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MARITIME REPORTER AND ENGINEERING NEWS

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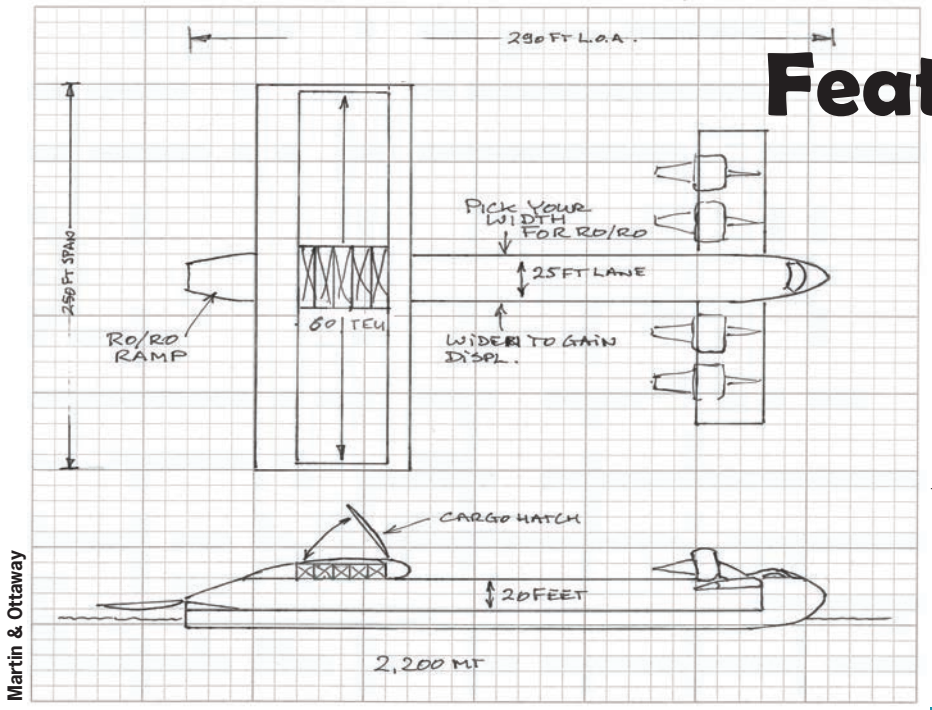

Martin & Ottaway

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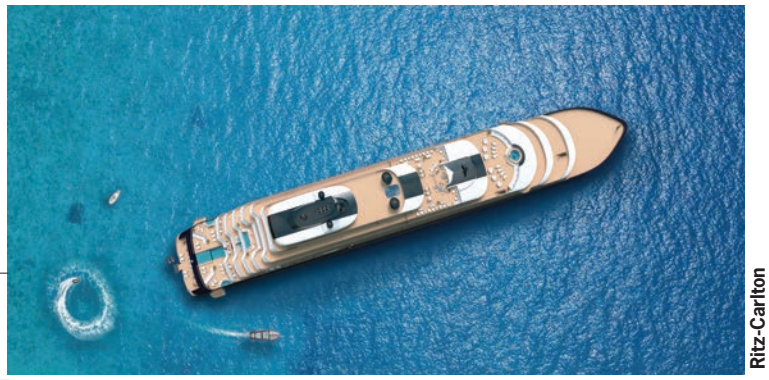
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By Greg Trauthwein

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Editorial

When the Admiral calls ...

As we enter the dog days of summer in New York City, it is traditionally a time for beach, boats, barbeque and family. Regarding the latter, my sister and her family were embarked recently on a 19-day U.S. east coast journey from their home in Ohio, and I was all set to spend Wednesday, June 19 trekking around NYC in 'tourist mode', which I thoroughly enjoy because despite living here for more than 30 years, hosting visitors is the only time that I get to see some of the city's more famous attractions.

