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Volume 35 • Number 4

Marine News

APRIL 2024

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eWolf

First Fully Electric Tug in the U.S.

2024 Shipbuilding Report
A Challenging & Complicated Business

Offshore Wind
Solving Marine Navigation Problems

Inland Waterways
An Economic Engine

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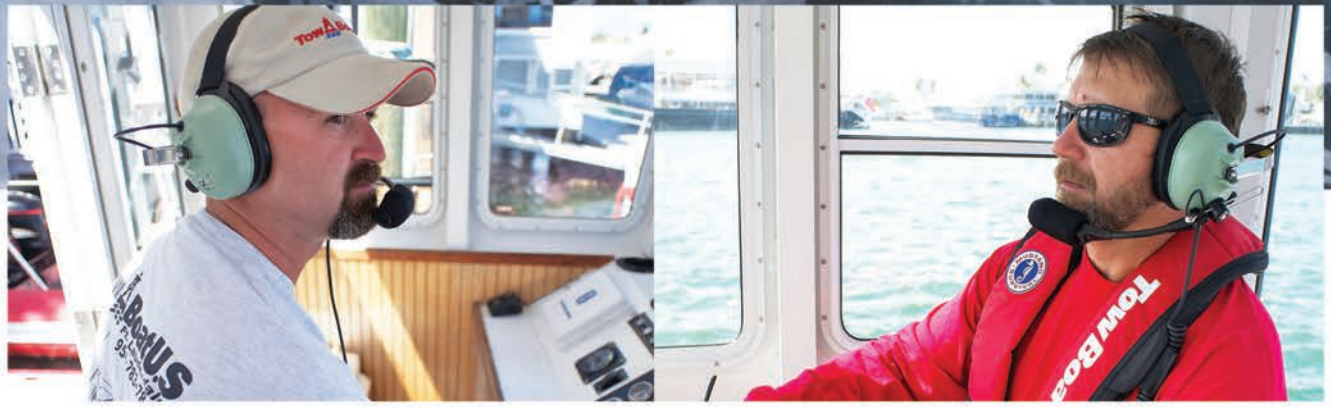

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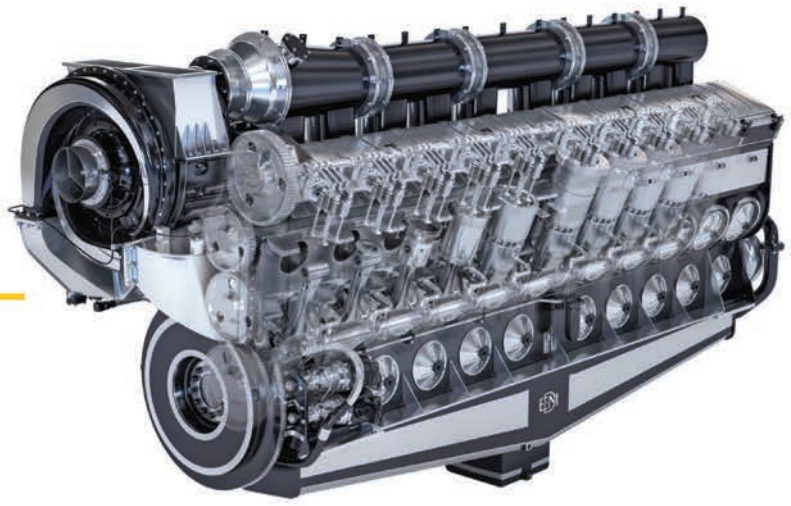

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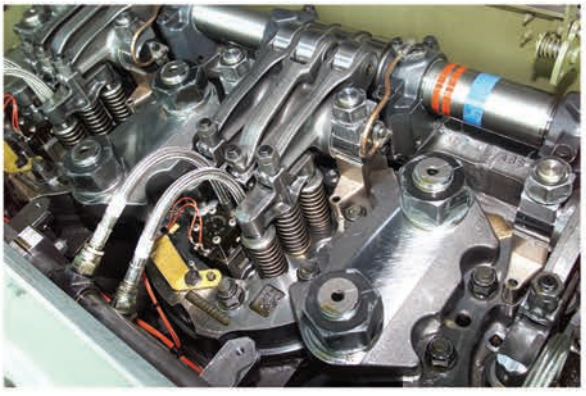

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Contents

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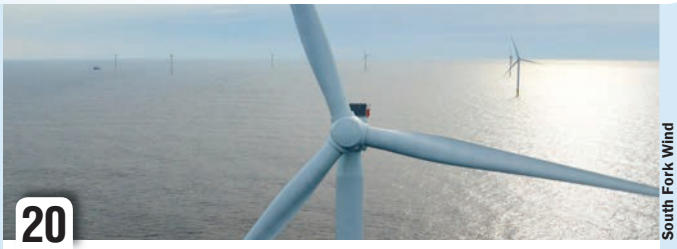

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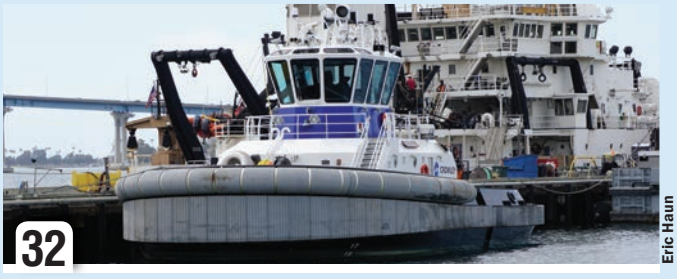

Eric Haun

On the Cover

Marine News recently traveled to the Tenth Avenue Marine Terminal in San Diego to visit Crowley's new fully electric tug, eWolf. The vessel is capable of operating 100% on battery power, slashing noise and emissions.

(Photo: Eric Haun)

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Editor's Note

Eric Haun, Editor,
haun@marinelink.com

The current period of time is one of swift transition for the maritime industry, as regulatory and technological evolutions increasingly make their presence felt across sectors, from tankers to tugboats.

Evidence of these major changes can be seen throughout Crowley's new harbor tug, eWolf, the first in the U.S. capable of running on power supplied entirely by on-board batteries. I recently traveled to San Diego to see (and ride) the vessel, a truly surreal, almost eerie, experience as the vessel emits no noise or vibration as it plies the waters of San Diego Harbor 100% on battery power—no diesel engines, no emissions.

The technology is impressive, though still too expensive and limited for widespread adoption. eWolf is tailored specifically for operations in San Diego, and it was made possible by a significant grant support. But experts tell me this can change in time as technologies evolve and markets evolve.

When the eWolf enters service this Spring, it will serve as a testbed, both for its clean propulsion system and advanced control systems designed to scale toward tech-assisted and eventually autonomous operations down the road. As the tug helps to guide ships in and out of port, it will also be helping to chart the course for this industry's future.

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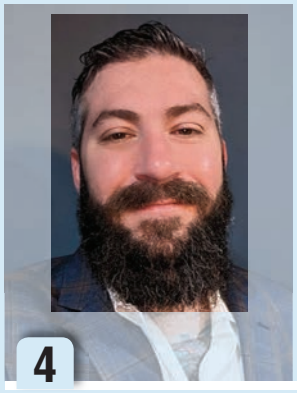

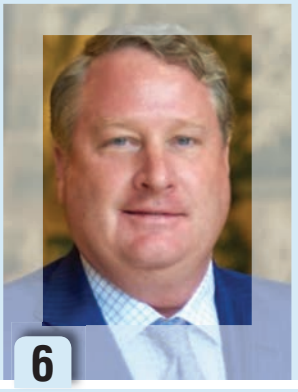

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By the Numbers

US Inland Waterways: Economic Impact by State

In 2021, nearly 500 million tons of goods valued at more than $158 billion moved on the U.S. inland waterways system, which includes a vast network of 12,000 miles of connecting waterways and 219 locks. The U.S. Department of Transportation Freight Analysis Framework freight forecasts suggest total water tonnage will increase at an annual growth of 0.7% per year through 2040.

Earlier this year, the National Waterways Foundation (NWF) released updated data illustrating the economic impacts of the inland waterway systems within several key states.

State	Miles of Navigable Inland Waterways (U.S. Rank)	Public Ports	Tons of Freight Moved by Inland Waterway ($ Value)	Inland Ports, Inland Waterways and Inland Waterways-dependent Industries Support:				
				Jobs	Personal Income $	Gross State Product $	Total Output $	State & Local Tax Revenue $
Alabama	1,270 (6)	19	27.8M (5.3B)	134K	8.4B	15.9B	35.4B	1.7B
Arkansas	1,860 (3)	10	18.9M (2.4B)	71K	3.7B	7B	15.2B	452M
Illinois	1,100 (8)	19	70.3M (17.9B)	262K	17.7B	28.2B	67.6B	2B
Indiana	350 (24)	6	26.6M (2.7B)	140K	8.2B	16.4B	43.8B	2B
Iowa	490 (19)	3	8M (1.5B)	88K	5B	9.9B	31B	349M
Kentucky	1,590 (4)	10	79M (5.2B)	158K	10.1B	18B	40B	1.9B
Louisiana	2,820 (2)	32	216.6M (60.1B)	143K	9.4B	15.3B	42.2B	989M
Minnesota	260 (27)	10	11.1M (1.3B)	198K	15B	24.3B	48.5B	2.2B
Mississippi	870 (12)	16	17.9M (10B)	114K	6B	9.2B	23.8B	879M
Missouri	1,050 (10)	16	41.5M (2.6B)	128K	7.3B	13.4B	35.2B	570M
Ohio	440 (21)	10	29.7M (5.2B)	162K	11.4B	25.2B	57.6B	3.2B
Oklahoma	150 (3)	2	5M (1.6B)	78K	4.4B	6.6B	15.5B	86M
Pennsylvania	260 (28)	6	17.7M (7.7B)	184K	14.8B	31.9B	65.7B	4.8B
Tennessee	950 (11)	5	29.5M (5.6B)	100K	6.5B	12B	26.4B	1.1B
Texas	830 (13)	23	79.7M (54.9B)	305K	27.9B	54.6B	111B	7.7B
West Virginia	680 (16)	2	45.7M (3.4B)	127K	8B	17.1B	37B	1.8B
Wisconsin	230 (29)	12	1.9M (107M)	147K	10B	15.8B	34.1B	1.2B

Data from 2021, courtesy of the National Waterways Foundation state profiles (Sources: U.S. Department of Agriculture Inland Waterways Study (2019); U.S. Army Corps of Engineers Waterborne Commerce Statistics; Federal Highway Administration Freight Analysis Framework; U.S. Department of Labor Bureau of Labor Statistics Occupational Employment Statistics; IMPLAN)

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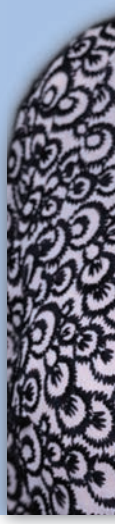

The towboat, tug and barge industry is in a period of rapid evolution. How is AWO—now in its 80th year of existence—adapting to meet the industry's evolving needs?

