April 2024

MARITIME REPORTER AND ENGINEERING NEWS

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Sobeck

As Military Sealift Command turns 75, Radm Sobeck discusses the need for new ships & mariners

Since 1939 | Number 4 | Volume 86

Offshore Energy Analyzing SOV Demand Drivers

One-on-One Rob Langford, VP Global Offshore Wind, ABS

Heavy Lift New Cranes for Offshore Efficiency

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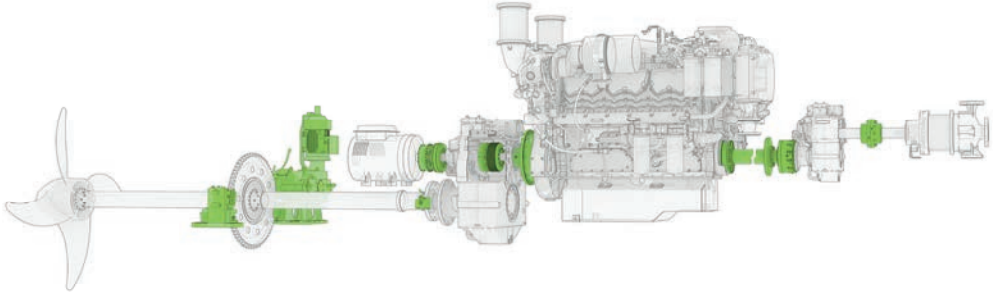

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Photo Justin Zurre

This month's coverage is almost an afterthought following the tragedy that unfolded in Baltimore in the wee hours of Tuesday, March 26, when the containership Dali apparently lost propulsion and the ability to steer, crashing into and taking down a large section of the Francis Scott Key Bridge. The scope of this tragic event will echo through the maritime, ports and logistics community for a generation, and trust it will take the NTSB years to fully analyze and report back on the true cause of the accident. At press time, difficult work progressed in earnest to clear the waterways and re-open a critical east coast port facility.

This incident again highlights how 'out of sight, out of mind' the maritime world is to the general public, that is until tragedy strikes, lives are lost, environments are soiled and business is disrupted. Even though my career has been one focused on media, I must confess a decided disdain for the general media and a loathing of the social brand. Don't get me wrong, our ability to dispense information immediately, globally via our own and social channels is without compare, and when I think of what this industry looked like when I entered in 1992 I start to feel very old! Today we leverage every electronic and social channel in the book with our multiple brands serving the global maritime, offshore energy, ports and logistics industries. It's the social media screaming heads that are the turn-off; it's the misinformed social media screaming heads that are dangerous. The maritime industry isn't perfect, but many of theories I've seen floated in social media circles regarding th accident are simply ignorant.

Back to this month, our cover story stands on its own merit, as Edward Lundquist interviews **RAdm Philip Sobeck**, head of Military Sealift Command which this year celebrates its 75th anniversary. RAdm Sobeck is charged to ensure that the U.S. Department of Defense has the appropriate amount of ready sealift capability, a capability that today gains increasing importance given Russia's ongoing war in the Ukraine as well as geopolitical unrest in several other regions. RAdm Sobeck and MSC face many of the same challenges facing the commercial industry at large: the need for modern tonnage and the need for trained mariners, now and in the future. His story starts on page 24.

Looking to the offshore energy sector, we offer a pair of insightful articles. The first one takes a deep dive into the SOV market, authored by Philip Lewis, director of research, Intelatus. While the offshore wind market has been stop and start in the U.S., wind is a driver for business and activity globally, and starting on page 16 Lewis takes a deep dive into the existing and emerging fleet in this important class of vessels. Next, Wendy Laursen takes a look at new cranes being developed for offshore wind installation and maintenance efficiency. Even as this wind market is still in its infancy, the rapid rate of growth in the size of turbines is stressing everything in the logistics chain, from port and harbor facilities to ships to the cranes to install them. The race for bigger, better cranes is on, and you can read more starting on page 30.

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Tip #58

Enhancing Behavior-Based Safety

By Murray Goldberg, CEO, Marine Learning Systems

Have you ever heard the term ***"Behaviour-Based Safety"***? Although the term itself is relatively new to many of us, the individual components are likely well understood by most. Yet it is very useful to understand it as a collective concept, and to understand what we can do as maritime training managers to improve the safety of our people and operations through this concept. So what is Behavior-Based Safety (BBS)? At its heart, BBS focuses on influencing employee behaviors as a route to safety improvement, emphasizing the idea that many maritime accidents are preventable through the modification or elimination of unsafe behaviors. As an all-too-familiar example, consider the tendency for experienced mariners to bypass pre-departure safety checks. These checks are needed to ensure that all systems are functioning correctly, that the ship is properly loaded, and that all safety equipment is in place and operational before setting sail. Despite their importance, crew members may sometimes skip these checks due to time pressure or complacency. This is one of a myriad of tendencies that BBS is designed to reduce.

So let's explore what techniques are useful when taking a behavior-based safety approach to reducing accidents and keeping our crew and passengers safe.

The core of a successful BBS program is building a strong safety culture. A strong safety culture is simply another way of saying that safety is a primary concern and always top of mind for everyone on board from the deckplates up. This requires setting rules and expectations. But it also means creating an environment where each individual feels personally responsible for safety and is encouraged to actively participate in the identification and performance of safety practices.

One effective way of fostering a shared sense of responsibility is to involve crew members in safety activities, such as discussions, observations, and feedback, to ensure they feel a sense of ownership over their safety and that of their crewmates. Some of our customers go a step further than this, involving employees from every company level in workshops and focus groups to inform company training practices, policies, learning materials and even the selection of learning technologies. Engagement activities like these are absolutely a win-win-win. The company gains valuable and actionable insights that improve training. The employees are bought-in because they had a hand in generating the program they are expected to follow. And finally, the bonus benefit is a closer working relationship between management and employees.

Another effective component of BBS is the implementation of positive reinforcement and recognition programs that visibly and tangibly reward contributions to safety. These can be as simple as verbal praise, certificates, or even monetary rewards. Reward-worthy acts can be nominated by management or colleagues - thus creating another mechanism by which all employees are encouraged to be on the lookout for safe performance and keep safety top of mind. Additionally, by acknowledging positive safety actions we encourage them, we discuss them, and we facilitate their repetition. Again, a win-win-win.

A third opportunity to develop a strong BBS culture is through observational assessments. Here, when convenient, one crew member acts as an "observer" to any task being performed by another individual or team. The observer is equipped with a scoring form which is designed to evaluate the safety of the activity being carried out. In a perfect world, rather than a paper-based form the observer uses an application designed to assess skill performance - in this way requiring less expertise on behalf of the observer and yielding a more objective assessment. These assessments can be anonymous so as to help create a spirit of cooperation, rather than an adversarial relationship between the observer and those being observed. The results of the assessment are many faceted and extremely valuable. Most simply and immediately, they can be used to provide instant feedback to the individual or the team on their adherence to safety protocols and practices. More broadly, the company can use the full database of reports to identify organizational safety strengths and risks - thus helping to target future discussions and further training before an accident occurs. Moreover, the presence of a safety observer is an excellent, highly visible reminder of the company's dedication to safety and will help to further a strong safety culture. The above are only a few of the many practices that can support a strong behaviour-based safety approach in our maritime organizations. At the end of the day it all comes down to making safety considerations an ever-present factor in everything we do - from training, to assessment, to planning and to operations.

Thanks so much for reading, and until next time - sail safely!

The Author

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SIRE 2.0: Navigating the New Horizon of Maritime Safety

By Captain Aaron Cooper, Programs Director, OCIMF

The maritime industry is on the cusp of a significant transformation with the launch of the Ship Inspection Report Program (SIRE 2.0). This initiative, led by the Oil Companies International Marine Forum (OCIMF), heralds a new era in vessel inspection, compliance, and reporting, marrying the latest digital technologies with established inspection practices to elevate maritime safety and environmental responsibility to unprecedented levels.

SIRE 2.0 represents an update and a comprehensive reimagining of the inspection process. By integrating digital analytics with the insights from traditional inspections, the program aims to provide a more detailed analysis of a ship's condition, the crew's capabilities, and future performance through advanced risk assessment techniques.

A Phased Roll-out

The roll-out of SIRE 2.0, which entered its third phase in January with trial inspections available to all program users, is a testament to OCIMF's dedication to ensuring a smooth transition for all maritime stakeholders. This phase is pivotal in acquainting participants with the system's intricacies and supporting a smoother adaptation for all involved.

SIRE 2.0 goes beyond procedural upgrades; it marks a cultural shift in the maritime industry that required not just logistical and operational shifts but a change in mindset across the industry. Any initial concerns due to the magnitude of this change has been addressed by industry's proactive engagement with SIRE 2.0's phased implementation and its willingness to adapt.

The staged introduction of SIRE 2.0 has been crucial in preparing vessel operators and vessel assurance teams for the future. Making sure all program users fully familiarize themselves with the new regime, by using the portfolio of training materials and resources from OCIMF, has been key to ensuring stakeholders are well-equipped to navigate the new inspection framework.

SIRE 2.0 brings digital reporting and real-time analytics, to the fore, marking a significant technological stride. These innovations offer a depth of insight into a vessel's operational integrity and foster a proactive stance on safety and compliance.

Introducing Risk-based Inspections

One of SIRE 2.0's innovations is the distinction between core and rotational questions. This feature is designed to improve the efficiency and effectiveness of inspections.

Core questions are mandatory for every inspection, irrespective of the vessel type, operations, or any specific voyage details. These questions cover essential aspects of ship safety, environmental compliance, and crew competency that apply to all inspected vessels.

On the other hand, rotational questions are those that differ from one inspection to another. They are selected based on various factors such as the specific type of vessel being inspected, its previous inspection history, current industry trends, recent incidents, or emerging safety concerns. Rotational questions allow the inspection process to be more dynamic and customized to address specific risks or issues. These questions will be determined by using previous data, and, in contrast with its predecessor, the digitalization report-

ing will be more accurate in determining trends and aspects of improvement or safety concerns.

The introduction of core and rotational questions in SIRE 2.0 represents a strategic approach to maritime inspections, balancing the need for consistency and uniformity in safety standards with the flexibility to address specific and evolving risks. This methodology enhances the effectiveness of the SIRE program, ensuring that it remains a relevant and powerful tool for improving safety and compliance in the maritime industry.

A key focus of SIRE 2.0 is the quality of inspections, underpinned by a rigorous training and certification process for inspectors to ensure high standards. While regular assessments and feedback mechanisms maintain the inspection processes, integrity and reliability.

SIRE 2.0 also values the importance of human factors and the fostering of a no-blame culture to inspections and aims to improve the understanding of human errors by promoting an industry wide culture of continuous improvement and safety awareness.

A Cultural Shift

With standardized data collection and sharing protocols, SIRE 2.0 seeks to unify the maritime community in its approach to safety and compliance, enhancing transparency and operational efficiency by integrating seamlessly with existing maritime data systems.

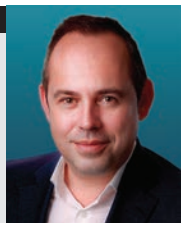
The deployment of SIRE 2.0 is a landmark moment in the maritime industry's evolution towards a safer, more transparent, and efficient future. By leveraging digital innovation and fostering a collaborative, improvement-driven culture, SIRE 2.0 is set to support the maritime sector in placing safety and environmental compliance at the forefront.

As the industry navigates through this period of change, the collective determination to embrace and implement these innovations will be crucial in unlocking the full potential of this pioneering initiative.

The Author

Cooper

Captain Aaron Cooper is a Master Mariner with 30 years of experience in the oil and gas industry. He is the programmes director at OCIMF.



When Efficiency *Does Not* Help Sustainability

By Rik van Hemmen

My brother and I had a discussion about methanol where we concluded that methanol is a promising sustainable liquid fuel for transportation devices when batteries cannot do the job. While Methanol is initially not carbon zero, as long as we focus on developing zero carbon electrical energy, eventually we can produce zero carbon green methanol. Once there is plentiful green methanol, existing methanol vehicles will automatically become zero carbon transportation.

