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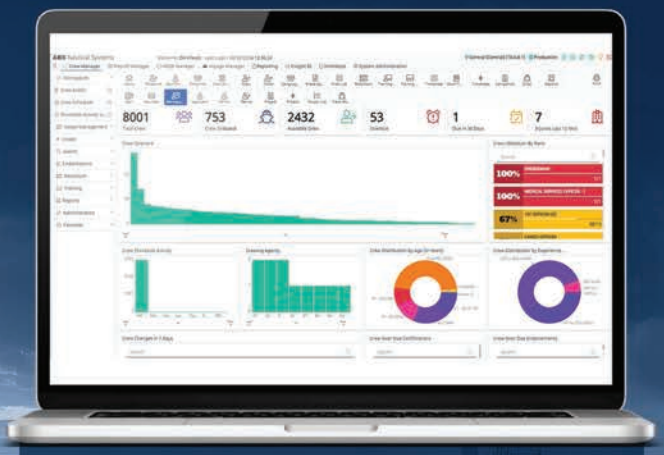

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Great Ships & Boats of 2024

Departments

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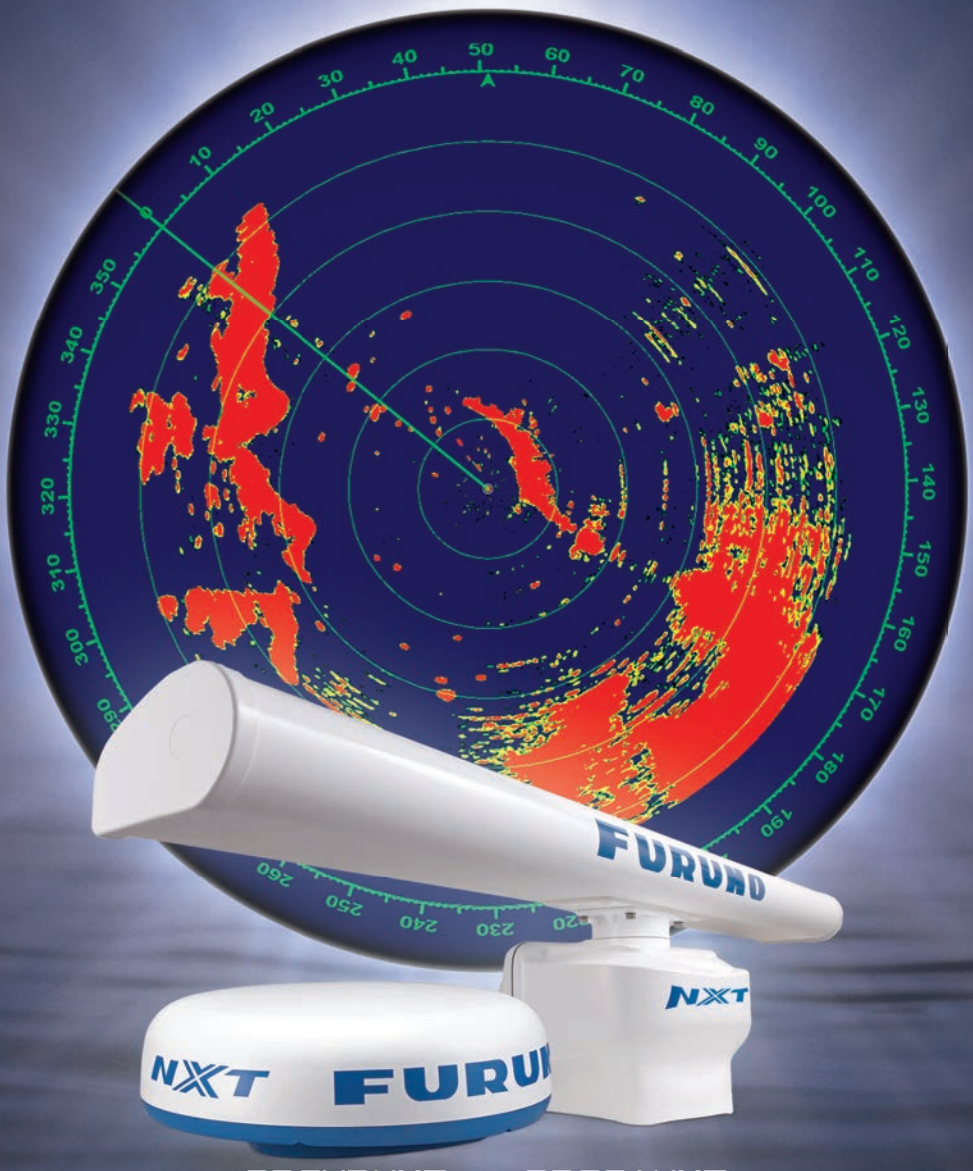

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Photo Justin Zurre

What, exactly, is a *'Great Ship* or a *Great Boat'*? Taking this to the micro and personal level, I've owned several boats in my lifetime, and when I first make the purchase I can assure you that I think it's a 'great boat'. Much time and money is spent researching, shopping, inspecting, test-driving and bringing the boat home to our slip. In retrospect, after I've sold a boat and moved on to bigger, better or more practical as life situation dictates, my view on the boat has most likely changed. For me its reflecting [primarily] on the amount that boat has cost me, in time and money lost for problems, big and small, that crop up along the way.

Annually we present what we see as the most significant deliveries of the calendar year, but does the incorporation of new design and technology necessarily make a vessel 'Great.'

The short answer is no.

In fact I would argue that true greatness of any vessel, anywhere can only be determined once it has served its full operational life, as only then can one reflect on the attributes that made it great: *What was the profitability of that vessel over its lifetime? While technology X solved one problem, what additional, unexpected problem did it create?*

This is a transcendent period in maritime history, with the confluence of decarbonization, digitalization and automation reshaping ship design, construction and outfit before our eyes. Ultimately it will be a generation or longer before the scales are truly tipped away from, for example, the use of traditional fossil fuels as the primary source of marine fuel, but the clear leaders in the sector are investing mightily – the NYKs, the A.P. Moller - Mærsk's – as embodied by our cover story and "Ship of the Year" Ane Mærsk. So the question begs ... will Ane Mærsk be considered 'Great' once she is retired in 20-30 years? Only time will tell.

As is the case with ships, 'great stories' are subjective to the reader, and our aim perpetually is to deliver compelling content that informs, educates and entertains, across all platforms, print, electronic and social channels. In this edition, in my humble opinion [and not because I wrote it], we present a great interview with **George Whittier, CEO, Fairbaks Morse Defense (FMD)**. When I reflect on my 30+ year career, one defining highlight has been the ability to pick the brains of leaders across business, academia and government globally. Earlier this year I took the trek to Beloit, Wisconsin, for a visit to FMD, and I walked away thoroughly impressed with the history, the facilities, the people. In turn, Whittier joined us recently for a **Maritime Matters: The Marinelink Podcast**, and in the world of what has become perpetual 'corporate speak' what I found was an engaging, informative and passionate leader who is driving FMD to become an industrial juggernaut with a laser focus on the U.S. Navy and U.S. Coast Guard.

Read the story and/or listen to the podcast, and share your thoughts on this, or another feature focus that you think would be 'Great'.

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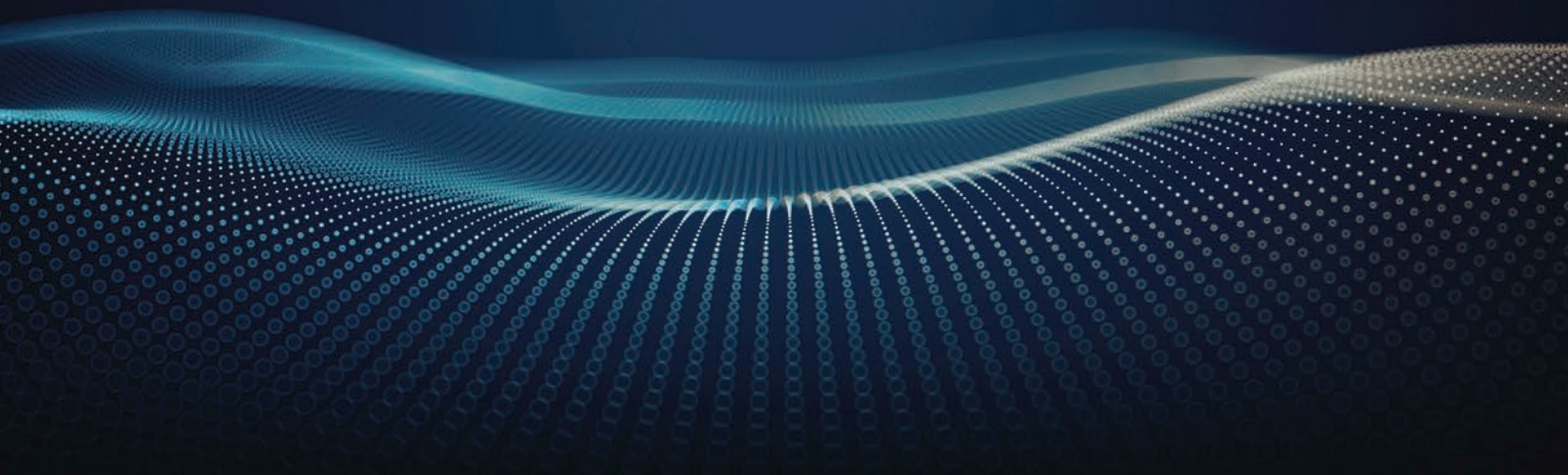

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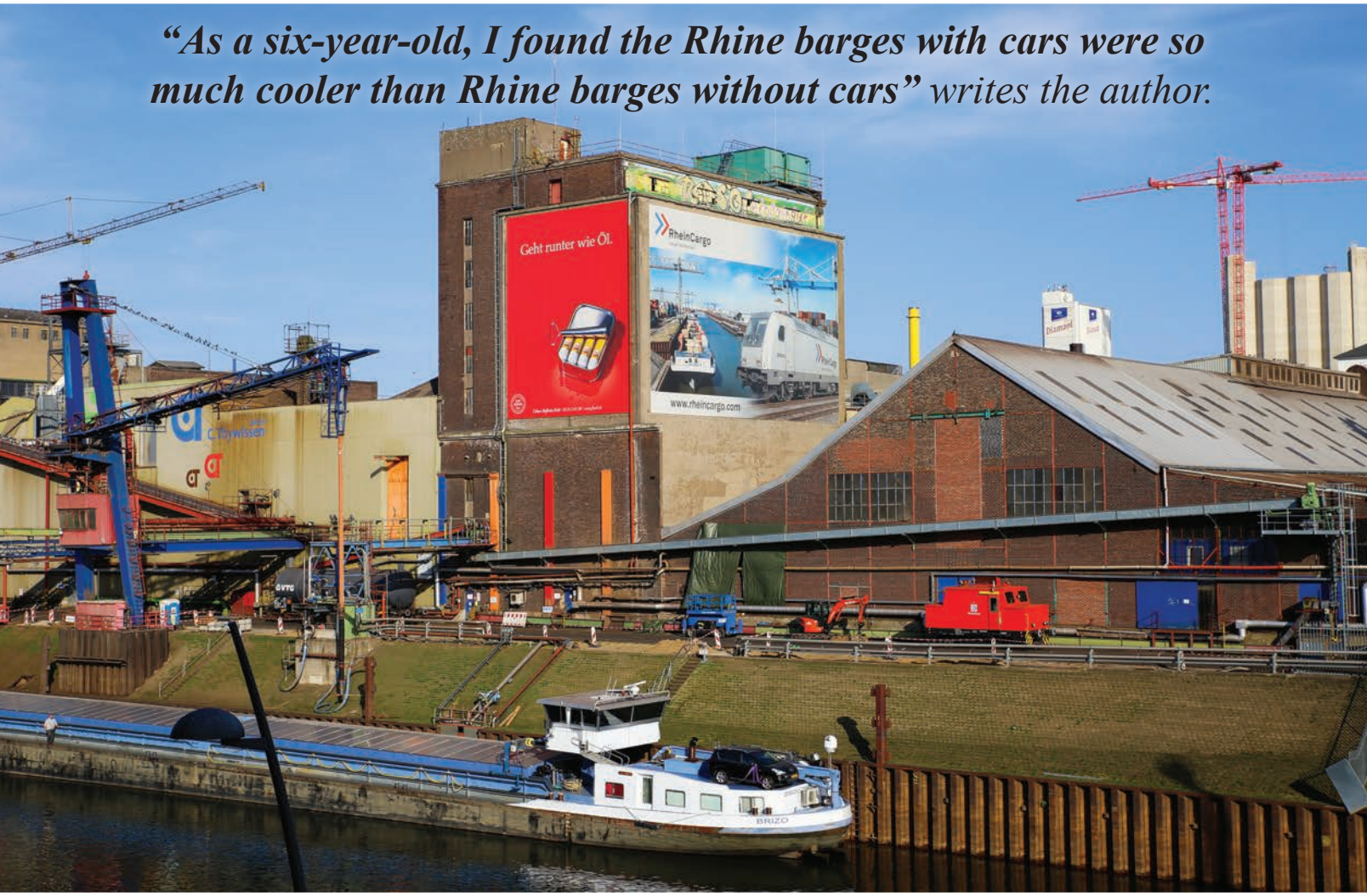
Great Ships and an Argument for *the Anti-Autonomous Ship Crew*

By Rik van Hemmen

Another trip around the sun and Greg has asked me once again to talk about "great ships." As an older engineer I find it much more difficult to judge greatness in ships. It was much easier when I was young. When I was quite young and living near the Dutch rivers, I thought the greatest ships were Rhine barges with cars on them. I am talking about the inland cargo vessels that ran up and down the Rhine and through the rest of the European canal and river systems. As a six-year-old, I found the the Rhine barges with cars were so much cooler than Rhine barges without cars. And then my mother told me that often those barges were operated by a husband and wife and often the children were aboard too.

"As a six-year-old, I found the Rhine barges with cars were so much cooler than Rhine barges without cars" *writes the author.*



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Just the thought of living on a boat like that with your parents and siblings, arriving at a Rhine port, taking the car off the deck, drive around town, put it back on the barge again and go to the next port. It seemed so exciting and weirdly powerful.

That to me seemed like the best way to live.

Always moving around on a boat and never having to go to school! Unfortunately, my mother quickly disavowed me of that notion and told me there was a boarding school for skipper's kids in Rotterdam, which did not seem as much fun.

Some 60 years later I was in Holland at a party and discovered I was sitting next to a couple that had just sold their Rhine barge, and had retired to a pleasure cruising boat.

That flipped me back to my youth and right away I asked: "Did you have a car on deck?"

They looked at me kind of strangely and said: "Yes, why not?"

I explained my 1960's fascination. The husband then fired up his phone and showed me all the Rhine barges his family had owned going back to the 1940's and the first one with a car was in the 1960's. I then asked the husband if he went to skipper kids' school and his acknowledgement made it clear I was sitting next to an expert, and I quizzed him about the growth in sizes of the barges, the trades they had been in, and the propulsion engines they preferred. He and his wife also added that on their most recent vessels the accommodations had been very spacious and because they ran low speed diesels, the accommodations were very comfortable too. He also told me he sort of liked the skipper kids' school, but then the conversation shifted, and I did not get to dig any deeper.

When I got back to the US, I wondered what the present status of those schools was. With ubiquitous internet, the ability to homeschool kids aboard surely would reduce the need for these boarding schools. It turns out there is a switch. The boarding schools are closing, and there is a certain level of internet instruction, but it is progressing only slowly.

Worldwide we are experiencing crew shortages and there even is a push for autonomous shipping; ships without humans aboard. But are we actually engaging the problem in the right way?

Autonomous long-haul shipping has some weird unexamined economic issues. The first relating to the fact that a ship that does not move makes no money. All those repairs and fixes that get made by the crew when the ship is moving, will now require that the ship be laid up somewhere. And when things truly go wrong, it will certainly not be

cheap to wrangle a ship somewhere far from land in uncertain weather conditions.

With ubiquitous internet would it actually make more sense to move entire families aboard large ocean going ships as crew?

Today's ships are big and designing nice accommodations for, say, 20 families would not be impossible. Some of those families may be couples and maybe both work the ship. Or maybe one works the ship and the other has a remote job or is working on a remote advanced degree. Maybe some families have kids. Other couples may have a spouse that is a qualified teacher or at least would work as a babysitter, so parents with kids can enjoy a few hours off while the kids are swimming in the pool.