It starts with listening to members so that we can adapt to the changing needs that they have now, and the needs that they anticipate having going forward. Some things stay pretty constant: AWO's fundamental roles as the industry's advocate, as a resource for the industry, as the industry's united voice. But what are the issues? What are the challenges? What are the things that could really shape members, both in the public policy environment and the business environment, over the next few years? Those things change. In order to evolve and adapt, we've got to be constantly talking with members, listening to them, hearing what they have to say so that we can make the improvements, make the changes and make sure that we're keeping up.

CARB's harbor craft rules have been center stage of late. AWO's stance on the situation has been clear since day one. What do you make of recent developments?

I think that concerns about both the safety implications and the supply chain implications of the CARB harbor craft rules are gaining traction. To be clear, our industry does not shy away from making improvements, making upgrades to support safety and environmental sustainability. You've seen that many times over the years in our support for things, our leadership of things like Subchapter M, or the Vessel Incidental Discharge Act. Unfortunately, CARB has, to date, just not been willing to make changes to make sure that their regulations are going to be effective in reducing emissions, and they're not going to produce unacceptable safety risks for mariners and vessels and the environment and that they're going to be achievable within the

prescribed timeframes.

What we're seeing now is it's not only AWO, vessel owners and maritime labor who are saying this; it's the Coast Guard saying, "We've been telling you this, CARB. We continue to have concerns that you haven't addressed." And I think the increasing media coverage that we're seeing and the introduction of legislation in the California assembly is reflective of the fact that there are serious unresolved concerns. The fact that EPA has had California's request for a waiver to allow it to enforce these regulations on its desk for quite a while and hasn't approved it, I think, can be read as EPA has serious questions and concerns.

I hope that Governor Newsom will take note of this and will recognize that there is a path forward here, but it does require engaging with industry, engaging with the Coast Guard and making some revisions so we have a rule that's going to be both effective and safe.

Increasingly, cyber security has been gaining focus as an area of concern across maritime supply chains, and recently the Coast Guard has been tasked with creating and enforcing maritime cyber standards. What do you hope to see from these standards as they are drafted and put to use?

Two key watchwords here are going to be risk-based and scalable. Everybody needs to have good cyber hygiene—any business, anybody who uses a computer, anybody who has electronically controlled and connected systems. It's really important for safety, for security, for the bottom line as everybody knows. Good cybersecurity practices, cyber-risk management practices absolutely should be part of a company's safety management system. We're doing a deeper dive into the Coast Guard's proposed rule. What we hope to see and what we'll really be advocating for is an approach that is risk-based, recognizes that not every company's or vessel's risk profile is the same and that recognizes that company size and sophistication also varies. So, what does a cyber-risk management program look like if I'm operating two harbor tugs in Evansville, Ind., versus if I am operating six terminals at the port of New York and New Jersey? We should both have good cyber, no question, but what that looks like is and should be a little bit different based on size, scale and risk.

AWO has been actively involved in helping the industry address workforce issues, which continue to be a major challenge for many companies. Will you please discuss these efforts and their impacts?

At AWO, our first mission is to be an advocate for the industry. We want to make sure that government agencies are not making a challenge worse by what they do or fail to do. We work very hard with the Coast Guard to make sure that their National Maritime Center has efficient processes for reviewing and approving merchant mariner credentials. We want to make sure that we don't ever have mariners who are frustrated and consider leaving the industry because it's just too hard to get and maintain the credentials that they need for their livelihood. We want to make sure we never have companies, vessel owners who say, "I have a boat that needs to sail, and I have someone who can't get their license renewed because the NMC is using late-20th

century technology in 2024." That's an area of focus.

We also want to make sure that we have workers on our vessels who are fit for duty. One of the things that we have been advocating for in this era when we've seen cannabis legalization in a number of states and localities is drug testing options which are better gauges of impairment than the current testing modalities that have been approved. We are strongly supporting the Department of Transportation's decision to allow oral fluid testing as a drug testing alternative. This gives you maybe a couple day lookback window instead of a month or more so company could more readily tell, "Hey, do I have somebody who's a safety risk here, or do I have somebody who had a marijuana gummy before he ever considered applying for a job in this industry?" The Department of Transportation has approved oral fluid testing for the other modes of transportation that it regulates. We now need the Coast Guard to publish a parallel regulation to authorize it for marine use as well. We're pressing for the Coast Guard to do that with speed.

In addition, we want to be a resource for our members and develop tools and provide forums that they can use as they deal with the challenges of recruiting and retaining and growing their maritime workforces. We've put on a series of virtual mariner workforce forums. We have engaged with our members and maritime schools and academies to talk about how their offerings could be tailored to better support our industry.

As we try to serve as the industry's united voice, we are partnering with other organizations to spread the good word about the awesome careers that are out there in our industry. We want to do that in a realistic way. These are great careers where a hardworking person can make a six-figure income within a matter of seven years and have a fantastic career with lots of responsibilities and great benefits. It's hard work. You're deployed. You're on the water. You're away from home. It's 24/7. We want to be realistic about the challenges involved as well as forthright in describing all the benefits so that folks know that the industry is out there and can make a decision about whether it's right for them. I think we still have the strong sense, as do a lot of our public and private sector partners out there, that there are a lot of folks in this country who just don't know what opportunities are available to them here and would be pretty excited if they knew what those opportunities were.

Last year the USCG updated its guidance for ATBs. Why were these updates necessary and what are the biggest changes?

The Coast Guard really needed to update its ATB guidance. Their Navigation and Vessel Inspection Circular had last been revised in 1981. In 40-plus years, the ATB fleet has grown significantly. In addition, we're now in the Subchapter M era. Tugs that are part of an ATB combination are inspected. The Towing Safety Advisory Committee had done some good work with the Coast Guard several years back on trying to provide clearer guidance on when ATB barges can be authorized to be conditionally occupied, that is, when somebody can go from the tug onto the barge and work there for a period of time. We needed this new guidance because the old guidance was out of date.

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We've still got some work to do. Despite the new guidance, we are seeing differences in the way that the Coast Guard is applying crewing and life-saving requirements to ATBs from one unit to another. Those differences don't seem to be driven primarily by risk, by the specific operational risks involved, but more by ambiguity in the requirements which then leads to different interpretations and different outcomes. We appreciate the Coast Guard taking steps to modernize its policy. We think there's a little bit more work to be done there.

The previous Coast Guard guidance was old, but ATBs are not new. These are vessels that have a really outstanding and long safety record of operation in the US. I think it's really important for the Coast Guard as they modernize their guidance to really take that risk-based lens that we've talked about on cyber and other issues and make sure that it is tailored.

Looking across the industry, what are some other important regulatory issues that AWO is currently paying attention to?

Subchapter M, believe it or not, we are getting ready to, for some vessels embark on the COI renewal cycle, so we want to make sure that that renewal cycle goes smoothly and efficiently, that the process of dry docking and all of that goes efficiently and, again, with a risk-based approach. We got through the initial push to get all of the towing vessels certificated, but we're not done. We need to make sure that as we move into this next stage, whether a company is using the TPO option, the TSMS option or the Coast Guard option, that that policy is being applied, that the regulations are being applied in a practical risk-based way.

We hope to see a Coast Guard Authorization Bill and a Water Resources Development Act enacted this year. There is a need on the regulatory side for some clarifica-

tion on a couple of issues, including engine room crewing on ATBs with automated systems. This is an issue that Congress thought that it addressed in the last Coast Guard Authorization bill, the last National Defense Authorization Act. Unfortunately, the Coast Guard hasn't implemented it yet. It shouldn't come to this, but Congress may need to tell them again, "We told you to do this. Please, this time, get it done."

The issue of sexual assault and sexual harassment prevention and response is really important for both mariner safety and mariner mental health and well-being. We've got a continuing need to make sure that our members have the resources that they need to build and maintain the kind of workplace cultures that are needed in this industry. We also need to make sure that the Coast Guard is clearly and practically implementing the Safer Seas Act that was enacted at the end of the last Congress. There are several areas with respect to surveillance cameras for larger offshore vessels' master key control systems where existing guidance is not clear at best and is problematic at worst. There's a need for some clarity there.

The last thing I'll say is the Vessel Incidental Discharge Act. EPA is due to finalize its regulations implementing that statute later this year, setting standards for ballast water and other vessel discharges. The Coast Guard will then need to pick up the baton and produce its regulations implementing the EPA standards. That's where they'll deal with things like inspection and record-keeping which have been really significant parts of the burden that companies have incurred under the Vessel General Permit. We would like to see both agencies move forward quickly. They're already really late. They've blown past their statutory deadlines. They need to get those rules published in practical ways so that the intent of Congress in passing that legislation can be realized.

For AWO, as an organization, what is its top priorities for the coming six to 12 months and what's being done to address them?

We've hit on some of them. If I had to take it up to a higher level, I would say really focusing on our relationship with the Coast Guard and making sure not only that we have good communication and consultation, but also that the agency is producing practical risk-based regulations, policies, policy interpretations. That is a high priority, and that touches on a range of issues from Subchapter M to ATBs to SASH, etc. We'd like to see Coast Guard Authorization Bill and a Water Resources Development Act to get enacted that address some key industry priorities that don't include any harmful provisions.

We are always about spreading the word about the importance of the Jones Act and making sure that not only do we have strong bipartisan congressional support, which we do, strong support from the top of the administration, which we do, in President Biden, but also that agencies are faithfully carrying out that direction in their Jones Act enforcement policies.

Last, I'll mention state advocacy. We talked about CARB earlier. That is at the top of the list of regulations that need revisions in order to work from a safety standpoint and from a supply-chain standpoint, but there are others out there, too, we're dealing with.

Is there anything else you'd like to add or that you think *Marine News* readers should know about?

We're trying to do hard things, and so it's really important that we are a united industry, that we're fielding a full team and that we are pushing hard together to tackle some of these tough issues. We have a long history as an industry of winning on tough issues. Sometimes we win in over-

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time, sometimes we win in game seven, but it really takes a united industry, and so I just really appreciate the great work of AWO members, of coalition partners, shippers, other associations, WCI, maritime labor who really help us form an effective fighting force.

The other thing I'll say is I think it's really important to always have what I would call a bifocal vision. Obviously, we've got to deal with the issues that are right in front of us now. What do we need to fix today because it's a problem, because it's a challenge, but we've also got to be looking ahead and saying, "Hey, what are the things that we can be doing now to prepare ourselves for the future?" and so a lot of our work on sustainability, on workforce is really aimed at that objective. What do we need to be doing now to make sure that folks understand that tug and barge transportation is the most sustainable mode of freight transportation? How can we make sure that our ports and waterways infrastructure is funded, is operating in a way that optimizes both economic efficiency and also environmental efficiency? What do we need to be doing now to make sure that we're not handicapping or stymieing?

We need to make sure the path is clear for innovators, for first movers who want to adopt new technology and then scale that so the rest of us can learn from it. The ATB crewing issue I mentioned is an example where we're penalizing companies that have made investments in technology designed to make things safer and more efficient. We've got to fix that.