But then the Admiral called, and my sister and her family were 'bumped' to dinner on the evening of the 18th! (OK, full disclosure, the Admiral's PAO actually 'called').

Admiral Karl Schultz, the Commandant of the United States Coast Guard, invited me to join him on his jet for a day trip to New Orleans for an underway tour onboard a mid-stream transfer operation in the Mississippi River. (And in case you're wondering, yes, the USCG sports a very nice 12-seat jet for the Commandant. Unfortunately, I do believe it has ruined any future flying experiences for me.) As the U.S. inland waterway system has endured historic water levels for more than six months, the destination provided a perfect backdrop to discuss several key messages coming from USCG leadership:

- The maritime industry's critical role in facilitating U.S. commerce;
- The need for investment in Coast Guard and maritime infrastructure to keep that commerce flowing; and
- The importance of collaboration between government and industry on the national, regional and local levels.

'Roiling on the Rivers' starts on page 36, documenting in words and images a mid-stream cargo operation run by Associated Terminals and sister company Turn Services. Being on the river and seeing the work being done is amazing; seeing the work being conducted in the current high- and fast flowing water environment really punctuates the impact (slower and riskier) to marine operations across the system. Keeping in mind that I have been to and through New Orleans more than 50 times, I am still amazed flying into the area and getting the literal 'bird's eye' view of the vibrant and mixed maritime economy on the lower Mississippi River – literally where brown water meets blue water – a vital corridor in the export of a majority of our nation's farm-grown products.

While battling Mother Nature is certainly not new to the farmers or the towboat and barge companies, this historic, six-month-long high-water event has helped to expose the fragility of the system as a whole, and the need for both maritime and the U.S. Coast Guard to be included in the 'infrastructure investment' conversation, as both are crucial components to keeping $5.4 trillion in commerce annually flowing, here and along waterways in and around the country. I love this edition and this industry, because in one breath you can discuss inland workboat operations, in the next breath the birth of The Ritz-Carlton Yacht Collection luxury cruise ship line; polar opposites, I think you will agree. While the USCG Admiral Schultz receives top billing in this space, **Douglas Prothero** and The Ritz-Carlton Yacht Collection get the cover and 10 pages of coverage inside, the anchor of our Cruise Interior Design feature focus. To be honest, I've run thin on adjectives to describe the current cruise industry, as the boom in business far exceeds anything that I have seen in the last three decades. Shipyards globally are filled with cruise ship building projects of every size and scope, and while 10 years ago the race was toward 'bigger', the current craze is focused on smaller, more intimate and exclusive ships and trips. Starting on page 26 our luxury vessel specialist Lisa Overing interviews Prothero, the CEO of The Ritz-Carlton Yacht Collection and the driving force to bring the brand from the drawing board to the world's waterways in 2020. A nice addition to this was my interview with **Fredrik Johansson** of Tillberg Design of Sweden, starting on page 32, who was literally involved in the design from the start. By design I mean not only the vessel exterior and interior, but every detail from the service organization to the crew uniforms.

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MarTID 2019: Maritime Training Trends Report Available

As announced earlier this summer, results from the second annual Maritime Training Insights Database (MarTID) 2019 have been released, and training budgets – both money spent by companies and mariners themselves – continues to rise. The results of the survey are freely available on the link below.

Training Models & Tools

According to MarTID 2019, for vessel operators traditional classroom teaching and job shadowing remain the most frequently used training methods for operators, with over third of the respondents reporting high usage. This is relatively unchanged from last year's survey results.

Around 68% of operators indicated high to medium use of e-learning with video sources, and approximately 60% report the same for online e-learning. While the previous year's MarTID report surveyed all types of organizations, these percentages are very similar to last year's numbers (70% and 60% respectively).

Interestingly, all vessel operators surveyed reported at least some use of internet-based e-learning usage.

For Maritime Training & Education Institutions (METIs), as expected in-person classroom teaching and simulator training are the most highly used training methods.

