakes with the addition of four geographically oriented annexes: the Atlantic Coast (CANUSLANT), Pacific Coast (CANUSPAC), Dixon Entrance (CANUSDIX), and Beaufort Sea (CANUSNORTH). The relationship between the Coast Guard Northeast District and the Canadian Coast Guard Atlantic Region for pollution response began with the formation of CANUSLANT. In the event of oil or harmful substance spills along the border, the CANUSLANT serves as a bridge between the United States and Canada Contingency Plans for preparation and response efforts.

Chris Henderson, the Canadian Coast Guard's deputy commissioner of operations, left, uses a portable remote control aboard CGC *William Chadwick* to steer the cutter during a demonstration in Rockland, Maine, on May 15, 2023. The demonstration was part of the Canada-United States Coast Guard Summit, a multinational event to, among other things, maintain and strengthen partnerships and discuss existing and emerging challenges. Coast Guard photo by Petty Officer 3rd Class Briana Carter

The overall responsibility for the JCP falls under the Canadian Coast Guard's National Strategies director general, and the U.S. Coast Guard's Incident Management and Preparedness Policy director. For each geographic region, the overall responsibility falls under the applicable U.S. Coast Guard district commander and the Canadian Coast Guard assistant commissioner.

In the event of discharges of harmful substances along the border, CANUSLANT's primary objectives are to:

- Ensure an effective, coordinated response to a cross-border spill
- Establish a Canada-United States Joint Response Team (JRT) for the Atlantic Region under co-leadership of the Canadian Coast Guard and U.S. Coast Guard
- When necessary, set up a Canada-U.S. Joint Area Command Post
- Ensure timely and accurate notification of cross-border incidents to federal, state/provincial, tribal, and local authorities
- Ensure timely and accurate flow of information between responders in both countries
- Facilitate safe and timely cross-border movement and coordination of personnel, equipment, and supplies
- Ensure coordinated and timely flow of information to the public and media

CANUSLANT may also be used to obtain cross-border assistance (mutual aid) when only one country is affected.

Organization and Partners

CANUSLANT's joint response team membership structure is similar to the United States' Regional Response Teams (RRT), and membership is not limited to the two coast guards. Other federal, state, and provincial agencies participate and play critical roles. On the U.S. side, Maine is joined by the Department of the Interior,

the National Oceanic and Atmospheric Administration, the Environmental Protection Agency, the Federal Emergency Management Agency, and Customs and Border Protection, in making critical contributions. From Canada, there is great participation from Environment Canada, Transport Canada, Fisheries and Oceans Canada, Public Safety Canada, Canada Border Services Agency, the Canadian Wildlife Service, and the provinces of New Brunswick and Nova Scotia. The cooperation and effort by all agencies are key to the CANUSLANT JRT being a well-established, close-knit team. The JRT meets twice annually, and the meeting locations rotate to various locations on each side of the border.

U.S. and Canadian Coast Guard dignitaries, including ADM Linda L. Fagan and Commissioner Mario Pelletier, were on hand to observe a Coast Guard Air Station Cape Cod H-60 helicopter performing a search-and-rescue demonstration with a rescue swimmer from the deck of the CGC *William Chadwick* in Penobscot Bay, Maine, in May 2023. Coast Guard photo

Maintaining the Relationship

As for testing the CANUSLANT Annex, exercises are conducted every five to six years, with the last full-scale exercise held in 2019. During this exercise, command posts were established on each side of the border and a joint Area Command was established in St. John, New Brunswick, Canada. The exercise also included equipment deployment along the border in Passamaquoddy Bay, where U.S. and Canadian vessels conducted joint boom and skimming operations.

The next round of exercises will begin with a tabletop exercise in 2025 before building into a full-scale exercise the following year. The exercise scenario will focus on a large vessel fire causing the loss of containerized cargo, much of which is hazmat. Responders will need to address two events—containers washing ashore along the border between both countries and a burning container ship along the border.

The 2025 workshop will focus on notification procedures and the CANUSLANT activation process, as well as discussions on hazmat and salvage response capabilities along the border. As with the 2019 exercise, it is anticipated that there will be an Incident Command Post (ICP) on each side of the border with a joint Area Command over the two ICPs handling political engagement and critical resource allocations during the 2026 full-scale exercise. Field operations for a joint hazmat response also are being planned.

Each year, the CANUSLANT Annex plan is reviewed for accuracy and contact lists, and procedures are updated as needed. Every five years, or following a major exercise or real-world event, the plan is updated to reflect any lessons learned.

Conclusion

The Coast Guard Northeast District and the Canadian Coast Guard, Atlantic Region continue to work closely together to improve the safety of our waters. By conducting regular planning, exercises, and meetings, relationships between agencies grow. With strong interagency relations, response capabilities improve, and better service is provided.

About the author

Joseph Boudrow serves as the incident management and preparedness advisor for the Coast Guard Northeast District. In this role, he serves as the U.S. Coast Guard co-chair for the Regional Response Teams for federal Regions 1 and 2 and serves as the U.S. Coast Guard co-chair for the JRT with the Canadian Coast Guard for CANUSLANT.

Read the CANUSLANT Annex of the Joint Contingency Plan at https://bit.ly/JCPConsolidated.

Atlantic Destiny

by *LCDR J. Travis Christy*
Academy Instructor
Force Readiness Command
U.S. Coast Guard

I will never forget March 2, 2021. That date has been seared into my memory as the night the 143-foot fishing vessel *Atlantic Destiny* caught fire and began taking on water more than 200 miles offshore with 31 souls onboard. As 60-knot winds pummeled the vessel and violently tossed it in seas topping 33 feet, I saw the U.S. Coast Guard, working in tandem with our Canadian search and rescue (SAR) partners, at its very best.

I wish I could describe to you what it was like to be there. Not in the sterile terms of an after-action report, or with the calming knowledge that, in the end, everything would turn out alright. Instead, I wish you could experience it as we did, moment to moment, uncertain of whether triumph or disaster awaited each time we said the words, "Begin the hoist."

I wish you could arrive on scene, as we did, and see the Royal Canadian Air Force (RCAF) C-130 in a low orbit as its flares dropped to illuminate the *Atlantic Destiny* and the loose cluster of storm-tossed vessels that had come to its aid on Georges Bank. You would likely marvel at

The *Atlantic Destiny* ran into trouble after a fire broke out on the night of March 2, 2021. The blaze knocked out the vessel's power and then the ship started taking on water. Adverse weather conditions made the rescue hazardous. Canadian Coast Guard photo by Jaylon Brownbridge

A Canadian Coast Guard CH-149 Cormorant helicopter aircrew participates in a search and rescue training demonstration near St. John's in Newfoundland, Canada, in May 2022. A similar Cormorant responded to the *Atlantic Destiny* search and rescue operation on March 2, 2021, initiating the rescue process before reporting a mechanical issue. U.S. Coast Guard photo by Petty Officer 1st Class Travis Magee

how the bevy of activity on the surface was mirrored in the sky above, as crimson flashes of anti-collision lights bloomed brightly from five different aircraft that made their way to the scene that night from Greenwood, Nova Scotia, and Cape Cod, Massachusetts.

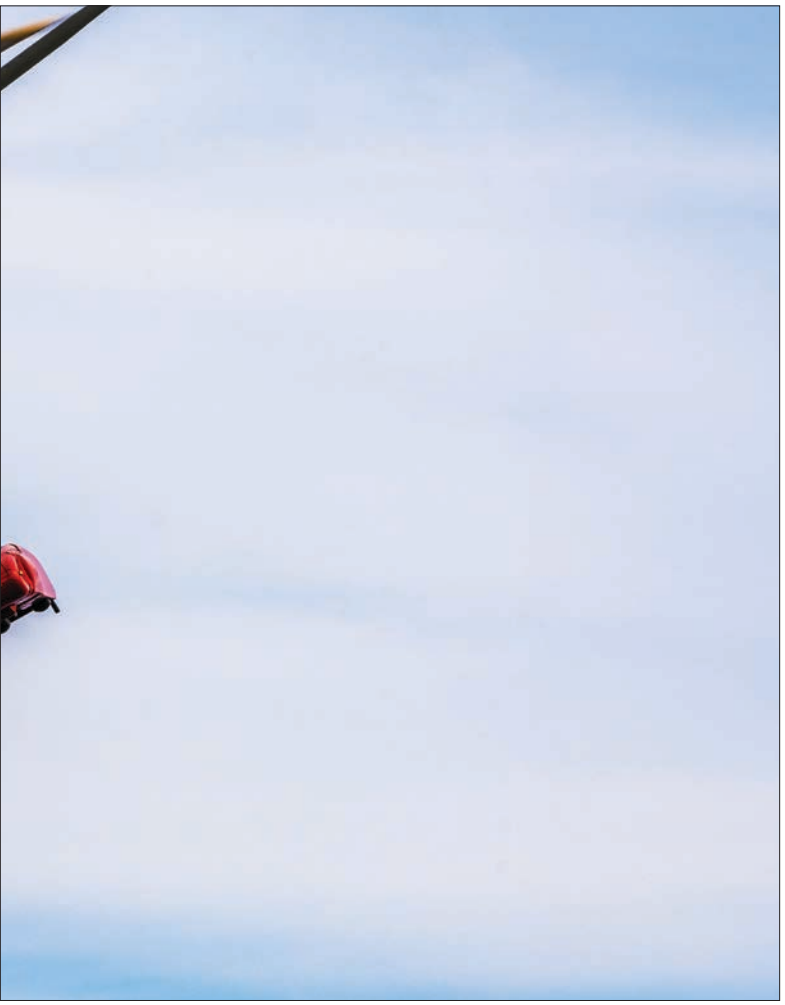
I wish you could experience the emotional whiplash as updates on the vessel's condition were passed in real time over the radio:

> *The engine room fire is out and the flooding is contained—no assistance required at this time.*
>
> *The fire reflashed, but it's out again—no assistance required at this time. The dewatering pumps are clogged—the water is rising—all but a skeleton crew need to be extracted immediately.*

I wish you could sense the anticipation, shared among our crew, of awaiting our chance to hoist from the *Atlantic Destiny* that evening. As an RCAF CH-149 Cormorant helicopter commenced the rescue operation, we listened intently for updates and configured our aircraft in a fuel-conserving orbit 300 feet above the water's surface. Unable to assess the sea state in the darkness but armed with the knowledge that nearby National Oceanic and Atmospheric Administration buoys had recorded waves in excess of 20 feet, we sighed with relief when the on-scene conditions were reported as eight to 10 feet by our fixed-wing cover asset. If you had been with us moments later, when they corrected that wave height estimate to meters, you too might understand the emptiness left behind when hope evaporates.

I wish you could feel the tightness in your chest when the Cormorant reported a major hydraulic emergency. Or hear the reassuring voices of the RCAF C-130 and a second on-scene U.S. Coast Guard helicopter as they announced they would follow behind the malfunctioning Cormorant on its journey of over 100 miles back to Nova Scotia. Every minute, you would stare into the darkness, wondering if the Cormorant crew would have to ditch amid the towering waves with six survivors onboard and two of their search-and-rescue technicians (SAR techs) still deployed to the sinking vessel.

I wish you could be there as we transitioned into a



high hover, slightly downwind of the *Atlantic Destiny*, where you could see in nauseating detail the stern of the vessel rise up on waves that would have dwarfed a three-story building. Looking closer, you might squint against the staccato flashing of strobe lights outlining a four-by-six-foot hoisting area on the starboard quarter that moved erratically with the ship as it pitched, rolled, and heaved. You might be forgiven for struggling to believe that the four-by-six space—surrounded by a tall exterior railing, crowded with obstacles, and with twin cranes looming above it—was your target.

You might wonder whether this rescue attempt was madness. But ultimately, you would rely on every ounce of your training, effort, and ability to try.

I wish you could hear the concern in your flight mechanic's voice as the 60-knot winds threatened to push the trail line into the tail rotor. Or know what it felt like to begin the rescue effort with five trail lines, and then have that number quickly whittled down to one. You might decide, as we did, to lower your hoisting altitude from 90 feet to 60 feet because you couldn't afford to lose the last one. From that height, you could see the whole ship in alarming detail.

From that height, you could look up at the vessel's mast as it thrashed wildly against the sea.

More than anything, I wish you could hear the words, "The survivor is inside the cabin—hoist complete." Or sit in the pilot's seat and have something catch your eye near the aircraft's lower console, where a man in an immersion suit is huddled, because that's the only space in the cabin not already claimed by survivors.

By the next morning, international news outlets would report that a robust SAR coalition including the Royal Canadian Air Force, U.S. Coast Guard, and Canadian Coast Guard had recovered all 31 crewmembers from the doomed vessel. Within hours of abandoning ship, the *Atlantic Destiny* pointed its bow skywards, as if in a final salute to its captain and the skeleton crew who had tried to save it from the sea, and then slip beneath the waves. The Canadian CGS *Cape Roger* would return to shore with the SAR techs and final four survivors. The other 27 crewmembers, hoisted from their vessel in unfathomable conditions by a series of U.S. Coast Guard and RCAF helicopters over the preceding hours, awaited their safe return.