OpEd

Shipbuilding

U.S. Commercial Shipbuilding and Repair Industry Ensures American Strength at Sea

By Matthew Paxton, President, Shipbuilders Council of America

As Senator Roger Wicker of Mississippi once said, "Growth in commercial shipbuilding facilitates growth in the battle fleet." Sen. Wicker shrewdly recognizes that America's manufacturing capacity and national security are deeply intertwined. A robust commercial shipbuilding and repair industry is a critical cornerstone of this capacity.

For the shipyard industrial base to remain strong and competitive, American innovators need a forward-thinking comprehensive American maritime strategy, for Congress to advance stable and predictable budgeting and recognize the importance of strengthening the Jones Act.

First, the U.S. must create a definable national maritime strategy that bolsters the Pentagon's National Defense Industrial Strategy, released earlier this year. As a maritime force, the U.S. is falling behind. China, Korea and Japan continue to dominate the world's total tonnage—95% of the world's tonnage in fact—due to generous government-backed subsidies and bailouts.

From 2010 to 2018 alone, China provided $132 billion in direct subsidies for commercial shipbuilding and has invested billions more since then. China has historically used this manipulation to saturate the shipbuilding market and drive out global competitors.

This economic warfare affects U.S. shipyards and U.S. readiness. In fact, on March 12, Wisconsin Senator Tammy Baldwin, Pennsylvania Senator Bob Casey and the United Steelworkers, among others, joined together to call for the U.S. Trade Representative to launch an investigation into China's unfair trade practices that are harming the Ameri-

Felix Castillo / U.S. Navy

can industrial base.

Second, the Congress must prioritize stable and predictable budgets rather than short-term funding stop gaps that allow for the shipyard industry to plan for investments in their infrastructure and workforce. Inconsistent funding signals create uncertainty in future operation plans, and to train, advance and retain the most valuable asset in our industrial base—our skilled workforce—we need that certainty, like any business sector.

On the commercial side, consistent policy signals for new maritime markets, such as the Biden Administration's push for offshore wind, are essential for the industrial base to plan and construct for these exciting new opportunities. As with any industry or supply chain that will support a burgeoning innovation for a new market, funding is critical, but without long-term policy and cross-sector operationalization plans, investment in these markets becomes significantly more difficult.

Third, the fundamental maritime national security law—the Jones Act—must remain the foundation of the U.S. maritime strategy. Per the Maritime Administration (MARAD), the U.S. shipbuilding industrial base creates a workforce of nearly 400,000, generates $28.1 billion of labor income and contributes $42.4 billion in GDP. These are good family-waged jobs in all 50 states and communities across the nation. In fact, in many communities in regions like the Gulf states, the shipyard industrial base is the leading economic engine, employing generations of families.

There are 125 yards engaged in building, repairing, repowering and maintaining ships, not to mention the massive supply chain that supports those yards. This capacity has not been outsourced like many other critical manufacturing sectors, like semiconductor manufacturing, largely thanks to the Jones Act.

Disturbingly, special interest groups and foreign-funded think tanks are actively attacking the U.S. maritime industry and the Jones Act. Their shortsighted, greed-driven policies seek to outsource this critical manufacturing sector for cheap foreign labor and shoddily-built Chinese ships. This would be disastrous for our maritime security and would decimate jobs in local communities at a time in which our maritime strength is needed more than ever during geopolitical unrest.

Without a strong, forward-thinking comprehensive American maritime strategy, advancing predictable budgeting and other market-building policies and strengthening the Jones Act, other nations like China will continue to invest in their commercial and military maritime capacity and will continue to overtake us as the world's maritime leader.

A flourishing shipyard industrial base is not just an investment in our national and economic security future but a safeguard for generations to come.

Column

Cybersecurity

The Maritime Industry Has Unique Cybersecurity Challenges

By Joe Nicastro, Field CTO, Legit Security

With supply chain attacks on the rise, and nation-state attackers constantly looking for new ways to disrupt national security and economic stability, one of the most vulnerable areas is the security around our maritime operations. The Biden-Harris Administration's recent Executive Order to fortify the cybersecurity of U.S. ports underscores this concern, spotlighting the urgency of addressing vulnerabilities in a sector that drives over $5.4 trillion in economic activity annually. This initiative is not merely a legislative action but a clear and needed call to safeguard the backbone of global commerce against the consistently increasing threat of cyberattacks.

While every industry working toward cybersecurity maturity has challenges, the maritime industry faces a unique set of obstacles due to the complex nature of information technology (IT) and operational technology (OT) systems that need to work together to fulfill the wide array of its missions. Over time, the maritime industry's reliance on digital technologies has grown exponentially, integrating operations from navigation to cargo handling.

However, this digital transformation has also ushered in vulnerabilities, making maritime assets prime targets for cyber threats. These vulnerabilities are multifaceted, stemming from regulatory ambiguities, the complex integration of IT and OT, the implementation of cybersecurity measures and a pervasive shortage of cybersecurity professionals.

Add to that the idea that, historically, maritime security regulations have focused predominantly on physical threats, as evidenced by the post-9/11 security measures which emphasized "guns, gates, guards and identification cards." But as times have changed and attackers have become more sophisticated, there is a very real demand, both in the industry and the government, to pivot towards addressing non-physical threats that can have equally, if not more, devastating effects. The existing regulatory frameworks, while foundational, have not evolved in tandem with these digital threats, leaving gaps that could be exploited. The International Ship and Port Facility Security (ISPS) Code and the Maritime Transportation Security Act (MTSA) of 2002 exemplify this lag, as they were conceived in a pre-digital threat landscape.

The recent Executive Order aims to bridge these gaps by enhancing the Department of Homeland Security's authority to mitigate maritime cyber threats and signifies a proactive stance towards creating a resilient maritime infrastructure capable of withstanding cyber threats. Some of the action items included in this EO are:

- **Authority Expansion for Homeland Security:** The EO grants the Department of Homeland Security and the U.S. Coast Guard increased authority to directly manage maritime cyber threats. This includes setting cybersecurity standards to secure networks and systems at American ports.
- **Cyber Incident Reporting:** Entities are now required to report any actual or potential cyber incidents that could endanger vessels, harbors, ports or waterfront facilities. The Coast Guard, FBI and Cybersecurity and Infrastructure Security Agency (CISA) must be notified of such incidents.
- **Maritime Security Directive:** Specifically targeting ship-to-shore cranes manufactured by the People's Republic of China located at U.S. Commercial Strategic Seaports, the directive demands actions to address vulnerabilities within these cranes and their associated IT and OT systems.
- **Cybersecurity Requirements Establishment:** The EO includes a Notice of Proposed Rulemaking to establish baseline cybersecurity requirements for the maritime sector, influenced by international and industry-recognized standards. These requirements aim to strengthen the digital systems of the Marine Transportation System against cyber threats.

• **Investment in Infrastructure and Onshoring Manufacturing:** The administration is committing over $20 billion towards U.S. port infrastructure over the next five years, including efforts to onshore manufacturing of port cranes to mitigate reliance on foreign-produced equipment that may pose security risks.

• **Enhanced Collaboration and Security Measures:** The EO also emphasizes the importance of adopting best practices for cybersecurity in the maritime sector. This includes monitoring for wireless threats, addressing vulnerabilities due to the integration of IT and OT and implementing rigorous cybersecurity plans.

Despite these directives, there are very real challenges that persist. Most notably is the current ambiguity surrounding cybersecurity regulations. The Coast Guard's NVIC 01-20, for example, attempts to address these challenges by providing guidance for incorporating cybersecurity into Facility Security Assessments (FSAs) and Facility Security Plans (FSPs), but that guidance falls short of mandating the implementation of these plans, underscoring a need for more explicit and enforceable regulations.

Moreover, as mentioned previously, the integration of IT and OT in maritime operations complicates cybersecurity efforts, as these systems often have different security needs and are managed by separate teams within an organization. Protecting these interconnected systems requires a holistic approach that considers both IT and OT vulnerabilities and allows for both teams to have visibility into how risk carries over into adjacent systems.

Lastly, and probably most critical, is the investment in human capital. The shortage of qualified cybersecurity professionals within the maritime sector can be mitigated through targeted training programs and partnerships with academic institutions to cultivate a new generation of maritime cybersecurity experts, as currently there is a very real lack of qualified professionals capable of addressing the growing cybersecurity across all sectors, not just maritime.

Addressing these challenges necessitates a multi-faceted strategy that includes updating and clarifying regulations, fostering a cybersecurity culture within maritime organizations and investing in cybersecurity training and resources. The Maritime Cybersecurity Methodology, which integrates the NIST Cybersecurity Framework and the ISA/IEC IACS Cybersecurity Lifecycle model, offers a structured approach for assessing, planning, implementing and monitoring cybersecurity measure, and with the new EO, even more clarity, resources and regulation are on the horizon to help.

With that said, collaboration between government agencies, industry stakeholders and international partners is going to be vital for enhancing cybersecurity standards and sharing best practices. Additionally, given the global nature of maritime operations, international cooperation is essential for establishing uniform cybersecurity standards and protocols that transcend national borders.

To this end, I believe the Biden-Harris Administration's Executive Order represents a pivotal stride towards understanding, aligning and remediating the gaps and challenges that the cybersecurity defenses of the U.S. maritime sector currently face. This initiative not only addresses current vulnerabilities but also lays the groundwork for a more resilient and secure maritime infrastructure capable of combating emerging cyber threats. Overcoming the hurdles of regulatory clarity, bridging the gap between IT and OT security needs and bolstering the workforce with skilled cybersecurity professionals are essential steps forward. Through collaborative efforts among government, industry and international entities, the maritime sector can navigate these digital waters more safely. Implementing these solutions will not only safeguard national security but also ensure the continuity and efficiency of global trade operations, making this initiative a beacon for future cybersecurity endeavors in critical infrastructures.

South Fork Wind

NAVIGATION AND WIND FARMS:

COMPETING OCEAN USES RAISE EXISTENTIAL QUESTIONS

By Tom Ewing

"Wind Turbines: The Bigger, the Better"

– USDOE Office of Energy Efficiency & Renewable Energy, August 24, 2023

Last December the Bureau of Ocean Energy Management (BOEM) published a proposed sale notice regarding new development areas for utility scale wind projects in the central Atlantic Ocean. The notice includes an upfront issue: the need to mitigate conflicts with U.S. Department of Defense (DOD) activities. BOEM explains that in certain areas the Air Force has set an airspace floor of 1,000 feet above sea level and the Air Force asked BOEM to keep structures below that height. BOEM advises that prospective wind energy companies will need an agreement with DOD to "deconflict potential impacts". (Today, the blades of a GE Haliade-X offshore turbine reach 853 feet above sea level.)

American Clean Power (ACP), the wind industry advocacy group, in comments to BOEM, takes on this issue. ACP writes that when Atlantic projects are built "the optimal wind turbine generator (WTG) height would exceed this restriction" and that "a condition restricting height to 1,000 feet would be very problematic", impacting a project's financial and technical viabilities. ACP suggests that BOEM and the Air Force work something out.