The core argument is that zero carbon electricity production is becoming the most promising approach for zero carbon energy whether through solar, wind wave or nuclear energy. Once we develop gobs of zero carbon electricity, we can do sustainable carbon capture, sustainably produce methanol and use EV's or methanol to mine lithium for batteries. That is, if we still need lithium for batteries by then.

There are those who argue that biofuels can be zero carbon too. In theory there are some situations where biofuels can be carbon zero (waste conversion, etc.), but once we farm our stock for bio fuels (like corn or sugar cane), the whole house of cards comes tumbling down. This is based on very simple math. A plant can, at best, convert 10% of sunlight into useful sustainable energy and that requires water, labor, farm equipment, fertilizer, bio fuel plants and all kinds of other energy consumers. Meanwhile, an infertile field planted with solar panels directly converts 20% or more of sunlight into useful sustainable energy with minimal water, fertilizer, conversion plant, etc. use. The math for farmed biofuels simply does not work.

The next day my brother alerted me to an article published in the *Washington Post* that commented on a study prepared by the American Council for an Energy Efficient Economy. This study concluded that the Toyota Prius Prime is the greenest car you can buy in the United States.

The Council assesses vehicle "green scores" not only by their on-road emissions, but also upstream emissions, including what generates the power needed for EVs, as well as emissions from mining and processing minerals for batteries, and creating vehicle components. It was unclear if it includes emissions for gasoline production or counts carbon produced by gasoline combustion alone (one gallon of gasoline produces 20 pounds of CO2, but the production and distribution of gasoline also produces anywhere from 3 to 6 pounds of CO2). I actually dug into the available information on the website, but stopped when I discovered the posted basis for the rating is a 2016 study, which will be inherently incorrect due to the rapid pace of technology.

As near as I could establish, the American Council for an Energy Efficient Economy is an earnest and well-meaning organization, but while many of their efforts, like promoting the conversion to heat pumps and improving home insulation, make perfect sense, they are missing an important point in their determination that a plug-in hybrid is the greenest car, and it applies regardless of the methodology they use to rate their cars.

Inherently plug-in hybrid cars cannot be the greenest cars, since they will continue to spew carbon into the atmosphere over the life of the car, while an EV would eventually become a zero-carbon emissions car with ever increasingly clean electricity production. My EV is already much greener than the study assumes because I use solar and wind generated electricity.

It is frustrating to note that this technical pig has not made it through the ACEEE python.

With regard to plug-in hybrids, one may argue that once we produce ample clean methanol we could convert the IC car

from gasoline to methanol, but compared to just buying an EV today that is a pointless exercise. It would actually make more sense to buy a plug-in hybrid that is configured for methanol IC, but, unfortunately, no such cars are being produced today. A methanol plug-in hybrid may not be the most efficient approach today, but it holds the promise of eventually being carbon zero.

Don't get me wrong, I am an efficiency freak, and I strongly support the inherent favorable bias to smaller cars in the ACEEE study. Nothing is less efficient than a huge truck (EV or not) driving one person around. It is technically stupid, and quite frankly also economically unattractive from the driver's point of view, since it simply increases their cost for getting from A to B.

As a matter of fact, if the Toyota Prius were listed as "A best alternative if an EV cannot do the job" I would heartily endorse the ACEEE study.

Efficiencies need to be strategically applied. Something that is efficient today may not be efficient tomorrow, and only efficiencies that increase through time are truly great efficiencies.

Moreover, efficiencies in individual devices are not always the best approach. Generally, efficiencies in large systems have much better payoffs than individual component efficiencies. In the maritime industry we know this, because containerization is superefficient as a system. Although an individual container may not be the most efficient package for every random object, as a system, it beats any other solution.

Meanwhile, building ever larger container ships may reduce the carbon footprint per box mile, but running half full super large container ships within the system is less efficient than running full smaller container ships. The solution to this problem actually also applies to cars. Run small cars when you are alone, and use (own or rent) larger cars only when you carry a full load.

I know, it is all so confusing. Is there are straightforward approach that avoids these pitfalls?

After some pondering, I think I can reduce it to this logical sequence:

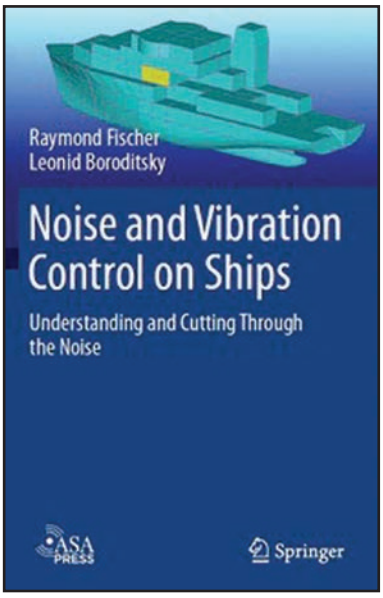
1. It is the carbon. We want zero carbon as soon as possible.
2. Focus on sustainable electricity generation.
3. Provide the smallest device that can do the job.
4. Electrify everything.
5. Avoid building new carbon fuel IC equipment at all cost.
6. Efficiency increases are a great way to speed up sustainability, but not if it achieved by introducing long term carbon fuel use.
7. If a liquid or other chemical fuel is needed, provide equipment that can use fuels that can eventually be produced as green fuels such as hydrogen or methanol.
8. Don't sweat green fuel costs, once there is ample sustainable electrical energy, all other required fuels such as green methanol, or green hydrogen will become much cheaper.

Keep in mind this is a logical sequence from a design point of view. Consumers can only respond to it if we provide the proper products. Without the proper products, we cannot blame them for not doing the right thing.

Therefore, first the designers, engineers, policy makers, NGO's and manufacturers need to get their head around the problem and, most of all, they need to stay away from promulgating sloppy arguments and studies.

For every column I write *MREN* has agreed to make a small contribution to an organization of my choice. For this column I select the Sierra Club. *www.sierraclub.org* When I was trying to find the CO2 emissions for the production of a gallon of gasoline, they popped up first with a well-supported answer.

Approach to Meeting Underwater Radiated Noise Limits Defined



By Raymond Fischer

Quantitative underwater radiated noise limits will be developed shortly by IMO, and/or countries like Canada and the EU. In the past, only quieting approaches have been promulgated. As outlined below, this would bring a whole new design/built process to the marine industry.

The first step will be how to meet these limits in a proficient manner. At this point, it will be advantageous to utilize techniques and lesson learned in meeting stringent noise regulations imposed on naval and special purpose vessels. This information is needed by the marine industry in order understand what is being required, what engineering will be needed, how to build a quieter vessel, and how to demonstrate compliance to regulatory agencies.

The process starts with the owner, operator, NGO, regulatory agency, etc. developing quantitative limits and providing them to the naval architects, marine engineers, and ship builders. This specification must be appropriate for the type and function of the vessel. The limits should be achievable and reasonable from an overall systems viewpoint. Above all they must be unambiguous, clearly defining acoustic limits and compliance methods. Ideally, the approach should be a performance specification or a hardware specification. This would help avoid possible problems or misinterpretations as to whom is responsible for what part of the design.

The next step involves developing a Noise and Vibration Control Plan designed to meet the specified limits. The Plan would lay out 1) management, organization and scheduling, 2) acoustic analyses and control approaches along with risk assessment and reduction, 3) design reviews to track progress/compliance, 4) optimal selection of control approaches and materials, 4) quality assessment such as drawing reviews and construction inspections, 5) possible training with respect to salient design/construction essentials, 6) compliance verification methods, and 7) deliverables.

The design process involves associating realistic noise and vibration source levels for all the salient machinery, equipment, and systems. This includes prime movers – generally diesels and the propulsor. Next are auxiliary machinery and distributed systems such as hydraulic plants. An additional source not usually considered for habitability noise is sea connected systems. Flow induced noise over appendages may also be a factor depending on operational speed.

The real engineering comes in the prediction modeling stage. The tools – equations, 3-D modeling, utilization of data from similar vessels, etc. – exist. Prediction algorithms can rely on empirical methods, be based on analyses of measured data from other vessels, or use explicit methodologies such as Statistical Energy Analysis (SEA) or Finite Element Analysis (FEA). The most accurate are those that can account for all the machinery transmitting acoustic energy over all the possible structural and airborne paths into the ocean. The hydroacoustic design of the propulsor is a major factor because once it cavitates the radiated noise increases dramatically.

The critical effort comes in the selection of the optimum control approaches and selection of appropriate marine treatments. Non-treatment approaches can range from moving sources away from the waterline to beefing up foundations. Treatment typically adversely affect the vessels weight and space. Some can also be relatively expensive. This process hinges on the frequency range being treated, the magnitude of the potential noise excess, and maintenance and replacement impacts. Use of low noise and vibration equipment should be the first line of consideration. The second would be the

hydro-acoustic design of a propulsor that delays cavitation inception and cavitating area. The third approach should be isolation mounting of a vibro-active equipment and machinery. This can range anywhere for the use of low-frequency resilient mounts to use of a high-frequency mount such as distributed isolation material. There are numerous existing and developing approaches and treatments applicable to marine vessels. With the proper tools and expertise, selection of treatments and control approaches can be optimized to minimize adverse impacts on space, weight, and costs. These treatments can be used in new-builds and retrofits. With a judicious selection of approaches and treatment a return on investment can be realized.

Inspection of the treatment installations is the "insurance" required to ensure that all the effort going into a quiet vessel pays off. As needed, specialized diagnostic testing, dockside or underway, may facilitate optimization of treatments. Compliance testing is the final stage, demonstrating the vessel meets its underwater noise limits. This will require specialized test sites or specialized mobile underwater testing equipment.

This process of designing and delivering a vessel meeting the upcoming underwater radiated noise regulations is spelled out in a book being published by Springer Nature entitled Noise and Vibration Control on Ships; Understanding and Cutting Through the Noise by Raymond Fischer and Leo Boroditsky.

The Author

Fischer

Raymond Fischer (pictured) and Leonid Boroditsky have been involved with the prediction and control of underwater radiated noise on more than 350 vessels.

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SOVs – Analyzing Current, Future Demand Drivers

By Philip Lewis,
Director of Research, Intelatus

At a high-level, there are three solutions to transferring technicians from shore bases to offshore wind farms for construction and O&M activities: crew transfer vessel (CTV), helicopter, and SOVs/CSOVs.

SOVs and CSOVs generally house 60-120 technicians offshore for a few weeks at a time, allowing them to transfer to structures on integrated heave compensated gangways, by daughter craft or on CTVs. The vessels are also equipped with cranes, storage, and small workshop areas.

SOV: Service operations vessels, generally on long-term charter to a wind turbine OEM or offshore wind farm operator to service and maintain equipment during the operations period of the wind farm. A typical SOV will accommodate ~60 technicians. A typical SOV is diesel electric and increasingly includes dual fuel flexibility and battery energy storage systems.
CSOV: Commissioning service operations vessel, generally on short-to-mid-term charters for project construction, turbine installation and commissioning, and initial service warranty periods. A typical CSOV will accommodate ~120 technicians. A typical CSOV is a battery hybrid diesel electric, ready for dual fuel operations.

Lower day rate CTVs are often used for daily transfer of 12-24 and increasingly 30+ technicians on a daily basis and have an advantage when windfarms are close to shore. There is a trend for CTVs to be built with crew accommodation, allowing the vessels to stay offshore overnight, and to serve accommodation and construction vessels (including CSOVs) for extended periods.

In some applications, helicopters are cost competitive, although their use is relatively limited.

- **Tier 1:** purpose-built vessels for offshore wind with in-built crane and gangway.
- **Tier 2:** Generally, oil & gas tonnage (MPSVs, PSVs, etc.) with fixed gangway, serving oil & gas and offshore wind markets.
- **Tier 3:** Generally, oil & gas tonnage (MPSVs, PSVs, etc.) with temporary gangway, serving oil & gas and offshore wind markets.