Really what I am describing is ships arranged like the Enterprise in the Star Trek, The Next Generation. The shipboard society is no longer crew with its peculiar social dynamics; it is now a moving community with its own peculiar social dynamics.

Pre-internet the sailing family concept would be complex and tedious for those who are not actively engaged in the operation of the ship, but would it be possible to design ships today that can create such communities?

I can certainly see some benefits. As a family it could be economically and socially quite attractive to sail on a ship for, say 10 months and then to go ashore in a nice location for two months.

Family based communities also provide higher levels of mentoring and training. Almost certainly a ship would not just be families with kids, there would be a mixture of social arrangements each with specific community assets.

On a personal level I think that my wife would have been much more supportive of a sailing career for me if she would be able to join the crew as the teacher for our, and other shipboard family kids. Even if my wife's pay would have been very modest, our free cashflow would have very significantly increased early in our marriage providing us with a significant increase in our financial choices later in our marriage. Free board, short commutes and no need to own a car certainly makes a very significant difference, even if we would have

Courtesy Rik van Hemmen

had to pay for our own food.

This should not be regarded as communal living; it remains an economic proposition and, as such, might be worthy of investigation by shipping companies with large fleets to break our present only partial successful "one size fits all" crew approach. The creation of a family based crewing structure on one or more of their vessels could increase crew retention and recruiting. It certainly would be an interesting subject for a socio economic study. The company could poll their crew personnel to see if there is interest for that approach and go from there. My gut tells me the economics could be mutually quite attractive.

Maybe ship crewing does not have to be zero sum, and maybe better designs are out there.

Courtesy Rik van Hemmen

For each column I write, ***MREN*** has agreed to make a small donation to an organization of my choice. For this column I choose Liberty Nautical Education Center, LiNE, ***https://www.libertynautical.org/home*** a group volunteers that focuses on introducing kids to the nautical life through through first-class, hands-on, maritime educational programs.

The U.S. Navy's New Navigation Plan

Anticipating the Impact on Uncrewed Surface Systems

By George Galdorisi

In September 2024, the U.S. Chief of Naval Operations, Admiral Lisa Franchetti, issued her Chief of Naval Operations Navigation Plan for America's Warfighting Navy. Admiral Franchetti describes this Navigation Plan as the strategic guidance to the U.S. Navy.

This Navigation Plan embodies "Project 33" in recognition of the fact that Admiral Franchetti is the 33rd Chief of Naval Operations. Project 33 articulates two overarching objectives: an imperative to be ready for the possibility of war with the People's Republic of China by 2027 and enhancing the Navy's long-term advantage.

While this Plan has several components, the goal to scale robotic and autonomous systems to integrate more platforms at speed focuses on capitalizing on the inherent advantages that uncrewed systems bring to any navy. This is perhaps the most intriguing part of the Navigation Plan and one that will likely have a major impact on the maritime industry.

Momentum to enable the U.S. Navy to leverage uncrewed systems has been building for almost two decades, beginning with the Navy's Strategic Study Group report titled The Unmanned Imperative and other reports and studies up to and including the Navy's UNMANNED Campaign Framework.

These aspirational documents have now found purchase in the Navigation Plan for America's Warfighting Navy with specific goals and objectives for inserting uncrewed and autonomous systems into the Navy inventory.

Admiral Franchetti's predecessor, Admiral Michael Gilday, articulated the goal of a "500-Ship Navy," which includes 350 crewed vessels, and 150 uncrewed vessels. Admiral Franchetti has embraced this goal of a "hybrid fleet" and her plan to scale robotic and autonomous systems and integrate them with crewed platforms points directly to the goal of a 500-ship hybrid fleet.

Two recent real-world events have worked to accelerate the U.S. Navy's development and fielding of uncrewed vessels. The first is the Ukrainian Navy's use of uncrewed surface vessels to deny the Russian Navy the use of the Western Black Sea, as well as threaten Russia's supply lines to occupying forces in Crimea. The second is Yemen's Houthi rebels use of drones against commercial vessels as well as against U.S. and partner navies in the Red Sea.

The U.S. Navy's & Uncrewed Systems

Uncrewed capabilities not only keep sailors out of harm's way, but they provide opportunities to greatly expand the sea service's warfighting capacity at less cost than traditional Navy vessels. The Navigation Plan for America's Warfighting Navy adds more granularity to the "why" behind the Navy's commitment to uncrewed surface vessels. It notes that robotic and autonomous systems, by augmenting the multi-mission conventional force, will provide opportunities to expand the reach, resilience, and lethality of the combined crewed-uncrewed Navy team.

A short-term goal, articled in the Navigation Plan, is to integrate proven robotic and autonomous systems for routine use by the commanders who will employ them and to incorporate mature uncrewed capabilities into all deploying carrier and expeditionary strike groups by 2027. The anticipated use of these uncrewed capabilities will focus on key operational challenges across critical mission areas.

The Evolving U.S. Navy Hybrid Fleet

The Navigation Plan puts special emphasis on the Hybrid Fleet. As Admiral Franchetti noted, absent a large infusion of resources, it will not be possible to build a bigger traditional navy in a few short years. Therefore, the hybrid fleet concept is seen as a viable path to put enough hulls in the water to accomplish the Navy's myriad global missions.

The Hybrid Fleet is moving forward. Navy officials have been laying the keel for the future hybrid fleet via experimentation and other efforts, such as standing up Task Force 59 and Task Force 59.1, establishing the Disruptive Capabilities Of-

fice, and "operationalizing" the integration of uncrewed platforms into numbered fleets beginning with the U.S. 4th Fleet.

Uncrewed Vessels Must Get to the Fight

One of the reasons that the Navigation Plan describes the Navy's confidence in the ability of uncrewed surface systems to perform as expected next to the Navy's crewed vessels is the fact that over the past decade, the U.S. Navy, along with allied and partner navies, have inserted commercial-off-the-shelf (COTS) uncrewed systems into Navy and Marine Corps events to perform a wide range missions.

That said, small and medium uncrewed surface vessels (along with their air and undersea counterparts) must get to the area of operations to perform their various missions. Given that there is limited space aboard Navy ships, another means must be found. This requires a large uncrewed surface vessel to serve as a "truck." The Navy wants LUSVs to be low-cost, high-endurance, reconfigurable ships based on commercial ship designs. Some potential candidates for this mission include the Navy's program of record LUSV, the MARTAC T82, and the Ranger and Nomad USVs operated by Unmanned Surface Vessel Division 1.

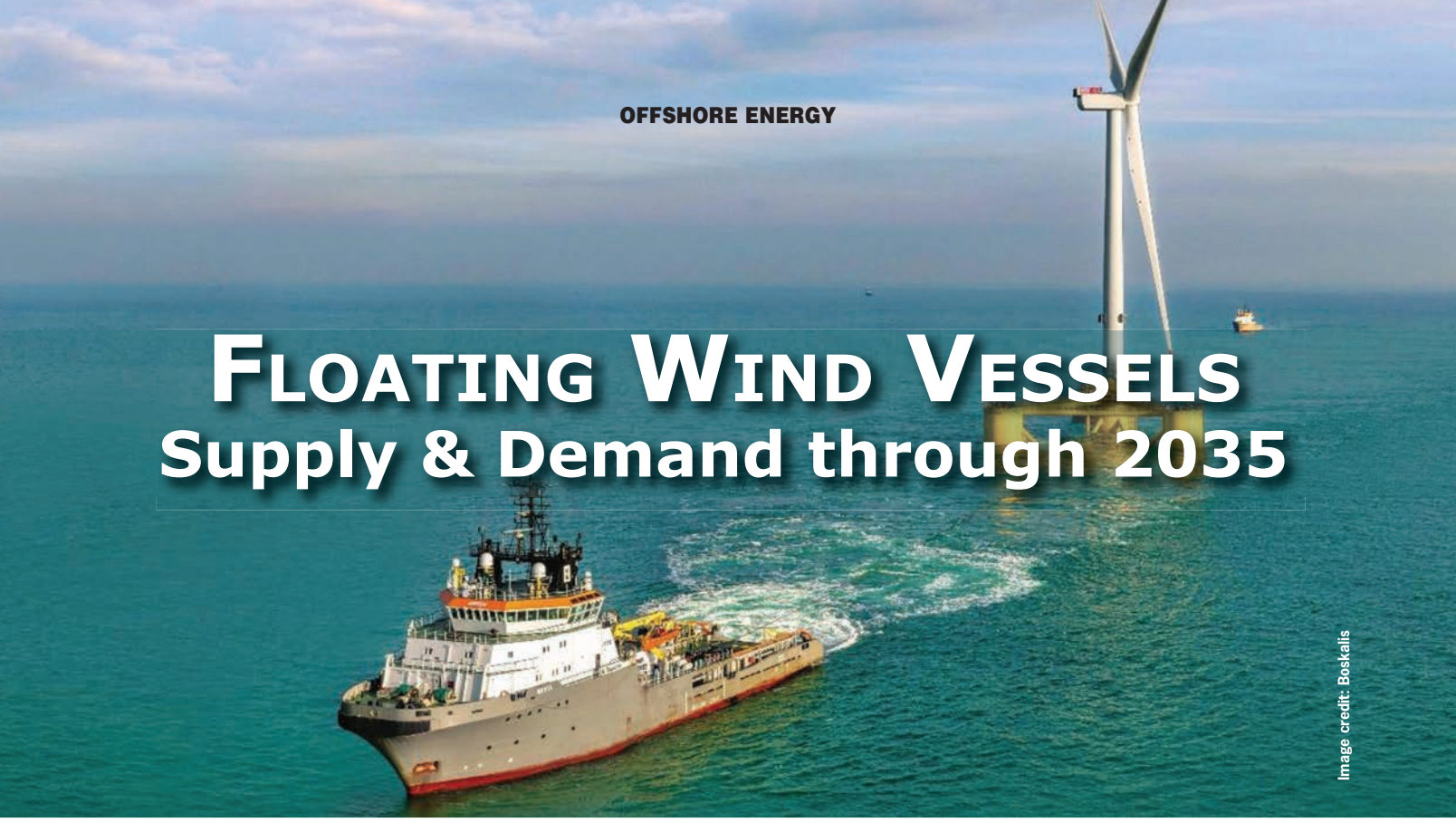
Rather than speak in hypotheticals, since it will be in the water next year and will be built from the keel up to transport, launch and recover smaller uncrewed surface vessels of various sizes, the Devil Ray T82 is likely a leading candidate to serve as the truck most capable of carrying, launching and recovering smaller uncrewed craft. With a maximum payload of 35,000 pounds, the T82 could carry eight eighteen-foot T18 USVs configured for various Navy missions such as intelligence surveillance and reconnaissance (ISR) and mine countermeasures (MCM).

A Bright Future for Uncrewed Surface Vessels

This is not a platform-specific solution, but rather a concept. When Navy operators see a capability with different size uncrewed COTS platforms in the water successfully performing the missions presented in this article, they will likely press industry to offer even more-capable platforms to perform these tasks.

The U.S. Navy's commitment to develop, test and field uncrewed surface vessels at an accelerated pace has profound implications for the maritime community. The need to field a hybrid fleet not at some distant time, but this decade, will likely mean that the Navy can't wait for uncrewed surface vessels that are developed via the DoD's often tortuous acquisition process.

What this means for industry is that commercial-off-the-shelf uncrewed surface vessels will likely receive a favorable hearing from Navy officials who increasingly recognize that the need for a hybrid fleet to emerge as soon as possible is compelling. The first step for industry should be to embrace this new security paradigm and think outside the box as to how their COTS uncrewed systems can fulfill a range of Navy mission requirements.



Floating Wind Vessels
Supply & Demand through 2035

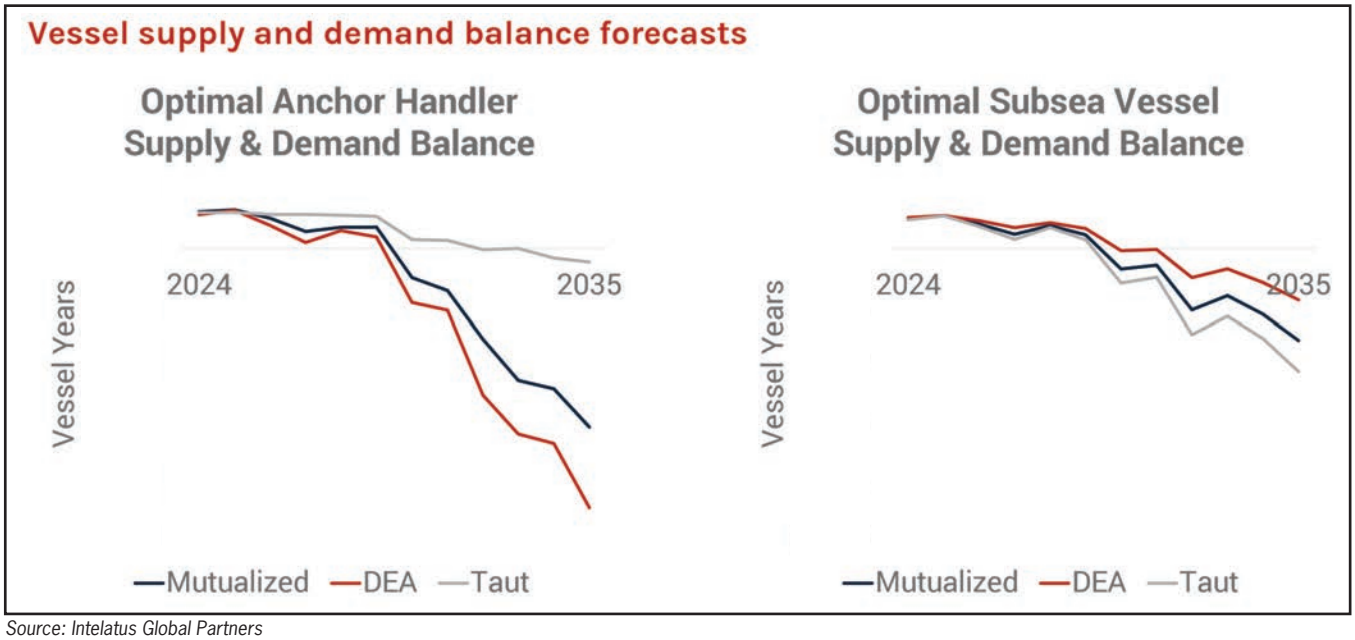
Image credit: Boskalis

By Philip Lewis, Research Director, Intelatus Global Partners

Floating wind is an emerging technology, currently being tested in small scale demonstration and pilot projects. Global commissioned floating wind capacity is forecast to amount to ~6 GW by 2030 and ~50 GW by 2035. A sharp increase in activity is expected in the period 2031-2035. Market growth will initially be led by the South Korean market, but the European market, led by the UK and France, is forecast to dominate in the next decade as North America and other East Asia Pacific markets join the fray. To reach ~50 GW of installed capacity by 2035, capital investment of around a quarter of a trillion dollars is required.

Although there are many different solutions to building a floating wind farm (different floater, anchor and mooring line types), the nature of floating wind projects, both in numbers of systems to install and their physical size, drives demand for the largest and most highly specified anchor handlers and subsea vessels.

Significant vessel shortages are forecast through the middle of the next decade.



Source: Intelatus Global Partners

This vessel shortage will drive shortages of qualified and experienced seafarers, which appear from ~2030. Shortages will be in all senior bridge, deck and engine room positions. To demonstrate the trend, the chart presents a forecast of additional Senior DPOs and DPOs onboard (i.e. excluding back-to-back crew).