I wish you could've been there. It was a night I will never forget. It is a night I cannot forget. But before March 2, 2021, transformed into The Night of the *Atlantic Destiny* Rescue, it was a Tuesday. Just an ordinary Tuesday. And while, with luck, we are several years out from the next case that has a similar confluence of challenges, the next time the SAR alarm goes off, it could be for the next *Atlantic Destiny*.

If you are a maintainer on the hangar deck, the next time you turn a wrench on your aircraft, know that your efforts could enable it to face up to the buffeting strength of a winter gale. If you are an aircrew member, the next time you have an opportunity to train, act as if it's the last time before your skills will be tested as someone's life hangs in the balance. That is the reality. We don't get to know when the very best versions of ourselves will be called upon, so we have to be ready. In this line of work, even ordinary Tuesdays have a habit of becoming extraordinary.

About the author:

LCDR J. Travis Christy served as an MH-60T instructor pilot and flight examiner with three operational tours at Coast Guard Air Station Cape Cod in Massachusetts and the Aviation Training Center in Mobile, Alabama. His professional awards include the Distinguished Flying Cross, Helicopter Association International's Pilot of the Year Award, Naval Helicopter Association's Non-Deployed Aircrew of the Year Award, and five Coast Guard Commendation Medals. He was honored to respond alongside an incredible group of SAR professionals on the night of the Atlantic Destiny *rescue. He is currently attending Northeastern University in Boston, where he is pursuing a master's degree in English.*

Guarding the Future

Coast Guard Sector Boston leverages tech partnerships

by CDR Shannon J. Peifer
Intelligence Chief
Sector Boston
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Even if you are not a history enthusiast, it is impossible to overlook Boston's deep historical roots and its crucial role in shaping the United States. The earliest settlers arrived in 1630 and in just a few years, America's oldest institution of higher education, Harvard University, was founded in nearby Cambridge in 1636. Boston is considered the birthplace of the American Revolution with key events such as the Boston Massacre, Boston Tea Party, and Battle of Bunker Hill, all taking place in the 1770s. A lesser-known fact is that the USS *Constitution*, affectionately known as "Old Ironsides," was constructed at Hartt's Shipyard, where Coast Guard Base Boston is located today. The city's past continues to shape its present and future. It's exciting to be part of its story.

Today, Boston is a renowned academic research hub for private companies and federal entities, particularly in the fields of science, technology, engineering, and medicine. This reputation is largely due to the presence of world-class universities and research institutions, such as the Massachusetts Institute of Technology (MIT), Harvard University, and Boston University. These institutions attract top talent from around the world and collaborate extensively with federal agencies on a wide range of research projects. Additional key factors that contribute to Boston's status as a federal research hub include the collaborative research culture among different institutions, its strong economic base, and its focus on emerging technologies such as artificial intelligence (AI) and biotechnology. These factors make Boston an ideal location for federal research.

Sector Boston Partnerships

Benefitting from its proximity to this research hub, Sector Boston collaborates with numerous institutions on various projects aimed at incorporating emerging technologies into daily work practices to enhance the way we accomplish our missions. The topics of these projects are not specific to the Northeast region, but they have the potential to bring positive impacts to the Coast Guard overall. The Coast Guard does not have all the latest capabilities, subject matter expertise, or vast resources to procure these emerging technologies. To put the Coast Guard's budget in perspective, it equates to only 6% of the U.S. Navy's budget. The budget may be small, but the missions and responsibilities are great. Thankfully, Sector Boston has established partnerships with local private and academic institutions which can be used to incorporate innovative solutions and resources to address the Coast Guard's complex challenges, often at little or no cost.

Sector Boston's close, regular collaboration with these entities and the shared understanding of challenges allows both sides to pick up the phone and call one another when a problem or potential solution is identified. These partnerships fall directly in line with the 2024 Coast Guard Operational Posture Statement, which emphasizes the need for action, innovation, and strategic foresight to overcome the Coast Guard's resourcing challenges and increasing complexity of its missions. These partnerships encourage proactive approaches rather than reactive ones, allowing the service to focus not only on today's challenges but to anticipate future threats and the emerging technologies required to address them.

Mutually Beneficial Collaboration

Amna Greaves, assistant group leader of Group 45 within the Homeland Protection and Air Traffic Control Division at MIT's Lincoln Laboratory, believes these partnerships are essential to understanding real-world needs and challenges and bridges the gap between research and application.

"Over the years of partnering on advanced technologies for maritime and emergency response, we know that [Coast Guard Sector Boston] can provide invaluable insights into mission requirements, environmental conditions, and operational constraints that may not be fully captured or understood in lab environments," she wrote in an email.

"Direct and honest feedback helps shape practical, user-centered solutions, ensuring that innovations are not only technically sound, but also effective and reliable in the field. This collaboration bridges the gap between research and application, accelerating the development

Affectionately known as "Old Ironsides," the USS *Constitution* sails past Coast Guard Sector Boston. The tall ship is a reminder of how far safety and security technology has advanced. Navy photo by Petty Officer 2nd Class Casey Scoular

of technologies that can meaningfully enhance national defense capabilities in a way that can be delivered through effective technology transfer, either to industry partners or directly to sponsors like the U.S. Coast Guard."

What follows are some examples of the collaborations Sector Boston and local institutions have been involved with in the recent past.

MIT Lincoln Laboratory

The Department of Homeland Security, Science and Technology Directorate (DHS S&T) needs assistance preparing for future threats and understanding advances in emerging technologies. To support DHS mission areas, DHS S&T is investing in explainable artificial intelligence (XAI) research to ensure the likelihood that AI solutions are effectively designed and used by end users. Enter MIT Lincoln Laboratory and its three-year research project aimed at providing a greater understanding of the benefits and risks associated with successful adoption of AI capabilities across DHS.

As part of its multiyear research, MIT Lincoln Laboratory collaborated with Sector Boston's Command Center to explore human-centered, participatory design of XAI tools. The goal was to understand the unique challenges and opportunities of the Coast Guard's search and rescue (SAR) mission, work alongside command center watchstanders to generate effective XAI solution ideas, gather input on explainability features, and prototype solutions to better address real-world operational needs.

The MIT Lincoln Laboratory researchers' objectives included learning about the SAR mission, how watchstanders would expect data to populate in a documentation tool, and developing an AI prototype with explainability built in. The researchers used numerous methods during the process, including observations, interviews, and storyboarding. Although it is a DHS S&T-funded project, the Coast Guard is a direct beneficiary of the research which has the potential to drastically improve the way SAR cases are executed and aligns with the 2024 Coast Guard Operational Posture Statement to enhance efficiency and effectiveness in SAR by employing emerging technologies.

MITRE

MITRE is an organization that applies systems thinking across government, industry, and academia to solve whole-of-nation challenges. MITRE's toolkit encompasses federally funded research and development centers, laboratories, independent research, strategic partnerships, and a technological foundation, all dedicated to pioneering a better future. In 2009, MITRE was selected to operate the Homeland Security Systems Engineering and Development Institute, which was established by DHS to serve as its primary systems engineering resource and meet the demand for rapid access to deep technical expertise.

The Coast Guard's Office of C4 & Sensors Capabilities is working with MITRE to conduct an analysis of Rescue 21 (R21). R21 is a radio communications system that uses direction-finding, digital-selective calling, and high-quality audio recording and playback, which transformed the efficiency of Coast Guard SAR operations upon its inception. The acquisition project for R21 was originally charted in 1995 with the first phase of installations completed in 2015. The launch of R21 revolutionized command centers' execution of SAR cases, but it has been over 20 years since the system reached initial operating capability. The partnership with MITRE ensures the Coast Guard remains at the cutting edge of emerging technology and includes goals like:

- Develop a "modernization in place" roadmap for R21 to accomplish a future coastal radio system, for example, next generation R21. Part of this analysis will include feasibility to augment coastal radio with space infrastructure to expand coverage in difficult to reach areas such as Alaska.
- Analyze mission requirements and develop comprehensive operational specifications for deployable special forces command, control, communication, computer, cyber, and intelligence (C5I) systems, with a focus on the interplay between capabilities, particularly with regards to data.
- Test the interoperability of high-frequency (HF) communication between modernized Coast Guard and U.S. Naval HF systems, aiming to evaluate the feasibility of transmitting textual data in mid-latitude and Arctic regions.

In support of this research, MITRE observed Sector Boston watchstanders in the fall of 2024 to observe the use of R21 and see the infrastructure footprint in the sector's back rooms. Sector Boston not only provided awareness of the existing R21 equipment laydown, but more importantly they provided a fundamental understanding of how a mission is executed within a command center and how communications are used.

MITRE has dozens of offices around the world, but one of their two principal offices is a few miles northwest of Boston in Bedford, Massachusetts, which makes Sector Boston a convenient place to conduct its research. Sector Boston is an eager participant and plays a crucial role in breaking the traditional approach of simply replacing old systems with new ones, instead driving innovation and progress. The collaboration with MITRE will enhance critical thinking about what types of decisions

Participants in the November 2024 active-shooter exercise pause for a photo. The joint exercise not only provided federal, state, and local agencies a chance to test response plans, but also allowed for the demonstration of emerging technologies that could improve responses. Coast Guard photo

watchstanders make, what data they need to make their decisions, what can be done to speed up those decisions, and then understand where the next generation R21 fits in with those decisions.

Boston Dynamics and Sea Machines

Like many Coast Guard sectors, Sector Boston routinely conducts joint exercises to ensure readiness and preparedness to respond to threats ranging from hurricanes to cybersecurity incidents. In November 2024, Sector Boston and more than 190 participants from 27 federal, state, and local agencies conducted an active-shooter exercise aboard a local commuter ferry. This was not only an opportunity for the Coast Guard and local partners to test the response plan, but also for the exercise controllers to integrate emerging technologies and explore how they could enhance future responses.

Boston Dynamics, an engineering and robotics company, offered a robotic technology to support this exercise. If you have visited the Boston Museum of Science, you may have had the pleasure of viewing Boston Dynamics' robotic dog, affectionately named Spot. While its ability to navigate stairs and rocky terrain in the controlled environment of the museum captivates both children and adults, its real-world potential to assess dangerous situations and remove humans from harm's way is truly

remarkable. During the exercise, Spot was used to access areas on the vessel prior to human first responders. It provided a live feed to the team and handled suspicious objects and packages so they could rapidly assess the safety and security of the situation without putting humans at risk.

Additionally, Boston-based Sea Machines, a private technology and robotics company, offered an autonomous vessel and AI Recognition & Identification System (AI-Ris) to participate in the exercise, part of which included recovering dummies that simulated people in the water. To enhance the authenticity of the scenario, hand-warming devices were affixed to the dummies' heads to simulate the temperature of a human body. The AI-Ris showcased the ability to quickly identify the dummies through AI and machine learning as well as infrared technology, greatly assisting responders in a quick recovery. Sea Machines helped Sector Boston explore how emerging technologies like autonomous vessels and AI could enhance responses to complex events, encouraging thinking beyond the limits of the traditional response toolkit.

Future-Focused

Sector Boston's partnerships and innovation mindset are pushing the envelope on status quo operations. Given the Coast Guard's limited resources, it is time to start thinking differently about how it will tackle the complex challenges of today and the future. Through collaboration with academia and industry partners, the Coast Guard has the potential to incorporate emerging technologies like AI and machine learning into everyday tasks. A modernized workforce and operations will assist the Coast Guard in attracting and retaining a diverse and talented workforce.

Boston Dynamics' robotic dog, Spot, shows off its skills during Sector Boston's joint active shooter threat exercise in November 2024. Coast Guard photo

The *USS Constitution*'s location just across the harbor from Sector Boston is a daily reminder of how far technology that ensures the safety and security of our nation has advanced. Through collaborations with private and academic partners, it is exciting to envision the potential for the future.

About the author:

CDR Shannon J. Peifer is a Coast Guard intelligence officer with more than 14 years of experience in both national and law enforcement intelligence. She began her career as a deck watch officer onboard the CGC Polar Sea *and currently serves at Sector Boston as the intelligence chief supporting numerous missions.*

Editor's Note

Due to the lead time required to publish Proceedings, this article was written before the public release of the Coast Guard's Force Design 2028 (FD 2028), which holds technology as one of its key tenets. FD 2028 is a recently announced blueprint to ensure the Coast Guard is ready to meet the nation's future demands of the service.

"Force Design 2028 is the way we will become a more agile, capable, and responsive fighting force to best serve the American people," acting Commandant ADM Kevin E. Lunday said.

FD 2028's focus on technology will position the Coast Guard to become a leader within the military and DHS for the adoption and use of advanced technology. "We are going to intentionally disrupt ourselves by radically accelerating our identification, acquisition, and implementation of technology," Assistant Commandant for C4&IT RDML Russell E. Dash said. In doing so, the service will exploit technology at every turn to improve operations and deliver exceptional mission results. In addition to technology, the plan focuses on people, organization, and acquisition and contracting.

"We are executing transformational change to renew the Coast Guard," ADM Lunday said. "Force Design 2028 will ensure the Coast Guard remains Semper Paratus, Always Ready, to serve the American people."

Find more information on Force Design 2028 at https://bit.ly/ForceDesign2028.