Market Drivers

When we look to understanding SOV/CSOV demand, we look at the number of turbines installed and planned. Given that three international OEMs (Siemens, Vestas and GE) currently dominate the global offshore wind space outside of

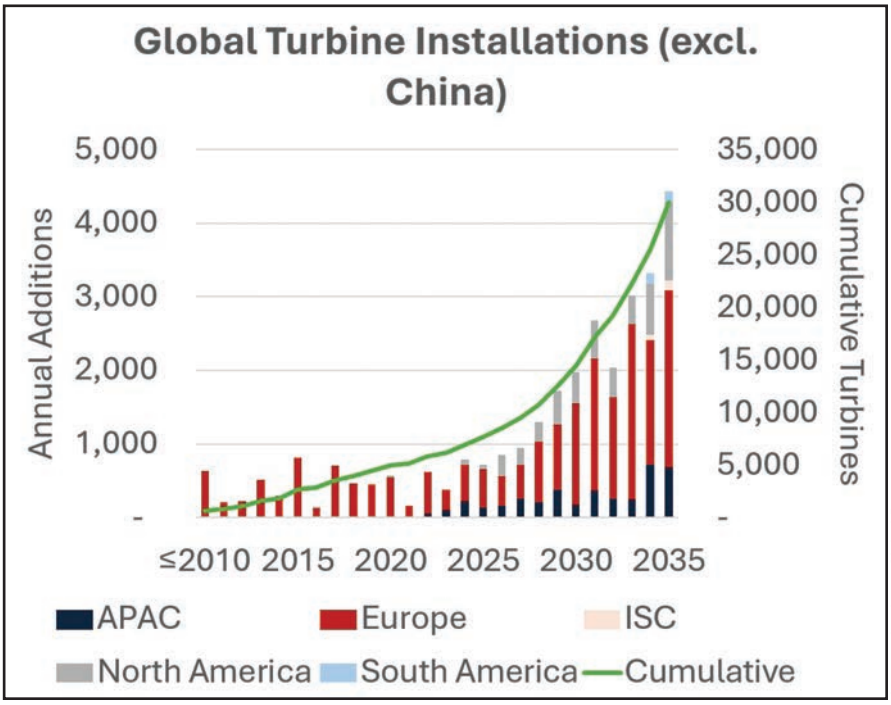
China, we do not look at demand for SOVs/CSOVs as having a linear relationship to the number of wind farms or turbines installed. We look to see where a large number of wind turbines are concentrated in relatively close proximity, generally in a very large wind farm or in a project cluster featuring two or more wind farms, which will give the economies of scale required to justify a SOV/CSOV. We should note that some Chinese OEMs are targeting international market expansion, which may result in the demand base becoming more fragmented.

Although the developer space is more fragmented, we look to the developers of large wind farms and/or developers of geographically close project clusters. Developers in this space include Ørsted, RWE, Equinor, SSE, etc.

Outside of China, the global installed and operational turbine base amounted to ~6,200 turbines at the end of 2023. The Tier 1 SOV/CSOV fleet stood at 32 vessels, 31 one of which being active in Europe. ~530 active CTVs served operating and under construction wind farms in Europe, APAC, and the USA.

~8,300 turbines are forecast to be installed globally (excluding China) between 2024 and 2030 and close to 15,500 in 2031-2035, as global offshore wind capacity (excluding China) grows to ~380 GW of capacity at the end of the forecast period. The high-level conclusion that one can make is that more turbines will drive the demand for more Tier 1 SOVs and CSOVs.

Until now demand Tier 1 vessels in the maturing European offshore wind segment has been driven by scale, more wind turbines, wind farms being built further offshore, clustering of developer projects (i.e., many multiple projects in close geographic proximity), and consolidation of wind turbine OEMs. 73 Tier 1 SOVs and CSOVs are active or under construction in the North European wind segment. Tier 2 and Tier 3 walk-to-work (W2W) vessels are currently active in the segment, but as oil



Source: Intelatus Global Partners

& gas activity returns, we anticipate that supply of the vessels to offshore wind projects will reduce, driving demand for additional CSOVs.

Outside of China, the Asia Pacific region is in the early stages of wind farm development, with one active Tier 1 SOV and three Tier 1 CSOVs in construction for the comparatively near shore Taiwanese market, which is also actively served by CTVs. Oil & gas offshore support vessels have been widely deployed to support construction logistics. South Korea, Japan and, in the longer-term, Vietnam and Australia, are forecast to be the largest APAC offshore wind markets and therefore sources for vessel demand.

The U.S market is preparing for a period of large wind farm construction and operations, with three Tier 1 SOVs, two on long-term charter for operators and one for an OEM. Construction and commissioning have been supported by several Gulf of Mexico Tier 2 and 3 vessels, the supply of which is expected to find core deployment in an increasingly active Gulf of Mexico oil & gas segment in the short-to-midterm. The 2024-2035 period is expected to witness strong growth in the U.S., as offshore wind spreads from the North and Mid-Atlantic, to the Pacific Coast and the Gulf of Mexico, effectively creating three-four sub segments for SOV/CSOV demand.

The Question of Emissions

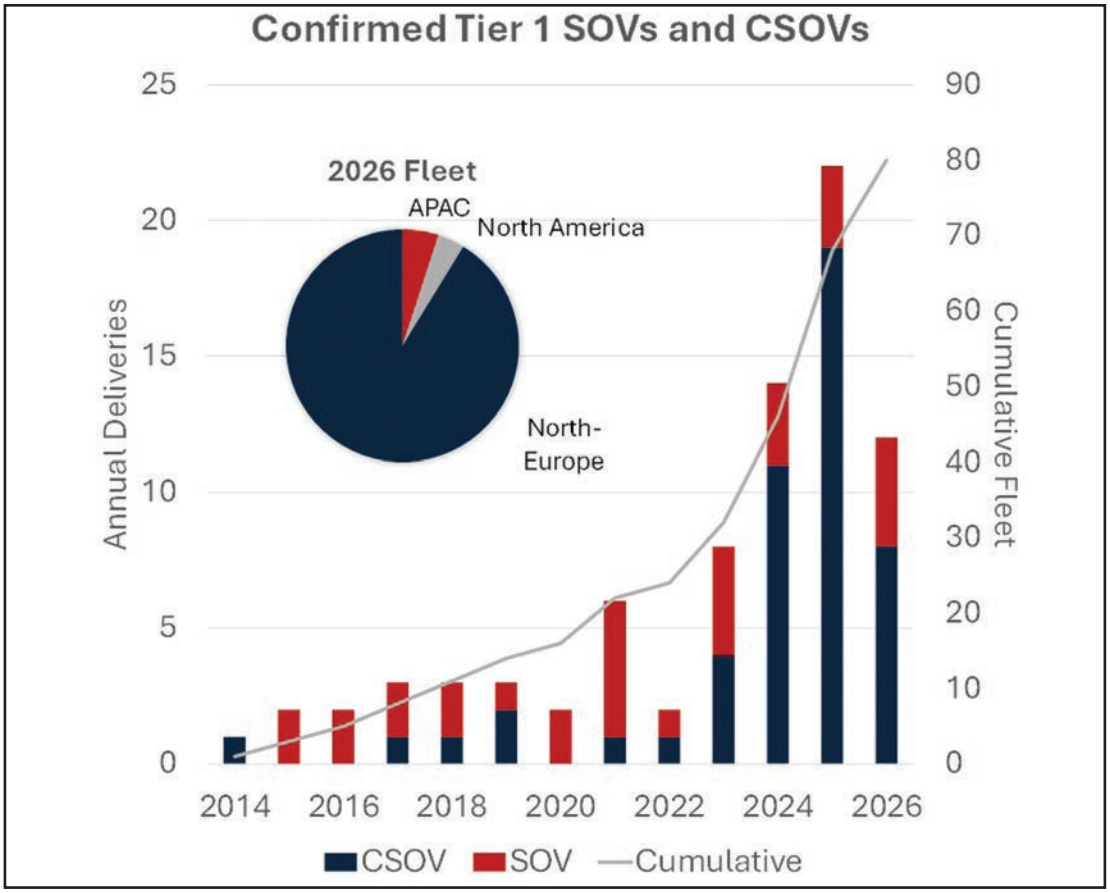
Given that SOVs and CSOVs operate in a segment targeting reduced emissions, and many operate in the North European segment, characterized by a general strengthening of emissions reduction measures, more than 20 active or under construction vessels feature fuel flexibility through dual fuel engines and (space for) a bunkering system. Currently methanol is a preferred energy carrier although hydrogen and liquid organic hydrogen carriers also feature.

Battery energy storage systems feature extensively as do electric drives.

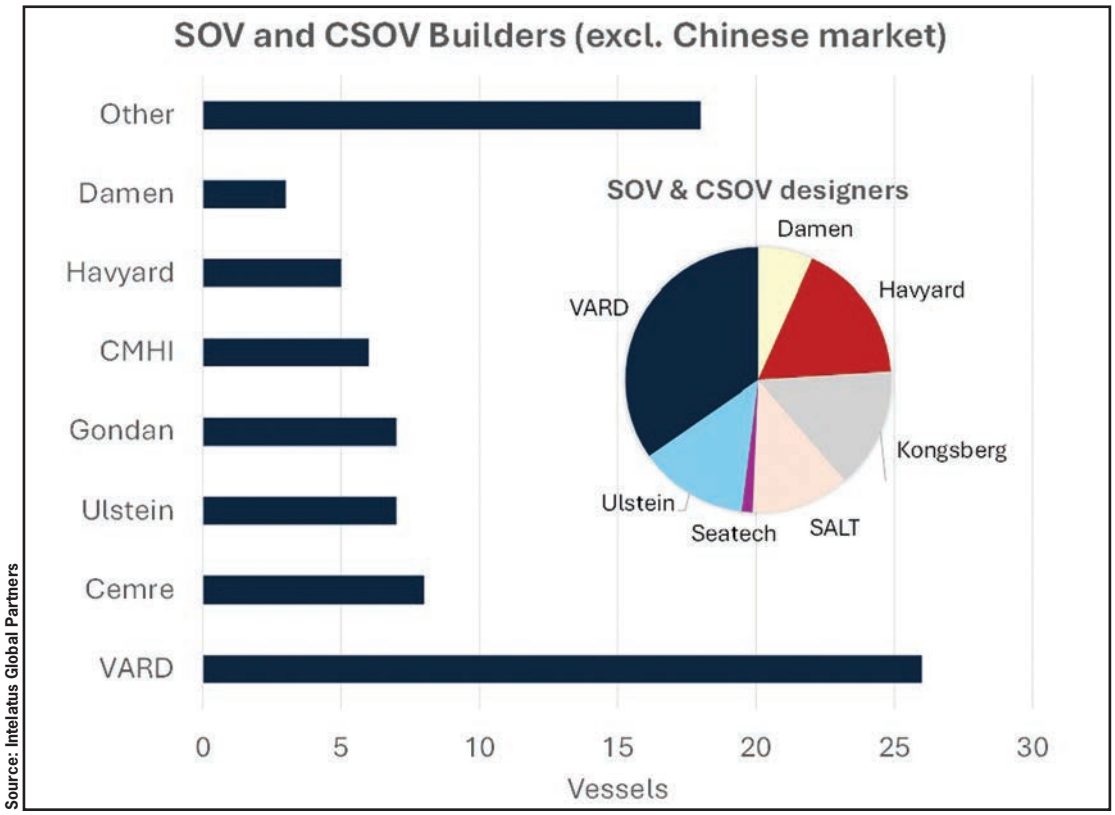
Designers and Builders

SOV and CSOV owners have generally sought pricing from Norwegian yards (who generally build the hulls in countries including Vietnam, Turkey, Romania, and Spain) and China.

According to CSOV owner Integrated Wind Solutions, the contracting price of a Norwegian newbuilding has risen from €60 million to €68 million between Q1-2021 and Q1-2024. With a hull built in Spain or Romania, the cost rose from €52 million (2021) to €66 million (2024). In the same period, a Chinese built CSOV for the European market would attract a yard price of €44 million (2021) and €61 million (2024). Based on this data, we note that the premium for a Norwegian



Source: Intelatus Global Partners



built vessel fell from ~25% in early 2021 to ~12% today.