As offshore wind projects advance that old riddle from eighth-grade science comes to mind: What happens when an unstoppable force meets an immovable object? As wind energy projects speed up, issues of competing ocean uses are forced into sharper, and harder, focus. When finalized, wind energy areas (WEAs) will impact vast ocean areas and pressure is building to find answers about competitive uses: about safely navigating and operating within, around, through, above and below the interconnections of a wind tower network covering thousands of acres.

Among federal agencies, say, between BOEM and the U.S. Coast Guard, this seems to remain a cooperative, friendly effort. Nevertheless, in recent agency filings in response to BOEM's proposed Atlantic WEAs, certain standout issues, and positions, are emerging, issues from navigational safety to fisheries to whales and mammals to undersea cables to weather monitoring and warning systems, even to cultural issues such as historic preservation. Agencies write: we want to advance wind energy, but ocean areas can only yield so much before a benign balance is tipped. Balance is the hard part and officials have to get it right because new ocean-based infrastructure and operations pose consequences for maybe the next 100 years.

Safe transit: Coast Guard has "several equities"

BOEM's December sale Notice also advises energy companies that vessel navigation and safety may present operational restrictions, that "portions of the lease areas may not be available because of navigational safety concerns" and that BOEM may require additional mitigation measures depending on future navigational safety risk assessments. Overall, however, navigation is just a brief reference within BOEM's Notice: one paragraph in 12 pages.

The Coast Guard is charged with safeguarding the viability of the Marine Transportation System (MTS), and the USCG is closely tracking issues of competing ocean uses. The USCG is one of the federal agencies that responded to BOEM's Atlantic sale notice.

In a letter to BOEM signed by Steve Ramassini, Chief of the USCG's Office of Navigation Systems, Ramassini writes that the Coast Guard has "several equities" tied to offshore energy. Ramassini writes directly that the CG "opposes priorities that place undue strain on the MTS or impede the execution of our statutory missions," which include, of course, search and rescue. Ramassini writes that it is "critical for BOEM to resolve conflicts prior" to auctioning energy lease areas.

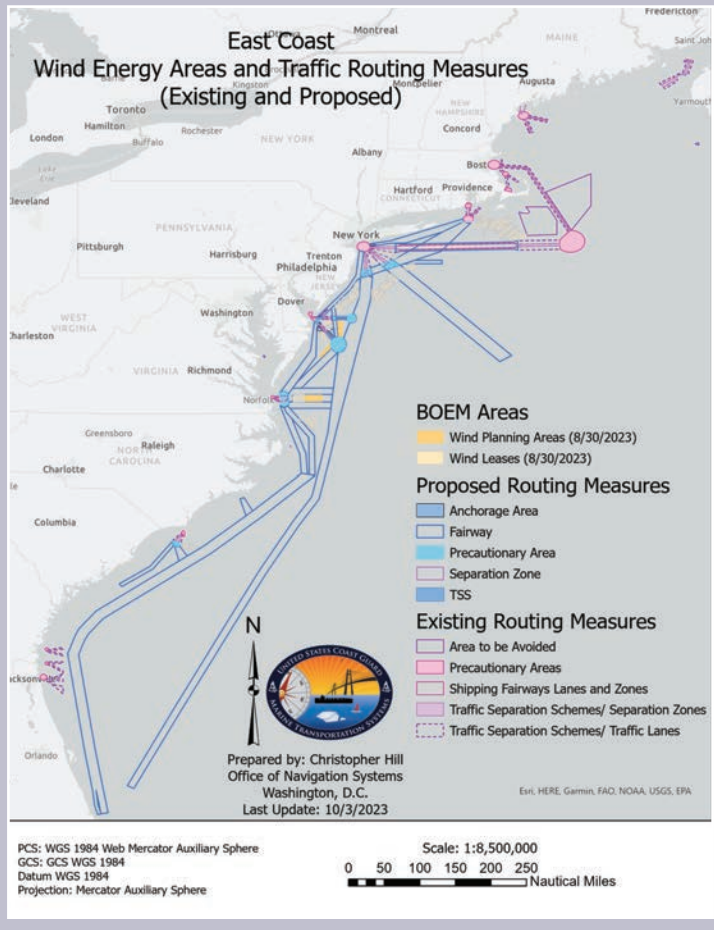
For navigation safety, Ramassini suggests that BOEM focus on and include the following priorities:

- *Avoid shared leases in order to set spacing and straight-line vessel routes.*
- *If deliberate separation isn't feasible additional marking and lighting should include Automatic Identification System Aids to Navigation to alert mariners of changes in spacing and/or orientation.*
- *Regardless of layout and location, the CG "insists" that mooring systems and ancillary equipment are contained*

inside the approved lease area as a requirement under the terms and conditions of a specific lease.

• For structure siting, the USCG (again) "insists" that BOEM apply the Marine Planning Guidelines detailed in Enclosure 4 to Navigation and Vessel Inspection Circular 02-23 ("Guidance on the Coast Guard's Roles and Responsibilities for Offshore Renewable Energy Installations (OREI) on the Outer Continental Shelf (OCS)." This 69-page document details degrees and types of risk for different vessels and vessel combinations. Towing at sea, for example, presents significantly different issues, e.g, maneuvering, compared to a single vessel. A tow-wire catenary can require significantly greater water depths than the drafts of the tug or barge. Therefore, submerged cabling and infrastructure need to be at depths that allow all such operations.

Importantly, Ramassini advises BOEM of the USCG's recent work on ocean transit and wind towers. He directs BOEM's attention to the USCG's recent 27-page Federal Register Notice (January 19) to establish "shipping safety fairways along the Atlantic coast." He notes that two possible fairways are adjacent to lease areas off the Delaware Bay and the Virginia coast.



In its Notice, the Coast Guard asserts that ocean fairways – as well as "traffic separation schemes" and "precautionary areas" – would confirm a central mission: maintaining and securing safe navigable waters for vessels transiting waters subject to U.S. jurisdiction.

TERMS – U.S. Coast Guard

- A shipping safety fairway is a lane or corridor free of fixed structures. It sets aside areas of sufficient depth and dimensions to accommodate vessels and to allow for the orderly and safe movements of vessels transiting to or from ports.
- A TSS – traffic separation scheme – is a designated routing measure that separates opposing streams of traffic into traffic lanes, in which vessels all travel in roughly the same direction.
- A precautionary area is a designated routing measure with defined limits, where vessels must navigate with caution.

The USCG proposes 18 fairways and one fairway anchorage (see map).

Formally established fairways would codify – and protect – historically traveled shipping routes. Fairways would facilitate offshore development, the Coast Guard writes, by preserving traditional routes and maintaining navigational safety "amidst growing offshore activity along the Atlantic Coast." Fairway designations would "ensure that these navigation lanes remain free of fixed structures." Depending on location, the lanes would be between 4 and 35 miles wide.

For the USCG, BOEM's assessments cover small, static ocean areas, too small for the USCG's environmental review and rulemaking. The Coast Guard process requires "an analysis with a broader scope along the entire Atlantic Coast."

Importantly, the USCG writes that fairway use is not mandatory. Vessels could continue to traverse U.S. jurisdictional waters without restriction. But with fairways captains would know they could depend on established routes, permanently clear of fixed structures. Without

the rule new projects might be set within historical vessel routes, conflicting with existing maritime uses and users.

The USCG's fairway proposal is based on BOEM's existing WEA projections (contained in the December Notice). The 18 proposed fairways, traffic separation schemes and precautionary areas, the USCG asserts, "do not intersect, limit, remove, or in any other way interfere" with further development of the Atlantic lease areas. It's important to keep in mind, of course, that federal officials seek 30 gigawatts (GW) of offshore wind by 2030. Then, by 2050, 110 GW, almost a four-fold increase. In its January Notice, the USCG asks for comments about "how future offshore energy development may be impacted by this proposed regulation, and whether any alternative fairway orientations could reduce those impacts while preserving navigational safety."

Commercial vessel navigation is just one competing ocean issue, of course. Commercial fishing boats can have similar concerns, but also very different concerns, since fishing vessels, to reach fish and gear, may need to move in and out of designated fairways. For helicopter crews, wind towers make search and rescue more difficult, both because the towers stand as obstacles and because of turbulence.

Plus, there are somewhat indirect maritime concerns. Google, for example, notes its support for wind power, but has questions about submerged communication and data cables. Google suggests that BOEM, when selecting and developing WEAs, should consider cable installation and maintenance, not just current cable placements, but also future installation.

Google notes that one proposed Atlantic WEA intersects an existing cable system (the "Dunant system"). "Future development of surface and seabed infrastructure," Google advises BOEM, "has the potential to severely restrict Google's ability to maintain Dunant if the cable's presence is not identified and considered during early stage planning activity."

BOEM's December lease document does not mention undersea cables and related systems, neither existing nor future systems. Offshore wind requires extensive cabling. For example, in March, the Army Corps approved a permit (River and Harbors Act of 1899) for Orsted's Revolution Wind project approximately 15 miles south of Rhode Island. The ACE permit area could include up to 65 wind turbines, eventually requiring 155 miles of inter-connecting

cables, 9 miles of cables connecting substations and up to two export transmission cables with "associated secondary cable protection" (text is from the permit) within a 42-mile-long offshore export cable corridor extending from the lease area north into Rhode Island Sound and Narragansett Bay, making landfall near Quonset Point in North Kingstown, RI. Orsted must submit a scour and cable protection plan at least 120 days before starting scour and cable protection efforts. A monitoring plan is also required.

Wind towers and radar degradation

Concerns about wind towers and radar degradation remain an open set of issues. These concerns extend beyond vessels and aircraft to weather and environmental monitoring, search and rescue and tracking environmental accidents, such as oil spills. Problems with radars and wind towers have been known for at least a decade but the topic received high level attention in February 2022, when the National Academy of Sciences published a report "Committee on Wind Turbine Generator Impacts to Marine Vessel Radar." (BOEM was a Report sponsor.) Turbine blades and towers skew radar performance, resulting in blurred, undependable information for vessel crews.

In the fairways Notice, the USCG references the NAS study, that vessels navigating in wind farms "could experience interference and reflectivity due to the turbine structures and blades which could lead to degrading effectiveness and confusing navigational pictures. The unique combination of factors in wind farms may lead to reduced navigational effectiveness and lost contact with smaller objects such as buoys, smaller commercial fishing vessels, and recreational vessels."

The USCG's references to radar issues are oblique. (The USCG's Federal Register text does not even include the word "radar"; the word only appears in a footnote referencing the title of the NAS report.) The Coast Guard does not ask for insights or comments on how or whether radar failure might be important – or not – within fairways. The Coast Guard recommends "additional caution" through WEAs. But within the proposed fairways, the USCG text implies that commercial vessels won't need radar, that vessels will be able to proceed "without experiencing significant degradation in navigation." It's not clear whether that safety – without radar – also extends to traffic separation operations and cautionary zones.

In comments to BOEM, NOAA raises radar issues, al-

Emily Velez / U.S. Coast Guard

though indirectly and not linked to navigation concerns, say, for NOAA's own fleet. Rather, NOAA hands-off the issue to its Integrated Ocean Observing System which suggests that BOEM include a requirement, as a condition of project approval, that wind companies "must develop a high frequency radar wind tower interference mitigation plan." IOOS notes that none of the mitigation measures mentioned among BOEM's discussion documents are helpful for IOOS radar.