Creating Leaders for the Coast Guard

New JROTC and Auxiliary University Programs prepare future Coasties for service

by Coast Guard CAPT Richard Schultz, retired
Senior Maritime Science Instructor
Junior Officers' Reserve Training Corps
Barnstable High School

LT Collin Batchelor
Graduate Student
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CDR Mason Wilcox
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Sector Southeastern New England
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AUX Russ Gasdia
Auxiliary University Programs
Student Programs Directorate
U.S. Coast Guard Auxiliary

A wide range of programs and pathways are available for those interested in pursuing a career in the Coast Guard. From enlisting in the active duty or reserve components, to pursuing a commission as an officer, the Coast Guard offers opportunities for individuals to achieve their personal and professional goals. Across the Coast Guard Northeast District, a variety of opportunities that provide future Coasties with new ways to prepare for service and distinguish themselves in an increasingly competitive landscape have emerged in recent years.

One notable development is the establishment of a Junior Reserve Officers' Training Corps (JROTC) program at Barnstable High School, as well as the implementation of Auxiliary University Programs (AUP) throughout the Northeast District. These initiatives are designed to foster leadership, discipline, and a deep understanding of Coast Guard operations, developing the next generation of leaders and professionals for both military and civilian careers. Whether through a JROTC pathway at a local high school or an AUP program at a university, these programs are instrumental in shaping the Coast Guard's future.

Barnstable High School's Coast Guard JROTC Program

Barnstable High School in Hyannis, Massachusetts, has made waves by becoming the first school in Massachusetts and the northeast region to launch a Coast Guard Junior Reserve Officers' Training Corps (CGJROTC) program. One of only 14 such programs across the country, Barnstable's CGJROTC unit was officially established on October 25, 2024, and provides a four-year maritime science curriculum. Additionally, it serves as a unique avenue for students to realize their true potential, develop self-discipline, exercise leadership skills, and build pride in country and community.

With the mission of developing service-minded citizens of character, the Barnstable program focuses on teaching leadership, citizenship, and the Coast Guard's core values of honor, respect, and devotion to duty. Cadets participate in a rigorous curriculum that includes academics, physical fitness, military drills, color guard, and leadership opportunities all while earning high school credits. They also participate in community service projects, with many opportunities to interact with Coast Guard and other military personnel, as well as visit local Coast Guard units, merchant marine academies, and marine industries.

The acronym COAST, which stands for Citizenship, Operations, Advancement, Service, and Teamwork, encapsulates the five CGJROTC program pillars that fortifies the learning which takes place inside and outside the classroom. For many students, this program serves as an invaluable introduction to the Coast Guard, helping them decide whether to pursue a military career. Those who complete the program leave high school with a competitive edge, whether they choose to enlist, seek an appointment to a service academy, or apply for an officer commissioning program. Overall, the program instills in cadets a deep appreciation for the Coast Guard and the United States. Whether graduates go on to serve in the Coast Guard, another military branch, or pursue any other life path, they will develop attitudes,

RDML Will E. Watson, the Coast Guard's director for governmental and public affairs, speaks at the commissioning ceremony for the first Coast Guard Junior ROTC unit at Barnstable High School in Hyannis, Massachusetts. He discussed the program's objectives, which include developing service-minded citizens of character. Coast Guard photo by Chief Petty Officer Richard Brahm

Cadets stand in formation during the commissioning ceremony of the Coast Guard Junior ROTC unit at Barnstable High School in Hyannis, Massachusetts. The program aims to instill values of citizenship, personal responsibility, and service in students. Coast Guard photo by Chief Petty Officer Richard Brahm

knowledge, and skills to help them be more prepared for tomorrow's challenges.

Auxiliary University Programs Across the District

In addition to the high school JROTC initiative, Northeast District is home to five AUPs including Maine Maritime Academy, New York Maritime College, the U.S. Merchant Marine Academy, Norwich University—The Military College of Vermont, and Massachusetts Maritime Academy. Through the Coast Guard Auxiliary, the AUP enables college students to participate in a rigorous program of study that provides Coast Guard-related subjects, qualifications, and training, as well as leadership opportunities and operational Coast Guard experience through volunteer service and internships.

The unit at the Massachusetts Maritime Academy (MMA), where around 40 cadets have kept the unit operational since 2015, is a stellar example of an AUP unit. As a supplement to their regimented campus life, cadets engage in a combination of academic rigor and Coast Guard professional development through weekly classes, workshops, and discussions with guest speakers. This is supplemented by the opportunity to complete internships with active-duty units as auxiliarists. Through hands-on experiences, these AUP cadets are afforded professional real-world experience with vessel inspectors, search and rescue mission coordinators, and maritime law enforcement officers at various sectors, cutters, and small boat and air stations.

The academy's specialized majors in marine engineering, ship operations, marine environmental protection, and emergency management provide the Coast Guard with eager, volunteer-driven professionals while returning deckplate-level knowledge to hone their professional skills. The AUP program is tailored to prepare its members for professional development and volunteer service for their future careers in the Coast Guard and in the private sector. In the past 12 months, five graduates of the MMA AUP have received direct commissions, while one graduate is serving as a boatswain's mate 3rd class in the Coast Guard Reserve. Many AUP students also join the Reserve while attending college.

Visit the CGJROTC website at https://bit.ly/CGJROTC

Remote AUP Unit

In addition to the on-campus programs, several students within the Northeast District participate in the AUP Remote Collaborative Unit (RCU), which is designed for students who attend a college or university that does not have a standalone AUP unit on campus. This helps to

ensure that anyone with a passion for maritime service can engage with the Coast Guard Auxiliary, no matter their geographic location.

RCU students receive mentorship and virtual training, participate in local auxiliary flotillas, and have the opportunity to attend events in person. This setup ensures that the AUP remains accessible to a broader range of students, including those studying online or attending smaller colleges and universities.

Why Joining is Helpful

Participation in these programs offers significant advantages for those considering a career with the Coast Guard. Whether enlisting or commissioning, candidates who have completed a JROTC or AUP program are often seen as having an edge over other applicants. In fact, statistics show that applicants with prior experience in programs like these are more likely to be accepted into officer candidate programs and are better prepared for the rigors of Coast Guard training.

According to Coast Guard recruiting data, historically AUP graduates have a 70% acceptance rate through a commissioning program versus college graduates with no AUP involvement. More recently that has increased to approximately 88%. This preparation extends beyond military service with many program participants succeeding in civilian jobs that require leadership, technical skills, and a commitment to public service.

In addition to professional skills, cadets and university students gain a sense of discipline and responsibility that serves them well in any field. The leadership development, maritime knowledge, and community engagement they experience through JROTC and AUP are transferable to any career, particularly in industries related to maritime operations, environmental protection, emergency response, and law enforcement.

Conclusion

The CGJROTC at Barnstable High School and the AUP units throughout the Northeast District represent a powerful investment in the future of the Coast Guard. These programs not only equip young people with the knowledge and skills they need to serve, but also instill values that will guide them through their careers in uniform or the private sector.

As these initiatives continue to grow, they will undoubtedly play an increasingly important role in shaping the Coast Guard's leadership pipeline. For students and college-aged individuals with a passion for public service, maritime safety, and leadership, there has never been a better time to join the ranks of the Coast Guard's future leaders.

Cadets salute during the commissioning ceremony of the Coast Guard Junior ROTC unit at Barnstable High School in Hyannis, Massachusetts. Coast Guard photo by Chief Petty Officer Richard Brahm

About the authors:

CAPT Richard Schultz, recently retired after 31 years in the Coast Guard, now serves as senior maritime science instructor for the Coast Guard Junior Reserve Officers' Training Corps program at Barnstable High School in Hyannis, Massachusetts. His career, which included roles as Northeast District chief of prevention, commander of Sector Southeastern New England, and Strike Team commanding officer, was marked by leadership in safety, environmental health, emergency response, and crisis management. Now, he is focused on mentoring the next generation of Coast Guard leaders.

CDR Mason Wilcox, the prevention department head at Sector Southeastern New England, has dedicated 20 years to marine inspections, investigations, and waterways safety. A 2004 graduate of Massachusetts Maritime Academy, he was commissioned through the Maritime Academy Graduate program and continues to play a key role in upholding the Coast Guard's missions in the region.

LT Collin Batchelor is an Auxiliary University Programs (AUP) graduate and volunteers as the Massachusetts Maritime Academy (MMA) AUP unit officer. After attending MMA, he earned his direct commission through the Maritime Academy Graduate program and has served six years as a marine inspector at Marine Safety Unit Port Arthur, Texas, and Sector Southeastern New England. He is currently attending the University of Rhode Island for the marine engineering advanced education postgraduate program.

Auxiliarist Russ Gasdia serves on Coast Guard Auxiliary National Staff in the Auxiliary University Programs (AUP) Division as deputy division chief and operations manager. He also serves as the Massachusetts Maritime Academy Auxiliary Unit liaison for the campus AUP Unit. He has been a member of the Coast Guard Auxiliary for 17 years.

ANALYSIS IN ACTION
FROM USCG CASUALTY INVESTIGATIONS

Charting Digital Waters

Strengthening U.S. Coast Guard marine casualty investigations with electronic evidence

by LCDR Tom Whalen
National Technical Advisor
Investigations National Center of Expertise
U.S. Coast Guard

The digital revolution has profoundly transformed the maritime domain, making electronic evidence a vital component of U.S. Coast Guard marine casualty investigations. As digital technologies become increasingly integrated into maritime operations, the focus for investigators has shifted from simple data collection to the sophisticated analysis and secure preservation of massive amounts of digital evidence. This article delves into the Coast Guard's forward-thinking approach of harnessing cutting-edge technology to enhance investigative outcomes. From the early incorporation of electronics in maritime operations to compelling real-world examples that highlight the power of digital evidence in deciphering complex maritime incidents, we explore how the Coast Guard is using resources like the Investigations National Center of Expertise, digital forensic labs, and the Coast Guard Auxiliary to navigate the evolving maritime digital landscape.

Electronics in Marine Transportation

Electronics have been pivotal in the advancement of the entire marine transportation system. From early radar systems guiding vessels through fog to today's sophisticated integrated bridge systems, digital technology underpins safe, efficient maritime operations. Modern ships are now rich digital environments, generating and storing extensive information ranging from voyage data recorders (VDR) and closed-circuit television (CCTV) systems to intricate engine diagnostics, stability and loading systems, and Electronic Chart Display and Information Systems (ECDIS).

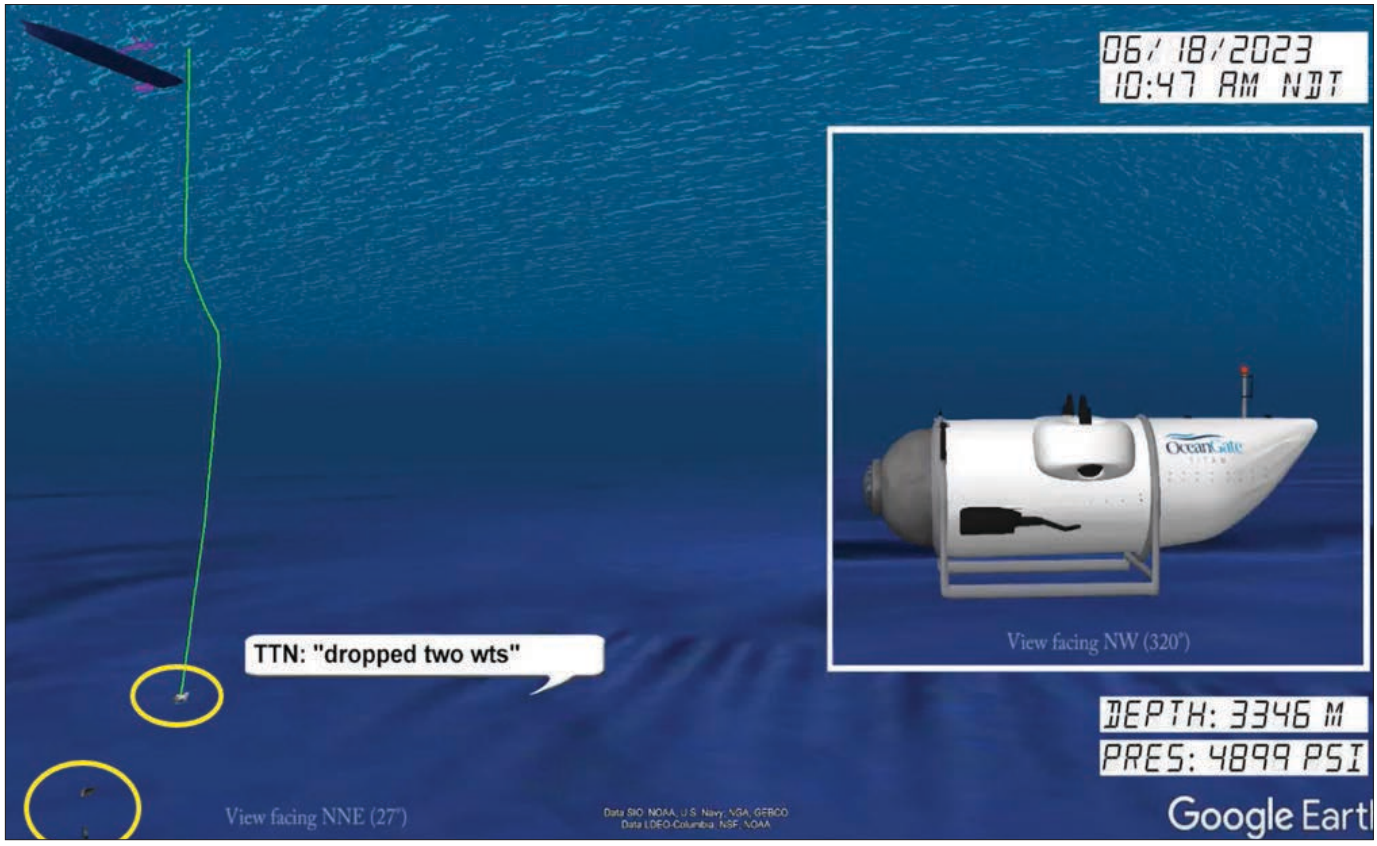
A VDR serves as the "black box" for a ship. Analogous to an aircraft's "black box," the flight data recorder for aviation, a VDR continuously records crucial information about a vessel's operations and its surroundings. This data typically encompasses details such as the ship's position, speed, heading, communications on the bridge, radar imagery, ECDIS data, rudder commands and responses, courses and speeds, engine status, alarm systems, and hull stress.