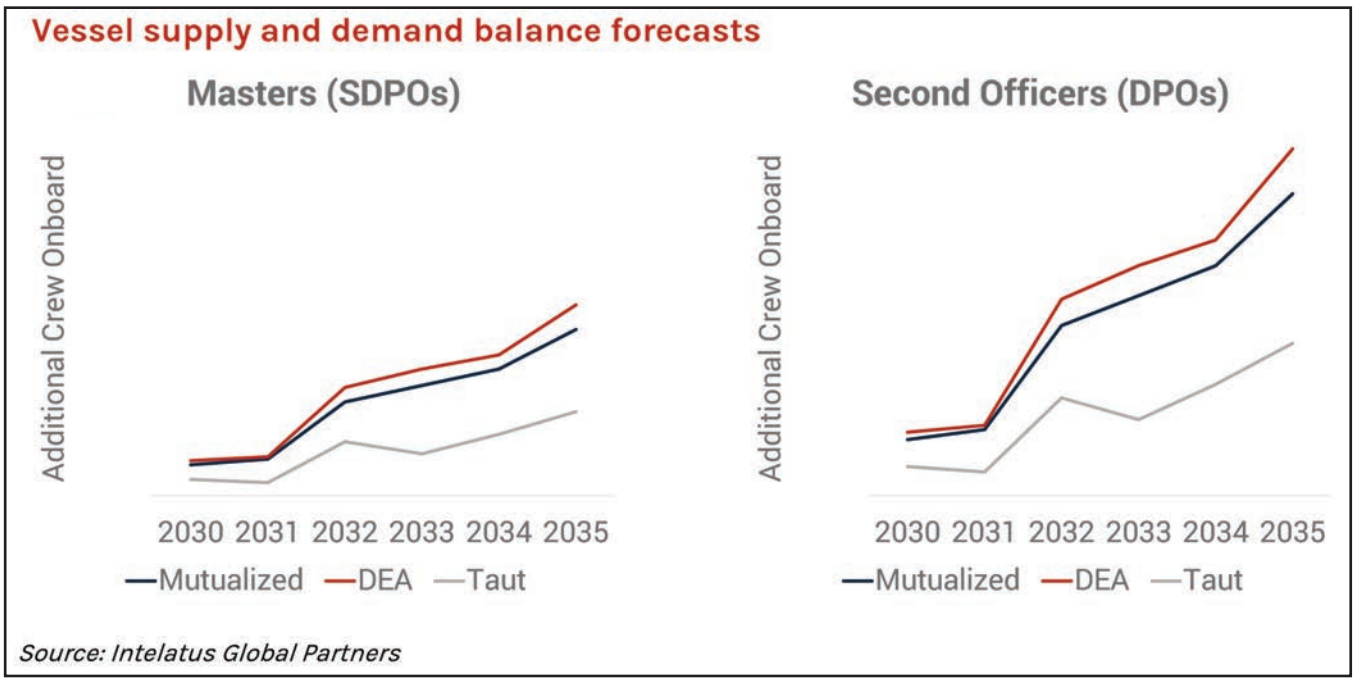
These are the findings of a comprehensive new floating wind installation vessel market report published by Intelatus Global Partners. The report examines a range of technical drivers, summarizes the findings of the latest research, presents a deep dive into each of the major floating wind markets and translates the activity forecast into a vessel supply and demand balance forecast.

THE MARKET IS GROWING ...

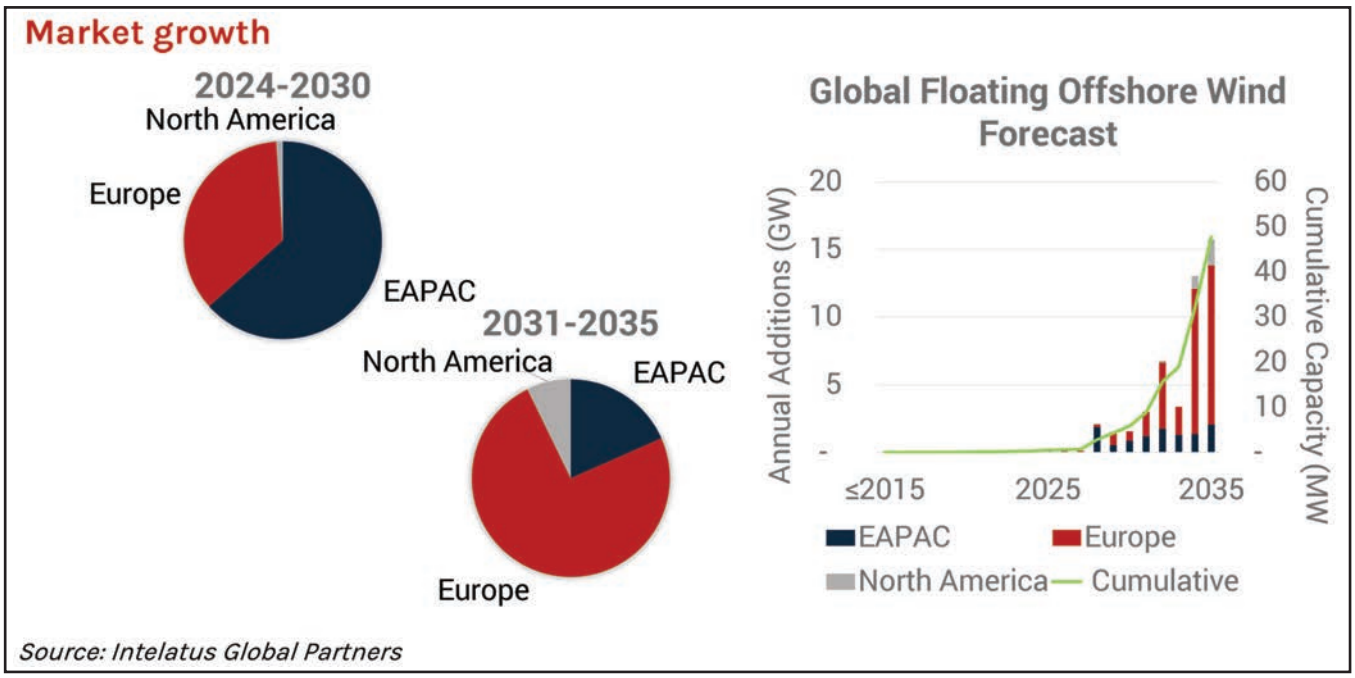
BUT NOT AS QUICKLY AS SOME BELIEVE

As we have mentioned previously, floating wind is an emerging technology. Concepts are still be demonstrated in single turbine and small pilot arrays. The first commercial scale arrays (±500 MW) with offshore construction activity within this decade are being planned for such markets as South Korea and the UK.

From around ~305 MW installed at the end of 2024 to ~6 GW (2030) and ~48 GW (2035). Market growth anchored by Europe in the first half of the next decade.



Source: Intelatus Global Partners



Source: Intelatus Global Partners

Through this decade, we anticipate that South Korea will be the largest floating market, but the first half of the next decade is likely to be dominated by activity in Europe, with the UK, France, Italy, Portugal forecast to be the most active (but not only) floating wind markets. The U.S. enters the floating wind stage during the forecast period with both pilot and commercial scale developments on the West Coast and pilot arrays on the East Coast.

HOW DO YOU BUILD A FLOATING WIND FARM?

At a high level, building a floating wind farm can seem to be a simple exercise, as shown in the graphic.

However, the uncertainty over what we will be installed, volumes of components to be handled and their sheer physical size present many challenges to floating wind developers. Let's look at the differences that sets the building of a floating wind project apart from the established bottom-fixed segment to understand these challenges of technical uncertainty, volumes and sizes of components.

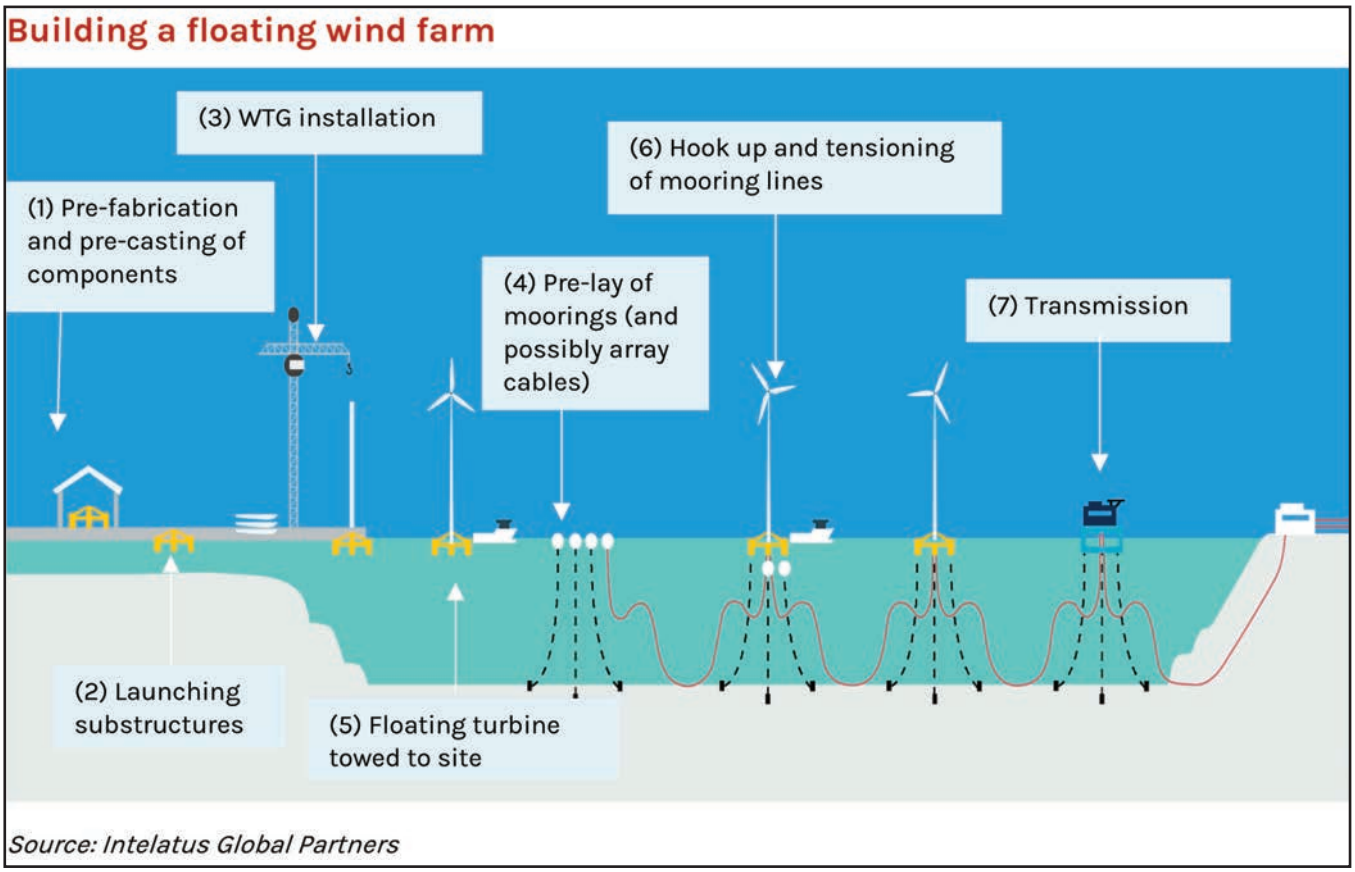
- It starts with the floater, for which there are more than 100 concepts being developed globally that are broadly grouped in semi-submersibles, barges, spars and TLPs. These concepts can be built from steel (rolled stiffened plate, flat panel construction and heavy-walled tubular, etc.) or concrete (slip formed, pre-cast, with reinforcement, with post tensioning tendons, etc.). Some concepts feature steel plate construction familiar to shipbuilders while others rely on large diameter steel pipes produced at offshore wind monopile and tower manufacturing plants. Steel concepts can be manufactured in sub-assemblies and shipped to assembly yards or can be shipped as complete units from construction yards on heavy lift vessels. Concrete concepts are generally more suited to local manufacture and assembly. Depending on the concept selected, each floater for current generation turbines could weigh from below 5,000 tonnes to 20,0000 tonnes. A commercial scale project will require ~30-35 of these floaters per year to meet installation requirements of one full installation spread.
- Turbine installation is generally expected to take place at the assembly port. Next generation turbines with larger diameters drive the hub height where a crane needs to lift weights of 750-1,050 tonnes to over 180 meters assuming the currently available large turbines. A key variable to monitor is the development by Chinese developers of turbines as large as 25 MW with rotor diameters of ~300-310 meters. Suitable crane supply is limited today and with potential increases in rotor diameters will become even more limited. Once assembled, several turbines will likely be wet stored before being towed offshore for hook-up. Due to installation season weather windows, this period could last 4-6 months. The implication is that a sufficient supply of suitable large, sheltered harbor facilities is required.
- A station keeping system is required for the floating turbines. There are many different solutions available depending on the specific site conditions and floater design, but suction anchors, drag embedment anchors and driven piles are likely to feature in most projects in the short- to mid-term. Again, depending on a number of variables, anchors can be shared by mooring lines or each mooring line can feature an anchor. The base case is for each floater to generally require three mooring lines, either in a 3x1 (3 lines per floater) configuration, a 3x2 layout or even 3x3. The uncertainty over the technical solutions drives us to develop our three base scenarios (mutualized suction anchors, drag embedment anchors and taut mooring with suction anchors) to present an order of magnitude of the volumes of components, the demand for vessels and to highlight the impacts and major differences in the various technical choices. It is likely, at least in the short-to-mid-term, that mooring systems will feature sections of large chain (~130-1800mm) and sections of large fiber rope (±300mm).
- Complete assemblies will be towed offshore by a spread of tugs including lead, support, and security tugs and then hooked up to the pre-laid moorings. Tensioning of the mooring system will generally be required, more often than not from the vessel rather than the floater. It should be noted that the impact of larger turbines referenced earlier will likely be larger floaters and more robust (larger in number and/or size) moorings, which of course can increase the technical requirements for towing and hook-up vessels.
- Array cables can be pre-laid and wet-stored with the moorings or installed when the floaters are hooked-up. A key difference in floating wind array cable systems to those found on bottom-fixed projects is that the subsea cables are flexible or dynamic and are suited to deployment by vertical lay systems.
- Substations can be bottom-fixed, floating or even subsea, depending on the specific project site characteristics. Export cable laying is for the most part the same as seen in bottom fixed wind farms.

TURNING THE FORECAST INTO VESSEL DEMAND

We have prepared a bottom-up forecast for activity through 2035 and have developed demand models for three scenarios:

- Mutualized catenary mooring lines (very large diameter chain and fiber rope) connected to suction anchors.
- Drag embedment anchors, two per floater mooring connection, connected to individual catenary mooring lines (large diameter steel chain, smaller than that of the mutualized and taut mooring case, and a fiber rope mid-section).
- A taut mooring system with a smaller footprint, with predominantly fiber rope mooring lines and connected to induvial suction anchors.

The mooring scenarios deliver significantly different results



of anchor demand (~10,000-30,0000 anchors) and mooring lines (~17,000-35,000). We expect to see all three systems used, although the catenary systems are likely to be preferred in the short-to-mid-term. More than 14 million meters of array cables are also forecast to be installed in the period.

The characteristics of the components drive the need for large anchor handlers and subsea vessels. In our report, the detailed technical analysis takes the reader through the drivers to understand the constraints in terms of capacity, capabilities and efficiencies of vessels and why the large vessels will be required.

The simple conclusion is that there is insufficient technically capable vessel supply to meet forecast demand in the next decade.

ARE BIG, EXPENSIVE FLOATING WIND SPECIFIC VESSELS THE ANSWER ?

The quick answer is "no".

Unless charters agree long-term vessel utilization, there will be likely be several months every year where a floating wind specific vessel will be underutilized. Long-term charters commitments will be needed to justify investment in high-cost assets. These conditions do not currently exist.

There is a greater argument for large subsea vessel building, due to the flexibility of the assets to work in both oil & gas and offshore wind (bottom-fixed and floating) space. But the high-specification anchor handlers required by floating wind projects are a more difficult investment case. What most floating wind projects will require is generally technically very different from most oil & gas projects. As a result, a typical large oil & gas anchor handler will lack one or more of the key technical features to be an efficient tool for commercial floating wind projects.

Leveraging Human Factors for Safer Maritime Operations

By Fred Finger, SVP & Head of Operations, ARC

A safety management system, while vital, can only take a company so far. The real change has to be cultural throughout an organization. Many maritime companies can operate effectively under the International Safety Management Code, which governs safety and pollution prevention for ships. Frameworks like these enable carriers to act compliant with basic safety standards, but there is a significant human element not quite covered by such standards. In 2012, Allianz looked at around a century of maritime incidents, estimating that 75% to 96% of marine accidents involved some human error. That's where the adoption of "human factors" comes into play. Airlines have relied on analysis of human factors for decades, understanding that even the most advanced systems and rigorous processes can fall short if the human element is neglected. The emphasis on analyzing behaviors, decision-making, and communication patterns has yielded remarkable safety improvements in aviation. We recognized that this aviation example could be adopted at American Roll-On Roll-Off Carrier (ARC), as well as by other maritime companies.