The biggest new building premium is found in the USA, for a variety of reasons, where the three tier one SOVs are being built for ~€87-168 million.

VARD is a leader in the design and construction of SOVs and CSOVs, building hulls in Romania, Spain and Vietnam that are completed and commissioned in Norway. The company is also building a vessel through its Fincantieri Bay Shipbuilding subsidiary in the USA. The most popular design in the VARD 4 19 platfrom.

Far behind VARD is the Turkish yard Cemre, building Havyard and SALT Ship designs, Norway's Ulstein, Spain's Gondan (SALT Ship Design and Kongsberg designs), and China's CMHI building Kongsberg designs.

Ten yards account for the remaining vessels.

The Future Looks (generally) Bright

The market fundamentals, reflected by an increasing number of turbines being installed and operational coupled with a likely reduction of Tier 2/3 vessels, support a growth in the vessel supply-side.

Whereas, SOVs are generally built against long-term charter and therefore have a certain amount of financial security, CSOVs are more exposed to redeployment risk and there remains a concern that overbuilding of a commoditized vessel may result in future oversupply as seen in the oil & gas OSV space in the 2008-2014 period.

One-on-One with

ROB LANGFORD,
VP, GLOBAL OFFSHORE WIND

As the U.S. offshore wind industry endures a predictable number of stops and starts during its adolescence, common mantras are 'learn from the established European model' and 'embrace technology transfer from the offshore oil and gas sector.' In **Robert Langford**, *the American Bureau of Shipping has all of that and more bundled in one neat package. Langford recently visited with* ***Maritime Reporter & Engineering News*** *on the sidelines of a floating wind conference in Houston to offer insights on the pace, direction and hurdles to overcome in U.S. offshore wind.*

By Greg Trauthwein

© Mike Mareen/Adobe Stock

Rob Langford has worked in the offshore industry for more than three decades, 'cutting his teeth' in a UK design firm working in the North Sea oil and gas platforms, the holy grail of rigorous conditions in offshore energy production. From that start he – like most other burgeoning leaders in the sector – became 'mobile and global', working with SBM in the floating offshore world with FPSOs and the turret business, then moving to New Orleans to work on Gulf of Mexico deepwater projects with Shell. Eventually he settled in Houston, working with engineering and advisory/EPC companies for offshore developments and another stint at SBM, which entailed project work globally.

About five years ago he made the switch over to offshore wind, working for Worley as senior director of offshore wind, and today he finds himself at ABS as the VP of Global Offshore Wind, a pivotal cog in helping to facilitate this emerging market globally.

Roadblocks on the Wind Path

Like most organizations in the maritime and offshore sectors, renewable energy and sustainability are a focus aread for ABS. "We are growing and evolving our services across all offshore infrastructure along with our continued support to the marine industry," said Langford. "We continue to hire key individuals and partner to provide best-in-class solutions."

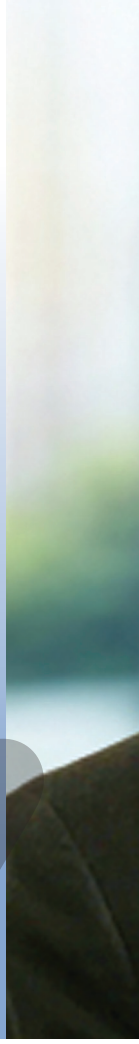
Also – like most companies in the maritime and offshore sectors – today it is not possible for ABS to put a definitive number on 'how fast, how far' this business will grow. "It is difficult to provide quantitative figures as this is driven by the developers and approval regime," said Langford. "However, we are gung ho about making this happen, and we are confident that the offshore wind business will grow year-on-year."

While there are plentiful regulatory and environmental hurdles, they are not alone.

"One of the main risks I see is the onshore infrastructure to support fabrication, staging, O&M along with grid connectivity and PPA's," said Langford, noting that vessels to support installations are proving problematic, too.

From the government side, he sees a need for further support – incentives and subsidies – to develop ports and projects. "We need to help educate the local communities, helping them [especially government representatives] to better understand what we're trying to achieve," said Langford.

> *WE ARE ENGAGED WITH MULTIPLE US OSW WIND DEVELOPMENTS AND SEEING AN UP-TICK FOR CVA, TECHNOLOGY REVIEW AND RISK REDUCTION SERVICES IN EARLY DEVELOPMENT PHASES. WITH NEW LEASE ROUNDS COMING AND NEW OPPORTUNITIES, WE DO NOT SEE A BIG SLOWDOWN FOR OSW DEVELOPMENTS APART FROM THE OBVIOUS PROJECT DELAYS AND RE-BIDS.*
>
> **ROB LANGFORD, VP, GLOBAL OFFSHORE WIND, ABS**



"Some of them do understand, but I think there's more work to do in that regard to meet the renewable energy goals."

Is There Good News?

By its very nature, bad news sells, and there is no exception when it comes to offshore wind. At the end of '23 rolling into 2024, the industry hit significant regulatory roadblocks – driven by environmental concerns, both real and manufactured – coupled with a rapidly changing economic situation [ie. runaway inflation] that caused several key stakeholders, early movers, to head for the exit. While the cost of project delays and cancellations have a real impact on the players that remain, Langford maintains an optimistic outlook long term.

"We are engaged with multiple US OSW wind developments and seeing an up-tick for CVA, technology review and risk reduction services in early development phases," said Langford. "With new lease rounds coming and new opportunities, we do not see a big slowdown for OSW developments apart from the obvious project delays and re-bids."

To date the U.S. has more than 30+ commercial scale projects underway and more to come, as BOEM approves more projects and lease areas. Virginia Offshore Wind and Revolution is in construction; Southfork is into installation, "so Orsted remains a key player in the U.S."

"Equinor and BP obviously split the JV where Equinor takes the Empire Wind development and BP continues Beacon Wind," said Langford. "New Jersey awarded a combined 3.7MW of offshore wind capacity to Invenergy, energyRE's Leading Light Wind Project and Attentive Energy LLC's Attentive Energy Projects in January 2024; all good signs for the industry. RWE and OceanWinds are also eager to push forward with their developments."

Another good news story that could and should emerge is an energized U.S. shipbuilding and repair base, an orderbook packed with new ships and boats to feed this emerging market. While that has yet to transpire, Lanford assesses the potential.

"To meet the US offshore wind goal of 30GW by 2030, we see the demand of 5 to 7 installation vessels, 12 to 15 service operation vessels and 50 to 60 crew transfer vessels by 2030. Adding dredges, rock installation vessels, cable layers and feeder vessels, the U.S. Department of Energy estimates a total of 110 vessels."

Currently two purpose-built Wind Turbine Installations are under construction, one the U.S.-flag WTIV Charybdis being built at Seatrium Amfels for Dominion Energy Coast Virginia offshore wind; and the foreign flag Maersk supply WTIV at Seatrium Singapore, together with U.S. flag feeder ATBs for

transportation and installation of the Empire Wind. Three newbuild SOVs and three conversions/retrofits were awarded, too, and 22 CTVs were also announced. The first US rock installation vessel was ordered by Great Lakes Dredge & Dock Company, LLC.

Floating Future?

While the reality of widespread utility level floating offshore wind is still years away, it is generally acknowledged that floating wind is the future premised on its ability to operate further from shore to catch the stronger, more favorable winds. While the speed of technological development continues to pick up pace, Langford proposes that in the U.S. market, a correctly paced approach to suit supporting supply chain might be best in the long term. "It really boils down to further demonstrations … let's build it. But let's not try and do everything at once. The European model was more of a staged process in making things happen, and I think the U.S. can learn a fair bit from the European model. We're trying to do a lot all at the same time, and I think that's potentially problematic. Starting more demonstration projects would be a good path to success."

U.S. Navy photograph by Brian Suriani/Released

Rear Adm. Philip Sobeck (right) Commander of U.S. Military Sealift Command (MSC) explains the tradition of the Navy 'looping ceremony'. Lt. Robert P. Ellison assumes the title of MSC's Flag Aide during the ceremony.

MILITARY SEALIFT COMMAND NEEDS MORE MARINERS, NEW SHIPS

Founded as the Military Sea Transportation Service (MSTS) and renamed Military Sealift Command in 1970, MSC today not only support the Navy, but we are the Department of Defense's provider of all sealift. ***Maritime Reporter & Engineering News*** *recently interviewed* ***Rear Adm. Philip Sobeck****, U.S. Navy, for insights on the service today and it's needs to grow in the future.*

By Edward Lundquist

Photo by Brian Suriani USN Military Sealift Command

What makes MSC so vital to the Navy's fleet and our military forces around the world?

When we look at the history of contested logistics in World War II, for example, all of the operational commander's after-action reports in the Pacific and Atlantic theaters talked about "logistics, logistics, logistics." Every senior leader during that timeframe said it was absolutely a war of logistics.

Today, if we have to move forces--with their vehicles, equipment and material--from the U.S. to where it's needed, most of that will move by sea. One of our larger sealift vessels can carry the equivalent of 30 C-17 transports.

Our Combat Logistics Force (CLF) is the key to keeping our ships at sea and in the fight, and sustain our forces engaged in distributed maritime operations (DMO).

MSC currently has 140 ships globally, including ships that are government owned and operated ships, government owned and contract operated, and contract owned and contract operated.

You not just commanding an operational fleet, you're running a global business enterprise.

Correct. MSC has responsibilities and authorities that span the entire Navy. I'm a "type commander," responsible for the "man, train and equip" function that generates forces for the combatant commanders around the world. From the business point of view, I'm an acquisition lead—one of 11 individuals within the Navy. And I'm a contracting authority, also one of just a few within the Navy. We're our own manning control authority for our civil service mariners (CIVMARs).

We're hearing a lot about "contested logistics." What does that mean?

For years, we have enjoyed intact supply lines and an assured flow of logistics. We cannot assume that luxury in the next major conflict. An adversary will try to deter, delay and stop the flow of logistics, using all means of warfighting, from seabed to cyber to space and everything in between.

Operating our ships in the contested logistics environment is not without risk. We've got to be smart in the disposition of our ships; the way that we maneuver and distribute in a time of our choosing; all so that we can back up, retrograde, and come back and do it again to keep the fight going.

From a global supply chain perspective, we've learned a lot about dealing with disruptions. COVID delivered a big wake-up call to the world's supply chain. Manpower was disrupted; ships were delayed; docks were stacked high with containers; rail terminals were clogged; truckers could get access to the ports.