The purpose of a VDR is to provide investigators a comprehensive, chronological record of events leading up to an incident, enabling a thorough understanding of voyage events and factors contributing to a complex accident. This proliferation of digital data, while offering unprecedented insight into maritime incidents, simultaneously presents significant challenges in terms of data preservation and sophisticated processing after it is retrieved and analyzed.

Regulatory Framework of Digital Evidence

The regulatory framework for electronic voyage data ensures the collection, storage, and use of critical navigational and operational information for safety and investigative purposes. On the international level, the International Maritime Organization's (IMO) International Convention for the Safety of Life at Sea mandates that commercial ships of 3,000 gross tons

Mark L. Jenkins downloads electronic evidence aboard a vessel. A former Coast Guardsman with 21 years of service, Jenkins was the first digital forensics examiner in the Northeast District and founded the Coast Guard Northeast District's Digital Forensics Lab in Boston, which now bears his name. Coast Guard photo



A Coast Guard Auxiliarist with data analysis skills created a 3-D animation of the Titan submersible's last voyage, providing a minute-by-minute recreation of the incident based on forensic data recovered from the scene. Coast Guard illustration

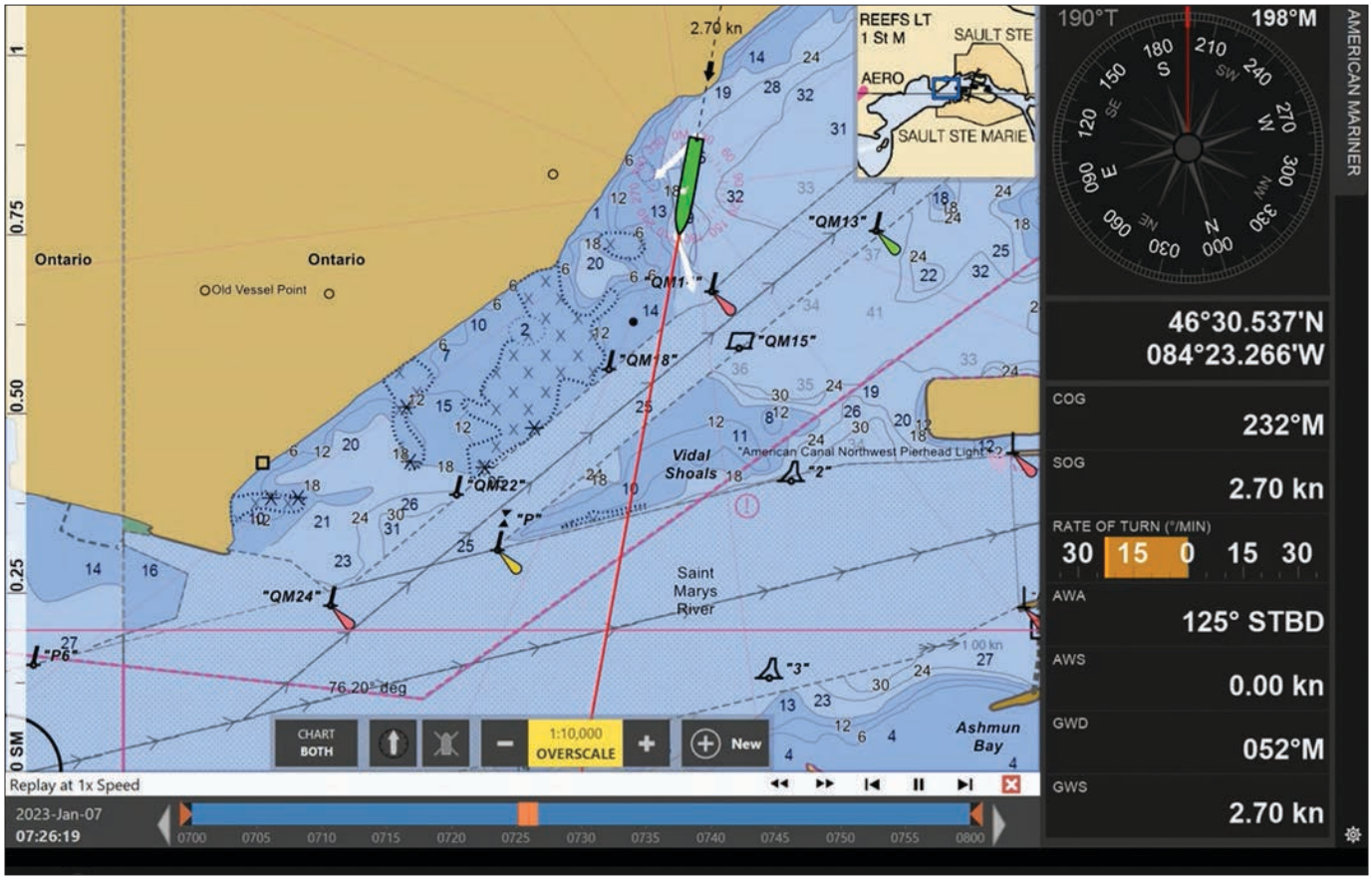
and above on international voyages be equipped with VDRs to capture essential data. VDRs must retain this data for at least 30 days for post-incident analysis. The IMO's MSC.333(90) resolution sets performance standards for VDRs and requires secure, accessible data storage. Additionally, ships must have an Automatic Identification System (AIS) to allow other ships and vessel traffic services to track and record vessel movements, which are often integrated with VDRs and can aid in accident investigations. Newer VDRs are designed with a float-free data capsule that contains the critical information even though the vessel may be at the bottom of the sea.

Domestically, the Coast Guard enforces these standards through regulations like 46 Code of Federal Regulations (CFR) Part 161, which require U.S. vessels to comply with VDR requirements, and 46 CFR Part 164, which focuses on navigational safety and the use of AIS and GPS. The Coast Guard's Navigation and Vessel Inspection Circulars guide the implementation of these systems, while 46 CFR Part 4 outlines marine casualty investigation procedures, with VDR and AIS data playing a central role in reconstructing incidents. The Federal Communications Commission ensures the proper transmission of data, and the National Transportation Safety Board frequently emphasizes the importance of digital evidence in transportation accident investigations.

Together, these international and domestic regulations and guidance documents provide a comprehensive framework for the use and preservation of maritime digital evidence that enhances maritime safety and ensures vital data is available for thorough forensic incident analysis. This facilitates the overall goal of improving safety standards by enhancing the quality, scope, and accuracy of investigations.

Forging Digital Expertise

Recognizing the escalating importance and intricate nature of digital evidence in marine casualty investigations, the Coast Guard has strategically developed specialized units to expertly manage the complexities of electronic data collection, preservation, and in-depth analysis. At the forefront of this endeavor is the Investigations National Center of Expertise (INCOE), a central hub for marine casualty investigation knowledge. The INCOE plays a pivotal role by providing invaluable specialized assistance and guidance to investigators on the nuanced handling of electronic evidence. This encompasses a wide range of critical data, including VDR information, precise GPS data, and detailed navigation logs,



Visual data, like this Resepoint® playback from a 2023 grounding marine casualty, gives investigators a more complete picture of what may have led to the incident. Coast Guard image

weather observations and similar information.

By establishing centralized expertise and standardized protocols, the INCOE ensures both consistency and accuracy throughout the data collection and analysis process, significantly bolstering the integrity and reliability of investigations Coast Guard wide. The INCOE also fosters multinational and multiagency collaboration and knowledge sharing, ensuring that best practices and the latest technological advancements in digital forensics are disseminated effectively across the Coast Guard investigative community.

Vital to the success of the Coast Guard marine casualty investigations process is the Document and Media Exploitation (DOMEX) program executed through the Coast Guard's Digital Forensics Laboratory (DFL). The Mark L. Jenkins Digital Forensic Laboratory, located at Coast Guard Base Boston, operates with a full-time staff of trained professionals who provide advanced digital forensic services to meet the service's evolving needs. This state-of-the-art laboratory has a proven track record of successfully recovering data from encrypted, damaged, locked, and even submerged devices. The lab is indispensable in modern digital forensic investigations, particularly when physical evidence is damaged, corrupted, limited, or seemingly unavailable.

The DFL is equipped with cutting-edge tools and specialized expertise to make that information available to investigators. Its dedicated personnel meticulously analyze a diverse array of digital devices—ranging from personal smartphones and computer systems to sophisticated GPS units, critical engine control modules, and other electronically stored data. This comprehensive approach, central to the DOMEX program, involves the processing, exploitation, translation, analysis, and dissemination of lawfully obtained digital evidence. Through the application of digital forensics, skilled examiners identify, preserve, analyze, document, and extract material from these devices, playing a crucial role in resolving complex cases, reconstructing timelines, and uncovering essential details that would otherwise remain hidden. The following real-world cases illustrate the extraordinary capabilities of the Coast Guard's digital forensics infrastructure and its growing importance in maritime safety and accountability.

Leveraging the members of the Coast Guard Auxiliary who have highly technical skills has enabled their

seamless integration into the marine casualty analysis process, contributing significantly to the technological analysis of specific types of data. Auxiliarists have provided invaluable support in the examination of complex information, including sophisticated auditory analysis. Their expertise underscores the diverse capabilities the Coast Guard uses to augment the broader investigative efforts needed in the digital age.

Through the synergistic partnership of the INCOE, the DFL, and specialized members from the Auxiliary, the Coast Guard has forged a powerful and comprehensive capability to effectively exploit the burgeoning volume of digital evidence. This collaborative approach provides investigators with the advanced tools, specialized expertise, and the standardized procedures necessary to conduct efficient, accurate, and insightful analyses, ultimately leading to more informed conclusions and impactful safety recommendations.

Harnessing Technology for Streamlined Investigations

The strategic partnership between the INCOE and the DFL has fostered a fusion of advanced technologies coupled with specialized training, significantly strengthening the Coast Guard's digital forensics capabilities. Known for their innovative solutions to complex challenges, the collaborative investigative teams consistently achieve outstanding results. Their expertise is demonstrated through the skilled use of an advanced suite of software tools, as well as specialized hardware such as forensic workstations, imagers, and write blockers. To investigate more complex electronic devices, techniques and procedures like chip-off and JTAG extractions using specialized soldering equipment, are employed with precision

Modern ships have numerous devices, like this hard drive from the *Grande Costa D'Avorio's* engine control room, that can provide information that aids investigators after an incident. Coast Guard photo

Additionally, the deployment of specialized tools, such as the Covert Forensic Investigation Device for drone aerial forensics, the Berla iVe® kit for vehicle forensics, and the Fluke AirCheck® for wireless network surveys, demonstrate the wide range of cutting-edge resources available. The strategic use of advanced tools and technology allows for the efficient transformation of raw, unstructured digital data into an organized format, which is easily reviewable and, more importantly, intelligible. This ability to rapidly extract and analyze essential visual and video evidence underscores the Coast Guard's efficiency in handling complex marine casualty investigations, ensuring vital insights into the contributing factors to accidents are uncovered expeditiously with remarkable precision.

VDR Data Unveiling the Truth

The forensic examination of VDR data has consistently proven invaluable in resolving complex maritime incidents and uncovering the truth behind critical events. Over the past two years, experienced investigators from INCOE have processed more than 60 high-priority requests for advanced electronic evidence analysis. These efforts highlight the vital role that VDR systems—and related digital data sources—play in modern marine casualty investigations.