Table-top exercises were also reported to be moderately used by nearly half of the surveyed institutions. For video and internet-base e-learning, the results were relatively consistent with those from vessel operators, and with the results from last year's data.

Having said that, this year METIs were somewhat more likely to report high use of these training techniques (21% of METIs compared to 12% - 16% of vessel operators), and somewhat less likely to report "medium" use of these techniques (37% and 31%, respectively, compared to 52% and 48% of operators).

MarTID 2019
Training Report Available

http://scholar.wmu.se/martid

Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators. In his former life he was a computer science faculty member at the University of BC researching online learning and assessment delivery models and their effectiveness. This led to him develop WebCT, a learning management system that was used by 14 million students in 80 countries.

Important Training Need? A quick video may be the answer!

Have you ever witnessed a mariner performing a task poorly or unsafely? Possibly day-to-day confined space entry? A commonly misapplied or misunderstood ColReg? Inattentive watchkeeping? Of course you have. And if you have seen it happen once, you can rest assured that it has happened before, and it will continue to happen unless someone does something about it. So - what can you do?

Video may be your answer. It is surprisingly fast and easy to create short, laser-targeted videos that demonstrate best practice. And the results are surprisingly effective; the second most popular category of videos on YouTube is the "how-to" video. Let's discuss how to make use of this for maritime training.

Photo: Hermes Rivera on Unsplash

Maximum Effect Using Video

The goal here is to address a performance or safety issue by creating a very short video that addresses that issue. In order to achieve maximum effect, our videos should have a few simple but important qualities. I'll cover the most important here.

First, each video should address exactly one issue, no more. There are many reasons for this including making the video relevant and easy to find, and keeping the interest of the trainee.

The "correct" length of the video is whatever length is required to fully convey the lesson, but engagement studies often point to videos of between two and four minutes in length to maximize engagement. It is tempting to make the video longer to get all the "important" facts across, but this is usually a mistake. The video will have much more impact if just the critical facts are conveyed, and the video is kept very short. If more needs to be said than can be said in two to four minutes, dissect your topic further and make another video.

In addition to being short, videos should be well lit, and voice-overs clear and easy to understand.

And finally, what should the video show? An effective approach is a video of someone performing the task correctly, with a voice-over highlighting the key aspects of correct and safe performance. Once you become adept at making these, you can also use video call-outs (arrows or labels on the screen, for example) to highlight important points. Additionally, it is often very instructive to contrast the demonstration of correct performance by first showing commonly made mistakes.

Making and Distributing Training Videos in Your Organization

Shooting the video is easy. It's a great excuse to purchase a go-pro video camera. If that's not in the budget, a good quality smartphone will be very effective. It should also be easy to recruit volunteers from your officers and crew to be the "stars" of the video.

Once the video is recorded, you could put it up as-is, but you can improve effectiveness by adding a voice-over describing the issue being addressed and highlighting the constituents of correct performance. By recording the voice-over after recording the video, you are able to make a script and ensure excellent quality audio by recording it in a quiet environment. Investing in a $100 microphone will allow you to produce outstanding results here.

In order to add the audio as well as other effects, you will need a simple video-editing program. There are many free and paid options. Start with a free option and get to know it. Once you are comfortable, the skills learned there will be transferable to a more sophisticated paid option. To deploy your video to your trainees, you have many options. Ideally you have an LMS which will easily let you upload the video, notify users, track who watched it, and even assess their understanding of it. If not, YouTube can be your friend here. You can create a private channel, upload your videos, and e-mail your trainees the link. I'll cover distribution more in a subsequent training tips for ships!

Final Thoughts:

You *can* do this. Millions of people with no background make how-to videos every day. Check them out for good ideas. These are excellent training tools and a quick bit of experimentation will get you started and on your way to being an expert. Over time, you will develop a highly valuable, effective library to help keep everyone safe and efficient.