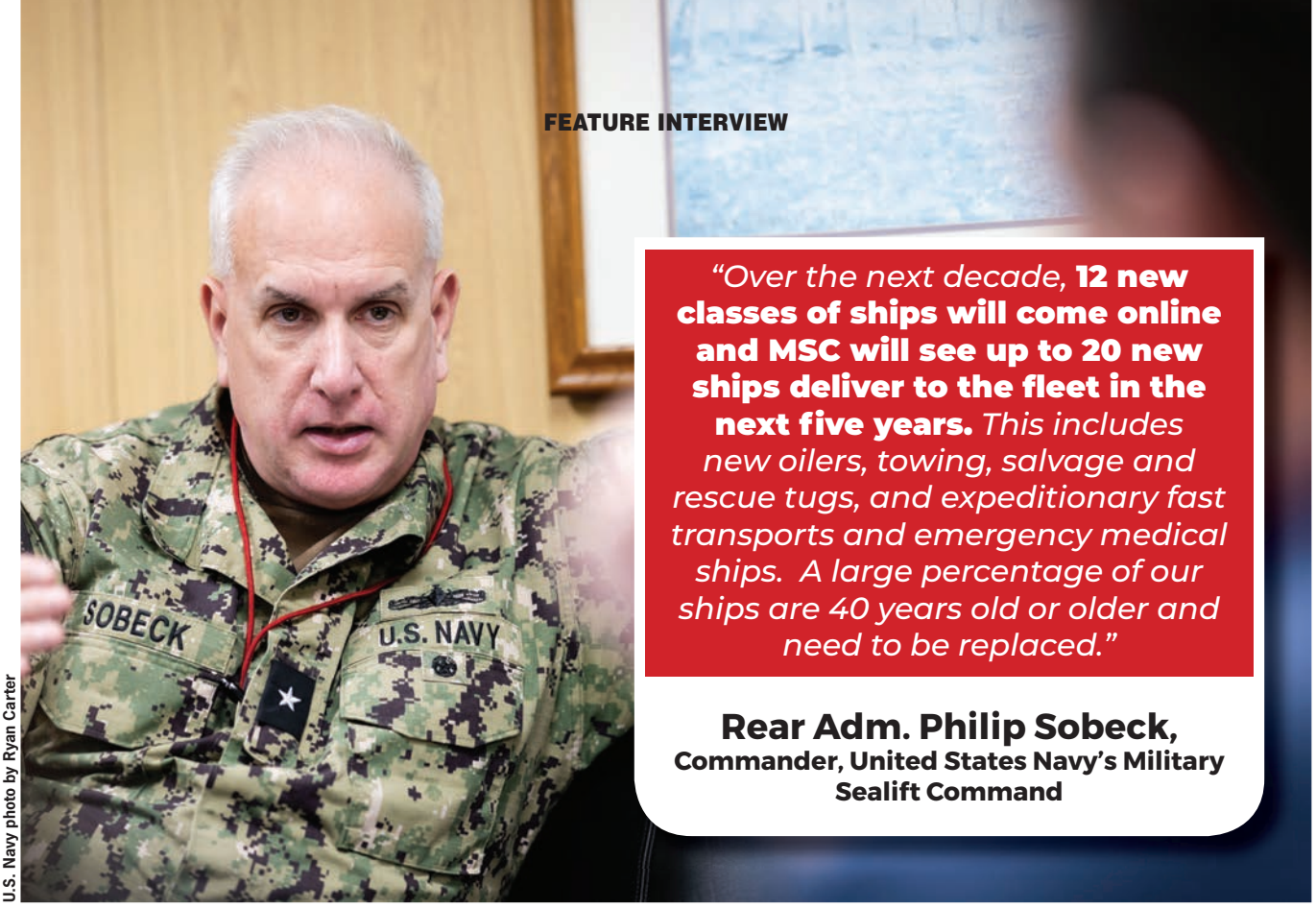
The MSC fleet is aging. How do you do all that with old ships while trying to recapitalize the fleet?

To start, we are building new ships. Over the next decade, 12 new classes of ships will come online and MSC will see up to 20 new ships deliver to the fleet in the next five years. This includes new oilers, towing, salvage and rescue tugs, and expeditionary fast transports and emergency medical ships. A large percentage of our ships are 40 years old or older and need to be replaced. We're talking all the way from steam to diesel and some gas turbines. The commercial world doesn't use steam any more, but we still have quite a few steam-powered ships. I happen to be a prior enlisted Navy machinist's mate and a 1200-lb. steam plant qualified engineer, but I can tell you that there are fewer and fewer mariners these days who know steam plants. I can say that we're expending a lot of resources to allow our older ships to continue to perform.

You mentioned steam engineers, but you have an across-the-board shortage of CIVMARs to man your ships. How can you keep your ships manned and ready for sea?

Our shortfall is in the middle to senior positions within our licensed mariners, but we need to attract the junior people now, those third-class mariners with the certifications they get from school, and start building our workforce from within.

We need to both recruit and retain today, in order to have the force we need tomorrow. COVID created a lot of uncertainty, and kept us from actively recruiting, and it made everything more difficult because we were constrained from the normal personnel rotations. We are competing with the commercial shipping companies, as well as other jobs that value the skills that our mariners have. We're not alone in this fight for talent, the entire shipping industry is experiencing a shortage. MSC competes well with the rest of the U.S. maritime industry when it comes to pay and benefits, but there can be issues regarding rotations and time off.



U.S. Navy photo by Ryan Carter

"Over the next decade, **12 new classes of ships will come online and MSC will see up to 20 new ships deliver to the fleet in the next five years.** *This includes new oilers, towing, salvage and rescue tugs, and expeditionary fast transports and emergency medical ships. A large percentage of our ships are 40 years old or older and need to be replaced."*

Rear Adm. Philip Sobeck,
Commander, United States Navy's Military Sealift Command

Military Sealift Command's expeditionary fast transport ship USNS Burlington (T-EPF 10) pulls into Joint Expeditionary Base Little Creek-Fort Story, Feb. 14. USNS Burlington is the U.S. Navy's newest expeditionary fast transport ship.

U.S. Navy photo by Brian Suriani/released

With COVID, we had to make some hard choices for our mariners because we couldn't rotate. Many of our mariners found other employment, and were able to use their skills and their tradecraft in other ways. That had an impact on our workforce. We thought we would have rebounded by now, but many of our mariners have not come back.

We are in that tough period with both recruiting and retention at the same time. It's a national problem.

We need to ensure our pay and benefits; the predictability of our rotations; and the time off compares favorably with the commercial maritime industry.

What are some of the programs you have initiated to address the manning issue?

MSC is implementing various initiatives to strengthen the Civil Service Mariner program and improve MSC's advantage to retain and grow this critical workforce. We have six key initiatives that we started. I was the director of the 21st Century Sailor Office (N17) in my first flag officer job, and involved in building the "MyNavy HR" portal as a mobile, adaptive platform for the management of our active-duty people personnel. So, at MSC, we've created a portal--much like MyNavy HR--called "MyMSC" for our CIVMARS. We want our people to be able to track their rotations, and the accrual of leave, management of travel pay, and make available the assignments that are best suited for our people. We can track all of the certifications; Coast Guard licensing; and skill sets across the entire force. A master with an all-tonnage license can pretty much sail on any of our ships and can be detailed world-wide, although some ships like EPF require high-speed craft (HSC) training. So, MyMSC will help track and manage all of those different things in one place. We're hoping that makes things easier for our people, and that it will help us to retain them. Unfortunately, we can't guarantee everyone their choice of ship assignment because we just don't have the mariners.

The shortage of Mariners is a problem for the entire maritime industry, not just MSC.

That's right. Our commercial partners that we contract with need mariners, too, and so does the rest of the maritime industry. We're certainly in a situation where we want to maintain positive relations with our partners, but we're also competing with them for talent.

The U.S. Merchant Marine Academy and state maritime academies are graduating mariners into the workforce. But those graduates have choices. They can go on active duty with the Navy, or sail with commercial companies. As we look to encourage and recruit the next generation, MSC must be an attractive career choice against a backdrop of many other choices.

Do your CIVMARs have upward mobility?

The Navy has Sailors who become "Mustangs," and work their way up to the officers' ranks, and there's the Seaman-to-Admiral program to grow young Sailors into future leaders. Likewise, we have a similar program we call "Hawsepipe." We have people who started on the deckplates who worked their way up the "hawsepipe" from able bodied seaman to master on our ships. We really want to grow our mariners from within. There's no better place that allows for upward movement for mariners than MSC.

The Maritime Administration maintains a number of sealift ships in the Ready Reserve Fleet. In a crisis, they can be manned up so MSC can use them to augment your fleet. But, if you took all of those RRF ships and activated them, would we have enough mariners to man them?

Yes. One time. But the problem is sustaining that. We don't have the reliefs.

That's my concern if we get into a large-scale, long-term operation. We can be reasonably certain that we won't have all of our ships going at one time. There will be some sort of prioritization, and we'll be able to manage that mobilization to some point, but we're concerned with how we would sustain those ships at sea, and provide for some kind of relief for our people.

We've talked about people. What can you tell us about your fleet?

The Combat Logistics Force will be familiar to our Surface Force Sailors. We have 14 Henry J. Kaiser-class fleet replenishment oilers and three of the new John Lewis class of fleet replenishment oilers, with more on the way. We have 14 Lewis and Clark class dry cargo and ammunition ships that deliver ammo, food, parts and fuel. We have two big fast combat support ships (T-AOEs), that are fast enough to keep up with the carrier strike groups.

The Special Mission ships conduct a number of different missions for a variety of the U.S. military and other U.S. Government agencies. Our missile range instrumentation ship, the USNS Howard O. Lorenzen (T-AGM 25) monitors missile launches and collects data. We have six ocean surveillance ships. Five of them are catamarans that conduct long-range surveillance with their towed arrays, and one is a contract vessel, HOS Red Rock, that can conduct acoustic monitors 24/7 for months at a time. We have six T-AGS oceanographic survey ships that perform a wide range of underwater science, research and surveys, and a pair cable laying and repair ships. Our navigation test support ship USNS Waters (T-AGS 45) helps test the navigation systems on our submarines and submarine-launched missiles. We have the self-propelled platform called Sea Based X-Band Radar (SBX 1), with the giant radome on top, used to

track missiles and warheads for the Missile Defense Agency, and it travels with its support ship, the MV Hercules.

For our Service Support ships, we have the two hospital ships, USNS Mercy and Comfort; two rescue and salvage ships; two submarine tenders; and the Sixth Fleet flagship, USS Mount Whitney, that has a combined civil service and military crew. Our two ocean going tugs are going to be part of a 10-ship class. We have a special warfare support ship; two high-speed transports; and the high-speed expeditionary fast transport, of which 14 are now in service. We have contractor-owned ships that are employed for fleet experimentation

Our prepositioning and sea basing ships are loaded with combat vehicles, equipment and supplies at stationed forward at strategic locations in the Pacific and Indian oceans. To support the Marines, we have ten container and roll on/roll off ships, two expeditionary transfer docks (ESDs) and four expeditionary sea base ships. We also have two offshore petroleum distribution system ships that help move fuel ashore. Another ten preposition ships support the Army and Air Force.

It should be pointed out that we can build adaptive force packages to be placed on a number of our ships to add additional capability.

MSC can also lease ship or contract for services as needed. For example, we have five leased tankers deliver petroleum products to our storage and distribution sites around the world. The MSC contracting team and the skill set of contracting in this environment at the at the numbers in which we're contracting, is absolutely going to be critical to how we can project at its speed and scale.

With all of that, do you have what you need to get the job done?

We're meeting mission. But we don't have the fleet that we need; we don't have the force that we need; and we certainly don't have the wherewithal to provide all of the end-to-end logistics the force will require in a future major conflict.

Military Sealift Command's fleet replenishment oiler USNS Joshua Humphreys (T-AO 188) sends fuel to MSC's fast combat support ship USNS Arctic (T-AOE 8) during an underway replenishment at sea in the Atlantic Ocean, July 17.

The San Antonio-class amphibious transport dock ship USS Arlington (LPD 24) sails alongside the Henry J. Kaiser-class fleet replenishment oiler USNS Joshua Humphreys (T-AO 188) in the Atlantic Ocean.

U.S. Navy photo by Mass Communication Specialist 2nd Class John Bellino

U.S. Navy photo by Bill Mesta/released

RADM PHILIP SOBECK, MILITARY SEALIFT COMMAND

U.S. Navy photo by Ryan Carter

Rear Adm. Philip Sobeck, Commander, United States Navy's Military Sealift Command, visits USNS Patuxent (T-AO 201) for a tour of the ship at Naval Station Norfolk, Va., November 20, 2023.

Image courtesy of Cadeler

NEW CRANES FOR OFFSHORE WIND EFFICIENCY

NOV is upgrading the cranes on Cadeler's existing O-class WTIVs.

The end may be in sight, but the race for bigger cranes is still having an impact on offshore wind project efficiency.

By Wendy Laursen

The industry has already felt the need for upgrading crane lifting capacity on existing offshore wind installation vessels: NOV is upgrading the cranes on Cadeler's existing O-class wind turbine installation vessels (WTIVs), and a gantry crane extension will soon make Van Oord's Svanen one of the largest floating heavy-lift installation vessels.

It's a newbuild phenomenon too. NOV has developed a telescoping leg encircling crane for Shimizu's GustoMSC-designed WTIV Blue Wind. When deployed in a retracted mode, the crane has a safe working load of 2,500t with a lifting height of 118m above the deck. The crane can then easily transition to an extended mode to install turbines at a height of up to 158m with a maximum safe working load of 1,250t. This means it is suitable for installing both foundations and towers.