INCOE personnel have played a critical role in some of the Coast Guard's highest profile investigations, providing specialized expertise in the recovery, preservation, and analysis of electronic data. These teams were instrumental in assisting field units with the rapid collection, preservation, and examination of VDR data in the March 2025 collision of the container ship *Solong* and the tank vessel *Stena Immaculate*. They were key in the widely publicized container ship *Dali*'s March 2024 allision with the Francis Scott Key Bridge, as well. Their work enabled

Complex Electronic Device Investigation Techniques

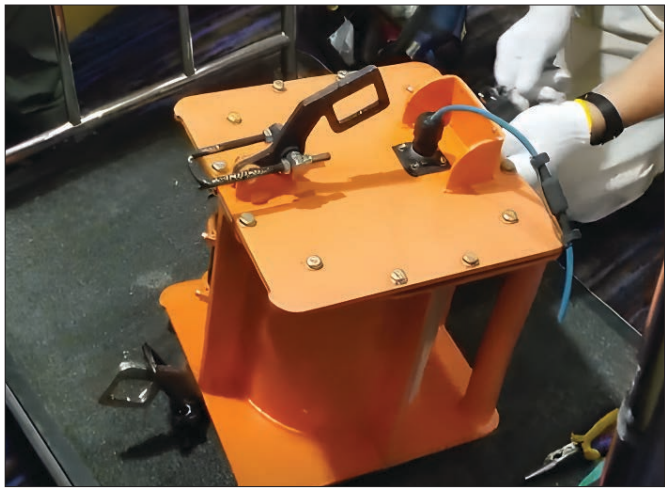
To investigate more complex electronic devices, techniques and procedures like chip-off and JTAG extractions, using specialized soldering equipment, are employed with precision. Chip-off involves physically removing memory chips from a device to access data directly, while Joint Test Action Group, or JTAG, extraction leverages the debugging interface to bypass the device's normal operation, enabling the retrieval of data or firmware directly from the device's internal circuits.

investigators to develop a detailed timeline of each vessel's operations, including navigation parameters, bridge activity, and key system inputs during the incidents in question. The ability to retrieve, process, and structure this information efficiently was essential in supporting these complex investigative efforts.

These cases demonstrate the growing reliance on VDR data not just as a technical resource, but as a cornerstone of modern marine casualty investigations. With the INCOE's support, field units are better equipped to manage and interpret complex digital evidence in time-sensitive environments.

In addition to these major cases, INCOE personnel have supported a wide range of investigations involving VDR, AIS, CCTV, and Rose Point chart software data. Their work has contributed to key inquiries such as the cargo vessel *Genius Star XI* cargo hold fire, a pier allision at a U.S. Naval Weapons Station, and a bridge allision involving the towing vessel, *Miss Doris*. In each case, the timely collection and expert handling of electronic evidence proved essential in establishing the complex operational picture needed for thorough analysis.

These compelling case studies unequivocally demonstrate the escalating importance of VDR data in contemporary maritime investigations. By providing an objective and reliable record of a vessel's operations, VDRs empower investigators to reconstruct complex incidents with exceptional accuracy and speed, ultimately leading to a more thorough analysis of the complex events and contributing factors to a marine casualty investigation.

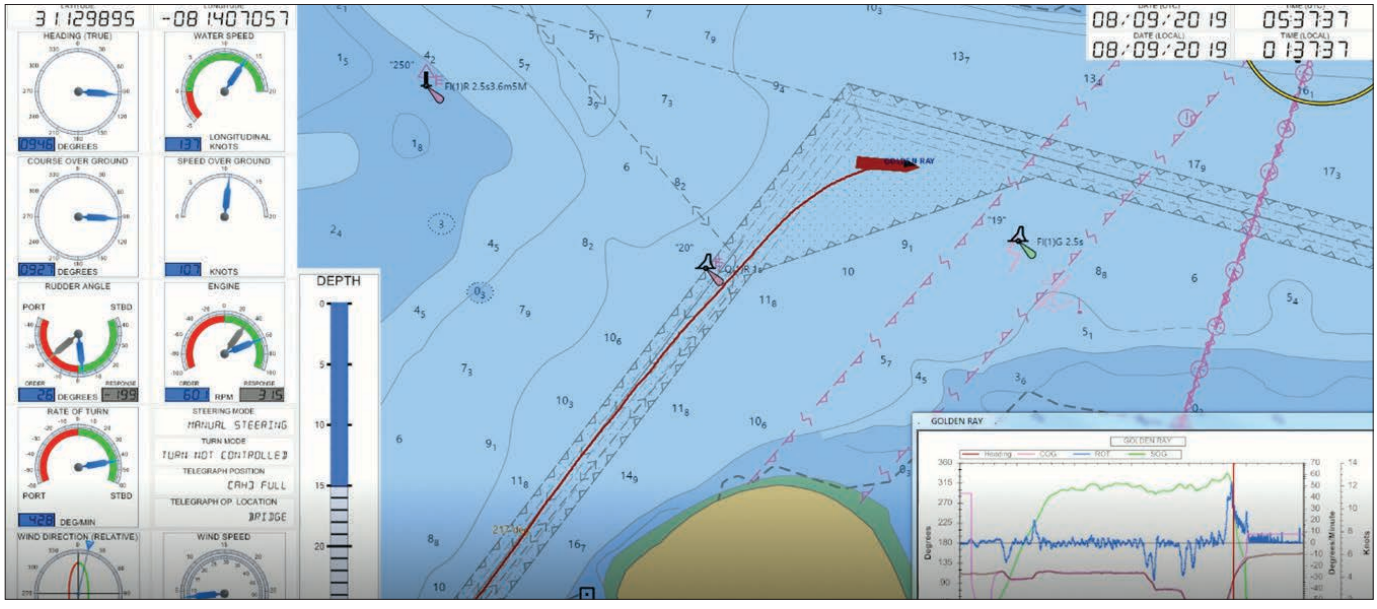


DOMEX in Action: Illuminating Marine Casualties Through Digital Evidence

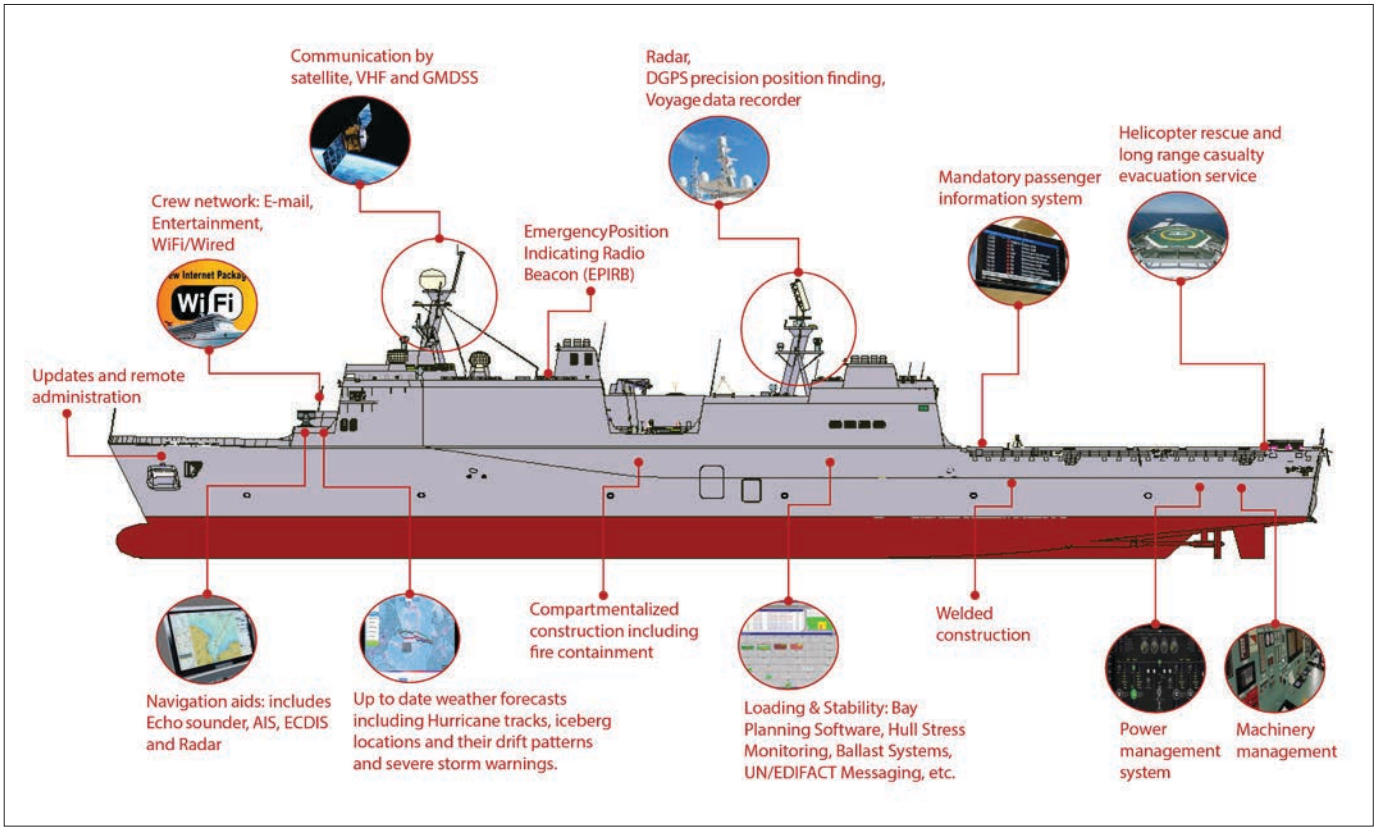
The Coast Guard's Document and Media Exploitation (DOMEX) program stands as a critical asset in deciphering the complexities of marine casualties. By meticulously extracting and analyzing data from a wide range of digital devices, DOMEX provides invaluable insights that complement traditional investigative methods. The following cases underscore the program's pivotal role in uncovering the truth behind maritime incidents.

Titan Submersible

The implosion of the *Titan* submersible during its expedition to the Titanic wreck site posed an unprecedented challenge for investigators. From the start, DOMEX personnel played a critical role in the recovery effort,



Top photo: A technician extracts a memory drive from the *Golden Ray*'s voyage data recorder capsule. The ship, a roll-on/roll-off cargo vessel, was carrying more than 4,200 vehicles when it ran aground off the coast of Georgia. Bottom photo: Visual data of the *Golden Ray*'s voyage helped investigators determine the cause of the incident. Coast Guard photo



Advanced technology installed on modern ships can provide a wealth of useful data for any number of applications, including casualty investigations. Courtesy illustration/Cybersecurity Challenges in the Maritime Sector

ensuring the preservation of crucial electronic evidence and storage components. Their expertise in handling and preserving digital data was vital to maintaining evidence integrity.

DOMEX specialists processed over 120 terabytes of data from multiple sources, including control system logs, satellite communications, predive videos, and company records. Organizing this data enabled investigators to expeditiously identify key elements related to the incident.

This systematic approach allowed investigators to examine communications and data between the submersible and its surface support vessel and understand the *Titan*'s internal and environmental conditions leading up to the implosion. DOMEX's work was instrumental in assisting investigators in reconstructing the timeline of events and analyzing the submersible's final moments, driving the investigation forward.

Grande Costa D'Avorio

The destructive fire aboard the roll-on/roll-off vessel *Grande Costa D'Avorio*v in port presented a complex investigation challenge involving potential cargo issues, vessel systems malfunctions, and shipboard and stevedores' operational procedures. DOMEX teams focused on recovering and imaging critical shipboard computer systems, including hard drives from the cargo and engine control rooms. The successful recovery and analysis of data from two of the three retrieved hard drives provided a digital record of the vessel's operational status and system commands in the critical period before and during the fire. This allowed investigators to verify the activation and performance of fire suppression systems, trace the sequence of events through vessel system logs, and potentially identify the origin and spread of the fire based on sensor readings and alarm history captured within the electronic data.

Awakin

The disappearance of the charter vessel *Awakin* off the Alaskan coast, resulting in multiple fatalities, triggered an extensive search and recovery effort. DOMEX specialists played a crucial role in analyzing electronic devices recovered from the water, including cell phones, a laptop, and marine navigation systems. Despite significant water damage, the forensic techniques that DOMEX employed allowed for the recovery of vital information. Text messages exchanged in the vessel's final moments, photographs taken by those on board, and GPS and heading data extracted from an onboard laptop provided

a crucial timeline of the boat's last known events and movements during the unfolding emergency. This digital evidence used by investigators played a critical role in understanding a remote incident with no surviving witnesses.

King Emerald and Bow Lind

Coast Guard enforcement operations against the tank vessels *King Emerald* and *Bow Lind* demonstrated the power of digital forensics in uncovering and proving environmental violations. DOMEX specialists meticulously imaged and analyzed control room computers, CCTV systems, and vessel engineers' workstations, as well as a "white box" monitoring system onboard. This in-depth analysis led to the recovery of shipboard videos, time-stamped system logs, and even deleted system entries that demonstrated the deliberate bypassing of the oily water separator systems, resulting in unauthorized discharges of oily bilge water into the marine environment. The chronological evidence trail constructed from the electronically stored logs and video files provided irrefutable proof of regulatory violations, leading to substantial settlements and penalties that underscored the critical role of digital forensics in enforcing environmental protection laws protecting our oceans.