At ARC, we continue to see how considering human factors can be just as critical to keeping our crews safe and delivering for our customers. From our lessons learned over five years of implementing human factors analysis, we have focused our analysis on three core principles that any carrier can follow.

1. Creating a No-Blame Culture

One of the most significant barriers to safety improvement in any industry is the fear of blame. When individuals fear repercussions, they're far less likely to report mistakes or near misses, which means crucial learning opportunities are lost. In the airline industry, introducing a no-blame culture revolutionized how crews handled mistakes, enabling them to openly discuss incidents without fear of punitive action.

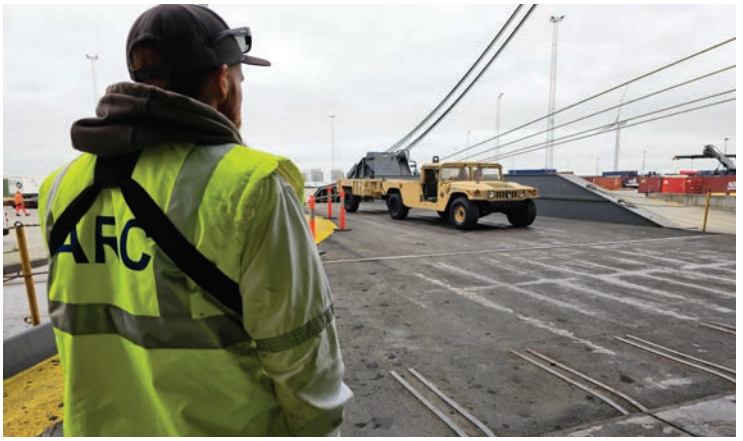
At ARC, we've made a conscious effort to cultivate a similar no-blame culture. It's not about pointing fingers but about understanding why something went wrong and how we can fix it.

Early in our adoption of human factors, ARC officers pointed to this as a critical component of reducing risk in the fleet. By framing non-conformities—instances where procedures or actions don't meet safety standards—not as failures but as opportunities for learning, we've seen our teams become more engaged and proactive in reporting issues. This cultural shift has allowed us to address minor problems before they become big ones.

2. Accepting and Disclosing Mistakes

A no-blame culture naturally leads to more openness, but it must be paired with an environment where mistakes are accepted, disclosed, and analyzed. The most effective way to improve is to be upfront about where things have gone wrong. Early in our implementation of human factors, ARC held a series of workshops where our officers were encouraged to speak candidly about mistakes they had made or witnessed. This "tone of accountability," as we call it, was a powerful step. We saw officers from across the fleet open up at ARC's key officer conferences about situations where better decisions could have been made. The point was not to dwell on the error but to learn from it and improve.

This kind of honesty can be challenging to achieve, espe-



Images courtesy ARC

cially in industries where the stakes are high, but ARC has found it essential for long-term safety improvements.

3. Greatly Increasing Communication

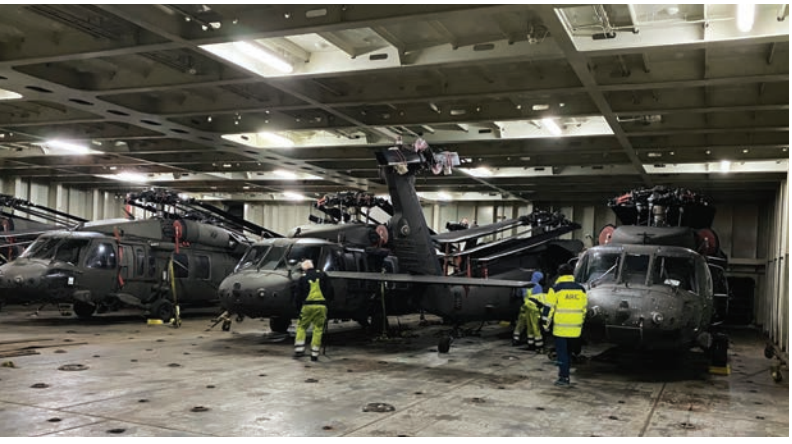
Communication is the backbone of any successful safety program, and, in human factors, it's no different. Too often, miscommunications or assumptions onboard or between ship and shore lead to preventable incidents. Almost every report from the National Transportation Safety Board shows that a critical failure from an accident, whether it is a massive container ship or a small tugboat, comes from miscommunication or a failure to communicate. These incidents can be fatal.

At ARC, we've made significant strides in improving communication. We've implemented bi-weekly meetings with every ship in our fleet using video conferencing tools to improve communication, aided by our full fleet adoption of Starlink. These aren't just high-level check-ins; they involve the entire crew, from the captain to the cadets. Everyone is encouraged to participate, share what's working, and highlight what needs improvement. In addition, ARC uses a monthly newsletter to relay safety information to the fleet so that important details are shared between the ships. This inclusive communication ensures that critical feedback is shared across all levels of the operation.

We also use regular surveys to gauge the effectiveness of our communication strategies and to identify areas for further improvement. By addressing the feedback we receive from the fleet, we ensure that we're not just talking about safety but continually improving it.

Conclusion

As an active participant in the Maritime Security Program, helping deliver military cargo needed for U.S. armed forces, ARC takes our operations seriously. With this in mind, we see creating this culture as not only helping to create a safer, more efficient maritime work environment but also a way to support our nation's security. ARC is leading with human factors analysis and we share these three core principles in the hope the rest of the maritime community will follow.



THE BRIDGE AND BEYOND

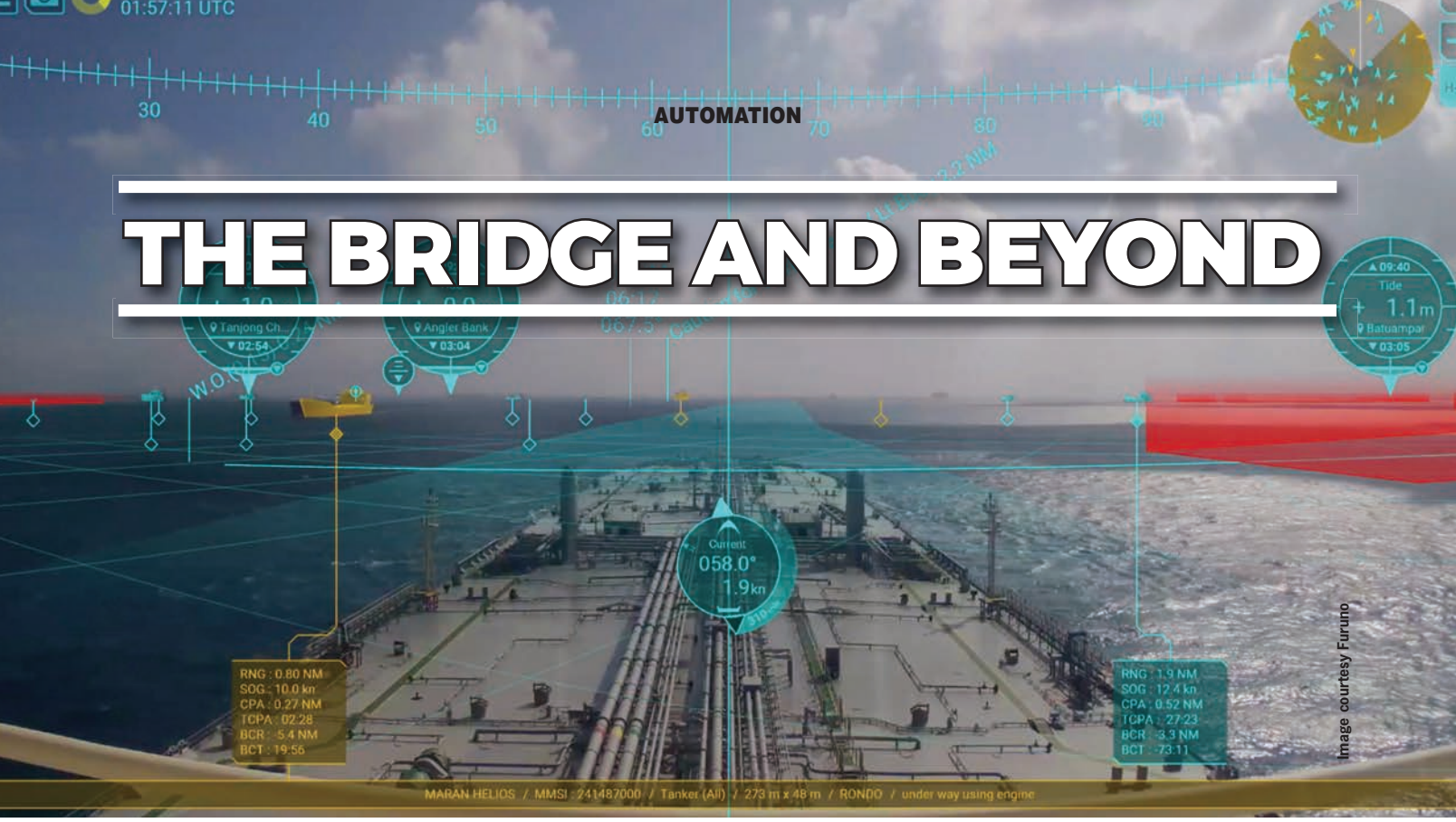


Image courtesy Furuno

AI and AR are revolutionizing decision-making on the bridge and beyond.

By Wendy Laursen

It's already possible to have smart decision support on the bridge: With Furuno's technology, live video imagery of the front view from the vessel has navigation information superimposed on it including heading, AIS data, radar target tracking, object identification, route waypoint and chart information.

SEA.AI's bridge support system can identify larger vessels not fitted with AIS up to a range of 7.5 kilometers (nearly five miles), smaller vessels up to 3 kilometers (nearly 2 miles) away and flotsam up to 700 meters (nearly half a mile) away.

Augmenting a watchkeeper's situational awareness with technology can reduce fatigue and help them make better decisions, earlier. But it's not easy to augment the skills of an experienced watchkeeper. A lot of effort goes into building the knowledge base that supports the digital interpretation of information.

One of the most common inquiries that SEA.AI receives pertains to its system's capability to detect semi-submerged containers. Detecting a floating container is mostly straightforward due to its larger size compared to buoys, its rigid rectangular structure and the temperature differential between the container and the surrounding water. However, any object can exhibit significant variation depending on viewing angle, distance, sea conditions, level of submersion, orientation in the water, time of day, weather conditions, sunlight intensity, spatial orientation and inclination, among other variables. As a result, to confidently identify an object, SEA.AI often requires input from hundreds of thousands of images.

Technology company Orca AI has costed out the benefits of using digital support to avoid sharp maneuvers and route deviations. One customer, Seaspan Corp, recorded a 19% reduction in close encounters and a 20% increase in minimum average distance from other vessels, leading to an estimated annual fuel saving of $100,000 per vessel using Orca AI's navigation assistant.

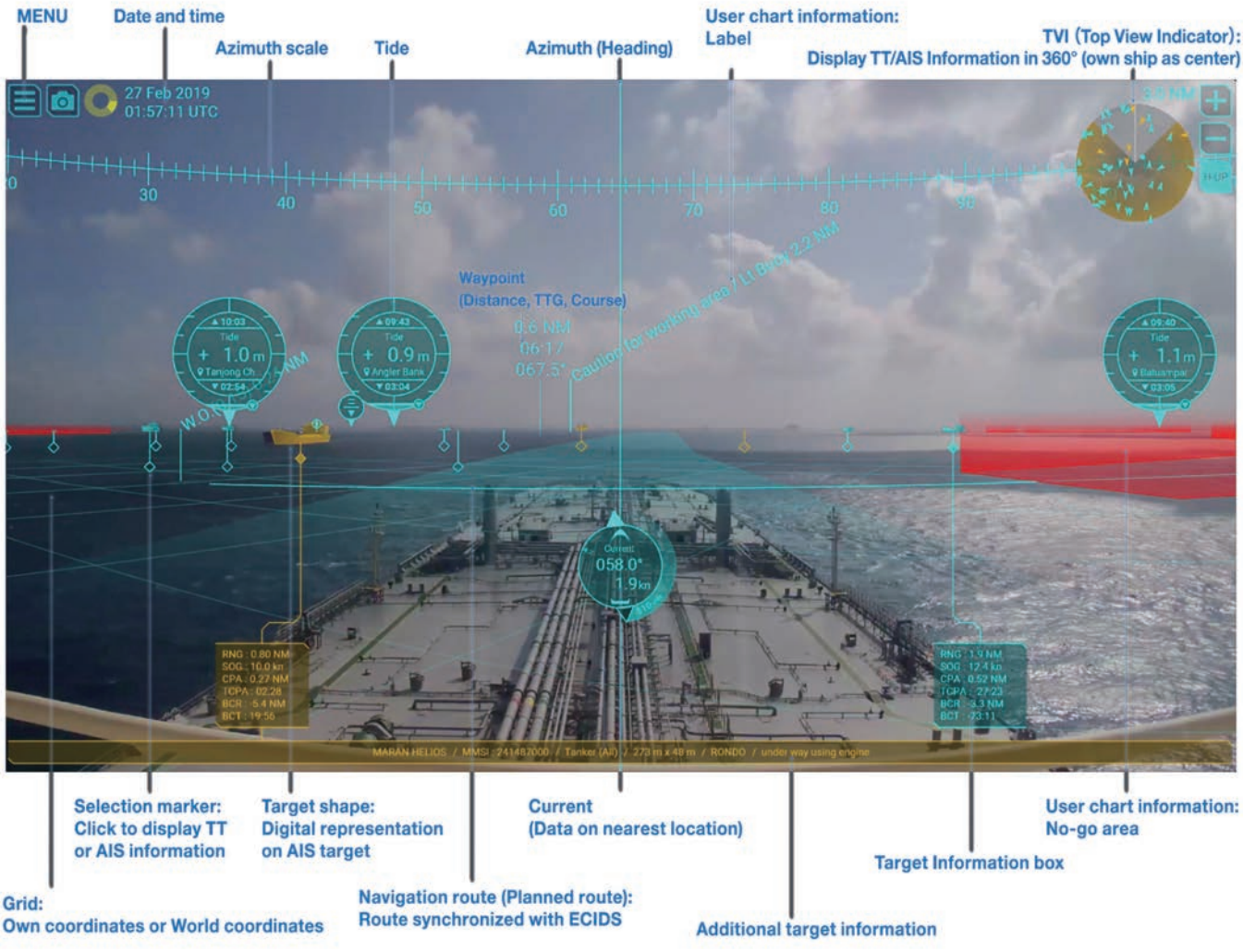
Shipin Systems CEO Osher Perry claims operational results including a 42% reduction in incidents and a 17% increase in bridge manning compliance when its AI-based camera system is placed in core operational areas throughout a vessel. The system offers real-time risk detection including early detection of fires, an unmanned bridge and improper PPE use by integrating video data with ship systems including navigation, weather and machinery sensors. Some vessels have reported zero incidents within 180 days of deployment, while improved maintenance and early anomaly detection has reduced unplanned off-hire days by 30%.

Furuno is using AI to augment its systems which can already superimpose a graphical virtual shape over AIS targets

"One of the likeliest scenarios in the near future is that the human crew on board vessels will be augmented by both machine learning and visualization of the vessel situation from a shore side facility."

– Matt Wood, National Sales Manager, Furuno USA Inc.