Dennis L. Bryant
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Maritime's Cyber Alert

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For some years now, the maritime sector has experienced breaches of various computer and information technology (IT) systems. Primarily, these breaches have been collateral damage. The maritime sector has almost never been the intended target. That does not mean that the damage has been minor. In June 2017, A.P. Moller-Maersk suffered a major cyber-attack. The malware had been designed by Russian hackers to disrupt the Ukrainian power sector. Once released, though, it proved to be indiscriminate, infecting IT systems worldwide that had not been kept up to date. In the case of A.P. Moller-Maersk, its container ships and associated ports were most impacted, halting operations for a while and causing economic damages of up to $300 million. The company had to scrub 40,000 devices to fully remove the malware. The Ports of Barcelona and San Diego and the American division of COSCO Shipping Lines have also been impacted by untargeted cyber-attacks.

Targeted threats

Recently, hackers have commenced actions specifically targeting the maritime sector.

Most targeted hacking is accomplished via spear-phishing. The hackers modify legitimate emails using tools such as EmailPicky, appearing to retain a legitimate sender's name and address, but adding malware so that the receiver of the email infects the IT system by downloading the attachment. Alternatively, the hacker crafts a fake email from a legitimate sender with instructions to transfer funds to the hacker's ghost account. Payment of fraudulent billings sometimes go on for months before they are discovered. Between 2011 and 2013, spear-phishing drug dealers hacked the Port of Antwerp IT system to arrange pickups of drugs hidden in shipping containers.

Agreeing to connect to an unknown network can also result in the unwitting downloading of malware. Once that malware is on a device with access to another network, such as that of a shipping company, the malware can easily spread throughout the entire network unless robust cybersecurity protocols are in place.

Many individuals and business entities utilize simple passwords (e.g., ABC123) and never change their passwords. These practices are the electronic equivalent of unlocked doors for hackers.

Software producers regularly issue updates and patches to their products. They also retire older products, replacing them with new, more sophisticated versions. It is vital that software users install these updates and patches promptly and replace retired software. A software producer issues an update or patch when a flaw in a product is discovered. That update or patch often discloses, perhaps inadvertently, what the flaw was. Hackers utilize that information to exploit the IT systems that utilize the product but do not keep it current.

An infected IT system can be directed to provide hackers with sensitive commercial information or to upload additional malicious software. In some instances, that malicious software consists of ransomware. Ransomware is designed to freeze the IT system or copy sensitive data and send a ransom demand to the system administrator. If the ransom is paid (generally in bitcoins or another electronic currency), the IT system is released or the data returned, but not always. Numerous public and private entities have been the subjects of

ransomware attacks, including law enforcement agencies, hospitals, municipal governments, shipping companies, and in 2017, the major British shipping services firm Clarkson Plc. The Australian shipbuilder Austral Limited was also the apparent subject of a ransomware attack.

The Internet of Things (IoT) has made access to information and control systems easier. These has created expansive opportunities for improved efficiencies. Connected devices and systems offer the possibility of ubiquitous access, which equates to more possible entry points for both authorized and unauthorized users. As more devices become connected to each other and to the internet, the overall risk and impact of a compromise increase, along with the possibility of a cascading effect in the event of a cyber attack. Navigation, propulsion, and other vessel operation systems can be hijacked.

Preventative protocols

Following are a few of the steps that may be taken to reduce the risk of cyber attack:

- Utilizing unique passwords and changing passwords on a regular basis.
- Installing software updates and patches promptly upon receipt.
- Routinely checking the IT system for malware.
- Backing up data frequently onto a stand-alone device disconnected to the IT system.
- Two-factor identification is an effective means of ensuring that persons seeking access to an IT system are properly authorized, but few entities utilize it.
- Cyber security training is vital. Since the threat evolves rapidly, the training must be continual.