Cadeler's new NG-20000X class vessels will have 2,600t cranes, and its new NG-20000F class vessel will have a 3,200t crane. Similar new vessels for Havfram will have a crane of approximately 3,200t, as will Van Oord's KNUD E. HANSEN-designed newbuilding currently being built in China.

Details of this vessel's lifting capacity are yet to be made public, but Jesper Kanstrup, Senior Naval Architect at KNUD E. HANSEN, says these big cranes and vessels are needed to meet the installation challenges of scaling up of turbine capacity to 20MW. The towers could easily weigh over 1,500t, nacelles over 1,000t and blades over 100t.

Designing new vessels involves predicting what turbine components will weigh 25 years into the future, and Kanstrup is already looking towards a future that could include 25MW+ turbines. Then, towers could weigh at least 2,500t.

"A reason for even larger cranes would not only be the desire to be able to install 25MW turbine towers in one piece but also to expand the area on the deck within which the crane can handle the heavy towers or nacelles and thereby be able to carry more turbines on the vessel," says Kanstrup. "If, for example, a 3,200t crane can handle a load of 2,000t within a radius of 55m, a 4,000t crane might be able to handle the same load within a radius of maybe 68m. So, the desire to be able to carry more turbines on the vessel could very well be the driving factor for even larger cranes."

Competition between turbine manufacturers is so tough that the turbines have barely been thoroughly tested before they are launched on the market, says Kanstrup, and too few of each size will be manufactured to pay for the development costs before an even larger size is required. "And if the manufacturers are bleeding, that could eventually put a damper on the size race."

For Elomatic, that race is already over, at least for the heavy lift vessels that install foundations. The company's Float Foundation, suitable for fixed turbines in water depths of up to 45 meters, can be built at a shipyard or dock, and it only needs two tugboats, and no offshore lifts, for installation.

There's a second crane race underway, though, this time onshore where components are stored and assembled ready for offshore installation. Large ring cranes can optimize the use of high-value offshore installation vessels by assembling the turbines efficiently, even as offshore wind components continue to grow in size.

On Equinor's Hywind Tampen project, the largest floating wind project to date, Mammoet provided its PTC200-DS ring crane quayside to handle the 134m distance that turbine components needed to be lifted over the quay edge, over a spacer barge, then on to the 107m spar buoy foundations for assembly. The crane eliminated the need for the more complex engineering that would have been required if the components were transferred by crane between two floating vessels.

Heavy Lift Projects (HLP) is developing what it claims is the world's biggest ring crane, one capable of 6,000t lifts. "It's an ambitious outlay for us, but we think that there's a market

A closeup of a blade installation process taken via drone. A blade handling system is apparent (in yellow).

Images courtesy of Mammoet

requirement for the development of these cranes, particularly in floating offshore wind," says Adrian Green, Engineering & Contracts Director. "Ports are a major bottleneck at the moment, certainly in Western Europe."

The crane will have two hooks, one on the main boom and then a second on a luffing jib. This reduces the time it would ordinarily take, weeks, to reconfigure the wiring of an ordinary crane. "Effectively, it can move the foundation in one lift and then immediately pick up the tower."

The crane will also enable components such as towers to be stacked vertically in marshalling areas, reducing their footprint from around 150m long and 7m wide to just that of the diameter of the base. It also enables them to be moved without SPMTs. Additionally, in fixed foundation wind, monopiles can be stacked in multiple layers for delivery to the marshalling area. This would result in a major time and fuel saving. For floating projects, it could reduce project installation time enough to make it comparable to fixed wind, says Green.

The development of the floating wind industry will be different to that of fixed wind. The subsidies won't be a plentiful, and there won't be the same downturn in oil and gas that made all the high-spec construction vessels available at attractive rates, says David Inman, Sales Manager at NOV-subsidiary GustoMSC. "The industry needs assets specifically designed for what is going to be a very industrialized installation campaign."

NOV has launched the Enhydra floating wind installation vessel (FWIV) concept for the global market which is expected to scale up significantly between 2028 and 2035. The GustoMSC-designed vessel has a 400t main crane featuring NOV's knuckle boom design which features integrated

Mammoet's PTC200 crane assembling a floating wind turbine blade.

HLP is developing a crane that will enable components such as towers to be stacked vertically in marshalling areas.

HLP is developing a crane that will enable tower pieces to be stacked in multiple layers on installation vessels.

HLP is developing a ring crane capable of 6,000 tonne lifts.

Images courtesy of HLP

heave compensation in a fully electric and closed-loop hydraulic setup, eliminating the need for a separate motion-compensated crane.

The vessel design is optimized for both mooring and hook-up operations and offers a flexible deck layout and specific provisions for mission equipment integration, including electric subsea cranes. Electrification enhances operational smoothness and reduces downtime.

Inman sees strong market potential for the FWIV. "Floating offshore wind is going to be a global industry, and it's going to be big from the get go."

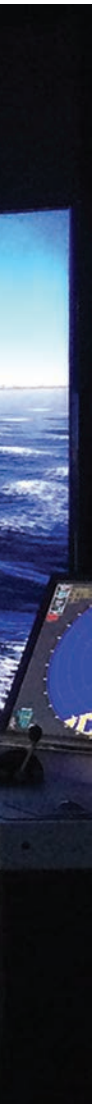
Image courtesy Kongsberg Digital

Simulators Track our Changing Relationship with Technology

Simulation-based training has its whole-of-ship/ whole-of-team scenarios, but zooming in, the industry is now working on more specific targets.

By Wendy Laursen

Image above: Kongsberg Digital has integrated NORBIT's oil spill detection system with its K-Pos DP system for simulation-based training of offshore professionals at Equinor.



We have a close relationship with technology, evidenced by, for example, the phones we are estimated to unlock around 50-80 times a day. It has changed us. Half the people surveyed in a 2022 King's College London study said that they feel like their attention span is shorter than it used to be. They are wrong, though, if they think that the average attention span of adults today is just eight seconds, one second less than goldfish. The science behind these attention span perceptions is limited, but educators do still now have an "attention economy" to consider.

MarinePALS founder Captain Pradeep Chawla says that people are used to accessing information in a variety of short and entertaining ways. MarinePALS is therefore embracing a new approach that involves interactive experiences and bite-size training materials, including micro-learning videos, gaming apps, VR programs and online mentoring.

"These digital methods are more effective than traditional learning methods, because they mimic the way people live today," says Chawla. The gamification of learning makes it fun, he says.

There are practical benefits. Virtual reality headsets with the right training package can instruct seafarers how to use specific equipment in a realistic environment, which in turn can reduce the time they need to spend on a simulator. This saves time and money and frees up simulator time for others.

Once onboard the simulator, seafarers can expect a comprehensive experience. Wärtsilä will supply its latest technology for a new maritime training center in Finland that will have two engine room simulators along with two large and three medium sized full mission navigational bridges with 360-degree visualization. They will include digital chart tables and a separate bridge wing console operated in virtual reality.

Realism is prized beyond immersive, photo-realistic visuals, and providers are introducing increasingly accurate functionality. FORCE Technology's upcoming DEN-Mark2 mathematical model release for its augmented reality SimFlex4 tug and ship simulator will offer unprecedented model accuracy as well as enhanced line forces calculations for pilot training undertaken at Smartship Australia.

NYK has secured certification from ClassNK for Japan's first training program for crew members of offshore wind industry crew transfer vessels (CTVs). The training uses the latest ship-handling simulators to reproduce the movement of a vessel pushing against an offshore wind turbine in severe weather and sea conditions, aiming to improve the advanced navigational safety skills required for CTV ship handling.

Simulators are becoming as interconnected as onboard systems. Kongsberg Digital has integrated NORBIT's oil spill detection system with its K-Pos DP system for simulation-based training of offshore professionals at Equinor. The tailored configuration will enable environmental conservation drills, oil spill detection and recovery simulations and all-encompassing safety and crisis management drills.

The ABS Global LNG Academy in Qatar features MetaSHIPs simulators, powered by Orka, that are built to scale from vessel drawings. The academy program also includes gas handling operations and engine room simulation courses offered by GTT Training and the Thet Training Center.

The process of decarbonization creates new safety issues that need to be addressed. One of the most important is the familiarization of the crew with new and emerging fuels and technology. For example, the industry has well-established experience in handling ammonia as cargo, but not as fuel, so there is a need for training that enables this to be done safely. ABS has begun to address this challenge through the utilization of simulation

FORCE Technology's upcoming DEN-Mark2 mathematical model release for its augmented reality SimFlex4 tug and ship simulator will offer unprecedented model accuracy.

Image courtesy FORCE Technology

"Simulators with high accuracy have become a vital tool for engineering studies."

Image courtesy Kongsberg Digital

– Terje Heierstad, VP Business Development, Maritime Simulation, Kongsberg Digital

"Tomorrow's seafarer is going to have to be more technology-savvy than in previous years."