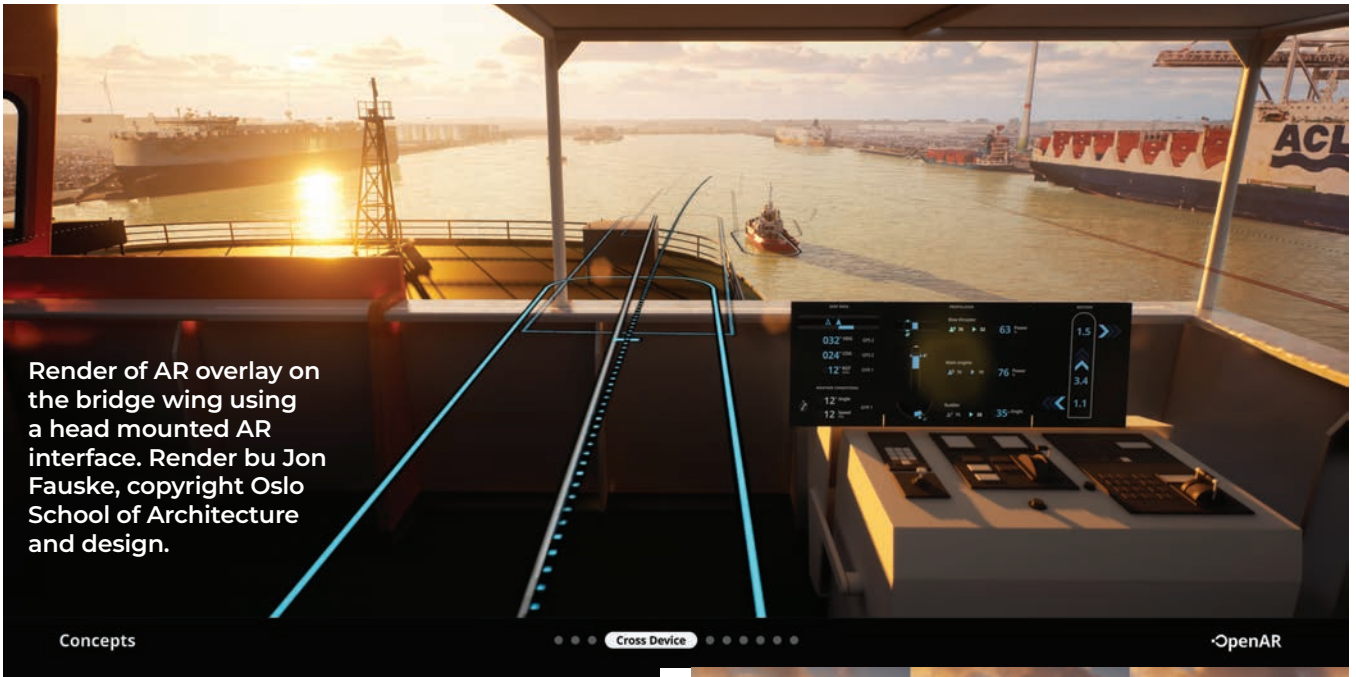
Furuno systems can superimpose a graphical virtual shape over AIS targets such as buoys, boats and ships to provide details of their position in low visibility conditions.



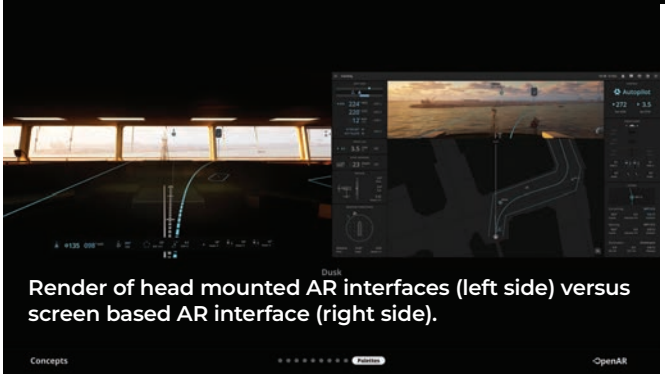
Images courtesy Furuno

"Most of the OpenAR project's technology demonstrations so far have focused on situational awareness support through points-of-interest display systems showing vessels and other information over the real world."

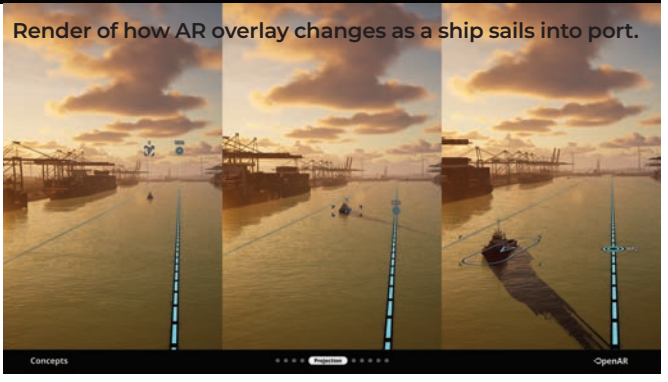
– Professor Kjetil Nordby, Oslo School of Architecture and Design



Render of AR overlay on the bridge wing using a head mounted AR interface. Render bu Jon Fauske, copyright Oslo School of Architecture and design.



Render of head mounted AR interfaces (left side) versus screen based AR interface (right side).



Render of how AR overlay changes as a ship sails into port.

Renders by Jon Fauske, copyright Oslo School of Architecture and design.

such as buoys, boats and ships to provide details of their position in low visibility conditions. The company is now developing an automatic or assisted docking system.

Additionally, says Matt Wood, National Sales manager for Furuno USA Inc., the company has participated in several semi manned and autonomous voyages within Japan. "One of the likeliest scenarios in the near future is that the human crew on board vessels will be augmented by both machine learning and visualization of the vessel situation from a shore side facility."

But, he continues: "We are at a stage of AR development right now in which many tools are being created, many of which are good. However, there is no standardization in these displays. We cannot and should not remove the mariner from the equation, but we need a way to present them with the best possible information in as easy to recognize a way as possible."

Furuno is participating in the OpenBridge project led by the

Oslo School of Architecture and Design, in partnership with a wide range of other companies including Kongsberg, Brunvoll and Vard. Together, they have developed a collection of tools and approaches to improve the design of bridges based on modern user interface technology and human-centered design principles. The aim is to avoid the fragmentation that comes with many different user interfaces on a bridge, increasing the need for training and also increasing the chances of human error.

Over 1,000 companies have now registered to access the guidelines, and the success of OpenBridge has led to the OpenAR project which is expanding the guidance to AR functionality. Most of the project's technology demonstrations so far have focused on situational awareness support through points-of-interest display systems showing vessels and other information over the real world, says Professor Kjetil Nordby of the Oslo School of Architecture and Design. "These are now been made for video in remote operation centers, window-projected interfaces, on-ship screen-based situational awareness systems and head-up displays similar to car systems. We have not seen any partner make head mounted systems yet, but we expect that is also on the horizon."

His focus on workplace design is extending to engine rooms, and most recently, with the OpenZero project, he is encompassing decarbonization technologies that boost energy efficiency and reduce fuel consumption. Partners for this project include ABB, GE Marine and DNV.

All these projects are designed to support decision-making by crews, but the systems being developed are also the building blocks for the safe navigation and management of autonomous ships. For this, it's the decision-making of machines that needs to be augmented.

"Predicting pedestrians and other vehicles or vessels is one of the most funded research areas in autonomous navigation in land, air or maritime systems," says Professor Lokukaluge Prasad Perera from the Arctic University of Norway. Perera is testing models for predicting ship behavior at long and close range using neural networks that can learn from extensive databases, such as those generated on training simulators, as well as from onboard sensor and AIS data. The aim is to enable safe decision-making on autonomous ships and to help crews understand the behavior of autonomous ships if they encounter them.

Perera's team is working on a large-scale predictor that combines neural network learning with AIS data to predict up to 20 minutes of a ship's trajectory. A local predictor is also being developed that combines ship kinematic models and neural network learning from onboard ship performance data to accurately predict the immediate 20 seconds of a ship's trajectory.

"The local predictor is important for many close ship encounter situations to evaluate the possible collision risk. Therefore, both local and global scale predictors can help autonomous ships to detect possible collision situations and then take appropriate action at an early stage," says Perera. "When systems are making decisions, these early predictions are extremely important."

Image courtesy ShipIn Systems Inc.

Shipin Systems uses an AI-based camera system placed in core operational areas throughout a vessel.

Embracing Maritime's Future with Open Arms

Tech leaders across maritime have the unenviable task of plotting for, at best, a fuzzy future. Make no mistake, the mission is clear: emission reduction leading to decarbonization. But the means to that end – and the realistic timeframe to get there – is less than clear. Sit with **Sameer Kalra, President, Marine, Alfa Laval** *for awhile and it becomes abundantly clear he has a firm handle on the means to make money for Alfa Laval today while funding the technologies that will power the company's future.*

By Greg Trauthwein

Sameer Kalra, six years in as President, Marine, Alfa Laval, has a history that is not unlike many heard from maritime executives: starting out as a marine engineer in a boiler suit sailing on ships. Today he oversees a large and expanding portfolio of marine technology to serves the needs of ships today and tomorrow. "Onboard a vessel, we're the biggest secret in plain sight. The water that you drink onboard; Alfa Laval's water maker is delivering it. The emissions from the funnel; most likely there is Alfa Laval equipment cleaning it up. The fuel that goes into the engine that propel the vessel; an Alfa Laval piece of equipment has most likely cleaned it. We work with three big technology areas: heat transfer, separation, and fluid handling." Last but not the least is the company's most recent acquisition: StormGeo and with it a world of digital solution possibilities. Today, Kalra looks over approximately 20+ independent product verticals, but more than simply pushing product, Kalra said Alfa Laval has emerged a remit for experience and guidance, particularly when it comes to decarbonization. "When customers are looking for solutions in this energy transition, Alfa Laval is a place you would come. We are a knowledge center."

Business Drivers

Maritime is in a transcendent period, with digitalization, decarbonization and autonomy collectively impacting ships and ship systems. But Kalra said the real driver today for Alfa Laval, and shipowners, is clear. "No matter where you are in the industrial supply chain, the one thing you can't escape is how the energy transition will impact your portfolio. If I go back just five to seven years, our legacy products were built around one fuel that had been around for 100 years: heavy fuel, oil and gas oil."

"I sailed between 1983 to 1993, and I sailed only on heavy fuel oil," said Kalra. "In those 10 years sailing on the same fuel oil, the engines become a bit more efficient, but if I look at the machinery on board, in my time, probably the only thing that really developed in a big way was the incineration and oily water separation."

Fast track 30 years and the view on the ship, from the bridge to the engine room, is completely different, in some ways unrecognizable to someone who last sailed in 1993. "I was not that imaginative when I left shipping [to visualize] what the future may look like," said Kalra, " but today I'm so fascinated. I think this is reflection of how innovative we are in an industry and how we have slowly pushed the boundaries."

For Alfa Laval the trick today is staying relevant with shipowners regardless of fuel, a transition for the company, too, as new fuels mean new challenges, and the requisite need for investment to find solutions. "Today we are now fit for purpose for biofuels, methanol, and gas," said Kalra. "Next step, transition to make sure that they can also do ammonia, too, for example." The only certainty today in maritime is uncertainty, as there is no definitive 'fuel of the future' that fits all needs. The key now and in the future is flexibility.

"Neither I, nor you, nor anyone has this crystal ball to say which fuel is going to be the future fuel in the world," said Kalra. "Quite possibly there will not be a one-size-fits-all (fuel solution); I don't see ammonia going on a cruise ship which is carrying 3000 passenger; nor do I see small product tankers going to Sandakan in Malaysia and having green methanol available in the storage tanks."

So the key for Alfa Laval, too, is flexibility, investment and patience, saying his primary focus is making sure that the company's portfolio is "fit for purpose for the needs ahead."

"We are doing a lot of cool stuff … wind propulsion, air

"We are doing a lot of cool stuff … wind propulsion, air lubrication, etc. … but none of this is a profit pool

… it's what we have that is funding the future. Much of my energy goes into making sure that what we have is competitive and relevant [so] ship owners can sail and say: 'This is future-proof [regardless of the future fuel mix]. I know Alfa Laval has solutions to make sure I can transition to the new fuel.'

– Sameer Kalra

President, Marine, Alfa Laval

lubrication, etc. … but none of this is a profit pool that can fund itself today; it's what we have that is funding the future," said Kalra. "Much of my energy goes into making sure that what we have is competitive, relevant, and it is something that can make sure that the ship owners can sail and say: 'This is future-proof [regardless of the future fuel mix]. I know Alfa Laval has solutions to make sure I can transition to the new fuel.' This is what we are built on, this is what we are famous for." Alfa Laval's foray into wind propulsion is one example, "this is not something we had on our radar three years ago," said Kalra. "But we decided if energy efficiency is going to be important, clean energy is going to be important, so why not develop a technology area which will stay relevant 10 years from today, 20 years from today and maybe even 100 years from today." With that, for first time in its history, it recruited an engineer who had been trained in aeronautical engineering.

When talk turns to shipowner demands, in the area of fuels the narrative has changed. "Two years ago, everyone was clamoring for solutions around methanol and ammonia. But today, everyone recognizes that in the short- to medium-term, clean fuels; green methanol, green ammonia, are not available at scale." The industrial supply chain behind ammonia is not ready. And the narrative has shifted back to LNG as a fuel.

Bigger picture, the chatter today transcends the fuel itself, and Kalra says that in terms of decarbonization, "all the easy to stuff around energy efficiency is done. People worked with their wallets, with hull forms and mavis ducts and propellers and rudders and the like. Now they are starting to look at operational measures too."

Enter connectivity and digital solutions … or for Alfa Laval: the StormGeo acquisition. "People are suddenly about keeping their hulls clean from fouling," said Kalra. "I was speaking to one of the customers the other day and they said their charterers are sending underwater drones whenever the ship stops to check that the hull is clean … Who dreamt of this even two years ago?" And while clean hulls are the physical manifestation, the real end is information shared in real-time, globally, seamlessly, whether it's in regards the shape of a hull or the load and run-time of an auxiliary engine.

"Now what we start to see in the charter party, we are having customers saying to the liner operators and the ones who manage it, 'You need to make sure your ship is capable of sending high frequency data back.'

This, in turn, will put the onus on the full spectrum of OEMs to deliver high-frequency data for more immediate operational course corrections. "I think what we are seeing now is the next-generation of energy efficiency where operational behavior, operational practice start to change," said Kalra. "We can see our StormGeo business, the digital business [playing a big and growing role]," helping people report in an efficient manner. "Two years ago, if you supplied some equipment, we wanted to have our own field gateways, we wanted to have our own cloud," said Kalra. "Imagine [that today]: 20 suppliers having their own cloud and their own field gateways: you would say, 'forget about it'." Today he sees the opportunity and action for OEMs to work together, to share data on alternate platforms, with all eyes on delivering a seamless solution to the owner/operators. "We should not be the one determining which platform is running. So we are a good dialogue with the MANs [for example] … They don't compete with us. They have similar interests to see how can we make sure that in the end it should be the customer, what is best for the customer, not singularly best for yourself. So you need to be a bit more collaborative. You need to be a bit more partnership oriented and you'd need to have a bit more of an open arm rather than closed hands."

FMD & the Building of a **Defense Juggernaut**

You would be hard pressed to find a corporate leader more passionate about the company they lead; more dedicated to the customer they serve. In this case it's **George Whittier, CEO, Fairbanks Morse Defense** *and the* **U.S. Navy**. *Upon his return less than five years ago, Whittier has driven FMD towards the top of the U.S. Navy supply heap, with a string of strategic acquisitions. Whittier discusses with* **Maritime Matters: The Marinelink Podcast**, *FMD's rich history and promising future in helping the U.S. Navy rebuild its strategic edge globally with a strengthened manufacturing base.*

By Greg Trauthwein

George, let's start out with your leadership at FMD. You originally joined Fairbanks Morse in 2009, you left in 2012, but you retook the helm in 2020. Why did you leave, and what drew you back?

When I left [in 2012], it was really just time to leave, things have a season. But at the time, I was sad about it: I loved this company, the products, the people, the market, and the opportunity to feel like I'm 'serving.'

One of the biggest regrets in my life is that I didn't serve. By doing the job I'm doing at Fairbanks Morse Defense, being such an integral supplier to the Navy and the Coast Guard, it's given me [almost] that feeling of serving. [Compared to] the people in uniform, it's not even close to the same thing; but for me it's a way to give back.

So, I left the company, I went and I ran a couple other companies, and in December 2019 Fairbanks Morse was mainly an engine company, part of EnPro Industries, and they didn't really know what to do with it. They decided to sell it into a private equity company called Arcline [which subsequently asked me to come back]. The day the transaction was announced in January of 2020, that was also my first day back to the company, and it's been off to the races ever since.

I must admit that the rapid expansion of FMD, via mergers and acquisitions starting in 2020, took me by surprise as one day I saw what was a diesel engine manufacturer, the next a burgeoning defense conglomerate. Can you talk a bit more about the strategy behind FMD's growth?

That's a great question, Greg. Go back to when Fairbanks Morse was part of the public company. I use the old phrase, 'if all you have is a hammer every problem looks like a nail.' At that point in time, we were an engine company [and the mantra to address challenges was] "Well, we just have to go sell more engines."

With the acquisition by Arcline and [my return] we had a change of perspective.

We said "This actually isn't an engine company, what we really are is a critical supplier to the Navy."

With that as a guiding light, we said to ourselves, "Well, if we're a critical supplier to the Navy, then we should be selling other critical equipment?"