The US Coast Guard recently issued a Marine Safety Information Bulletin advising the maritime industry to be on guard against email phishing and malware intrusion attempts. Cyber adversaries were reported to be attempting to gain access to sensitive information including the content of notice of arrival (NOA) messages. Masters of US vessels were reminded of the obligation to report suspicious cyber activity to the USCG National Response Center (NRC). Unsolicited emails, particularly those requesting sensitive information or including attachments, should be verified by contacting the sending entity via separate means prior to acting or downloading any attachments.

Cyber security procedures and protocols must be laid out in the safety management system (SMS) of the vessel and the company. Failure to do so constitutes a deficiency and may result in the vessel being determined unseaworthy.

Baltic and International Maritime Council (BIMCO), the largest international shipping association, has developed a new cyber security clause for use in maritime contracts requiring parties to implement cyber security procedures and systems to reduce the risk of an incident.

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) jointly developed the information security standard ISO/IEC 27001. The standard specifies a management system intended to bring information security under management control and lays out specific requirements for conformance. Organizations meeting those requirements may be certified by an accredited certification body following successful completion of an audit. Such certification is generally considered the gold standard in cyber security.

Summary

Cyber experts say that they are two kinds of company IT systems: those known to have been hacked and those that don't yet know that they have been hacked. This may be an over-statement, but not by far. There are so many threats and the sophistication of those threats is increasing so fast that the IT system administrators are getting overwhelmed. Entities and individuals should take as many steps as possible to protect their IT systems and data. Continual vigilance is required.

Gurinder Singh
Gurinder Singh is Director of Global Sustainability, at ABS.

Course to Low Carbon Shipping

In a collective call to action for the decarbonization of shipping last year, 34 signatory CEOs from the industry made clear that efforts to significantly lower the carbon footprint of shipping presented "biggest technology challenge in the past 100 years".

This statement was not an exaggeration. In fact, the transition to a low-carbon future will take more than an unprecedented commitment to the research and development that traditionally underpins technological advance. Finding complex solutions that are at once commercially viable, technically feasible, sustainable and safe will require a stable regulatory environment that provides long-term certainty for a wide range of investors in new low-carbon technologies.

The IMO last year set an ambitious course with its preliminary greenhouse-gas (GHG) strategy, which was aimed at reducing CO2 emissions by at least 40% per cargo tonne-mile by 2030 (pursuing a 70% reduction by 2050) and a 50% reduction in GHG emissions by 2050 (against 2008 levels).

According to the organization's 3rd GHG study (2014), from 2007-2012 international shipping on average produced 2.6% of global CO2 emissions every year. Since then, consensus has formed that strong growth in demand for seaborne transport will see shipping's carbon output grow faster than other major industries, if we continue business as usual.

Shipowners have not been idle in the interim; significant reductions in fuel consumption have since come from improving vessel designs and operating methods. It will be difficult, however, to find further meaningful GHG gains by simply applying current technologies.

The 2030 emissions targets are challenging. But because they are a measure of 'carbon intensity', they account for trade growth. Any efforts to meet those goals, however, will need to be aligned with the 2050 targets, if they are to account for the greater demand for transportation inherent in trade growth. This will require new technologies.

Download the ABS Low Carbon Shipping Outlook@
https://ww2.eagle.org/en/innovation-and-technology/sustainability-for-the-maritime-sector.html

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A quick examination of some rough numbers helps to outline the size of the challenge. The IMO's 3rd GHG study estimated that international shipping emitted 921 million tonnes of CO2 in 2008; by 2050, that volume could grow by as much as 250% to 2,300m tonnes, the IMO said.

That means, to reduce CO2 output to 460m tonnes (and achieve the 2050 target), the global fleet would need to emit 1,840m fewer tonnes than in 2008, while having grown to serve a significant expansion in seaborne trade.

Based on the historical average growth rate for maritime trade of 3.2% per year, the volume of seaborne trade could increase by 90% from 2030-2050; even using a conservative rate of 1.5%, the trade volumes would still grow 35%.