Image courtesy ABS

– Vassilios Kroustallis, VP, Global Business Development, ABS

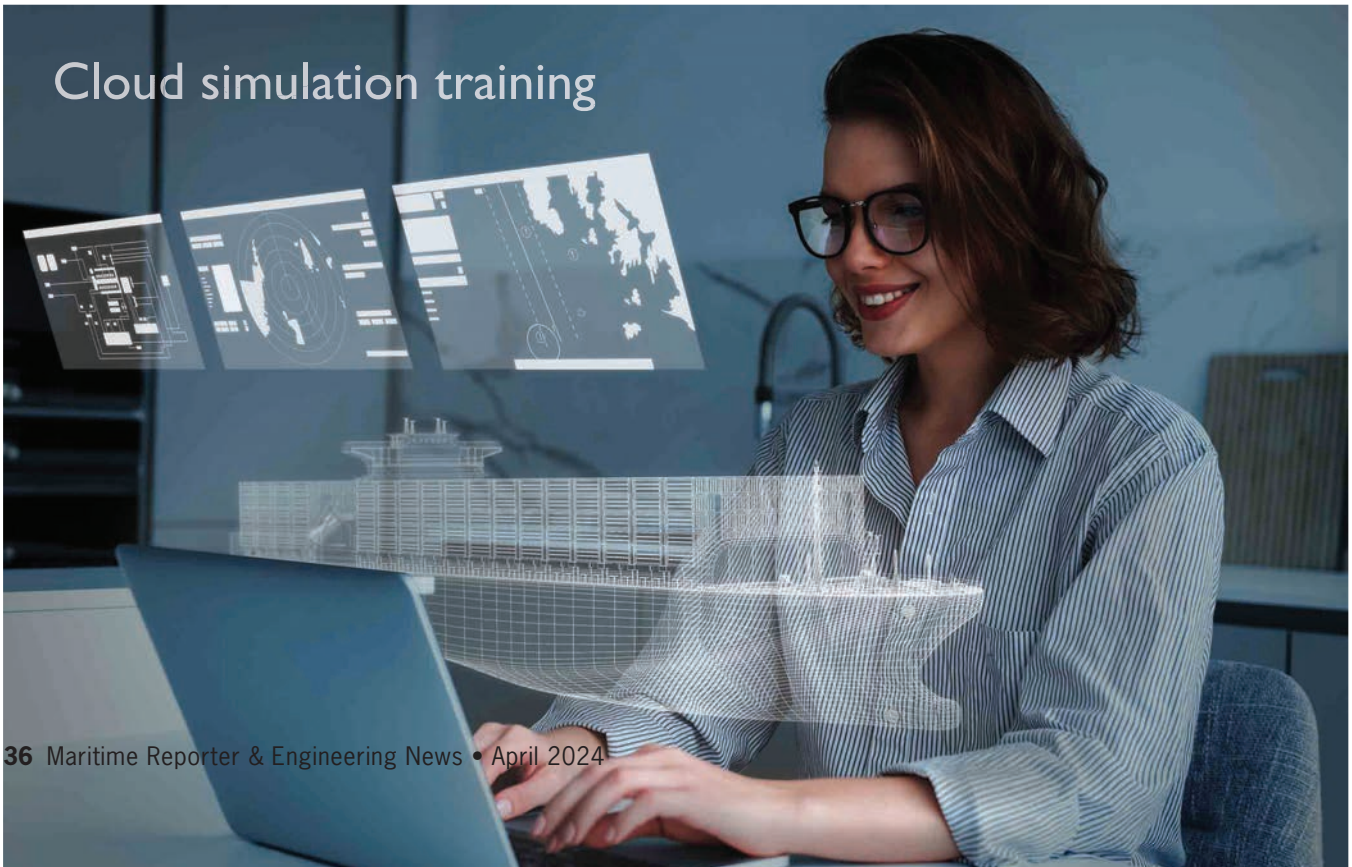


Image courtesy Kongsberg

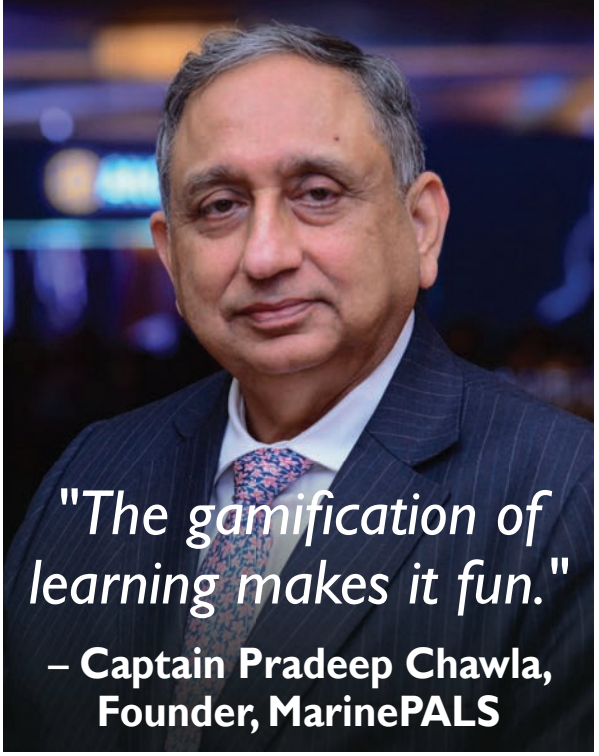


Image courtesy MarinePals

Image courtesy NAPA

technology which it develops at its global center in Singapore. "When we think of the new skills and competencies required for safety onboard the next generation of vessels, it is clear that tomorrow's seafarer is going to have to be more technology-savvy than in previous years," says Vassilios Kroustallis, VP, Global Business Development, ABS. "Quite apart from the array of challenges associated with handling and bunkering the new fuels, they will need literacy in the emerging digital and autonomous ecosystems as well as an entirely new safety mindset understanding cyber threats as well as the traditional physical dangers."

A simulated vessel flooding can help teams work together to solve the challenge using different systems on the bridge, says Jussi Siltanen, Lead, Product Marketing, Safety Solutions at NAPA. The company's partnership with Simwave, for example, means that simulations can be customized to deliver specific exercises to ensure officers and crews feel as prepared as possible on emergency response and stability principles, including making the best use of NAPA Stability and NAPA Loading Computer software onboard.

Many autonomous ships will be operated using systems similar to those currently used for training simulations, says Siltanen. This means that investing in simulation tools is a win-win equation where crews will benefit from the best possible situational awareness of the real ship operating environment. Equally, it also ensures future officers are comfortable working with cloud-based tools, as these will play a major role in autonomous ships. "Digital training solutions like this also help accelerate innovation and research across the industry by acting as the perfect testbed for new concepts and technologies, which then contribute to their commercialization."

Mobile phones have grown beyond their fundamental role as telephones, and the same is true for simulators which have grown beyond their role as a training tool. FORCE Technology has developed SimFlex Cloud for port and offshore renewables engineering studies. The simulator visualizes the advantages and limitations of, say, a proposed port design. Simulated vessels can maneuver under different wind, waves, current, swell, tide, time of day and weather conditions in a simulated port, enabling fact-based engineering design decisions to be made on the port or approach channel's layout.

Terje Heierstad, VP Business Development, Maritime Simulation, Kongsberg Digital, says simulators with high accuracy have become a vital tool for engineering studies and for efficiency studies on emissions reduction, digital twins and autonomous shipping studies, verifying both vessel models and their behavior in various scenarios generated and tested in simulators. "This is fundamental for a safer, smarter and greener maritime future."

Tech Files

Latest Products, Systems and Ship Designs

Zero-Emission Mooring Service of a Tanker

Consulmar achieved a milestone by executing what it calls the world's first zero-emissions mooring service for a tanker. This took place at an offshore multiple buoy mooring site near the BP refinery, two miles from the Port of Castellón in Spain. Using its electric line handling tug Castalia, Consulmar towed the steel mooring lines from the vessel to each of the five mooring buoys.

The tanker vessel Archangel, 274 meters long and 85,474 gt, was moored using the 3-ton pulling capacity of the mooring boat Castalia, which operates on full electric propulsion. Equipped with two 150 kW engines and a lithium battery capacity of 485 kWh, Castalia ensures operational autonomy of up to eight hours, providing an efficient and non-polluting solution for mooring operations. In addition to mooring, the multipurpose Castalia, which measures 12.5 x 5 m, plays a role in various port activities, including collecting MARPOL liquid and solid waste, transporting personnel and provisions, and oil spill response services.

Images courtesy Consulmar

Carbon Capture @ Sea

Image courtesy HRDD

ClassNK granted its "SCCS-Full" class notation to Ever Top, a Neopanamax container vessel owned by Evergreen and equipped with an onboard CO2 capture and storage (CCS) systems, reportedly making it the world's first Neopanamax container vessel to be retrofitted with such systems. The CCS systems, designed and developed by Shanghai Marine Diesel Engine Research Institute, were installed at Huarun Dadong Dockyard Co., Ltd. (HRDD). ClassNK reviewed the system components and the installation plan, aligning with its comprehensive *"Guidelines for Shipboard CO2 Capture and Storage Systems."*

Crowley's New LNG Containerships

Crowley shared first renderings and the names of its four new dual fuel liquefied natural gas (LNG)-powered containerships: Quetzal, Copan, Tiscapa and Torogoz. The 1,400 TEU vessels were ordered in 2022 by Singapore-based Eastern Pacific Shipping (EPS) for scheduled delivery from South Korea's Hyundai Mipo Dockyard in 2025. EPS will charter the ships out to Crowley, who will deploy them on its U.S.-Central America trade connecting U.S. markets to Nicaragua, Honduras, Guatemala and El Salvador. Each ship will feature 300 refrigerated unit plugs. The four Avance-class ships are named after national birds, archaeological sites and lakes in Central America, Crowley said on social media. The newbuilds will feature ME-GI engines from MAN Energy Solutions that are capable running on cleaner burning LNG to slash greenhouse gas emissions such as sulfur oxide, carbon dioxide and nitrogen oxide while eliminating particulate matter. The engines are also said to reduce methane slippage to negligible levels.

Image courtesy Crowley

Tech Files

Latest Products, Systems and Ship Designs

"Wall Climbing Robot" gets ClassNK Nod

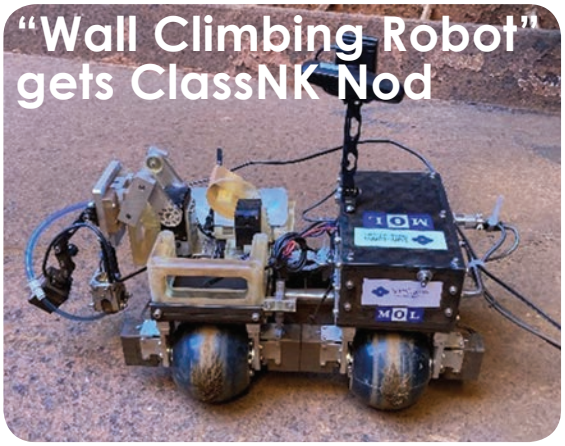


Image courtesy MOL, Sumitomo Heavy Industries

ClassNK granted its Innovation Endorsement for Products & Solutions to a ***"Wall Climbing Robot"*** from Sumitomo Heavy Industries, Ltd., Mitsui O.S.K. Lines, Ltd., and MOL Ship Management Co., Ltd.

The "Wall Climbing Robot" can move to high places that were previously difficult to access by humans or robots, and can take photographs and inspections of the relevant parts. Moreover, it is capable of measuring the thickness of steel plates by remote operation by the operator. This not only avoids the dangers of working at heights, etc., but also eliminates the need for scaffolding, reducing labor costs and scaffolding costs.

Danish Pilot calls LEGO Model *"A tribute build to a work life at sea"*

Image courtesy Espen Andersen/DanPilot

Espen Andersen, a pilot boat driver for DanPilot, the independent public enterprise owned by the Danish state, takes his love of maritime and LEGOs to new heights, creating a LEGO model of the pilot boat he sails - DanPilot India. Andersen calls the project *"A tribute build to a work life at sea"*. "My model is inspired by a Danish pilot boat, but it could just as easily be a pilot boat from any other country." **Vote to turn the pilot boat into a LEGO set at: https://ideas.lego.com/projects/1de118e0-b9bc-4177-9b58-efd33bf4e2f5**

LEGO Pilot Boat Main Particulars
Bricks: 2500 pcs.
Scale: 1:25
Length: 61.5 cm
With: 22.5 cm
Weight: 2.5 kg

Norway OKs Ammonia Bunkering Terminal

The Norwegian Directorate for Civil Protection gave its approval to the construction of the planned ammonia bunkering facility at Fjord Base in Florø, Norway.

The planned terminal consists of a floating stationary barge with a capacity of 1000 cubic meters, or 650 tons, of ammonia. The permit allows for up to 416 operations annually, many of these expected to be bunkering operations for offshore supply vessels that regularly call at Fjord Base in Florø.

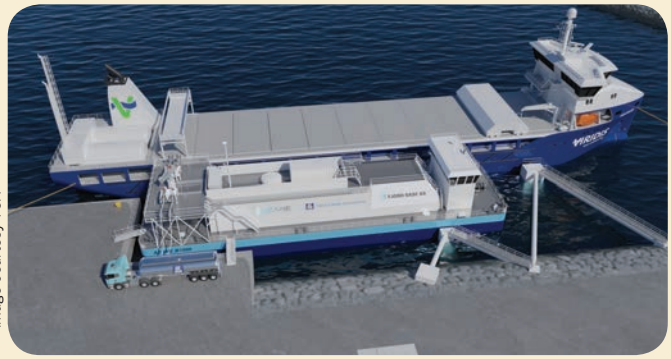


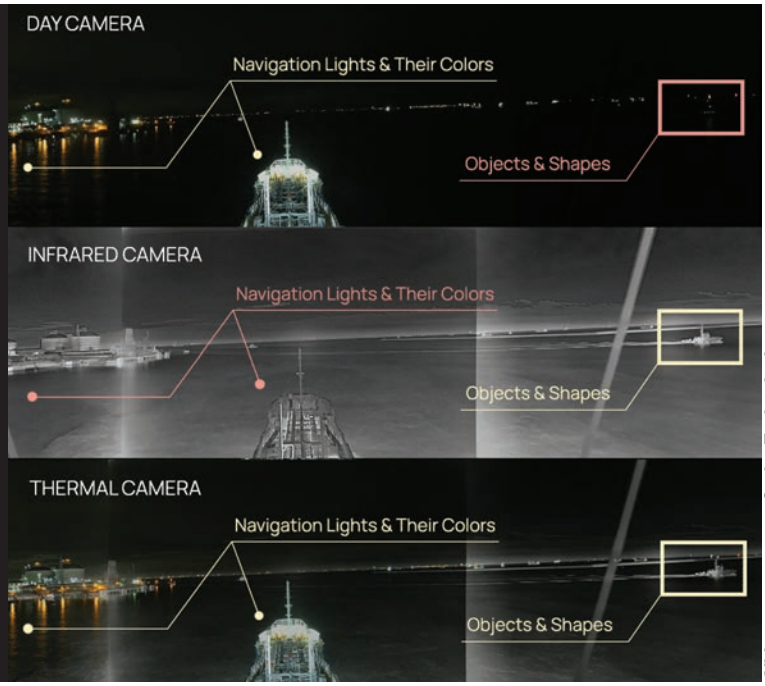
Image courtesy YCA

The planned terminal is part of Yara Clean Ammonia and Azane's efforts to make low-emission ammonia a common fuel for shipping. With ammonia's potential to fully decarbonize the maritime sector, the companies plan to roll out a network of terminals in Scandinavia.