That put us on the path of making these acquisitions, building the company to where we are today. So, with the Rolls Royce acquisition, that's our 13th. It won't close until sometime next year [2025], but that's a pretty significant run in a four-year period of time.

Can you tell me a little bit more about the integrity, velocity and teamwork mantra … what does that mean to you in real terms?

I like to do things in terms of threes, and I always tell people … "I'm not the smartest guy out there by any stretch, but I can remember three things." So I figure if I can remember three things, then everyone else can remember three things, too.

It starts with **integrity**. Former senator Alan Simpson had a great line. He said, *"If you have integrity, nothing else matters. If you don't have integrity, nothing else matters."*

That really resonated with me. I realized how important [integrity] is to me in how I run my life and how I do things, not just at work but in my personal life, too. We're going to

*"With the acquisition by Arcline and [my return] we had a change of perspective. We said 'this actually isn't an engine company, **what we are is a critical supplier to the Navy.**' That put us on the path of making these acquisitions, building the company to where we are today."*

– George Whittier, CEO, FMD

on FMD's M&A activity since 2020

MARITIME MATTERS: The MarineLink Podcast

Scan the QR code to watch the full, uncut podcast with FMD CEO George Whittier on the **Maritime Matters: The Marinelink Podcast**

operate above board, we're going to be honest, be respectful. We're going to admit our mistakes, we're going to fix problems when we have problems, we're just going to be that good partner for our customers, our suppliers, and then our own teammates.

Then that feeds into **teamwork**. If you have integrity and you have that sense of honor and respect, and you operate in a sense of teamwork. A winning team is a team that works well together, a losing team is a team where you're pointing fingers at each other and you're placing blame all the time. We want a team that – we're not going to win everything – but we're going to win as a team and we're going to lose as a team. And when we lose as a team, we're going to figure out what we did wrong and then we're going to fix it. Because we have integrity. The second value, even though I talk about it third, is really the cornerstone for what we do here at Fairbanks Morse, and that's **velocity**.

I tell folks that we have to be decisive in what we do, and I talk about velocity as speed with a direction. We will make decisions when we have 80% of the information that we need, and then we course correct, and we know that we're going to make some mistakes because we're operating with 80%, but because we have integrity and because we have teamwork, we can course correct, solve those problems and still get to the finish line, get to where we need to be before anyone else can get there. We've literally won projects where I've had a competitor call and tell me, and say, "You guys won that project before I knew there was a project."

I know you are passionate about the U.S. Navy industrial base. Can you summarize what you see today?

We're in a dangerous world right now. Iran is shooting missiles at Israel, the Houthis are disrupting trade, everyone knows about Russia and Ukraine. And to me, the biggest challenge of all would be: *what happens if China invades Taiwan?* There's some talk of that in a 2027 timeline, and in global timelines that's tomorrow, and we're not ready for that as a Navy. I get concerned when I see the shipbuilding budget for 2024, where the Navy [is decommissioning three times more ships than they're building, including only six or seven newbuilds for 2025 when initially the projection was 10]. At a time when our Navy is shrinking, our industrial base is shrinking, we have a Chinese Navy that's gone from 300 ships to 350 ships or greater.

The counter to that is always, *'well, if you include all the allied nations we actually have a lot more ships, and the ships that we have are larger and more capable.'* I understand that, I really do, and I think we have the best Navy in the world, bar none. I don't think that the Chinese can compete with us at all, but it is really concerning just on a sheer quantity of ships and the fact that [a potential Taiwan] conflict is right in their backyard, where for us its 6,000-8,000 miles away.

[When you see] the hundreds of thousands, millions of man-hours that we're short to build the equipment that we need, it's a concern for everybody.

So my passion on this is that we should be doing a lot more of this work in the Midwest. The biggest constraint today is labor. [The big navy yards are storying to subcontract] but I'd like to see that much more broadly.

A crazy idea I have is we ought to have a shipyard in St.

Louis that's making modules for all of the other shipyards, and you stick them on a barge and you sail them down the Mississippi River. There's a lot of labor in the Heartland, and if you drive through the middle of the country, you see these rust belt towns where there's labor available. There are tech schools, there's trade schools, we can teach people how to weld. And then the shipyards that exist today really then should be transformed into assembly yards.

We don't do that, and I think the main reason is because we don't have enough demand [building six ships per year].

[The big Navy shipyards have] plenty of labor to do the work that they need to do today, but what's it going to look like if we say "Hey, we have to build 25 to 30 ships a year."

[To do that we have] to really transform the way that we do business today. And in order to do that, we're going to need significantly more labor, we're going to need more money from Congress. So, the Navy's going to have to say, "Hey, instead of a $35 billion shipbuilding budget, it needs to be $40 to $45 billion."

The Navy is our front line of defense; it's freedom of the seas for everything that we want to do as a country. That has the follow on effect to the supply chain, the industrial base that then has to grow and be able to support that. And there's tons of companies out there like, Fairbanks Morse, that are really waiting for that leadership. Now what we're seeing is that there's a lot of grassroots efforts [such as] a year ago I helped launch the Wisconsin Defense and Industry Coalition.

But none of that's really going to be successful if we don't start saying, 'Contracts have to start coming out of the big yards, out of the big primes into the industrial base.'

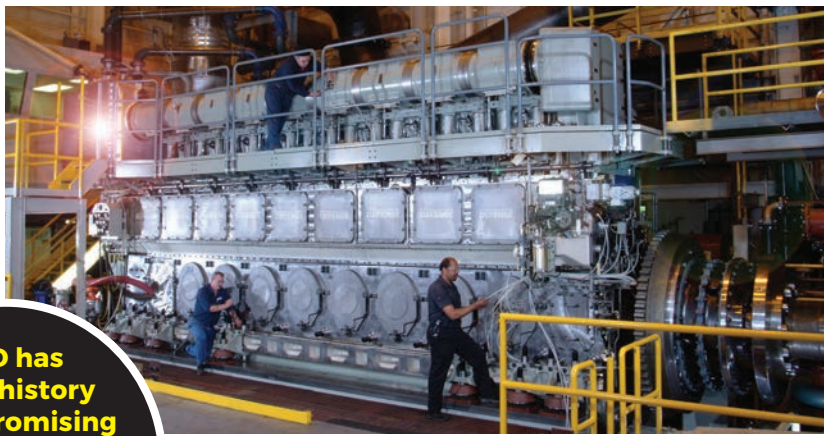
And in order for that to happen, the big primes, the big shipyards, they have to have additional contracts so that they can manage their financials. Because they can't just say, "Oh, all this stuff we're doing today, we're just going to outsource it."

I'm really passionate about this topic, and [to be clear] I'm not trying to build ships just for the sake of building ships. I'm very concerned about the state of the world today. [Almost no one today] thinks of China right as a friendly country. I've been there about 20 times in my life, but I wouldn't go today, it's a very adversarial relationship there. It'd be great if we could try to simmer tensions a bit, but the way to do that is 'peace through strength.'

Perhaps a bit early, but when you think about the FMD legacy that you pass on, what would you like it to be?

I think there's two things, Greg. If we go back in our [150-year] history, we made windmills, we made scales, we made pumps, motors and engines; a huge variety of products. By the 1960s-70s, the company was really only making engines. I think about the legacy that I would like to be able to leave is one, there's a clear focus on the customer that we have, the United States Navy and the United States Coast Guard, this legacy of defense, enabling freedom of the seas, how important that is.

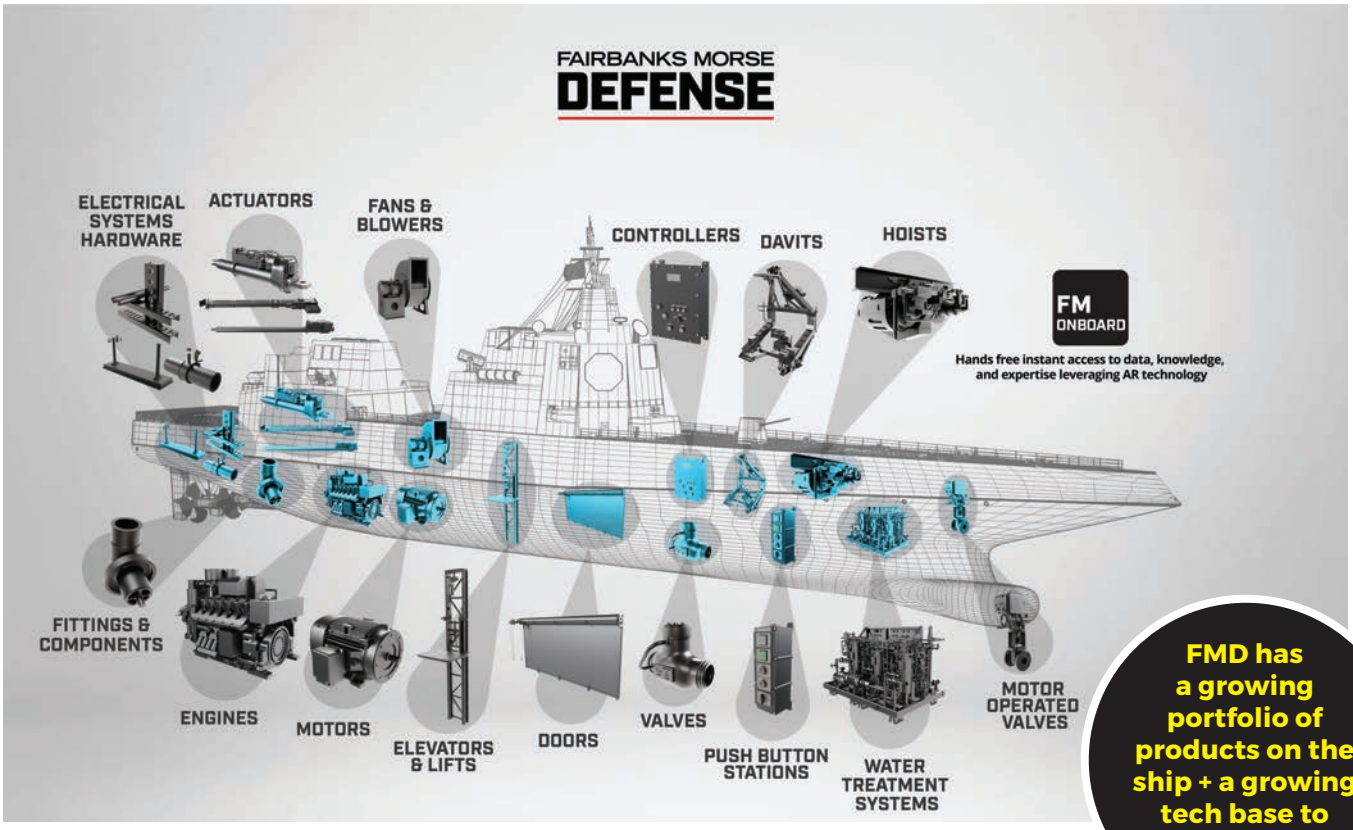
And second is going back to the original mission of Fairbanks Morse. We're much more than just an engine company. We now have a motor company, we have a valve company, we have an elevator company, we have all of this other capability that we've gone back to be able to add, to say, just almost like the company that existed more than 100 years ago. And so, it's a little bit of back to our original roots, and I think that whoever gets this job after me, whenever that may be, hopefully they can continue to grow and expand on that in a similar manner to what we've been able to do for the last couple of years.



FMD has a rich history and a promising future serving the needs of the US Navy and Coast Guard.

All images courtesy Fairbanks Morse Defense

GEORGE WHITTIER, CEO, FAIRBANKS MORSE DEFENSE



FMD has a growing portfolio of products on the ship + a growing tech base to service it for its life.

All images courtesy Fairbanks Morse Defense

ANE MÆRSK

WORLD'S FIRST LARGE METHANOL-FUELED CONTAINERSHIP

When talk turns to fuel transition in the maritime sector, the conversation usually starts with: 'yes, change is happening, but the majority of the world fleet continues to operate as it always has; with diesel fuel' and ends with 'change is being driven by a handful of pioneers: the big companies.'

Enter Danish shipping giant A.P. Moller - Mærsk, one of the biggest and most innovative companies operating ships globally today, and its world's first large methanol-enabled container vessel dubbed Ane Mærsk, delivered earlier this year from HD Hyundai Heavy Industries (HD HHI) in Ulsan, South Korea. Ane Mærsk is *Maritime Reporter & Engineering News'* 'Great Ship of 2024.'

The vessel is named after **Ane Mærsk Mc-Kinney Uggla**, the Chair of the A.P. Moller Foundation and A.P. Moller Holding. Ane's eldest granddaughter served as godmother and christened the vessel.

Ane Mærsk is equipped with a dual-fuel HYUNDAI-MAN B&W 8G95ME-C10.5-LGIM-EGRTC main engine, able to generate 44,187 kW.

Its methanol fuel capacity is 16,000 cu. m. in two tanks beside each other, located forward of the engine room, and it can sail up to 23,000 nautical miles on methanol corresponding to 41,400 km (1 nautical mile = 1,8 km) when fully bunkered. Both the main engine and the four auxiliary engines – HiMSEN H32DF-LM (3 x 9 cylinders each 4320 kW + 1 x 6 cylinders 2880 kW) – are dual fuel, meaning they can run on methanol as well as traditional marine fuels.

In addition, Ane Mærsk and her sister ships have an industry-first innovative design with the bridge and accommoda-

Ane Mærsk Main Particulars

Shipyard: ..... Hyundai Heavy Industries, South Korea.
Length: ..... 350 m
Breadth: ..... 53.5 m
Speed: ..... 21 knots
Container capacity: ..... 16,592 TEU
Main engine: ..... HYUNDAI-MAN B&W
..... G95ME-C10.5-LGIM-EGRTC, 8 cylinders, 44,187 kW
Auxiliary engines: ..... 4 x HiMSEN H32DF-LM
Shaft generator: ..... Wärtsilä [4 MW]
Methanol fuel capacity: ..... 16,000 m3 in two tanks

Note:
The vessel can sail up to 23,000 nautical miles on methanol corresponding to 41,400 km (1 nautical mile = 1,8 km) when fully bunkered. The engine is a Dual Fuel type, meaning it can run on methanol as well as traditional marine fuels. The same applies to the auxiliary engines.

tion placed at the very front of the vessel, allowing more cargo to be carried and reducing the consumption per container.

Ane Mærsk began her maiden voyage on green methanol and the company continues to work on sourcing bunkering solutions for its methanol-enabled vessel fleet, the classic 'chicken and egg' scenario most often cited as a challenge when it comes to owning and operating new tonnage operating on alternative fuels.

Ane Mærsk is the first of Mærsk's 18 large methanol-enabled vessels, that will be delivered between 2024 and 2025, and it is the world's second methanol-enabled container vessel.

THE CAPTAIN

"For me it was the challenge of something new – not the technical challenge per se but the organizational one in being 'the first of the first. And of course, the chance to play a role in our decarbonization story is quite special."

Douwe Joustra, the Captain, has been with with Mærsk for nearly four decades

Image courtesy Mærsk

OCEANUS AURORA

Rotor Sails Help Cut Fuel Burn 4%

Image courtesy IINO Lines

Oceanus Aurora, a very large LPG (liquefied petroleum gas) carrier, delivered at Okpo Shipyard of Hanwha Ocean Co., Ltd. (formerly Daewoo Shipbuilding & Marine Engineering Co., Ltd.) equipped with LPG dual-fuel main engine and has environmental performance that complies with emission regulations in the EU. Thanks to its dual-fuel engine, the Oceanus Aurora can use LPG in addition to conventional fuel oil , which significantly reduces emissions of nitrogen oxides (NOx), sulphur oxides (SOx) and carbon dioxide (CO2). The vessel's environmental footprint is further improved thanks to the installation of a wind propulsion system in the form of two Norsepower Rotor Sails, which are modernized version of the Flettner rotating cylinder. By using modest amounts of electricity to set a deck cylinder in motion, these spinning cylinders create a Magnus effect to generate thrust along with the wind. By installing the Rotor Sails, approximately 4% of fuel consumption and CO2 emissions will be reduced. As the vessel carries hazardous materials, the Rotor Sails are explosion-proof.