After the NAS 2022 report, the volunteer expert study committee disbanded. Since then, according to the study's chair, no one from any federal agency has contacted committee members seeking advice about following up on the study's recommendations. The NAS study – BOEM's study – sits on the proverbial shelf.

DOE seems to be leading next steps on radar/wind turbine research. Two recent efforts of note include –

- A request for information, published last November 2023, seeking insights about correcting wind tower/radar degradation. Comments were due in January. But DOE will not share the comments it received (if any). A DOE spokesperson said, "We are not currently in a position to share the responses received for this RFI." A freedom-of-information request was unanswered by the deadline for this report.
- Just over a year ago, in January 2023, DOE along with Defense, FAA, NOAA and BOEM signed an updated (from 2016) Memorandum of Agreement for the "Establishment of the Wind Turbine Radar Interference Mitigation Working Group." (Note: The Coast Guard and Homeland Security are not part of the MOA.) The MOA was to establish an Executive Steering Group, approve a 5-year study plan and prepare a yearly progress report, among other significant tasks.

DOE was asked about the yearly progress report. A spokesperson said a 2023 report was completed but the report falls into the Controlled Unclassified Information (CUI) category and cannot be released to the public. A "multi-agency review" will occur in March. Then, a steering group will discuss whether portions of the report may be released. No answer about why this material is classified.

The USCG is accepting public comments on the proposed fairways until April 18.

With offshore wind and competing ocean issues, many topics still need to be resolved.

Ørsted

ECO Edison, the first U.S.-built wind farm service operations vessel.

2024 U.S. SHIPBUILDING REPORT

By Barry Parker

If nothing else, building vessels in the U.S. is a complicated business.

In a session on the domestic shipbuilding marketplace, at Marine Money's late-November 2023 conference held in New Orleans, Ben Bordelon, president and CEO of Bollinger Shipyards (with more than a dozen facilities, in Mississippi and Louisiana), described his company's architecture as a "three-legged stool approach: commercial newbuilds, government newbuilds and repair/conversion capabilities".

On the same panel, moderated by Roy Bleiberg, who handles Business Development, North America, for ABS, Joey D'Isernia, the chairman and CEO of Eastern Shipbuilding Group (with three yards in the Florida Panhandle), handling "…government and commercial work, primarily newbuilds, but also repairs," talked about the balance between government versus private-sector work for U.S. yards. He noted the extreme cyclicality of commercial work, saying, "It's extremely challenging to recruit, train and sustain a workforce" with all the ups and downs, and described the yard's moves into to government work. "It was really about providing a good and steady base for riding out those cycles," he said.

Highlighting his yard's successes with work for the U.S. Coast Guard in construction of Offshore Patrol Cutters (OPC), D'Isernia stressed the challenges of doing both government and commercial work (historically, the yard's

focus), which require very different business systems to be in place. "We've been able to do both," he said, noting that having systems in place for government jobs makes Eastern Shipbuilding "move-in ready for the Navy and other DOD agencies that are going to have to grow the fleet."

"The big challenge," D'Isernia said, "is that there is not enough capacity in the U.S. . . . We are certainly eager to expand our presence in the government marketplace."

In the same panel discussion, Bollinger's Bordelon said, "You've had vessels come out of typical oil and gas markets and maneuver into other markets. This creates conversion opportunities. We've probably done over 30 in the last couple of years." But with stronger oil and gas markets (seemingly) on the horizon, he wondered aloud whether such work might continue on a bigger scale.

Two 2024 announcements from Eastern Shipbuilding provide a window into the types of commercial projects that sophisticated yards can take on. It announced a deal with a financial owner (which acquired the partially completed vessels after difficulties at another yard) to finish construction of two ultra-high-spec 400 class multipurpose support vessels (MPSV) for Hornbeck Offshore Services. According to Eastern, HOS Warhorse and HOS Wild Horse will boast two large, heave-compensated cranes, two remotely operated vehicles (ROV), a spacious moonpool and accommodations for 102 personnel.

In another project for Hornbeck, the yard is undertaking the conversion of a 2014 built 280 class Platform Supply vessel into a high spec Service Operation Vessel (SOV), to be named HOS Rocinante. Eastern says that the converted vessel, set for Spring 2025 delivery, "is a dual-service SOV/flotel tailored to serve the emerging demand of the U.S. offshore wind market and the ongoing demand of the petro-energy flotel market." Not so coincidentally, the boat (ex-name HOS Rosehill) was originally built by Eastern.

On the Marine Money panel in New Orleans, Bollinger's Bordelon had a different take on cyclicality, noting the absence of supply vessels under construction, as the market is recovering from the huge dip staring in 2014-2015. Like Eastern Shipbuilding, Bollinger handles both government and commercial work, and also strives to keep them separate. Bordelon was quick to point that: "The government does have some complex ships, and there are some lessons learned as far as project management, engineering and procurement

Loumania Stewart / U.S. Coast Guard

Eastern Shipbuilding Group is building the first four Offshore Patrol Cutters for the U.S. Coast Guard.

that you can integrate into commercial applications."

Bordelon followed up, discussing consolidation in the sector, noting "the smaller pool" and citing Bollinger's acquisitions of Gulf Island Shipyard (2021) and Halter (2022). He said, "Staying in commercial keeps your blades sharp. . . It is a more competitive market." In describing its portfolio, Bordelon cited the yard's present government-heavy newbuilds posture, saying, "We like more complex projects, that have more added value."

Complexity also ties into the human resources side of the business, a perennial issue for yards, with both panelists emphasizing the need to "de-risk" projects early on. This includes detailed management of workflows, where the specific tasks comport with the skills and expertise of the workforce.

"We need it to be as easy as it can be for us to have success. . . We spent a lot of our time on front-end engineering," Bordelon said, noting that in some cases, the need for highly specific skillsets has led to actual acquisition of vendors: "Sometimes we make buys."

After mentioning one long-term program building Fast Response Cutters (FRC) for the Coast Guard, where 55 vessels have been delivered over three decades, Bordelon said, "I'm pretty vertically integrated on that contract." This was then contrasted with commercial work, with one-off projects, he added: "It's hard to staff up . . . because

WindServe Marine

Senesco Marine is building a series of crew transfer vessels for sister company WindServe Marine, including the WindServe Journey launched in 2023.

you don't have the sustained backlog."

Previous editions of ***Marine News***' U.S. Shipbuilding report have noted the increasing concern about what ABS's Bleiberg (moderating the Marine Money panel) called "the big push for sustainable" shipping", adding that: "What we see is a substantial increase in retrofits and upgrades."

New technologies can require new construction. Indeed, sustainability concerns are behind two innovative newbuilds: eWolf, an all-electric tug delivered to Crowley from Master Boat Builders (Coden, Ala.) in January 2024, and Hydrogen One, a towboat to be powered by a hydrogen fuel cell, under construction at Intracoastal Iron Works in Bourg, La. The vessel will join the fleet of financial owner Maritime Partners, who have placed it on a long-term charter to a leading inland tug and barge operator.

The electric tug illustrates a different form of the complexities, with numerous external regulatory and financial "stakeholders" surrounding such newbuilds, and going way beyond the technologies (using a energy storage system from Corvus Energy, feeding an electrical propulsion package from ABB, driving a pair of Rudder Propellers from Schottel). In a news release, Crowley notes that the new tug "represents a historic innovation through a collaboration among Crowley, federal, state and local government partners. Their mutual commitment to improve air quality through battery energy for the vessel and port technology, including a shoreside, microgrid charging and storage station at the Port of San Diego."

The Maritime Partners tug (with its hydrogen fuel cell fed from a methanol reformer), architected by Elliott Bay Design Group, and originally slated for a 2023 delivery, is now scheduled for 2024 delivery.

Master Boat Builders is also constructing more conventional vessels. In mid-2023, it announced an order for two 92-foot escort tugs, with design by Robert Allan, Ltd. to be built for Moran Towing, based in Connecticut. Though using conventional fuel, the boats will feature Caterpillar 3516 EPA Tier 4 main engines. The yard is also building two smaller 86-foot tugs for Moran, also set to handle ship assist along the East Coast, ordered the previous year.

McAllister Towing, based in downtown New York, took delivery, in late 2023, of sister vessels Jane McAllister and Grace McAllister, from the Washburn & Doughty shipyard, in Maine. The Z-drive tugs also seature Tier 4 main

engines from Caterpillar. Another in the series, Isabel McAllister, will be delivered in 2024.

Construction of new vessels for the offshore wind markets has fallen short of the boom times forecast only several years ago amid calls for "30 by 30" (30 gigawatts (GW) of offshore power generated by 2030). At a February 2024 New York event hosted by Hellenic American and Norwegian American Chambers of Commerce (the HACC NACC conference), Charlie Papavizas, partner at law firm Winston Strawn appearing on an offshore wind panel, expressed concern about "the bad news"—cancellations of widely touted wind projects in the U.S. Northeast.

On the same HACC NACC panel, Alexandra Tebaldi, from MacAllister Towing, citing a recent conversion with an industry trade group, said, "The expectation is that we will reach half of our goal by 2030: 14.5 GW. . . . The goal stays alive, but we have to find a way forward from here."

Wind-related newbuild activity has been limited by the short-term nature of contracting. On the same panel, Papavizas said, "Most of the vessels have to be built on spec", and added that "they are not getting term contracts, except for service operations vessels (SOV)."

Tebaldi estimated the current cost for contracting a Jones Act compliant SOV at around $180 million.

Two SOVs, contracted in 2022, are presently under construction at Edison Chouest facilities. ECO Edison, an SOV (set to support Ørsted and Eversource projects Revolution Wind, South Fork Wind and Sunrise Wind) is under construction at its Houma, La. facility. Filings with the U.S. Maritime

Rock installation vessel Acadia is being built by Philly Shipyard for Great Lakes Dredge & Dock Company.

Ulstein

Crowley

Crowley's electric tug eWolf, built by Master Boat Builders.

Administration (MARAD) put a cost of $97 million on the vessel. The same yard has also been contracted to build an SOV with hybrid power capability (at a cost of $109 million per MARAD) to be deployed at the Equinor/ BP Empire Wind projects. Fincantieri Bay Shipbuilding, in Sturgeon Bay, Wis., is building an SOV (with a pricetag of $168 million, per MARAD) for CREST Wind, a joint venture of U.S. stalwart Crowley Maritime, and the Danish offshore specialist Esvagt. Scheduled to be delivered in 2026, the vessel (with a Norwegian design proven in the North Sea) will enter a long-term charter to turbine specialist Siemens Gamesa Renewable Energy. Dominion Energy, the Virginia utility developing the 2.6 GW Coastal Virginia Offshore Wind (CVOW) project, is bringing in a capital infusion from alternative investor StonePeak Infrastructure Partners.