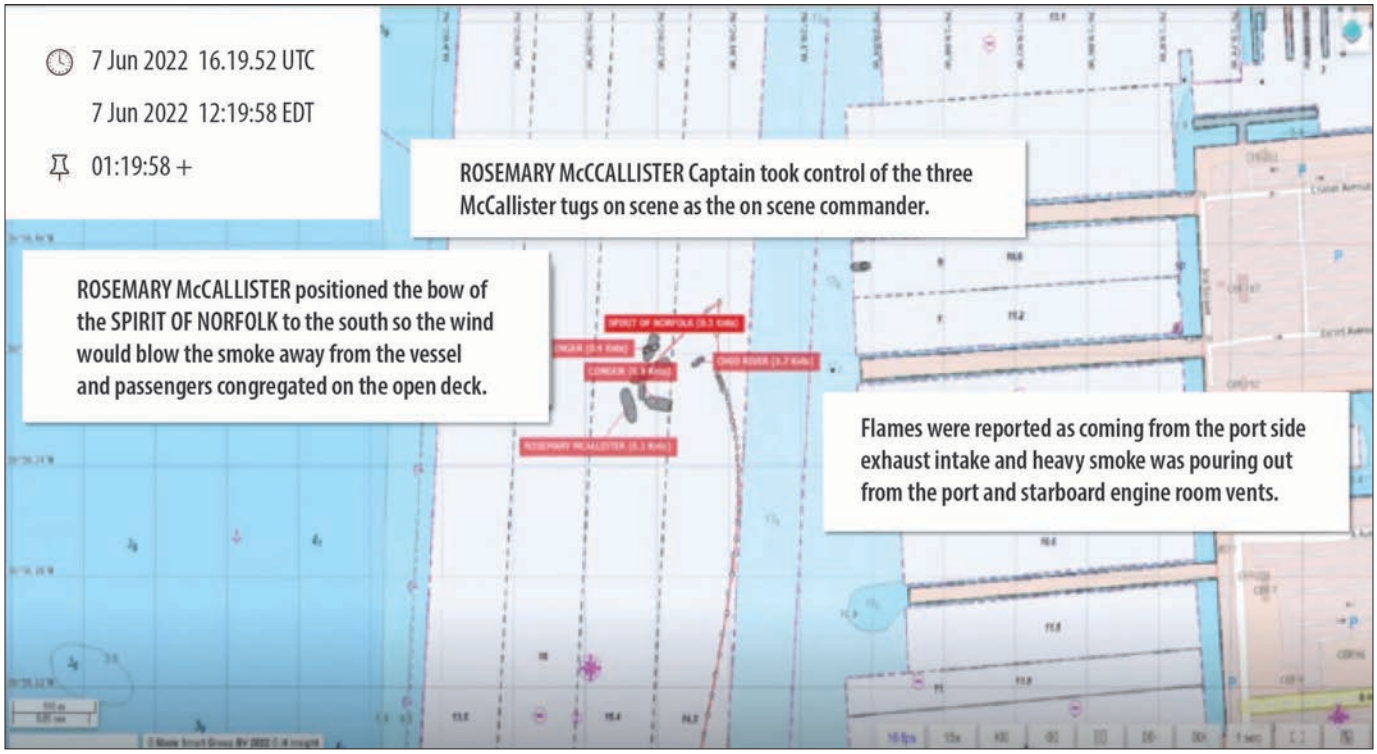
Innovative Force Multiplier

During the Marine board of Investigation (MBI) into implosion of the submersible *Titan* in the North Atlantic, the MBI swiftly enlisted the expertise of an Auxiliarist with a specialty in data analysis and digital reconstruction. Tasked with creating a compelling visual narrative, the Auxiliarist produced a high-fidelity animation that captured the submersible's final dive. This animation became a cornerstone of the investigation and was presented as the second exhibit during formal public proceedings.

Beyond its powerful storytelling, the animation served as a precise forensic tool. Leveraging advanced marine accident navigation analysis, the Auxiliarist reconstructed the movements of the submersible and its support vessel, *Polar Prince*, using data from the EvoLogics® SiNAPS acoustic positioning system. The *Titan*'s track line was meticulously adjusted to reflect the system's known limitations, with all reported submersible headings and tilt angles fully incorporated into the animation

More than just a visual aid, the animation offered critical insight into the *Titan*'s trajectory through the water column. This nuanced analysis illuminated key aspects of the submersible's final moments, bringing together data interpretation and technical expertise to support the exhaustive investigative effort.

This is not the first instance in which the highly specialized Auxiliarist has applied innovative animation techniques in support of marine



An animated recreation provides after-the-fact visual evidence of the *Spirit of Norfolk* fire while underway on the Elizabeth River near Norfolk, Virginia, in June 2022. Coast Guard illustration

casualty investigations. Previous cases include: the constructive loss of the passenger vessel *Spirit of Norfolk*

- the sinking and loss of life on the commercial fishing vessels *Scandies Rose* and *Wind Walker*
- the devastating fire that destroyed the small passenger vessel *Conception*, claiming 34 lives

The technical proficiency of this Auxiliarist in gathering, analyzing, and presenting complex navigational data has proven invaluable to the Coast Guard's investigative efforts. His ability to transform complex data into clear, visually impactful animations, significantly enhanced the public understanding of complex events, and the thoroughness of the marine casualty investigations, ensuring critical insights were communicated with precision and clarity.

Best Practices for Investigators

While the integration of digital evidence into investigations unlocks powerful new capabilities, investigators must remain steadfast in adhering to established best practices to navigate the complexities inherent in electronic data. These fundamental principles are critical to ensuring that investigations are both thorough and legally sound:

- ***Communicate early and often with experts:*** Consistent and proactive communication with INCOE staff to initiate engagement with digital forensic examiners is essential to ensure proper analysis and interpretation of digital evidence.
- ***Methodical timeline construction:*** Investigators must rigorously follow the chronological order of events, systematically identifying underlying causal factors that contributed to the incident. This helps establish a clear and accurate narrative.
- ***Strict legal compliance:*** Adherence to all relevant legal frameworks, including Title 46 U.S.C., and 46 CFR Part 4, is paramount to ensuring that digital evidence is collected and handled lawfully and ethically.
- ***Meticulous system documentation:*** Proper documentation of the condition of all relevant digital systems is vital, with particular attention paid to verifying the performance of VDRs and ensuring up-to-date equipment certifications.
- ***Validation of the various sources of digital information:*** Ensuring that the various pieces of digital evidence and eyewitness accounts are precisely synchronized regarding time and date is critical to ensuring the accuracy of the investigation record.

By consistently applying these cyber forensic best practices, investigators can enhance the accuracy and relevance of the data they gather while ensuring evidence is properly collected, safeguarded, and maintained. This disciplined approach preserves the integrity and defensibility of the entire investigative process, ensuring that digital evidence can withstand external scrutiny and support the success of the investigation.

Charting a Digital Course for Marine Investigations

The increasing reliance on electronic data in marine casualty investigations mirrors the pervasive digital transformation sweeping across the maritime industry. As vessels become increasingly sophisticated and technologically advanced, the imperative for specialized knowledge and advanced tools to effectively collect, securely preserve, and expertly analyze digital evidence becomes ever more critical.

Through the ongoing robust collaboration between INCOE and DFL, coupled with the specialized expertise of units like the Coast Guard Auxiliary, the Coast Guard has strategically positioned itself as a leader in the critical field of digital forensics. This proactive approach ensures the service remains fully equipped to effectively address the evolving challenges to modern maritime investigations. As these indispensable digital forensic tools continue their rapid evolution, the Coast Guard needs to remain at the cutting edge of digital evidence analysis. Doing so will empower investigating officers to draw increasingly well-informed conclusions and make recommendations to achieve the overarching goal of improving maritime safety and preventing marine incidents.

About the author:

LCDR Tom Whalen is the investigations national technical advisor at the U.S. Coast Guard Investigations National Center of Expertise, where he serves as subject matter expect providing technical support for marine casualty investigations worldwide. Commissioned in 2013, after serving as a Chief Machinery Technician, he has held key positions in marine safety and vessel compliance across multiple Coast Guard units, including Sector New Orleans, Marine Safety Detachment Belfast, and the Coast Guard's Northeast District. His operational experience spans domestic and foreign vessel inspections, pollution response, and investigations, including three district formal investigations and one commandant marine board of investigation.

Endnotes:

1. International Maritime Organization (IMO), "Performance standards for Voyage Data Recorders (VDRs)," Resolution MSC.333(90), 2012
2. SOLAS Chapter V, Regulation 20, International Maritime Organization.
3. IMO Resolution MSC.333(90), "Revised performance standards for VDRs," adopted 22 May 2012.
4. 46 CFR §161.240 – Voyage data recorder (VDR) and simplified voyage data recorder (S-VDR) performance.
5. *TITAN* Marine Board of Investigation Exhibit CG-001_1 *TITAN* Animation.
6. SPIRIT Of NORFOLK Formal Investigation Exhibit CG-001.1 SON Voyage Animation with Labels Significant Events.

Quentin Walsh

D-Day planner and Cherbourg liberator

by William H. Thiesen
Atlantic Area Historian
U.S. Coast Guard

Coast Guard officer Quentin Robert Walsh experienced one of the most colorful careers in the history of the U.S. Coast Guard. A native of Groton, Connecticut, Walsh grew up across the Thames River from the Coast Guard Academy in New London. Aggressive by nature, Walsh established himself as a leader while attending the academy. He was a fine athlete and a standout boxer, serving as co-captain of the academy's boxing team. His tenacity would serve him well as a Coast Guard officer in wartime and peace.

Quentin Walsh, who retired from the Coast Guard as a captain in 1960, was awarded the Navy Cross, the Navy's highest recognition for heroism beside the Medal of Honor, for his actions in and around Cherbourg, France, following D-Day. Coast Guard photo

Walsh spent much of his career on sea duty or on foreign assignments. In his first billet after graduation, he experienced the rigors of Prohibition enforcement during the height of the Rum War. Beginning in May 1933, he served on the former Navy "four-stacker" destroyer *Herndon*, which the Coast Guard used for offshore patrols between the Gulf of Maine and Cape Hatteras. In addition to rum-running patrols, *Herndon* participated in naval operations out of Key West, Florida, to protect U.S. citizens during the Cuban Revolution of 1933. In September 1934, Walsh transferred to the cutter *Yamacraw*, based in Savannah, Georgia. As boarding officer, he played an important role in the capture of the notorious rumrunner *Pronto* in January 1936.

One of the many highlights of Walsh's career was his tour as the Coast Guard inspector in charge of enforcing whaling treaty regulations. His assignment began in May 1937, when he boarded the American-flagged factory ship *Ulysses* to serve on board for a year. By April 1938, the *Ulysses* had steamed 30,000 miles, including the waters of Antarctica and the Indian Ocean. At one point, the vessel had spent 132 straight days without seeing land and had killed 3,665 whales. Walsh's first-hand knowledge of whaling practices heavily influenced the formulation of U.S. whaling policy, and his written report was later published in book form.

Between 1938 and the U.S. entry into World War II in 1941, Walsh served on board a variety of cutters. He first served on the *Cayuga*, which survived the Great Hurricane of 1938 when he ordered the use of towing hawsers to moor the cutter to her Boston dock. In the spring of 1939, he served as navigator on board cutter *Northland* in explorer Richard Byrd's expedition to Antarctica. However, Byrd ended the expedition early when war broke out in Europe. In October 1939, Walsh transferred to the 327-foot cutter *Campbell* and served as navigator and gunnery officer while the cutter convoyed merchantmen across the

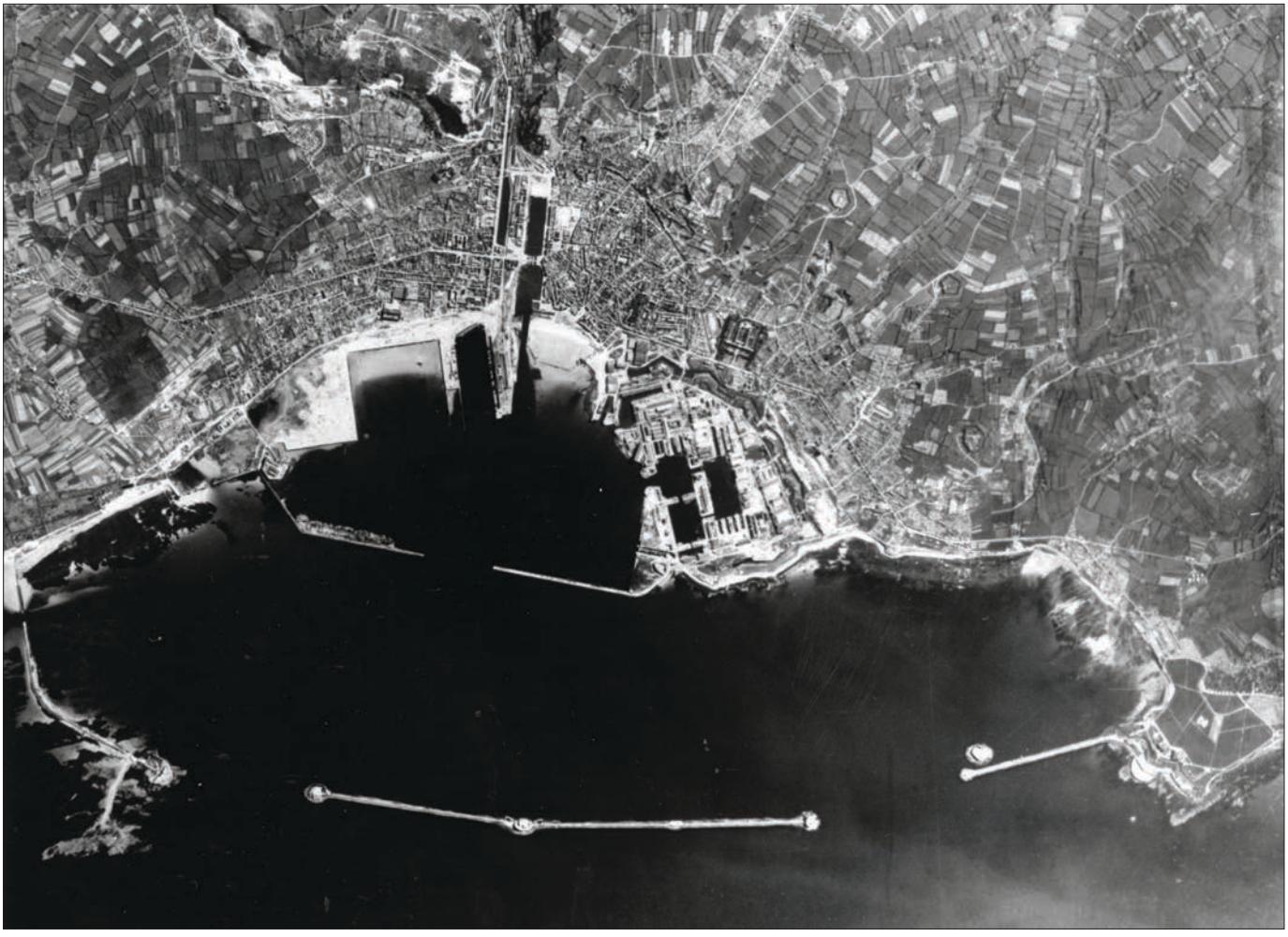
North Atlantic as part of the American Neutrality Patrols. During Walsh's assignment, *Campbell* also served on the Lisbon station to protect U.S. citizens in Portugal, threatened at the time by the spread of war in Europe.