To maximize fuel savings delivered by wind propulsion systems and minimize the greenhouse gas emissions, the voyage optimization system is used on Oceanus Aurora, as an in-depth simulation, evaluation, and operational route and speed optimization tool. This is designed to enhance operational efficiency and minimize the emissions of the vessels by allowing for comprehensive comparisons of their performance across various routes and under different sea and weather conditions. In addition to the 4% reduction in fuel consumption and CO2 emission, the collaboration with the voyage optimization system enables us to harness the potential of voyage optimization to inform operational decision-making and additionally improve emissions reduction by 3-10% from the combination of advanced routing solutions and wind propulsion systems.

Investing in sustainable vessels is paramount to IINO Lines' commitment to environmental stewardship, and Oceanus Aurora will help us achieve our emission reduction targets and is symbolic to further decarbonization efforts.

Oceanus Aurora Main Particulars

Name:	OCEANUS AURORA
Type:	LPG & AMMONIA CARRIER
Builder:	HANWHA OCEAN CO., LTD.
Owner:	IINO Kaiun Kaisha Ltd.
Designer:	HANWHA OCEAN
Classification:	ClassNK
Main Particulars	
Length, (o.a.):	229.9 m
Length, (b.p.):	223 m
Breadth, (molded):	36.6 m
Depth, (molded):	23.6 m
Draft, (designed):	11.6 m
Draft, (scantling):	12.2 m
DWT (at design draft):	54140.0 tons
DWT (at scantling draft):	58551.1 tons
Speed:	16.8 knots at the design draft, 85% MCR(11,033kW) with 15% sea margin
Fuel Type:	LSMGO/LPG
Main engines:	MAN B&W 6G60ME-C10.5-LGIP
Total installed power:	12,980 Kw at 93.5 RPM (MCR), 12,980 Kw at 93.5 RPM(NCR)
Propellers:	Fixed Pitch Propeller
Radars:	JRC
Depth Sounders:	JRC
Auto Pilot:	YOKOGAWA
Radios:	JRC
AIS:	JRC
GPS:	JRC
GMDSS:	JRC
SatCom:	JRC
Fire extinguishing systems:	Fain
Heat exchangers:	DongHwa Entec & Hisaka
Coatings:	JOTUN
BWMS:	TECHROSS

Image courtesy Höegh Autoliners

HÖEGH AURORA

Höegh Autoliners' Höegh Aurora, the world's largest pure car and truck carrier (PCTC) vessel, embarked on its maiden voyage and commenced commercial operations.

The newbuild is the first of 12 Aurora Class vessels being built by China Merchants Heavy Industry. Featuring 14 decks—including five liftable decks—the ship can carry up to 9,100 CEU. With enhanced decks and ramps, the vessel is designed to carry electric vehicles on all decks, and will be very flexible for most cargo.

Designed by Deltamarin, the Aurora class vessels are described as the world's most environmentally friendly PCTCs. The ships will be powered multi-fuel engines from MAN Energy Solutions that can run on marine gas oil (MGO) and liquefied natural gas (LNG). They also have DNV's ammonia ready and methanol ready notations, meaning they are prepared to run on zero carbon fuels such as ammonia or methanol once these become more widely available.

Höegh Autoliners estimates that the Aurora class will reduce carbon emissions by approximately 10,000 MT of CO2 in one year (tank-to-wake) and around 6,200 MT CO2eq (well-to-wake). The ship's CII, or carbon intensity indicator, is 58% lower compared to a standard 6500 CEU PCTC (Cat 1) due to improved efficiencies in the hull, machinery and propeller.

Höegh Autoliners expects delivery of two Aurora vessels every six months starting from the second half of this year.

Following the 12 Aurora Class vessels currently on order, Höegh Autoliners has an option to build another four vessels (vessels 13-16), as well as slot reservations for additional four vessels (vessels 17-20).

VANETA MARIE

Courtesy DSC Dredge

Muddy Water Dredging's new cutter suction dredge (CSD) Vaneta Marie "represents the future of dredging technology", according to Bill Wetta, senior vice president, and chief technology officer of DSC Dredge, the Reserve, La. based company that built the dredge.

Christened during a ceremony in New Orleans earlier this year, Vaneta Marie is a fully customized Marlin Class dredge that measures 371 ft. long, making it one of the longest in its category.

Boasting the capability to dredge a 400-ft.-wide cut with an 80-degree swing arc, it sets a new standard for operational efficiency, enhancing productivity by 5.9%. Furthermore, its customizable design features a detachable carriage barge, enabling seamless adaptation to various working environments.

"Vaneta Marie was specifically built for a certain set of projects in the Gulf Coast area, primarily the Calcasieu River, although it will actually work from Galveston all the way to Pensacola," Wetta said. The dredge will perform "mostly navigational maintenance-type work, where material is not that deep, but it tends to be more in the corners of the channel, where movement becomes really important."

"[Muddy Water Dredging] wanted to be able to dig depths to the new Panamax ships. This dredge can dig pretty deep, so it could actually dig container ports that went as deep as Panamax vessels."

With Vaneta Marie, the DSC team was able to match "unparalleled performance with forward-thinking designs", Wetta said. Notably, the dredge features DSC's survey-grade DSC VISION package and Dredge Rx remote monitoring system for enhanced precision and performance.

"DSC Vision is a multi-beam sonar that's attached to the dredge, and sonars typically don't really work unless there's movement. . . We use the motion of the dredge to create the motion for the sonar. So we're actually looking at a line perpendicular to the center of the dredge, maybe 100 feet forward of where the cutter head is, and all the way back behind where the ladder pivots at the trunnion. We look at that line, and as the dredge pivots from left to right, that line becomes a plane and it paints what the bottom looks like.

"When an operator shows up on a Corps job, before they start digging, they can make a pass to the left and a pass to the right, and basically, they can see everything on the bottom, real time, that's in front of them and behind them and they know if the job that they're going on even resembles what the plan was. Then as they start digging, it's real-time updating so they can see the changes they're making in the channel. They can also see what's caving in behind them. So, if the dredge advanced a hundred feet and the whole bank caved in, they would be able to see that real-time, back up and fix that, rather than having to wait for a survey crew to come on board."

Sometimes advanced technologies can complicate operations, but Wetta stressed that's not the case with Vaneta Marie. "There are a lot of computers on the dredge, and for traditional dredge operators, that can be scary," he said. "But when you sit in the chair of the dredge, there's basically two screens and eight buttons. One screen looks like a video game, and that's DSC Vision: a rendering of what the bottom looks like in a 3D-colored map. The other side [are the] gauges that the operator looks at to control the dredge. The operator doesn't have to be aware of everything around him [as that's] handled with the automation system. If there is a problem, he and the chief engineer will be notified."

Another standout feature of the Vaneta Marie is its dual diesel-electric power package, delivering 9,621-horsepower of total installed horsepower. "The [Wabtec] engines are the only in this class that can be [EPA] Tier 4 without a bunch of post-treatment or diesel exhaust fluid," Wetta said. "Looking at the exhaust, it's pretty clear you don't get any black smoke with the engines. It sips fuel compared to some of the higher speed engines."

The diesel-electric setup also unlocks other capabilities. "Because it's diesel-electric, can take power from the grid; so this machine could run strictly off of an umbilical cord. It's also designed, because we're in a hurricane area, where we can export the power off these engines in a disaster event, and we could power a city or a plant. So, it's basically an eight-megawatt power plant that becomes a dredge."

Image courtesy ADNOC

AL SHELILA

ADNOC Logistics and Services took delivery of Al Shelila, the first of six newbuild liquified natural gas (LNG) carriers from Jiangnan Shipyard in China. The vessel has been delivered two months ahead of schedule, with the remaining five expected to be delivered in 2025 and 2026. Immediately after delivery Al Shelila will go on hire with a top-tier, global energy trader.

Captain Abdulkareem Al Masabi, CEO of ADNOC L&S, said: "We are proud to take delivery of 'Al Shelila,' from Jiangnan Shipyard. In Arabic, 'Shelila' represents strength and grace, qualities that reflect the legacy of our forefathers' vessels. As we expand our fleet to meet rising global demand for natural gas, our deepening partnership with Jiangnan Shipyard underscores the strong industrial ties between the UAE and China, reinforcing our shared commitment to powering global economic growth."

ADNOC L&S awarded shipbuilding contracts to Jiangnan Shipyard in 2022 for the six LNG carriers as part of the company's strategic fleet expansion to meet the growing global demand for natural gas as a lower-carbon energy source. During 2024, the company strengthened and modernized its asset base with new build contracts for up to 23 new energy-efficient vessels, including 8-10 LNG carriers, nine Very Large Ethane Carriers (VLECs) and four Very Large Ammonia Carriers (VLACs).

"Under the great trust and support of ADNOC L&S, DNV, GTT and all relevant parties, Jiangnan has completed the construction of the first Mark III type large LNG carrier two months ahead of schedule," said Lin Ou, Chairman of Jiangnan Shipyard.

Al Shelila has a capacity of 175,000 cu. m., significantly larger than the 137,000m3 capacity of ADNOC L&S' current LNG carriers. Equipped with advanced energy-efficient technologies, including two new-generation LNG dual-fuel main engines, the vessel is designed to reduce methane emissions by up to 50% compared to older-generation technology.

Design from a 'Clean Sheet'

CMA CGM MERMAID

Courtesy CMA CGM

CMA CGM Group took delivery of the CMA CGM Mermaid, the first ship in a series of 10 new 2,000 TEU container ships powered by Liquefied Natural Gas (LNG), which will be progressively deployed in the Mediterranean and Northern Europe.

The new container ships, with an original design aimed at improving their energy efficiency and environmental performance, will join the CMA CGM fleet of around 620 vessels, including more than 30 already powered by alternative energies. These ships will emit up to -20% CO2 compared to a similar-sized ship with a conventional maritime fuel design (very low sulfur oil).

Mermaid is part of CMA CGM's fleet renewal program, in which the Group has invested more than $15 billion, and by 2028, nearly 120 ships will be powered by low-carbon energies.

A new, almost inverted straight bow with an integrated bow bulb also offers better hydrodynamic performance to reduce fuel consumption by 15% per trip.

These ships, with a different line and architecture from conventional container ships, were designed in collaboration with Chantiers de l'Atlantique. Danish engineering firm Odense Marine Technique (OMT) further converted the concept into an industrial prototype.

Built in South Korea at Hyundai Mipo Dockyard (HMD), the ship and the series all include valuable input from GTT, a French company focused on the maritime transport and storage of liquefied natural gas, which worked closely on the project for the design and conception of the gas chain and storage tank with total capacity of 1,053 cu. m.

In evaluating its options to maximize energy efficiency, CMA CGM decided to resize this new series of ships. One of the original characteristics of the design is the ratio of 204.29 m long to 29.6 m wide to improve the ships' hydrodynamic and aerodynamic performance.

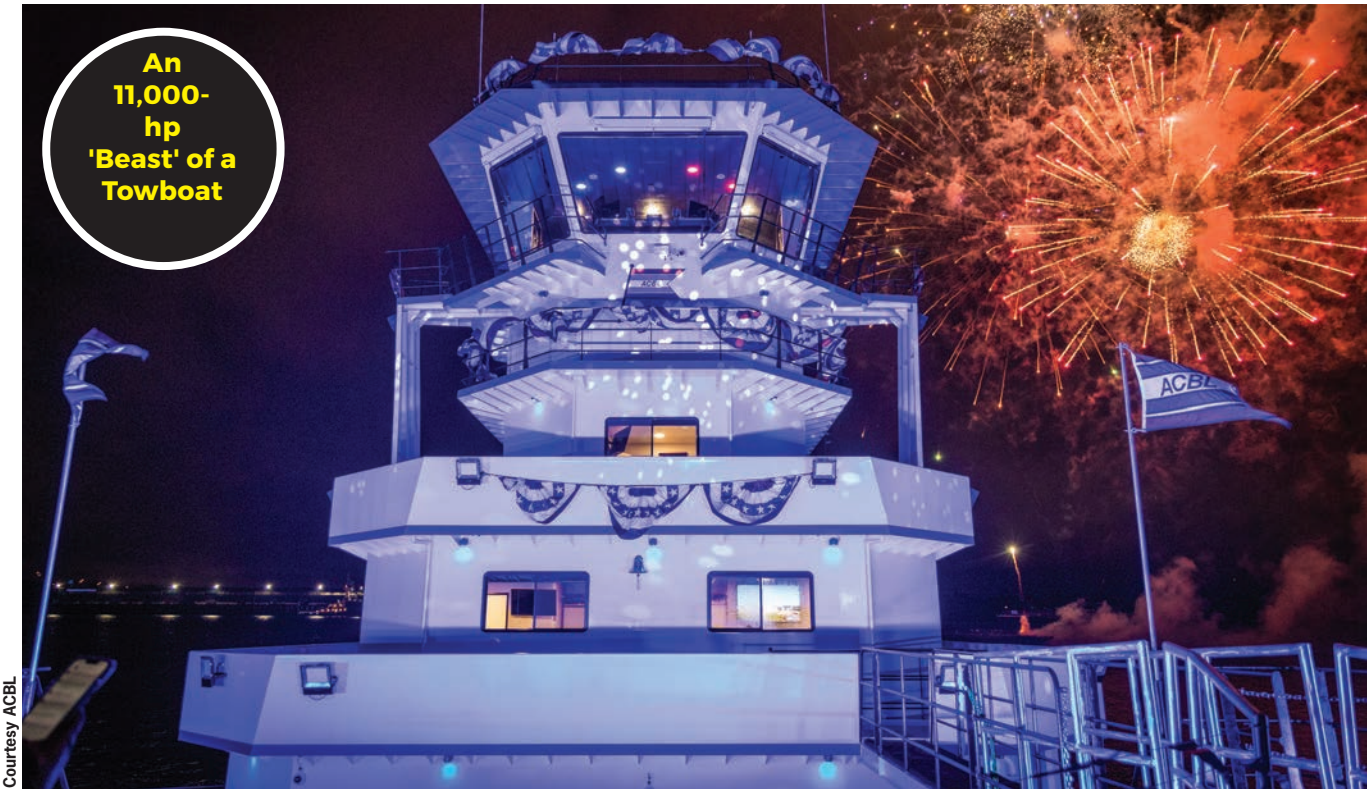
They are also the first ships in the CMA CGM fleet with superstructures at the front, as the forward placement of the bridge and accommodations ensure better aerodynamic performance and higher loading capacity compared to a conventional architecture.

These ships are powered by LNG, and while LNG is obviously still a fossil-fuel, it is a lower-carbon energy source than conventional fuel, which reduces sulfur oxide emissions by 99%, nitrogen oxide emissions by 92%, and fine particles by 91%. When cooled to -161°C, LNG powers a 12-megawatt MAN engine. These dual-fuel ships can also carry biogas (-67% eq. CO2) produced from bio-waste and are convertible to e-methane (-85% eq. CO2) produced from decarbonized hydrogen.

The 10 new container ships will also be equipped with an alternator coupled to the main propulsion engine, which will provide the energy needed to power the onboard electrical installations once at sea.

The latest outstanding innovation in this new generation of container ships is one of the most powerful fuel cells aboard a ship. It is on track to be mounted on the last of the series which is scheduled for delivery in January 2025. As the fuel cell is powered by hydrogen with an energy capacity of 1MW, this ship will have zero emissions when berthed.

Delivered progressively between February 2024 and January 2025, the ten new vessels will transport goods over short distances, mainly in Northern Europe and the Mediterranean.



Courtesy ACBL

ACBL MARINER

American Commercial Barge Line (ACBL) last month welcomed its new flagship, the 11,000-hp towboat ACBL Mariner. Designed by CT Marine and built by C&C Marine and Repair, the twin-screw towboat is a beast, measuring 200- x 54-ft. with an 11-ft. operating draft, powered by a pair of Louisiana CAT-supplied Caterpillar C280-12 main engines that produce approximately 11,000 hp. The engines are paired with two Reintjes WAF 6755 reduction gears from Karl Senner, LLC, while generator power comes from three Caterpillar 275-kW generators. The towboat is outfitted with CT Marine CT28-SL nozzles housing 124-inch diameter stainless-steel, five-blade fixed pitch propellers and features Twin-DIFF flanking and steering rudder systems.

"To have this much horsepower with only two engines and still be able to push the largest tows in the industry, that's a huge advantage because it brings the operational cost down," said Randy Chamness, ACBL's vice president of vessel operations. "When you look at it at cost per ton mile and cost per operating hour, there's no vessel in the industry that will be able to match what this boat."

ACBL Mariner will operate on ACBL's mainline network with the capability to push approximately 75,000 tons of cargo. It will push up to 46 loaded barges southbound and 56 barges northbound, and later on, ACBL plans to expand the northbound tows to 64 barges under the right navigational conditions, Chamness said.