Philly Shipyard, a builder of deepsea Jones Act vessels, has been a beneficiary of the move to offshore wind, cutting steel in mid-2023 on a rock installation vessel to be named Acadia, contracted by Great Lakes Dredge & Dock (GLDD) for loading rock in upstate New York for use in protecting monopiles (foundations for wind turbines) and undersea wiring on the sea floor. According to GLDD regulatory filings, the vessel "is expected to be delivered and operational in 2025." Filings with MARAD (which could potentially approve Title XI funding, meaning lengthier terms and lower interest rates, for vessels serving offshore wind) indicate a total cost of $246.7 million.

GLDD is also supporting U.S. yards, with two suction hopper dredges equipped with U.S. EPA Tier 4 compliant engines: Galveston Island, which was delivered from Conrad Shipyard in late 2023 (and is working on a multi-year harbor deepening project in Freeport, Texas), and Amelia Island, being constructed by the same shipyard for a 2025 delivery date.

The offshore wind sector has seen a number of contracts for crew transfer vessels (CTV). St. Johns Ship Building in Palatka, Fla. announced a contract with Windea CTV LLC., a U.S. domiciled joint venture between the U.S.-based MidOcean group, and passenger vessel owner Hornblower, with German CTV specialist Ems Maritime Offshore GmbH providing technical and operational support. MARAD filings put the price of the 10-vessel construction program at $120 million. The yard, which under new ownership has revamped its facilities, has recently deliv-

McAllister Towing

Grace McAllister, one of three sisters from Washburn & Doughty.

ered WINDEA Courageous, the first of three CTVs for an earlier contract with Windea CTV LLC.

Other shipyards known to be building CTVs at the moment include Blount Boats and Sensesco Marine, both in Rhode Island, as well as Metal Shark, Breaux Brothers and Gulf Craft in Louisiana and Gladding-Hearn Shipbuilding in Massachusetts. Port Angeles, Wash. shipyard Platypus Marine is building a CTV on spec.

Work continues at Seatrium AmFELS (formerly Keppel AmFELS), in Brownsville, Texas on Charybdis, the sole Jones Act compliant wind turbine installation vessel (WTIV) under construction in the United States. The most recent announcements have put the WTIV's cost at $625 million, with delivery pushed back to late 2024/early 2025.

All images courtesy Eric Haun

On Board the eWolf:

Full-electric Vessel Brings New Technology to the U.S.

By Eric Haun

Crowley Maritime Corporation has owned and operated a lot of vessels since its founding in 1892. But the latest vessel to join its fleet is unlike any other that has come before it.

Crowley's new harbor tug, eWolf, is unique in that it runs 100% powered by batteries, not diesel engines, meaning it produces zero emissions and nearly no noise. Not only is the vessel the first fully electric tug in the Crowley fleet, but it is also the first of its kind in the United States.

Faced with stricter regulations and commercial pressure to prioritize environmental, social and governance (ESG) objectives, vessel owners and operators have been exploring options to reduce their emissions. A growing number of hybrid- and full-electric ferries and tugs have been sprouting up across the globe.

"When we started this journey, the concept of an electric tug was just starting to kick off," said Paul Manzi, vice president of ship assist and escort at Crowley. "There was some work going on in New Zealand and in Europe, and we began to think it was possible to do it here as well."

So, Crowley set out to produce an electric tug of its own, and in 2021—the same year the company announced its commitment to reach net-zero emissions by 2050—its engineering services division unveiled the groundbreak-

ing tug design. ABB was brought on as systems integrator, and Coden, Ala. shipbuilder Master Boat Builders began building the vessel later that year.

The result of these efforts is the 82-foot-long tug eWolf, built to ABS class and is compliant with U.S. Coast Guard Subchapter M regulations. Officially delivered to Crowley in January of this year, the vessel was heavy lifted from Alabama through the Panama Canal and floated in Ensenada, Mexico. From there, eWolf transited under its own power up to its homeport, San Diego, where it sits today, ready to enter service at the Tenth Avenue Marine Terminal.

Building the beast

On the outside, eWolf has the appearance of a standard tug. On the inside, it's something altogether different. "A tug is a tug in a lot of ways," said Garrett Rice, president at Master Boat Builders. "The eWolf's hull and structure are very similar to those of some other tugs we've built and we'll continue to build. But once we got into the outfitting stage, everything changed real quick."

The vessel is equipped with an integrated electrical propulsion package provided by ABB, a 6.2 MWh Orca battery energy storage system from Corvus Energy, two 2,100 kW RAMME motors, and two electrically driven Schottel RudderPropellers type SRP 430 LE azimuthing thrusters, featuring propeller diameters of 2.5 meters. The vessel also has two small John Deere generators on board for emergency use and to enable long distance transits at a reduced speed.

Bruce Strupp, vice president of marine systems for U.S. and Canada at ABB Marine and Ports, described the key pieces of technology that are core to an ABB solution for hybrid and zero-emission vessels. "The first is our DC grid architecture. All the power sources integrate into the DC grid, which distributes them to all the consumers throughout the vessel," he said. "Our DC grid is a closed-bus configuration because it allows for more operational redundancy and safety for the vessel.

"The architecture that layers on top of that is the automation system, our power and energy management system (PEM). It basically controls the flow of all the power feeding into the DC grid, and then also all the power that's swung to all the consumers," Strupp said.

The use of electrical power on commercial vessels is not new, and Rice and his team have been building boats that

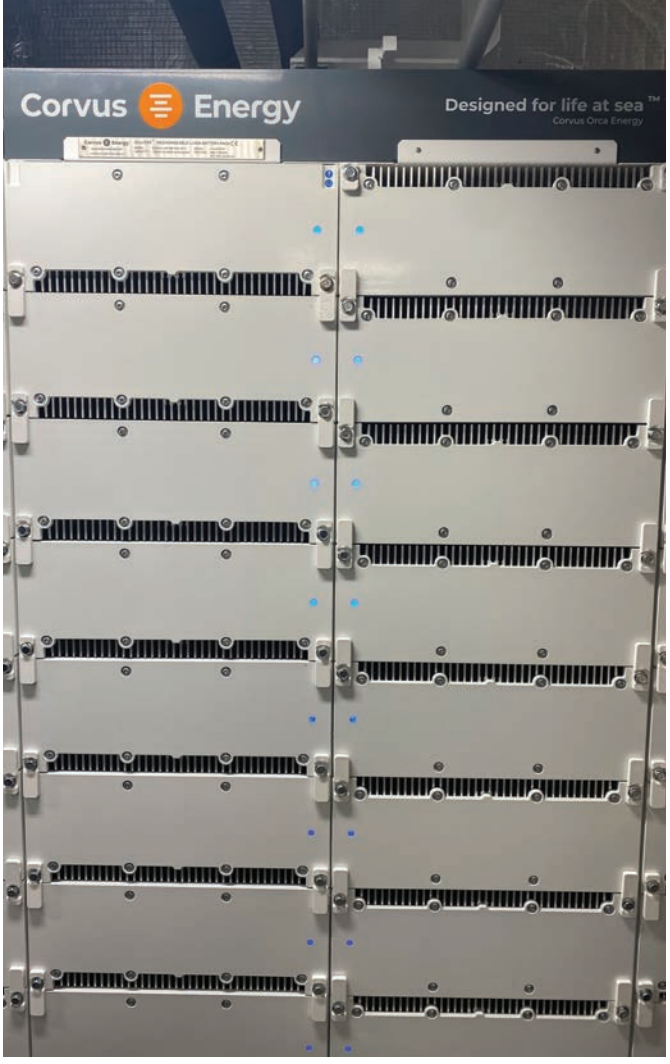
From left: Chairman Frank Urtasun, Board of Port Commissioners, Port of San Diego; Paul Manzi, Vice President, Crowley Shipping; Bruce Strupp, Vice President of Marine Systems US & Canada, ABB Marine & Ports

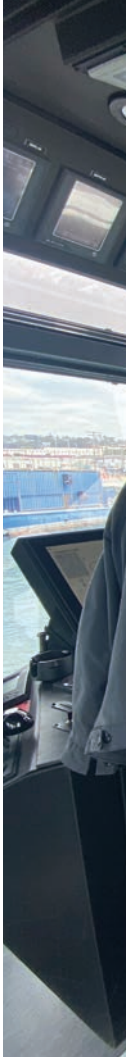
incorporate this technology for years—especially for the offshore market, where diesel-electric has become commonplace. "A lot of the big cables, terminations, variable frequency drives, etc., that go into the system, we've dealt with them before," Rice said. "We just had, in our case, 220 feet of real estate to deal with them. And so, here [with the eWolf], we had maybe 79 feet to put a lot of that same equipment."

A relative lack of space became a challenge when trying to install the cables in particular, Rice said. "Those big power cables can only bend so much because of how thick they are," he explained. "Typically, the grating height of the machinery space off the tank top is somewhere around

All images courtesy Eric Haun

The eWolf's power integrates into ABB's DC grid architecture, which distributes to all the consumers throughout the vessel.





eWolf features a 6.2 MWh Orca battery energy storage system from Corvus Energy.

12 to 16 inches. If you've got 14 inches and the bend rate's 13 inches, you've got a really, really tight spot and difficulty getting the cable in."

"On the eWolf, there's high voltage everywhere," Rice said. "We really had to think through how to make sure we have separation of cables, more so than we do on a traditional tug."

The eWolf turned out to be a learning experience for all of the partners involved in creating it. "From a planning and a design standpoint, there's a lot of nuances that we learned in this tug that we will apply to the next one—different things that we have to think about that we typically don't on a traditional tug," Rice said.

Rice stressed the importance of teamwork between the shipyard, electrical integrator, designer and production engineering team. "Everybody needs to know what each other's doing as early as possible," he said. "Early collaboration between partners is key to the success of any project, but in particular something like the eWolf that is this technical and first-of-its-kind."

The cost of slashing emissions

Notably, the eWolf is an expensive tug. Crowley officials declined to disclose a dollar figure, but said the new vessel costs about double the price of a similarly powered conventional tugboat.

While much of the project funds came from privately-held Crowley, the project also obtained a significant amount of grant funding aimed at helping maritime companies achieve cleaner operations. To bring the eWolf to life, Crowley partnered with the San Diego County Air Pollution Control District, the California Air Resources Board (CARB), the Port of San Diego, the U.S. Environmental Protection Agency (EPA) and the U.S. Maritime

Capt. Josh Ferguson, master of the eWolf.

Administration (MARAD), which all provided financial support and other resources.

"This tug becomes somewhat commercially viable because of the grant process," Manzi said. "Unlike a ferry service that's paid for by tax dollars, we have to collect fares and tariffs from the shipowners. Right now, the technology is out over market. So, we're working to true that up."

"The big driver [to produce the eWolf] was the reduction in emissions," Manzi said, noting that in 10 years' time, Crowely expects the eWolf will have saved 178 tons of nitrogen oxides, 2.5 tons of diesel particulate matter and 3,100 metric tons of carbon.

Receiving a charge

While eWolf is already in San Diego, ready to go, its official entry into service has been put on a short hold as it awaits the completion of a specially designed shore charging system,

On board the eWolf, Crowley's focus on environmental impact extended well beyond the innovative propulsion system. Sustainable materials were incorporated as much as possible throughout the vessel's interior spaces.

the construction of which has fallen behind schedule.