From a carbon-intensity perspective, the IMO's targets would require 2008's benchmark of 22 grams of CO2 per tonne-mile to fall to 6.6g of CO2 per tonne-mile by 2050.

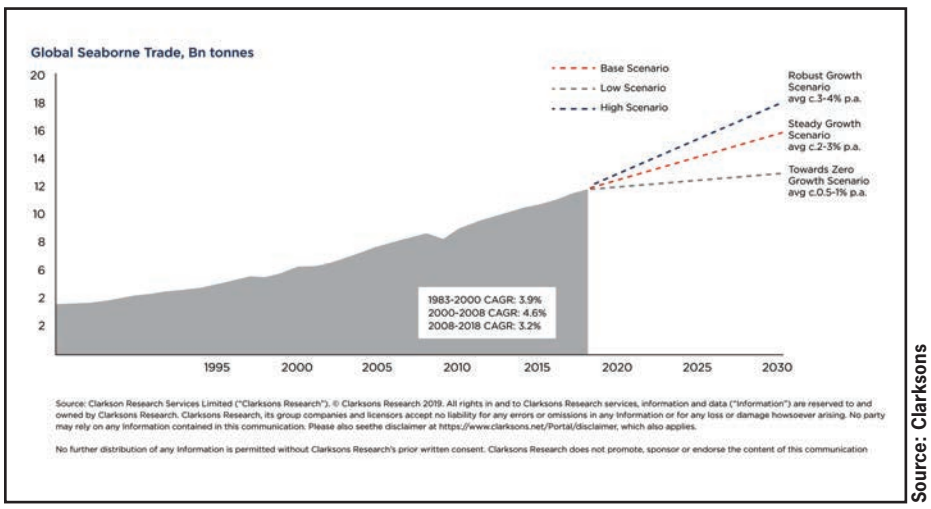
It is a significant challenge, but here have been recent signs of progress. For example, mainly as a result of slow steaming in weak market conditions, in 2012, total CO2 emissions dropped to 796m tonnes, a 14% reduction relative to 2008; and an impressive 30% dip in carbon intensity was witnessed in 2015. However, since this was a result of commercial pressures, maintaining the reductions is not a given as market drivers

can quickly change the paradigm and have vessels speed up to meet supply chain demands.

It is results such as these which likely fuels the belief that 2030 emissions targets can be met with a combination of available technology, optimized vessel speeds, improvements in scheduling efficiency and limited use of low-carbon fuels. But, even then, the gap between 2030 emissions output and 2050 reduction targets will remain large.

Assuming that operational and technical adjustments can suspend the growth in CO2 emissions until 2030, carbon output would still need to be reduced by 350m-tonne a year until 2050 to meet the IMO's goals. That by itself will pose an enormous challenge, one that we presently have neither the new fuels nor the technologies to achieve.

Improvements to the design of ships are required in the next phase of the IMO's Energy Efficiency Design Index, but their contribution to GHG-reduction targets will be minimal. Further advances in ship technology could make another contribution, but new low- and zero-carbon energy sources still will be needed to reach the 2050 targets.



Source: Clarksons

Although many new energy sources and propulsion technologies are being tested, more development is required for most if they are to become viable for international shipping.

Using digital technology to simplify shipping practices could further reduce fuel consumption and emissions by optimizing vessel speeds and routes, reducing waiting times and streamlining contractual transactions.

Information-driven, just-in-time shipping, for example, could introduce slower speeds without regulations having to make them mandatory for everyone, regardless of shipment requirements. With improved vessel utilization, less additional capacity would be required. Likewise, digital technology and improved connectivity will support next level of performance optimization, preventative maintenance and matching ships to cargo.

Understanding the impact and efficacy of technology options and their degrees of maturity will be critical for making investment decisions. And the readiness of some technologies will differ between shipping sectors; for example, some battery technologies may be available for vessels with short operating ranges, but not for the longer routes.