ACBL Mariner marks a pivot from what has been the industry norm over the last decade or so: towboats in the 6,000-hp range with Z-drives used for mainline operations.

"When comparing this 11,000 HP class towboat to smaller 6,000 HP class towboats frequently used for mainline operations, this larger horsepower vessel will increase efficiency by 20% or more on both a cost per ton mile and CO2 emission per ton mile basis due to the increase in tow size and tonnage capacity," said Patrick Sutton, ACBL SVP of fleet development and strategy.

Like most others in maritime, the barging industry struggles to recruit and retain the workforce it needs. To recruit crews effectively, "you have to have and offer the same level of [onboard] crew comforts and modern amenities that you would have at home," Chamness said. "This boat does that better than any other that I've seen. So, it's easy to recruit people to work on a boat like this."

With accommodations for a crew of up to 12, the vessel incorporates a floating, spring-mounted superstructure for additional onboard comfort. Its pilothouse eyeline will be 47 feet above the water.

eWolf *fully electric tugboat*

Crowley Maritime Corporation's eWolf is an innovative harbor tug that stands out as the first fully electric tugboat in its fleet and the first of its kind in the United States. Unlike traditional tugs powered by diesel engines, eWolf operates entirely on batteries, producing zero emissions and minimal noise.

As regulations tighten and environmental concerns rise, the maritime industry is increasingly investing in cleaner technologies. Crowley's drive to develop an electric tug began amid global developments in electric propulsion, "When we started this journey, the concept of an electric tug was just starting to kick off," said Paul Manzi, VP, 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."

In 2021, as part of its commitment to achieve net-zero emissions by 2050, Crowley's engineering division unveiled the eWolf design. The company partnered with ABB as the systems integrator and engaged Master Boat Builders in Alabama to build the vessel.

The 82-ft. eWolf is designed to meet ABS class standards and U.S. Coast Guard Subchapter M regulations. It was officially delivered in January 2024 and traveled from Alabama to San Diego under its own power, where it is now stationed at the Tenth Avenue Marine Terminal. Externally, eWolf resembles a conventional tug, but its interior is a technological leap. "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."

While electrical systems are not new to commercial vessels, installing them in a compact tug like eWolf presented unique challenges due to limited space for high-voltage cables and components, Rice said.

eWolf features an integrated electrical propulsion system by ABB, a 6.2 MWh Orca battery energy storage system, two 2,100 kW RAMME motors, and Schottel azimuthing thrusters. Emergency generators are also included for added reliability.

Bruce Strupp, vice president of marine systems for U.S. and Canada at ABB Marine & Ports, described the key pieces of technology that are core to an ABB solution for hybrid and zero-emission vessels. "The first is our Onboard DC Grid architecture. All the power sources integrate into the Onboard 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 eWolf represents a significant financial investment for Crowley, reportedly costing double that of a conventional tugboat. Funding for the project included substantial grants from several organizations, including the San Diego County Air Pollution Control District and the U.S. Environmental Protection Agency, aimed at supporting cleaner maritime operations. "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, Crowley 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.

Courtesy Port of San Diego

The U.S. Navy accepted delivery of the Flight IIA Arleigh Burke–class guided missile destroyer, the future USS John Basilone (DDG 122) in July 2024. The Arleigh Burke–class guided missile destroyer is arguably one of the most successful shipbuilding programs in the history of the U.S. Navy, and this most recent ship was built by General Dynamics Bath Iron Works in Bath, Maine. The ship is named after **U.S. Marine Corps Gunnery Sergeant John Basilone**, who received the Medal of Honor for his extraordinary heroism during the Battle of Guadalcanal.

DoD photo by EJ Hersom

USS JOHN BASILONE (DDG 122)

Eco Edison

First U.S.-built, -owned, -crewed SOV

Edison Chouest Offshore's (ECO) new service operations vessel (SOV) ECO Edison is a groundbreaking newbuild, the first-ever American-built, -owned and -crewed offshore wind SOV, christened and quickly sent to work earlier this year. ECO Edison will play an integral part of the operation and maintenance of Ørsted and Eversource's South Fork Wind, Revolution Wind and Sunrise Wind projects as the U.S. offshore wind industry continues to ramp up in the U.S. Northeast. Built at ECO's in-house shipyards in Louisiana, Mississippi and Florida, the 262-ft. liveaboard SOV will serve as a floating, year-round homebase for 60 of the first American offshore wind turbine technicians, who will work at-sea over the life of the wind farms, servicing and maintaining the wind turbines. ECO Edison is powered by two U.S. EPA Tier 4 certified Cat 3512E engines from Caterpillar Marine. The U.S.-flagged, Jones Act qualified vessel features a walk to work motion-compensated gangway that allows technicians to easily and safely access the wind turbines. The SOV's smaller daughter craft, Tee Ed, can be deployed to maneuver crew across the wind farms.

Courtesy Ørsted

Image courtesy Wallenius Marine

M/V Future Way

Wallenius Marine's new vessel Future Way, based on the Sleipner design concept, was christened in Emden, Germany in September. The ship, built at CIMC Raffles, China , features an advanced hydro- and aerodynamic design, and contributes to reducing emissions, energy use and environmental impact. This is the first of two car carriers that will go on charter for Volkswagen between Europe and North America.

With the Sleipner concept and the Future Way vessel, Wallenius Marine and Danish design firm Knud E. Hansen seek to raise the bar for innovation in the Pure Car and Truck Carriers (PCTC) segment.

"The Sleipner concept is the result of close co-operation between Wallenius, Knud E. Hansen and VW Group. The customer's needs and experience, combined with the shipbuilding and design expertise of Knud E. Hansen and Wallenius Marine, have enabled us to take further steps towards truly sustainable shipping with Future Way." said Johan Mattsson, CEO of Wallenius Marine.

A distinctive feature is that the ship can cross the Atlantic without ballast water in loaded condition. This both reduces the risk of spreading invasive species and makes the vessel lighter, leading to lower fuel consumption.

Future Way and its sister ship, Way Forward, are both powered by engines from MAN Energy Solutions, engines that emit less CO2, nitrogen oxides, soot particles and sulfur oxides.

The vessel's cargo capacity is equivalent to 6,500 cars, which are loaded and unloaded through the center ramp system, a long ramp serving all decks. On the ship, the crew has a gym, recreational facilities and modern social areas that follow the traditional Wallenius idea of the ship being 'a home away from home'.

1st of nine Venture Gator

Venture Gator is the first LNG vessel for Venture Global, launched at Samsung Heavy Industries shipyard in Geoji-si, South Korea. Venture Gator is the first of nine LNG carriers in the Venture Global fleet to be completed in quick succession across three shipyards in South Korea over the coming 24 months, built to transport LNG from the U.S. to multiple global partners and destinations. The ship deploys best-in-class environmental and efficiency technology and will be primarily fueled by Venture Global's liquefied natural gas. The Venture Gator and progressively the fleet's other eight ships will commence serving our global partners in Europe and Asia beginning this fall.

Venture Gator is a 174,000 cubic meter ship, in a state-of-the-art fleet which showcases the industry's newest, clean technologies for transporting LNG across the world. The new hull design; onboard reliquefication for liquefying gas which has boiled-off in transit; an air-lubrication systems; an auxiliary shaft generator and an exhaust gas recirculation systems (to reduce methane).

Courtesy Venture Global

Tech Files

Innovative Products & Systems

Are Fresh Vegetables a Key to Seafarer Happiness?

Image courtesy Tokei Kaiun

ClassNK awarded the first-ever notation for installing a **Hydroponic Vegetable Grower for a Ship** to improve seafarers' living conditions to Tokei Kaiun's bulk carrier Royal Laurel.

ClassNK granted its 'ELW (HP)' (Excellent Living and Working Environment (Hydroponics)) notation to the ship, and the system is expected to help improve working conditions that exceed the regulations set by the Maritime Labor Convention (MLC, 2006). ClassNK has established a scheme to indicate on a class certificate that a ship is equipped with measures and facilities that contribute to the improvement of the onboard environment in its 'Guidelines for Excellent Living and Working Environment'.

ClassNK confirmed that the 'Hydroponic Vegetable Grower for Ship' manufactured by HSN-KIKAI KOGYO CO., LTD. installed on Royal Laurel, is designed to operate in inclined environments, taking into account its use on ships, and the 'ELW (HP)' was affixed to the vessel.

Hoopo's *hoopo Sense* Solar Tracker

ZIM Integrated Shipping Services is accelerating the global deployment of smart containers, helping to advance visibility and transparency through the integration of Hoopo's innovative hoopoSense Solar trackers.

ZIM's smart container solution enables end-to-end tracking, including the inland leg, giving customers full transparency into their shipments and a more accurate ETA, even after the containers exit terminals or depots enroute to their final destinations.

The hoopoSense Solar tracker boasts a battery life of more than 12 years, sufficient to last a container's lifecycle and eliminating the need for replacements. Each tracker is designed to deliver precise location data and features a built-in door-opening detection system with 99% accuracy. Additionally, the tracker meets ATEX-1 standards for secure products, making it suitable for LNG vessels and diverse marine environments.

Image courtesy Hoopo/ZIM

Niel Spillane 100-Year-Old *'Webbie'* Reflects on a Life Well Lived

100 years, countless stories. Niel Spillane has seen it all, from his days at Webb Institute to the battlefields of WWII. Join me in this interview as he shares his inspiring wisdom and the secrets of a life well-lived.

By Kaye Lin

Niel was around 18 years old when he first went to Webb Institute. Back then, Webb was located in the Bronx. He then served in Europe for approximately three and a half years during World War II, and witnessed the horrors of war firsthand.

"It gets tiresome after a while ducking and finding a way to stay alive... I just wanted to go to college where nobody's shooting at us," recalled Niel. The constant threat of death was ever-present, especially during intense periods like the four months of relentless shelling in France, followed by two months in Germany.

After serving in World War II, now 22 years old, he returned to Webb and transitioned seamlessly back into college life, now at Webb's new campus in Long Island, NY.

"Webb has impacted my life in so many ways. It got me the job at Electric Boat. I led the repair of 16 ships on time and under budget. One of them was so under budget that my ship manager wrote a letter to my admiral for exceptional work and cost savings."

Niel's naval career was remarkable, earning him three Navy commendations within 18 months. He had repaired 16 ships, each on time and under budget. His achievements led to an unprecedented promotion, skipping three ranks to replace a lieutenant commander while still an ensign.

But Niel wasn't just defined by his accomplishments; he spoke warmly of his late wife, a social worker who believed in the power of human connection. He had even carved and painted a decorative statue to honor her. His grandchildren were thriving, one of them a proud Webb graduate, Colin Spillane '13, who was following in his grandfather's footsteps.

His voice grew animated as he talked about helping to establish the Honor Code that made Webb a safe and respectful space. Webb Institute's Honor Council is a student-led organization responsible for upholding the school's Honor Code. Students pledge to maintain the highest standards of academic integrity and personal conduct.

Life Lessons from Webb

"Webb was unlike any other school. People are not competing - they're actually helping one another graduate," he said. I learned from speaking with him that there is no zero-sum game in the reality of life. Webb is a microcosm of life in

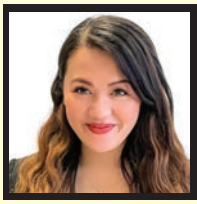
general - the more you help others, the more you will get back. Niel talked about how everyone studied late nights at the library and explained concepts to classmates who were struggling so they didn't have to stress alone.

I smiled as he told me about his memories and how Webb changed how he viewed the world as I've always believed that kindness and generosity tend to be reciprocated. And, here he is telling me about the valuable life lessons he learned in college. "Life isn't about tearing others down to build yourself up. It's about lifting each other up, knowing that by doing so, we all rise together. By collaborating and supporting one another, students are developing valuable life skills that will serve them well beyond graduation."

The Secret to Longevity

As we wrapped up the interview, I asked his secret was to staying healthy and living up to 100. He left me with advice that was simple yet profound: “Don't eat until you're full—stop at 80%, and prioritize joy. Also, avoid nasty people. I don’t know if that’s a secret, but it seems to contribute to a fulfilling and healthy life.” Despite the obstacles and challenges he’d faced for a century, Niel brimmed with joy. Articulate and sharp, he proved that age was just a number. At 100, he had just renewed his driver's license for another eight years.

The Spillane family, came from all around the country to celebrate Niel's 100th birthday at his house in Mystic, CT.



Kaye Lin is the Director of Communications and Marketing at **Webb Institute**. To read the full, unedited story by Kaye Lin, please scan the QR code.

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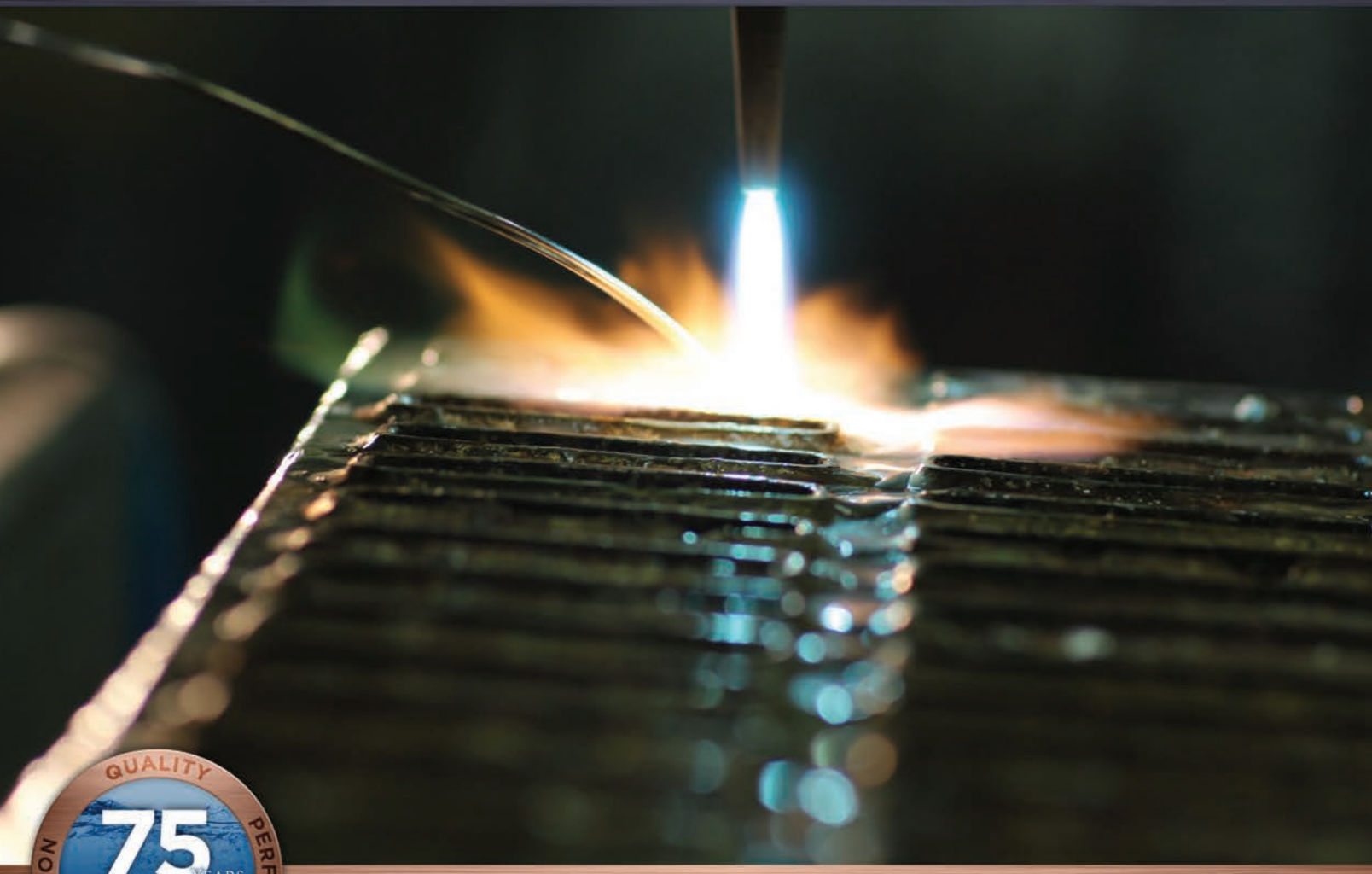

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