"When you're out on the leading edge of these technologies, everything has to catch up," Manzi said. "Permitting has to catch up, regulation has to catch up, standards have to catch up. And we've faced all three of those challenges in getting the charge. The boat actually went easier."

The microgrid charging facility features a pair of Corvus Orca BOB (battery on board) systems, the containerized version of the Corvus Orca ESS, each with storage capacity of almost 1.5 MWh, for a total capacity of 2,990 kW. The station is intended to operate on off-peak hours from the local energy grid, and it includes a solar power array to support renewable energy use, as well as battery monitoring system, HVAC and firefighting and detection technology.

Through a lot of hard work and collaboration with partners such as the Port of San Diego as well as utility provider San Diego Gas & Electric (SDGE), the regulatory and logistical hurdles have been overcome, and construction is progressing at a strong pace, Manzi said. "We expect to have the charging station ready to operate by April 15."

Operating the tug

Capt. Josh Ferguson previously served as the master of Crowley's tug Tioga before taking the helm aboard the eWolf. He said he's a fan of the new vessel but that operating it takes some getting used to. "It's much different," Ferguson said. "You don't realize how many audio cues that you have available [from the engines] aboard a traditional vessel. But now that you have none, and then couple that with the power of electric motors—they spool up very fast like a Tesla does—you have to change the way you operate the vessel in general. A little bit of a learning curve, but I'm excited about it."

Without engine noise or vibration, eWolf delivers a significantly smoother ride overall. Importantly, it can also perform on the job, offering 70-ton bollard pull capability. On deck, the tug sports two Markey model DEPC-48 electric hawser winches.

The tug is intended to perform two evolutions per day, and its charging time is about 4.5 hours, Manzi said. "We expect that the vessel will always have sufficient charge to be running at any time."

The eWolf is a dayboat with a three-person crew—a captain, deckhand and engineer, and it will remain that way for some time. But Manzi said the scope of mariner duties

could change down the road. "What do we really need an engineer to do? There are no moving parts. So, how does that [role] change? How does that change where we work? This is a conversation for 5, 6, 10 years in the future."

An autonomy testbed

Innovation aboard the eWolf extends well beyond its propulsions system. Today, eWolf's Certificate of Inspection (COI) is for standard operation, without any autonomous or remote-control functions, but the vessel is equipped with technology from ABB to enable autonomous operations in the future.

The vessel's current onboard systems can provide passive situational awareness. The next step would be supervised autonomous transits with a captain on board before eventually progressing to remote supervised autonomous transits, said Eileen Tausch, senior electrical engineer - research and development at Crowley.

ABB Ability Marine Pilot Vision fuses input from cameras and other sensors to create an augmented view of the vessel's surroundings that provides enhanced decision support for things such as docking assistance, obstacle detection and collision avoidance. eWolf has six cameras and then a pan-tilt-zoom camera, LIDAR, W-band radar and AIS, all feeding into the system.

"We're really trying to empower the captain and crew with the best information possible so they can use their skills and training and operate the vessel successfully," said Drew Orvieto, senior manager, passenger vessels, marine and ports at ABB Marine & Ports. "The system is set up as a buddy on the bridge to provide whatever it finds in sensory inputs that will be helpful for a navigator for safe transit."

"If Pilot Vision is the eyes and some of the brain, then [ABB Ability Marine Pilot Control] is the muscle that puts this to the water," Orvieto said. "Pilot Control is what will enable autonomous and remote operations down the road."

Tausch stressed that Crowely is working with its working with ABB to progress the technology in slow, phased approach, while seeking crew feedback through every step of the process. "Our main goal is to improve mariner safety and asset efficiency. . . Where we're focusing currently is the transit to and the transit from [a job]," said. "The actual ship assist or escort operation, I don't even see that on my timeline; that's a ways out."

In San Diego, eWolf's transits will typically run 20-30 minutes, "not the optimal operation to really see a lot of benefit," Tausch said, but noted there is "a lot of potential" elsewhere, like in the Pacific Northwest, where transits can be six or seven hours.

Crowley and ABB are using the eWolf as a testbed for this technology, working together to not only develop and trial the technology, but also navigate regulatory hurdles as the International Maritime Organization (IMO) continues to make headway on developing its Maritime Autonomous Surface Ships (MASS) Code, due to take effect in 2025.

"[The evolution] is step-by-step with crew on board. As the technology proves itself to the level of Coast Guard and class satisfaction, then we can start to investigate higher levels of functionality," Orvieto said.

Optimizing Blast and Paint Processes in New Construction Shipbuilding

By Colin Gallagher, Director of Shipyard Optimization, BlastOne International

The efficacy of surface preparation and coating application in the new construction shipbuilding industry is fundamentally anchored in a well-coordinated, integrated approach. This intricate process, essential for achieving top-tier corrosion control, is methodically segmented into five crucial stages:

1. Raw material entry
2. Painting the modules
3. Small parts
4. Painting of erection joints at the module level
5. Final paint and ship's completion.

Each stage is crucial in its own right but achieves its fullest potential when seamlessly integrated into an overarching process.

BlastOne International

The shipyard: A symphony of collaboration

Imagine a shipyard as a football team, where the disparate execution of roles, along with precise timing and placement are paramount for a united victory. Just as different football teams leverage their unique strengths to create an advantage to win games, shipyards must employ unique strategies based on their resources and capabilities to efficiently complete vessels. The vast differences in facilities, such as pier space, crane capacities and outfitting areas underscores the necessity of a bespoke approach for maximizing efficiency in their respective blast and paint processes.

Navigating ship types and their unique challenges

The complexity within shipyards is magnified by the variety of vessels under construction, whether tankers or surface combatants, each presents its own set of intricate challenges. Tankers, for example, emphasize the throughput of steel and panel processing, while destroyers focus on electrical and mechanical systems, including combat systems. These differences highlight the importance of a nuanced understanding of each vessel type, enabling a more effective navigation through the five major paint categories and ensuring a tailored, efficient construction process.

There are five major paint categories in new construction shipbuilding:

1. Raw material entry: The foundation

The initial stage of raw material entry sets the tone for the construction process. This stage poses critical questions: Should the steel be processed in-house with a wheel machine for primer application, or is it more efficient to source pre-primed steel? This decision significantly impacts the initial investment and operational costs versus the convenience and efficiency of using pre-primed steel. The choice between in-house processing and outsourcing affects not only cost, but also materials handling flow (and therefore efficiency) of the total construction timeline.

2. Module assembly and painting: A strategic approach

As the shipbuilding process advances, panels and bulkheads are assembled into modules, introducing a pivotal decision point regarding the treatment of weld seams and the timing of painting. The decision to paint modules before or after outfitting impacts throughput and requires careful coordination with the shipyard's spatial and equipment capabilities. Most Large Shipyards globally now have adopted a build strategy whereby the majority of the blast and paint occurs in module form. Large highly technologically advanced facilities now exist to efficiently blast, paint and cure modules. Without a well-considered blast and paint strategy that is aligned with the vessel's build strategy, timelines, efficiency and costs often become unmanageable and reinforce the age-old myth that blast and paint simply cannot conform to any consistently reliable engineered process. This is simply not true.

3. Addressing small parts: A key to efficiency

One of the most significant challenges in shipyards is managing small parts, which are prone to surface rust before installation. Optimizing the painting of these parts – through dedicated paint booths – can lead to significant efficiency gains and reduce the need for rework, showcasing the importance of thoughtful process-design in minimizing traditional bottlenecks. The efficiency of painting small parts in a dedicated small parts painting facility is often overlooked by Shipyard Facility Planners.

4. Erection joints and final hull coating: Optimize with technology

The painting of erection joints between modules and the final hull coating before launch are critical for both aesthetics and corrosion protection. Efficiently managing this stage requires a commitment to continued optimization of the blast and paint system, including updated equipment, abrasives, operator training and recovery methods. Proper planning, improving operator technology and incorporating automated system monitoring has proven to minimize both cost overruns and scheduling delays by effectively controlling the historically unruly wildcard of the blast and paint process.

5. Final paint: The finishing touch

The last stage, final paint, occurs post-launch and pre-delivery, offering an opportunity to employ advanced products and techniques such as foam blasting and paint touch-up kits. Research and innovation in this stage can significantly enhance efficiency and quality, highlighting the importance of staying abreast of the latest advancements in paint technology.

Conclusion

The optimization of blast and paint processes in new construction shipbuilding is a multifaceted endeavor that demands integrative systems planning, as well as adoption of new technologies and real-time monitoring processes that adapt to the unique challenges posed by each shipyard and vessel type. Contrary to popular experience and opinion, modern solutions do exist to the historically chaotic management of this critical path operation. By integrating the disparate five stages of the holistic process into an overall production strategy, shipyards can achieve unparalleled quality, efficiency and cost-effectiveness in their operations. This integrated approach not only enhances the performance and longevity of the vessels but also solidifies a shipbuilder's competitive edge in the dynamic maritime construction industry.

Vessels

General Arnold

Callan Marine

Galveston, Texas based dredging contractor Callan Marine christened its newest cutter suction dredge (CSD), General Arnold, built by C&C Marine and Repair in Belle Chasse, La. The 32-inch CSD will immediately begin work on Phase Four of the Corpus Christi Ship Channel Improvement Project. The project will beneficially reuse 100% of the dredged material removed from the channel deepening and widening.

The General Arnold is the newest, largest and most environmentally friendly CSD in the U.S. fleet. It features four Wabtec 4x16V250MDC EPA Tier 4 marine diesel gensets developing a combined 24,000 horsepower and utilizing exhaust gas recirculation technology to reduce emissions to sub-Tier 4 levels. The General Arnold is 290 feet long, 72 feet wide, has a maximum digging depth of 97 feet, and employs state-of-the-art production automation and monitoring systems.

The General Arnold joins Callan Marine's existing fleet of dredges including the 32-inch General MacArthur, the 28-inch General Bradley, the 18-inch General Marshall, the 18-inch General Pershing, the 16-inch General Patton, the 12-inch General Eisenhower, and the 8-inch General Swing.

Esperanza "Hope" Andrade

The Shearer Group, Inc.

The Texas Department of Transportation (TxDOT) christened its new ferry in Galveston Bay. Named for the first female chair of the TxDOT and first Latina Secretary of State, Esperanza "Hope" Andrade, the vessel was designed by The Shearer Group and built by Gulf Island Fabricators in Louisiana.

The 293-foot-long double-ended ferry is outfitted with diesel-powered and electrical engines and Siemens Energy's BlueDrive PLUSC power and propulsion system, which reduces fuel consumption by regulating speed, shifting control from port to starboard as necessary, and operating the diesel engines as minimally as possible. Siemens Energy's BlueVault Energy Storage System uses an advanced lithium-ion battery designed to maximize life, performance and safety. The system can store surplus power while the ferry is in operation and dispatches it on-demand. This efficiency boost translates to improved fuel economy, reduced operational costs, and increased sustainability.