In all probability, closing the emission gap between 2030 and 2050 will require a combination of measures. Among those, alternative fuels have most potential. But making them available for large-scale consumption will require the biggest investment.

For the modern owner, setting the course to low-carbon shipping will require some skillful navigation.

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Regulatory Crewing Challenges for Offshore Wind Vessels

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Every day we see more and more news about how the planning for new offshore wind projects continues to expand with the increasing investment from both domestic and foreign interests in these projects. This is resulting in both developers and contractors making logistics plans to secure vessels and crew for the purposes of meeting the demands necessary to crew and operate vessels in support of future wind farm operations. Unfortunately, there are challenges associated with the evolving federal regulatory regime that are developing with this nascent industry facing both U.S.- and foreign-flag vessel owners and operators related to the crewing of such vessels. Despite universal federal agency support for offshore windfarms, due to the varying ways in which federal agencies are applying crewing laws and the Outer Continental Shelf Lands Act (OCSLA) to offshore wind farms, this is resulting in a different regime in many ways compared to how these laws have been applied over the years to oil and gas projects on the Outer Continental Shelf (OCS). The following is a discussion of these challenges.

With regard to foreign-flag vessels, as a general rule, under OCSLA, vessels engaged in "OCS activities" must use U.S. citizens to crew such vessels. However, there is an exemption procedure available under OCSLA which allows foreign-flag vessels that are over 50% foreign owned or controlled by foreign citizens to engage in U.S. OCS activities using foreign crewmembers. A formal application to the Coast Guard is required to obtain such an exemption. Upon approval of the exemption, the foreign citizen crewmembers will be able to obtain a B-1 (OCS) visa from a U.S. embassy in order to allow them off the vessel in the United States, or travel to the United States, to meet a vessel. Crewmembers are not able to obtain the B-1 (OCS) visa until the Coast Guard exemption letter is issued.

Unfortunately, the Coast Guard will not grant an OCS crewing exemption to a foreign-flag vessel engaged in offshore wind farm operations because it has determined that the crewing restrictions under OCSLA only apply to the employment of personnel on units engaged in an "OCS activity" on the U.S. OCS. This term is defined by the Coast Guard to mean "any offshore activity associated with the exploration for, or development or production of, the minerals of the OCS." The definition of "minerals" has been interpreted by the U.S. Coast Guard to not include wind.

However, an analysis of the statutory authority reveals that the Coast Guard's interpretation is incorrect. Neither the U.S. citizen manning requirement nor the exemption procedure for this requirement limits its mandate to mineral activities. Indeed, the specific authorization that gives BOEM the authority to approve the development and construction of a wind energy project on the OCS, is authorized pursuant to a 2005 amendment to OCSLA, to specifically expand this authority beyond the production of oil and gas on the OCS.

Similarly, OCSLA also authorizes the Coast Guard to regulate the health and safety of workers and facilities offshore without distinguishing between projects that produce minerals or other energy. However, we understand that the Coast Guard takes the position that it does not have the authority to regulate an offshore windfarm under this provision because it is not an activity related to the minerals of the seabed.

Accordingly, a vessel engaged in wind operations on the OCS is not subject to the OCSLA crewing restrictions and can employ foreign citizens without obtaining a crewing exemption from the Coast Guard. The problem with this outcome is that the foreign crewmember cannot obtain a B-1 (OCS) which has a six-month maximum stay period. One would think that the next most logical option given the Coast Guard's position would be a D-Visa. Such a visa option, however, creates a conundrum because the crewmembers performing wind farm related work on such a vessel must depart the United States within (29) days which is not a long enough time to complete a typical wind farm project offshore.