Demand for the alternative fuel seems to gain momentum in Norway as ENOVA, which manages the Norwegian Climate and Energy fund on behalf of the government, is planning ammonia grant tenders for both ammonia powered ships and ammonia infrastructure in 2024. There are multiple newbuilding projects in the pipeline, and ongoing ammonia-powered Platform Supply Vessels (PSV) tender processes.

Yara Clean Ammonia, Azane and Fjord Base will now commence work with their project partners to obtain a permit with the local municipality before a final investment decision.

SITUATIONAL AWARENESS SYSTEM BATTLES COGNITIVE FATIGUE IN WATCHKEEPERS



All images courtesy Groke Technologies

Today's evolving maritime security risks pose all-too-familiar threats to international shipping, and as just one of the many causes of fatigue, they add to the cognitive burden already faced by watchkeepers. But Groke Technologies can boost safety onboard, says co-founder and CEO ***Juha Rokka.***

Life at sea is already physically and mentally demanding. Crewing levels are tight, work hours are long and irregular, watchkeepers are required to perform administrative tasks while on the bridge, port turnaround times are short, and there's more technology onboard to master.

Watchkeepers can find it difficult to correlate the things they are physically seeing with the instruments providing data on the bridge. They need to be constantly crosschecking data from different systems to understand the objects they see on the screen and how they correlate with where they are in the real world? It can take around 20 seconds for bridge systems to update, and this naturally adds to the complexity of the thought processes required of a watchkeeper.

The challenges increase when visibility is low or when there are large numbers of small vessels around. It is hard to predict what these vessels are going to do, and this racks up cognitive stress levels.

Greater Awareness

Groke Technologies was established to give watchkeepers unrivalled awareness of their vessel's surroundings with the aim of improving safety and wellbeing onboard.

Groke Pro is based on unique AI based sensor fusion technology which combines information from a 225-degree visual camera with a specially-developed 180-degree infrared camera, as well as radar and AIS. An inbuilt inertial measurement unit collects data on pitch, roll, and yaw, and a high-precision GNSS provides positioning data. The resulting informative display allows watchkeepers to detect any navigational hazards and objects in real time.

A unique blending function combines images from day and night cameras. The result is a clear view of the vessel surroundings even during night-time operations or other low-visibility situations such as fog, heavy rain or highly reflective situations. Even under these conditions, for example, the colour of navigation lights and surrounding objects can still be clearly shown.

All the objects detected by the computer vision system, including non-AIS vessels and sea marks, can be projected on to electronic charts. Additionally, real-time risk analysis functionality provides an intuitive risk compass, closest point of approach alarms and relative velocity tracking.

By bringing all this together, we aim to provide the best and most reliable depiction of reality possible. The information is available via an easy-to-read visual display on a tablet, so it can be viewed from anywhere on the ship not just the bridge.

Six Japanese companies have now invested in Groke Tech-

– Juha Rokka,
CEO and co-founder, Groke Technologies

nologies: Mitsubishi Corporation, Japan's largest trading house and a partner since our founding in 2019; Sumitomo Mitsui Finance and Leasing; tanker operators Uyeno Transtech, Tsurumi Sunmarine and Asahi Tanker; and, most recently, tugboat operator Tokyo Kisen. Oldendorff Carriers, one of the world's leading dry bulk owners and operators, has also joined us.

Machine Vision

Groke Pro is the first machine vision solution to obtain Innovation Endorsement for Products and Solutions from Japanese classification society ClassNK, a timely achievement. With increasing use of digital shipping technology, combined with a global shortage of experienced officers and crew, we anticipate that integrated ship situational awareness technology will be a mandatory requirement from the IMO by 2030. Before that will come class notations and voluntary IMO guidance, probably by 2026.

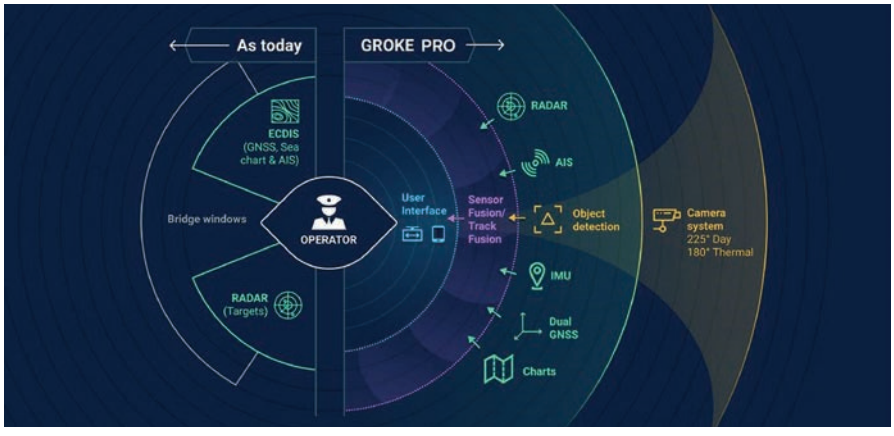
Groke Pro has an extensive reference list from Japanese shipping companies, including K Line and U-Ming Marine, and as well as our headquarters in Turku, we have established a Japanese office. We now have over 20 employees supporting new and existing clients in Asia and Europe.

It takes less than a day to install the system which consists of a sensor unit that is mounted on top of a ship's bridge, and a system cabinet installed inside the bridge.

We have more installations contracted for 2024, including return customers looking to roll out Groke Pro across their fleet. We see demand continuing to grow from both domestic and international shipowners, and we are also seeing interest from insurance companies. In high-risk situations, a recording of images is automatically triggered, so Groke Pro provides an irrefutable evidence trail that could ease the investigative work required for concluding claims.

It can also help shipping companies with professional development material, helping them apply lessons learned across the crews in their fleet. We are also providing cloud connectivity for the system so that shoreside managers can gain a real-time view of the challenges faced by their watchkeepers at sea. In the future, we are planning to build guidance into the system so watchkeepers can more easily assess the options they have for responding to challenging situations.

Groke Pro was not designed to replace crew on board but to provide them with the best possible information to support their decision-making. With better decision-making comes improved safety. Improved safety in turn helps to increase crew welfare.



Seeing the Ship as a System

Shipping must engage with the decarbonization realities that lie ahead by changing the way it crafts maritime legislation to reflect its place in the interconnected, interdependent world economy, said **Eero Lehtovaara**, *ABB Marine & Ports.*

ABB Marine & Ports Head of Regulatory & Public Affairs, Eero Lehtovaara has carved out an unusual - and possibly unique - role in the maritime industry over recent years, as a 'stakeholder' simultaneously mindful of the perspectives of owners, seafarers, manufacturers and regulators.

A Master Mariner with corporate experience to add to his commercial seagoing knowhow, Lehtovaara acknowledges the critical role collaboration plays in meeting the shipping industry's goal for net-zero greenhouse gas emissions by around 2050. He also believes maritime regulations need an overhaul, so that integrated digital technologies can make a full and decisive contribution.

"The industry is an ecosystem which includes owners, managers, mariners, shipyards, equipment makers, designers, research institutes and class societies: all of them are crucial," said Lehtovaara. "Shipping is the most efficient way of transporting goods, whether considered tons per mile or emissions per ton-mile. However, assuming that a miracle is not going to happen, it must also become more efficient very quickly to meet the sustainability goals now set out for it.

"Rather than focusing on individual parts of the industry, or fractions of it, we should use a holistic approach to evaluate the gains that are available to the industry as whole."

Regulators are fully aware that rapid advances in digital technology are changing the way ships are operated.

"The maritime education and training I had was comparable to what most seafarers out there are going through today, and it is not sufficient preparation for what's going on onboard ships at the moment," says Lehtovaara.

Today, ships are filled with standalone proprietary technologies. Two systems operating in storm conditions can base their analyses on different efficiency parameters, for example: a seafarer acting in full compliance with training requirements can find that one overrides the other in an unexpected way, compromising safety.

"In SOLAS, every ship system is considered independently, while the way to evaluate integrated system is based on outcomes. SOLAS is also descriptive, which is not compatible with software. You can't describe a code."

The International Maritime Organization's carbon intensity indicator (CII) and EU Emissions Trading Scheme are only early milestones on the regulatory route to net zero emissions from ships by around 2050. Already, the FuelEU Maritime Initiative favors 'well-to-wake' over 'tank-to-wake' as the measure for of the impact of ship greenhouse gas emissions, with IMO soon expected to follow.

With all levels of society increasingly reliant on digital technology, the progressive response from shipping is to engage more closely with solution

All images courtesy ABB Marine and Ports

"The industry is an ecosystem which includes owners, managers, mariners, shipyards, equipment makers, designers, research institutes and class societies: all of them are crucial,"

– Eero Lehtovaara,
Head of Regulatory & Public Affairs, ABB Marine & Ports

providers on developing standards and regulations to help digitalization nurture decarbonization.

"I don't say that crews must be software engineers, but there is no going back: there has to be both a systematic approach to understanding digital systems and how they fit together across shipping, and to the vetting of the systems in service."

Integrated for Sustainability

A member of technical committees with leading class societies, Lehtovaara started the International Council on Combustion Engines (CIMAC) Industry strategy Group Digitalization and, since the summer of 2024 has been a board member focusing on maritime digitalization. He is the current chair of One Sea - the association of autonomous ship technology frontrunners and he also chairs the Waterborne Technology Platform, which provides policy guidance to the European Commission on maritime R&D. With industry investments in zero-emission waterborne transport R&D per year for the period 2021 – 2030 amounting to €3.3 billion, the EU is adding €530 million through the Horizon Europe program.

In November-December 2023, Lehtovaara also represented the maritime industry as part of the Finnish delegation at COP28 in Dubai. His participation included a "Transition in Transportation" panel session covering how to reduce shipping's carbon footprint and accelerate the commercialized scaling-up of solutions.

New energy saving devices, alternative fuels, carbon capture, batteries and fuel cell power will all provide critical pathways to maritime decarbonization, Lehtovaara stresses. "But there is not going to be one solution that meets every objective, given the diversity of ship types, ship ages, routes and services."

What is also already known is that all the solutions proposed to advance maritime decarbonization – from CII to emissions trading – are optimized by formalizing solutions for data sharing. Lehtovaara says regulators should reconceive the ship as a system to reflect this reality.

"Perhaps this sounds like a small thing. It changes everything," says Lehtovaara.

Understanding the ship as a system is a point of departure for regulating the interface between the human in the loop and digitalized maritime technology.

Technology as Tool

"Technology should be helping to make the lives of seafarers easier, as well as making ships operate more efficiently. But the advisory products which support better decision-making aren't governed by specific rules or third-party approvals that examine how they affect the ship as system."

Lehtovaara says the model for data collaboration between engine and other systems would include an outline of standards for secure data exchange, vendor neutrality and data property protection. The work would also demand a review of SOLAS formulations for the design, planning and testing of ships, and a regulatory framework which takes account of the 'graceful deterioration' of electronic systems.

The 'ship as system' approach would be influential if considered as part of the IMO's review of its formulation of the CII, or as EU standards evolve to support FuelEU maritime requirements to have 90 percent of pier sides in ports to deliver power from shore by 2030, Lehtovaara suggests.

"As [IMO Secretary General] Arsenio Dominguez said recently, regulators have come to realize that that they were optimistic with the CII. Its impact so far has been to cut the average speed of the fleet by almost one knot. This means ships in service are less efficient and, globally, it's been the same as reducing ship capacity substantially.

"One response might be to build more ships, but even a shameless opportunist would acknowledge that this defeats the entire objective of the CII regulation."

A better response would involve improving understanding of the relationships of the world's population, GDP and trade, and the global shipping industry needed to support them.

Where shipping's contribution to 'carbon intensity' is concerned, this would need to include restraint on any haste to reform CII until a better understanding of the impact of changing vessel speeds is established.

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