Capable of accommodating 70 passenger vehicles or eight 18-wheelers per trip, the 495-passenger ferry will operate 18-minute voyages between Galveston and Port Bolivar—around the clock, seven days a week, weather permitting.

Gripper

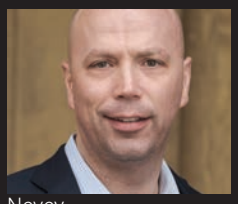
American Offshore Services

An official launch ceremony was held to celebrate the commissioning of a new Jones Act compliant crew transfer vessel (CTV) built for American Offshore Services (A-O-S)—the company's first. Constructed by Blount Boats in Warren, R.I., the 100-foot-long aluminum catamaran is owned and operated by A-O-S, a joint venture formed in 2020 by leading European CTV operator Northern Offshore Services (N-O-S) and U.S.-based investment firm OIC.

The vessel, based on N-O-S' 30-meter G-class design, features Volvo Penta's IPS propulsion system and is said to be "hybrid-ready", meaning it was built with space reserved for all the required components for future upgrade to hybrid propulsion. It will support Ørsted and Eversource's portfolio of offshore wind farms in the Northeast, including the Revolution Wind project in Rhode Island and the South Fork Wind and Sunrise Wind projects in New York. The vessel will be berthed at Ørsted's Operations Hub at Quonset Point, and will transport wind service technicians to projects at sea.

A-O-S, which plans to expand its CTV fleet with the growth of the U.S. offshore wind industry, currently has vessels on order at Blount Boats as well as Metal Shark in Franklin, La.

People & Companies

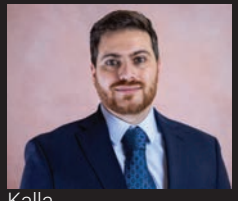

Nevey


Schwandt


Ziomek


Robinson


Parsons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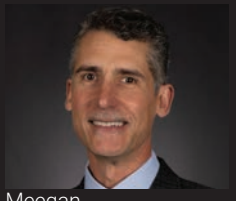
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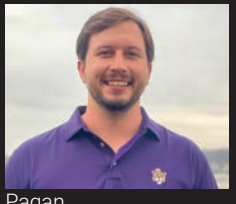
Pagan


Hunsaker


Martin

Nevey to Head Washington State Ferries

Steve Nevey has been selected to serve as assistant secretary for the Washington State Ferries Division, succeeding Patty Rubstello, who is stepping down as head of WSF after more than 33 years of service.

Schwandt Takes the Helm at SCHOTTEL

SCHOTTEL GmbH has appointed Roland Schwandt as Deputy CEO with effect from January 1, 2024.

Odyssey Names Ziomek COO

Odyssey Logistics appointed Michael Ziomek as chief operating officer effective December 11, 2023.

Port Houston Promotes Mariacher, Soares

Port Houston has promoted Ryan Mariacher to chief port operations officer and Paulo Soares to chief port maintenance officer.

Vigor Promotes Robinson

Jayson Robinson has been named Vigor's vice president of fabrication.

Austal USA Names Parsons VP

Austal USA has named Kristin Parsons as the company's vice president human resources.

TAI Hires Kalla

TAI Engineers appointed Amer Kalla as director of production design.

FMC Names Usman CIO

Mohammad "Ali" Usman has been hired as the chief information officer of the Federal Maritime Commission and appointed to be a member of the senior executive service.

Meegan Joins Ohmsett

Ohmsett has welcomed Dr. Doug Meegan as interim operations manager for the facility.

AME Hires Savage

Advanced Mechanical Enterprises (AME) has appointed Paul Savage as its new operations manager.

Pagan Joins BHGI

Bristol Harbor Group, Inc. announced it has hired Kyle Pagan as a naval architect.

TVIB Promotes Hunsaker

Cindy Hunsaker has been promoted to Instructional designer at the Towing Vessel Inspection Bureau, moving from the operations department to member services.

Webb Institute Promotes Martin

Webb Institute has promoted Michael Martin to the position of Lester and Mandell Rosenblatt professor of marine and electrical engineering.

Products

1 VETUS Maxwell

2 In-Mar Solutions

3 Furuno

4 ABB

5 EH Group

1. Heavy Duty Windscreen Wiper

Heavy-duty wiper has a thermal cut-out in case of excessive operating temperature. Self-parking on either side, 2 speeds/2 shaft lengths. Fully adjustable wipe from 62º - 92º. Stainless steel parts and meet EMC requirements. 12 or 24 VDC.
https://vetus.com/usa/

2. In-Mar Solutions: Wynn Marine Type C & Type D, HeavyDuty Straight Line Wipers

Wynn Type C (internal motor) and Type D (external motor) Straight Line Wipers offer the most advanced design of linear action window wiping systems for marine and other specialized applications. Optimum window coverage can be achieved and enhanced by utilizing a twin-bladed or dual-arm/blade design.
www.inmarsystems.com

3. NavNet TZtouchXL

Furuno's new NavNet TZtouchXL suite of multi-function displays (MFD) for workboat operators encompasses three large-sized MFDs with wide, all-glass displays: the 16" TZT16X, 22" TZT22X and 24" TZT24X. Powered by a hexacore processor, each offers exceptional clarity and brightness and incorporate Furuno's hybrid control with the intuitive RotoKey control knob as well as intuitive Edge Swipe functions and customizable quick pages. When connected to a Furuno DRS Radar, two new safety features are unlocked: Risk Visualizer and AI Avoidance Route. NavNet TZtouchXL also supports tools like AIS and autopilot, along with new chart plotting features found in TZ MAPS, which unlocks charts for the entire U.S. or other global areas of choice.

4. Azipod DI

The American Bureau of Shipping (ABS) has granted approval in principle (AIP) to ABB for its Azipod DI with a capacity of up to 4.5 MW and ice class PC3. ABB called the approval "a significant milestone", as the Azipod DI propulsion system is now ready to power future icebreakers in the North American market as demand for icebreakers on the rise. "This AIP of the PC3 ice-class Azipod DI system opens new prospects for the icebreaker development in the region of the Great Lakes, and other ice-covered waters," said Samuli Hänninen, Sales Director at ABB Marine & Ports based in Finland.

5. TRACE-M250

EH Group said its EH Fuel Cell System TRACE-M250, designed for high power and maritime applications, has been awarded approval in principle (AIP) following an assessment by classification society DNV to confirm that the fuel cell design meets all the applicable maritime rules, regulations, codes and standards. Based on EH Group's stack technology, the 250kW EH TRACE-M250 module is designed to improve efficiency and safety, in a more compact and lightweight module, the Switzerland-based manufacturer said, noting it is already working toward achieving type approval.

2024 Editorial Calendar

Marine News

January 2024

E-Magazine Edition

Design & Construction: Advances in Naval Architecture, Marine Engineering & Shipbuilding

February 2024

U.S. Offshore Wind

- Passenger Vessels
- Mariner Training & Education
- Safety Equipment

Event Distribution:
CMA: Mar 12-14, Stamford, CT

March 2024

E-Magazine Edition

U.S. Inland Waterways Transport: Operations, Infrastructure & Dredging

April 2024

Towboats, Tugs & Barges

- 2024 Shipbuilding Report
- Navigation Technology
- Power & Propulsion

Event Distribution:
OTC: May 6-9, Houston, TX

May 2024

E-Magazine Edition

U.S. Maritime Workforce: From Offshore to Inland Waterways & Shipyards

June 2024

Combat & Patrol Craft

- Navy & Coast Guard Shipbuilding
- Autonomous Vessels
- Workboat Communications Wind

Event Distribution:
Multi-Agency Combat Craft (MACC)
Marine Money Week, New York, NY

July 2024

E-Magazine Edition

The Green Marine Annual: Improving Environmental Performance & Efficiency

August 2024

Boatbuilding & Repair

- Naval Architecture & Marine Engineering
- Shipyard Equipment
- Dredging

Event Distribution:
SMM 2024, Hamburg, Germany

September 2024

E-Magazine Edition

Fast Craft: Patrol, Fire, Police, Pilot Boats & Ferries

October 2024

Vessel Repair & Conversion

- Offshore Energy
- Electrification & Alternative Fuels
- Deck Machinery & Cranes Autonomous

Event Distribution:

November 2024

Workboat Edition

- Top Vessels of 2024
- Top Tech & Service Innovations of 2024
- U.S. Shipyards

Event Distribution:
Int'l Workboat Show: Dec, New Orleans, LA

December 2024

E-Magazine Edition

Power & Propulsion: Technology Spotlight

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Seawork celebrates its 25th anniversary in 2024!

The 25th edition of Europe's largest commercial marine and workboat exhibition, is a proven platform to build business networks.

Seawork delivers an international audience of visitors supported by our trusted partners.

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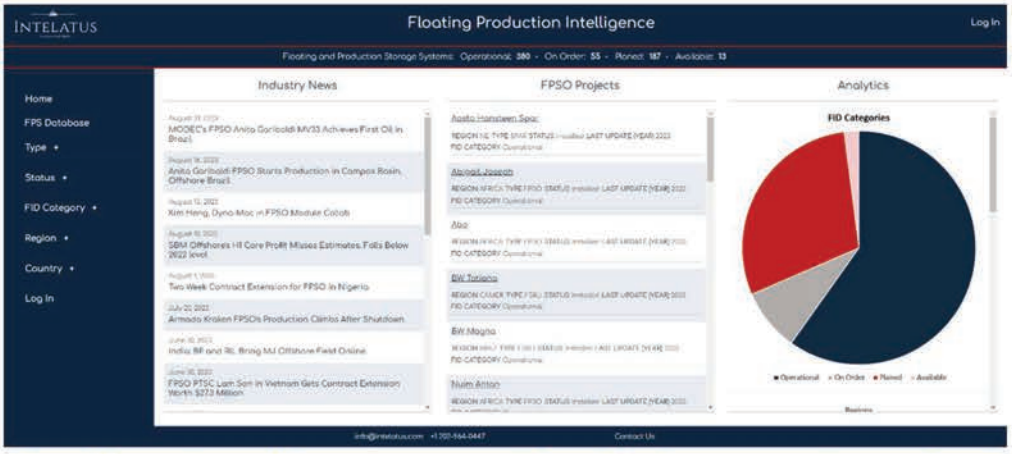

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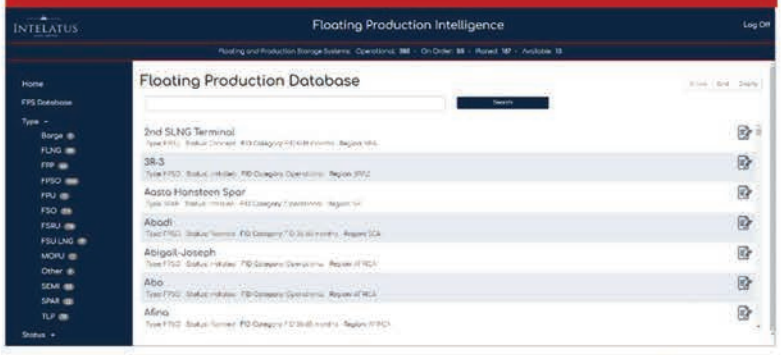

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