In November 1941, just before the United States' entry into the war, Walsh received yet another assignment as navigator. This time, he served on board the famous Coast Guard-manned troop transport *Joseph T. Dickman*, ferrying British troops from Halifax, Nova Scotia, to Bombay, India, now known as Mumbai. The *Dickman* also supported amphibious training with U.S. Marines on the North Carolina coast and landed troops in Cuba, Puerto Rico, and Bermuda.

Walsh left the *Dickman* in September 1942 and, after less than a year in the States, he received orders to the staff of commander, U.S. Naval Forces in Europe, located in London. As a member of the staff, Walsh gained full knowledge of Phase Neptune, the amphibious operation associated with Operation Overlord, the Allied invasion of Europe. This landing would prove the largest amphibious operation in world history and Walsh had to formulate plans to restore operations in liberated French ports to expedite the resupply of Allied armies by ship.

In addition to planning post-D-Day port operations, Walsh received orders to form a unit to carry out his plans. His extensive naval background and leadership ability served him well as he formed Navy Task Unit 127.2.8 out of 50 Navy Seabees, men from the Navy's construction battalion units. Seabee personnel were the best possible choice for Walsh's mission because they came equipped with combat training in addition to their expertise in construction, engineering, and heavy machinery operation. Walsh's task unit would serve with VII Corps of GEN Omar Bradley's First Army.

After an initial postponement due to poor weather conditions, the D-Day invasion took place on Tuesday, June 6, 1944. Walsh and his men landed on Saturday, D+4, at Utah Beach and advanced westward toward the port of Cherbourg, France. Walsh's mission was to secure the harbor and prepare the port facilities to receive shipments of troops and supplies as soon possible. When Walsh's unit entered the city on Monday, June 26, as part of the Army's



Aerial reconnaissance provided this high-altitude photograph of Cherbourg Harbor in Cherbourg, France. Notice the extensive port facilities and harbor defenses. Navy photo

Cherbourg's bombed-out citadel overlooks the dockyards that Quentin Walsh's men captured. Within a few short days of entering Cherbourg, Walsh's 50 men had taken 750 German troops, liberated more than 50 American prisoners, captured Cherbourg's port, and helped clear the harbor of enemy mines and obstructions. Navy photo

79th Infantry Division, he came under fire from machine gun nests still defending German positions, and his unit uncovered stubborn pockets of enemy resistance.

By Tuesday, June 27, Walsh's men had fought their way through to Cherbourg's harbor. During this assault, Walsh moved his men quickly to occupy strategic parts of the port and take control the harbor. During the assault, the men in his unit experienced a 25% casualty rate. By the end of the day, Walsh's unit had advanced to the city's old naval arsenal, where he accepted the surrender of 400 German troops.

After capturing Cherbourg's port facilities, Walsh learned that the Germans held American paratroopers in the city's old citadel at Fort du Homet. In the highlight of the Cherbourg operation, and likely his career, Walsh and one of his officers put themselves in harm's way to save the lives of the Americans. The two officers entered the fort under a flag of truce and met with the commanding officer of the German garrison. By greatly exaggerating the numeric strength of his small force of Seabees, Walsh convinced the commanding officer to surrender the stronghold. With the surrender of Fort du Homet, Walsh and his men disarmed another 350 German troops and liberated more than 50 American prisoners.

With Cherbourg secured, Walsh began preparing the port for operations. He established a naval operations center, surveyed the harbor, and collected vital intelligence from German prisoners, Free French partisans and slave laborers who had worked around the port. With this information, Walsh mapped underwater obstructions, navigable channels, and minefields in the harbor and its approaches. He sent this information to Allied minesweepers using shallow-draft wooden sailing vessels, which were immune to underwater mines. By doing this, Walsh accelerated use of the port by forwarding intelligence directly to the minesweepers rather than going through slow-moving official channels.

Within a few short days of entering Cherbourg,

Walsh's 50 men had taken 750 German troops, liberated more than 50 American prisoners, captured Cherbourg's port, and helped clear the harbor of enemy mines and obstructions. By Walsh's third day in Cherbourg, the Navy decommissioned his unit and designated him as Cherbourg's assistant port director. His unit had not only secured Cherbourg and saved American lives, but also sped thousands of troops and millions of tons of ammunition, equipment, and war materiel to the front lines. For his achievements and selfless devotion to duty, Walsh received the Navy Cross, the Navy's highest recognition for heroism beside the Medal of Honor.

Walsh's duties did not conclude with the successful capture and operation of Cherbourg's port. After a month of shipping operations, the Navy assigned Walsh to lead a naval reconnaissance party of 400 men to examine the French ports of Brittany, including the port of Brest. As part of VIII Corps of GEN George Patton's Third Army, Walsh's men completed this mission by the end of August 1944. Next, Walsh's unit joined forces with the First Canadian Army to open the Port of Le Havre. Once again, his men came under enemy fire as soon as they entered the city, but they completed the mission within two weeks.

After Le Havre, Walsh contracted a severe case of viral pneumonia. He was hospitalized in London and returned to the States. During the next year, he helped oversee the permanent transfer of the Bureau of Marine Inspection and Navigation from the Commerce Department into the Coast Guard. Meanwhile, Walsh's health problems persisted, and, in 1946, the service placed him on the retired list due to physical disability. With the onset of the Korean War, he returned to active duty in 1951. He served as liaison officer between the Coast Guard and Treasury Department and later served as aide to the assistant secretary of the department, overseeing Coast Guard affairs. Walsh finally retired as a captain in 1960.

Quentin Walsh passed away in May 2000. His career spanned some of the most eventful years in Coast Guard history, including Prohibition, World War II, and the postwar modernization of the service. He played an important role in the service's missions of law enforcement, fisheries management, combat operations, port security, and organizational change. In recognition of this, the Navy will soon christen the USS *Quentin Walsh* (DDG-132), an Arleigh Burke-class Flight III guided missile destroyer, in honor of his historic record of service.

Construction on the future USS *Quentin Walsh* (DDG-132), an Arleigh Burke-class guided-missile destroyer honoring Coast Guard CAPT Quentin R. Walsh, began in November 2021. Though a Coast Guardsman, Walsh led Navy Seabees in the liberation of Cherbourg, France, from German occupation, and the reopening of Cherbourg Harbor. Navy illustration

German prisoners march out of surrendered Cherbourg, France, under U.S. Army guard, in June 1944. Navy photo

For more information

You can access hundreds of service stories by visiting https://bit.ly/LongBlueLine.

About the author:

William H. Thiesen, Ph.D., is the Atlantic Area historian for the Coast Guard. He earned an M.A. from East Carolina University's program in maritime history, and a Ph.D. in the history of technology from the University of Delaware's Hagley Program. His books include Industrializing American Shipbuilding: The Transformation of Ship Design and Construction, 1820–1920, *and* Cruise of the Dashing Wave: Rounding Cape Horn in 1860. *His articles appear frequently in naval, maritime, and Coast Guard publications and the online history series, The Long Blue Line, featured weekly on the My Coast Guard website. The Long Blue Line blog series has published Coast Guard history essays for over 15 years.*

2024 *The Captain* **Quentin R. Walsh** Excellence in Living Marine Resources Enforcement Award

Captain Quentin R. Walsh, a distinguished Coast Guard officer and recipient of the Navy Cross, left an indelible mark on the Coast Guard. Some of his first notable accomplishments were in the field of living marine resources (LMR). In the late 1930s, LTJG Walsh was selected for special assignment as one of the nation's first two whaling inspectors. His three-volume report, one of the most detailed accounts of commercial whaling existing today, is still cited by the Commerce Department in its policy opposing commercial whaling. Ultimately, his report significantly contributed to policy and regulatory changes banning commercial whaling in the United States, saving several whale populations from extinction.

In 2016, the Coast Guard established the annual Captain Quentin R. Walsh Excellence in Living Marine Resources Enforcement Award to honor Walsh's legacy. The award continues to recognize the outstanding performance of LMR boarding officers (BO) and encourage outstanding achievement, stewardship, and contributions to the LMR mission. However, increased visibility and strategic importance of the LMR mission and the associated illegal, unreported, and unregulated (IUU) fishing mission, made it obvious the award was not capturing the totality of the tremendous work performed in service of the mission. To better recognize the important, and often varying natures, of this work, the award was divided into two classes—staff/training and operational.

Any nominee who contributes to the LMR or IUU fishing mission is eligible for the staff/training award. To be eligible for the operational award, nominees must be a certified LMR BO for at least six months of the award period.

Meet the recipients of the 2024 Captain Quentin R. Walsh Excellence in Living Marine Resources Enforcement Award!

Staff/Training

LT Brian Maffucci
Sector Guam
U.S. Coast Guard

In the Pacific, where marine life sustains millions, the battle against illegal, unreported, and unregulated (IUU) fishing across a 1.9 million square nautical mile area of responsibility stands as a critical mission for global sustainability. The creation of the IUU fishing operational planner position at Forces Micronesia/Sector Guam (FM/SG) marked a shift in the Coast Guard's approach to this challenge. At the forefront of this effort is LT Brian Maffucci, who stepped into the role in July 2022, bringing strategic oversight, international collaboration, and operational ingenuity to the job.

In this role he strengthened maritime domain awareness and fostered international partnerships when he leveraged his foreign disclosure representative authority to release critical location data to the Palauan government. A Coast Guard aircrew from Air Station Barbers Point, Hawaii, had spotted more than 100 fish aggregating devices, or tools often used to illegally attract fish. Maffucci's actions enhanced Palau's ability to monitor and protect its waters.

During a visit by the Korea Coast Guard, he provided more than 75 cadets with presentation highlighting IUU fishing trends, U.S. strategies, and the value of bilateral agreements. Following the visit, Maffucci conducted a video interview on the importance of international partnerships and global fish stocks that is now used as training material by the Korea Coast Guard.

Maffucci is also one of two U.S. Coast Guard representatives on the Mariana Trench Monument Advisory Council where his contributions help protect an iconic natural wonder, ensuring the Coast Guard's mission aligns with global environmental goals.

Enlisting in 2008, the Point Pleasant, New Jersey, native's first assignment was at a motor lifeboat station in Bodega Bay, California, before he transitioned to intelligence roles and earned a master's degree from the National Intelligence University. He was commissioned in 2015 and has earned two Joint Service Commendation Medals and two Coast Guard Commendation Medals. He is married to Air Force Capt. Carmen D'Arminio.

Operational

Petty Officer 2nd Class Trevor Abbo
CGC Hawk

Throughout 2024, Petty Officer 2nd Class Trevor Abbo, a machinery technician, was instrumental in safeguarding U.S. maritime sovereignty by consistently upholding the laws and regulations that protect both the environment and the nation's sensitive marine resources. Having qualified as a Gulf of America living marine resources boarding officer in January 2024, he served as the lead boarding officer aboard CGC *Hawk* throughout the year executing 57 LMR boardings and identifying 25 fishery violations.

He is credited with the discovery of illegally possessed, out-of-season and undersized red snapper, blacktip sharks caught without proper permits, a shrimp boat crew in possession detached shark fins, but no carcasses resulting in a waste of game violation, and five reef fish violations. These fishery violations are in addition to violations of the exclusive economic zone, environmental and safety issues, and 46 USC § 8103—also known as the 75/25 rule—a non-U.S. citizen in command of a U.S.-flagged vessel.

To further the mission, Abbo conducted joint operations with National Oceanic and Atmospheric Agency officers and voluntarily participated in ride-alongs with the Texas State Park Police and the Texas Parks and Wildlife Department's game wardens. These actions strengthened relationships, paving the way for greater cooperation and information sharing between the state agencies and the CGC *Hawk*'s crew. Always a team player, Petty Officer 2nd Class Trevor Abbo's tireless dedication exemplified the finest qualities of a living marine resources boarding officer.

Passionate about conservation and driven to ensure future generations can enjoy a healthy marine ecosystem, he believes humanity has an innate responsibility to be good stewards of our natural resources. LT Maffucci's actions uphold the Coast Guard's legacy as a guardian of the seas.

Married with one child, the southeast Michigan native studied natural resources management and agricultural economics at Texas Tech University before enlisting in the Coast Guard.

Understanding Methyl Acrylate

by LT Joe Kolb
Hazardous Materials Division
U.S. Coast Guard Office of Design and Engineering Standards

What is it?

Methyl acrylate is a methyl ester, specifically of acrylic acid, with chemical formula C4H6O2. Characterized by an acrid odor, it is a colorless liquid under ambient conditions. Due to its tendency to polymerize, it is used in the production of synthetic fibers and plastics. It is also used to prepare adhesives, sealants, and amphoteric surfactants. Highly flammable, toxic, and carcinogenic, methyl acrylate is considered a hazardous material in maritime transportation and is regulated by the U.S. Coast Guard and the International Maritime Organization (IMO).

Why should I care?

Synthetic Fibers

The primary use for methyl acrylate is in the production of synthetic fibers. It is very notably copolymerized with acrylonitrile to produce acrylic and modacrylic fibers, which are then used to make clothing, carpets, and other home furnishings.

Plastics

The production of plastics is another major use for methyl acrylate. It is often copolymerized with other alkenes to give rise to specialized engineered plastics. Such plastics are commonly used in the manufacturing and medical industries and can be found in items like prostheses, contact lenses, and cosmetics.

Flammability Concerns

Readily ignited when exposed to heat, flame, or sparks, methyl acrylate poses a dangerous fire hazard. Its vapors can form dense, explosive air mixtures, which can travel considerable distances along the ground, risking flashback if they reach a source of ignition. Care must be taken when storing and working with methyl acrylate to avoid contact with sources of heat and ignition. Flammable vapor detection is required for maritime carriage.

Health Concerns

Methyl acrylate also demonstrates serious human health concerns, as it is highly toxic when inhaled, ingested, or absorbed by the skin as a monomer. Exposure may cause irritation of the eyes, skin, respiratory system, and gastrointestinal tract. Chronic exposure is associated with liver and kidney tissue damage. Special requirements, such as toxic vapor detection, personnel protection equipment, and increased ventilation, are required for maritime carriage.

Polymerization Concerns

Methyl acrylate readily polymerizes, and several precautions should be taken during maritime transportation. The Coast Guard and IMO require that it be protected against polymerization via the addition of inhibitors, and ships must carry certificates attesting to such protections during transport. Cargo containment should be free of contaminants that could catalyze polymerization or degrade the inhibitor. Loading and carriage should be conducted as to avoid introducing heat to the methyl acrylate, which induces polymerization. Venting systems should be designed to avoid blockage from polymer buildup and be periodically checked for proper operation.

What is the Coast Guard doing about it?

The Coast Guard is responsible for enforcing maritime transportation requirements for all hazardous materials in liquid bulk, such as methyl acrylate. The Coast Guard Office of Design and Engineering Standards is responsible for creating and interpreting domestic regulations and voicing maritime transportation opinions on behalf of the United States at the IMO.

About the Author:

LT Joseph Kolb commissioned in the Coast Guard in 2015 through Officer Candidate School and currently works in the Hazardous Materials Division at Headquarters in Washington, D.C. He graduated from the University of Virginia in 2009 with a B.S. in chemistry and The Ohio State University in 2021 with an M.S. in chemical engineering.

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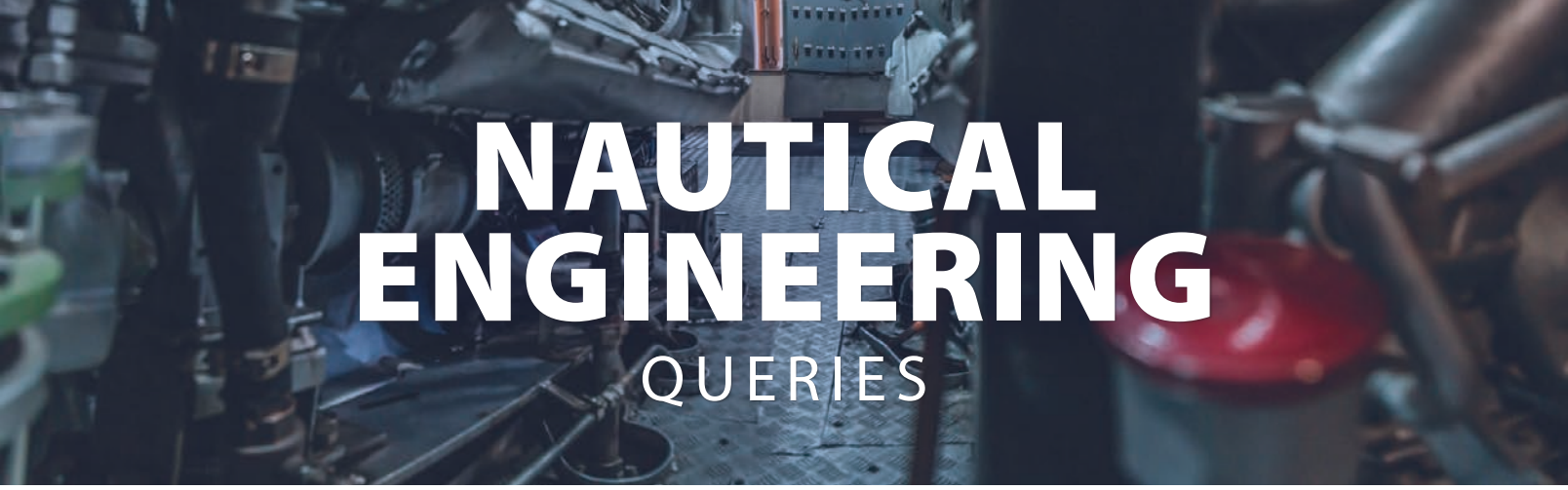

NAUTICAL ENGINEERING QUERIES

Prepared by NMC Engineering Examination Team

1. Modern marine diesel engines equipped with mechanical fuel injection operate on a combustion cycle which is _____ .

A. Entirely constant volume
B. Entirely constant pressure
C. A combination of constant volume and constant pressure
D. A combination of constant temperature and constant pressure

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2. The horizontal fore and aft movement of a vessel is called _____ .

A. Heave
B. Surge
C. Sway
D. Yaw

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3. Regulations require that shipboard cabling use stranded copper conductors. Why is copper a superior conductor compared to aluminum?

A. Even though copper is lower in conductivity than aluminum, copper has more resistance than aluminum
B. Even though copper is heavier in weight than aluminum, copper has less resistance than aluminum
C. Even though copper has more resistance than aluminum, copper is lighter in weight than aluminum
D. Even though copper is more corrosive than aluminum, copper is lighter in weight than aluminum

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4. Operating a steam turbine propulsion unit at medium speed in an area with extremely cold sea water and the main circulating pump providing full cooling water flow to the condenser will result _____ .

A. Excellent plant efficiency due to higher attainable vacuum
B. Increased plant efficiency due to increased condensate depression
C. Increased effectiveness of the air ejectors due to the increased main condenser vacuum
D. Increased condensate aeration due to the inability of the air ejectors to remove excessive air accumulation from the condenser

1. A. Entirely constant volume — Incorrect answer

B. Entirely constant pressure — Incorrect answer

C. A combination of constant volume and constant pressure — **Correct Answer:** "Modern high-speed diesel engines operate on a cycle which is a combination of two methods; part of the fuel is burned rapidly, almost at a constant volume near TDC, the rest is burned while the piston begins to move away from TDC."

D. A combination of constant temperature and constant pressure — Incorrect answer

Reference: Diesel Engine Operation and Maintenance, Maleev, page 19

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2. A. Heave — Incorrect Answer

B. Surge — **Correct Answer:** "It is desirable for a vessel to maintain a constant speed. This would require that the vessel have stability along the surge axis of motion. Surge is longitudinal bodily motion."

C. Sway — Incorrect Answer

D. Yaw — Incorrect answer

Reference: Stability and Trim for the Ships Officer, 4th Ed., George, (AKA Ladage), 2005, p. 33-34

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3. A. Even though copper is lower in conductivity than aluminum, copper has more resistance than aluminum — Incorrect answer

B. Even though copper is heavier in weight than aluminum, copper has less resistance than aluminum — **Correct Answer:** "The relatively high electrical conductivity, good heat-conduction capability, and relatively low cost of copper result in its extensive use in motors, generators, transformers, controls, switches, cable, etc. Aluminum, because of its light weight and high conductivity—although not as good as copper—is used in induction motor rotors, long distance transmission lines, etc."

C. Even though copper has more resistance than aluminum, copper is lighter in weight than aluminum — Incorrect answer

D. Even though copper is more corrosive than aluminum, copper is lighter in weight than aluminum. — Incorrect answer

Reference: Operation, Testing, and Preventive Maintenance of Electrical Power Apparatus, Hubert p. 5

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4. A. Excellent plant efficiency due to higher attainable vacuum — Incorrect answer

B. Increased plant efficiency due to increased condensate depression — Incorrect answer

C. Increased effectiveness of the air ejectors due to the increased main condenser vacuum — Incorrect answer

D. Increased condensate aeration due to the inability of the air ejectors to remove excessive air accumulation from the condenser — **Correct Answer:** "The capacity of the air removal equipment in operation limits the condenser vacuum and consequently affects deaeration. The effect is greatest at very light loads and with cold cooling water."

Reference: Marine Engineering, Harrington, p. 564

NAUTICAL DECK QUERIES

Prepared by NMC Engineering Examination Team

1. BOTH INTERNATIONAL AND INLAND: Which vessel is to keep out of the way of the others?

A. A vessel engaged in trawling
B. A vessel constrained by draft
C. A vessel engaged in underwater operations
D. A vessel not under command

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2. What is the purpose of a striking plate?

A. It provides a surface for applying force on machinery
B. It absorbs machinery vibration
C. It provides a landing surface for the sounding bob
D. It prevents valve stem over-travel

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3. What does "hanging a barge off" refer to?

A. Towing an empty barge astern
B. To remove and deliver a loaded barge from a multiple tow
C. To remove a barge while locking through
D. Mooring a barge to the bank and leaving it there

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4. Your 1,600 GRT vessel will be entering the navigable waters of the United States. You are required by regulation to take which action?

A. Test the primary and secondary steering systems no more than 8 hours before entering
B. Check the magnetic compass for the correct deviation
C. Correct the charts of the area to be transited using the Notices(s) to Mariners or equivalent reasonably available
D. Have a copy of the Radio Navigation Aids in the pilot house

1. A. A vessel engaged in trawling

Correct Answer: "A vessel engaged in fishing when underway shall, so far as possible, keep out of the way of: (i) a vessel not under command; (ii) a vessel restricted in ability to maneuver." (d)(i) Any vessel other than a vessel not under command or a vessel restricted in ability to maneuver shall, if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by draft, exhibiting the signals in Rule 28."

B. A vessel constrained by draft — Incorrect

C. A vessel engaged in underwater operations — Incorrect

D. A vessel not under command — Incorrect

Reference: International Navigation Rule 18(c)

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2. A. It provides a surface for applying force on machinery — Incorrect answer

B. It absorbs machinery vibration — Incorrect answer

C. It provides a landing surface for the sounding bob

Correct Answer: "…to prevent the sounding rod from wearing through the bottom of the tank. Doubling plates, often called 'striking plates,' are usually fitted for this purpose and are often welded to the bottom plating."

D. It prevents valve stem over-travel — Incorrect answer

Reference: Merchant Ship Construction, Pursey, 7th Ed., page 136

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3. A. Towing an empty barge astern — Incorrect answer

B. To remove and deliver a loaded barge from a multiple tow — Incorrect answer

C. To remove a barge while locking through — Incorrect answer

D. Mooring a barge to the bank and leaving it there

Correct Answer: "…damaged or sinking barges are disconnected and left tied along the bank for later repair. Rivermen are required to climb onto banks of rivers in order to secure and moor any barge that is to be left behind."

Reference: Tugs, Towboats and Towing, Brady, 1st Ed., 6th Printing, pages 120-121

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4. A. Test the primary and secondary steering systems no more than 8 hours before entering — Incorrect

B. Check the magnetic compass for the correct deviation — Incorrect

C. Correct the charts of the area to be transited using the Notices(s) to Mariners or equivalent reasonably available

Correct Answer: "Each vessel must have the following: (1) Marine charts of the area to be transited, published by the National Ocean Service, Army Corps of Engineers, or a river authority that (ii) are currently corrected."

D. Have a copy of the Radio Navigation Aids in the pilot house — Incorrect

Reference: 33 CFR 164.33(a)(1)

IN THE NEWS

Coast Guard Northeast District's command master chief, Master Chief Petty Officer Robert Riemer leads Coast Guard and Air Force members off the field at Fenway Park after participating in the National Anthem flag ceremony during the Boston Red Sox season home opener on April 21, 2025. Coast Guard photo by Chief Petty Officer Richard Brahm

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Members of the U.S. Coast Guard Hockey Organization watch their team from the bench during the 2025 Commandant's Cup in Hyannis, Massachusetts, on April 24, 2025. The team members displayed the Coast Guard's core values on the back of their jerseys. Coast Guard photo by Petty Officer 3rd Class Rajesh Harrilal