Indeed, this problem is further exacerbated when an individual applies for a visa at a U.S. embassy for offshore wind farm work on the OCS. Embassies expect that a person applying for a visa for OCS work will possess a Coast Guard crewing exemption letter and as a result some embassies are refusing to issue a B-1 visa to the applicant. As a result, the Coast Guard's interpretation is causing confusion with regard to the need for crewmembers to obtain a B visa (without an OCS annotation) to be issued by a U.S. embassy. We believe a B-type visa is the appropriate visa to issue in these circumstances which would provide crewmembers with the time needed to complete a wind farm project on the U.S. OCS.

This development is also causing confusion with regard to how U.S. Customs and Border Protect ("CBP") officials make U.S. entry decisions when a crewmember receives a visa and arrives at an airport or on a wind farm project on the OCS. The representative for the local CBP port director is confused because typically they are used to seeing a crewmember arrive with a B-1 (OCS) visa for energy related work on the OCS. Accordingly, this is also resulting in uncertainty in how visa rules will be interpreted by local CBP officials.

Fortunately, as a result of these developments, we understand discussions with relevant Coast Guard, CBP, and State Department officials in Washington D.C. have recently been taking place which hopefully will result in new approaches and agency coordination on the proper policy on issuing B-1 visas to crewmen who will work on offshore wind projects on the U.S. OCS.

With regard to U.S.-flag vessels, absent some exceptions, the officers and unlicensed seamen crew aboard a U.S.-flag vessel must be U.S. citizens. It has not been uncommon in the past for companies to place persons aboard a U.S.-flag vessel to perform special operations that U.S. citizens could not perform. However, the Coast Guard interprets the term "seaman" broadly to mean any individual engaged or employed in the business of a vessel or a person whose efforts contribute to accomplishing the vessel's business, whether that person is involved with operation of the vessel. Accordingly, individuals being compensated for performing their jobs while the vessel is underway are considered seamen for the purpose of applying citizenship requirements. However, the Coast Guard does not consider a person who is briefly visiting the vessel in a consulting capacity, or shoreside personnel who come on board vessels while they are not underway to load or unload cargo, or to perform services such as maintenance of shipboard equipment, to be a crewmember. In summary, in the Coast Guard's view only a foreign citizen that fits the description of a "consultant" can perform services aboard a U.S.-flag vessel.

There is also a new issue with regard to who must possess a Merchant Mariner Credential ("MMC") when employed aboard a U.S. flag vessel. In general, individuals serving aboard vessels of at least 100 GT must have an MMC, with certain exceptions. In short, under the law, unless otherwise excepted, an MMC is issued to qualified mariners and is required for any person "engaged or employed" on board a vessel of 100 GT or over. The term "engaged or employed" is very broad.

Certainly, the navigation and marine crew of a vessel possess should and do possess MMDs. However, typically other personnel serving aboard a vessel do not necessarily possess an MMD. This is particularly the case with regard to many operations taking place offshore related to energy development on the OCS. Many industrial-type personnel currently do not possess MMCs.

Despite the fact that this law has been on the book for decades, it appears that the Coast Guard is taking a more aggressive stance and there have been some incidents recently in which the Coast Guard has started to enforce this requirement.

Accordingly, absent a change in the law, there could be more circumstances arising in which vessel owners or operators may not be able to operate their U.S.-flag vessels unless everyone who is employed or engaged on the vessel possesses an MMC.

In conclusion, owners and operators of vessels engaged in offshore wind farm operations should be aware of these developments and the various agencies will need to coordinate their interpretations of the marine-related laws governing vessel crewing to ensure conflicting interpretations do not impede the development of this promising new offshore wind industry.

Forrest Booth & Pamela Schultz, Hinshaw & Culbertson LLP: Booth focuses his practice in admiralty, insurance and reinsurance, including litigation, maritime claims, insurance coverage, marine insurance, salvage, regulatory and energy matters. Schultz is a seasoned litigator, focusing on admiralty and maritime matters, including cargo claims, personal injury defense, charter party disputes, product liability and marine insurance.

Dutra Group v. Batterton: What Every Shipowner Should Know

On June 24, 2019, the U.S. Supreme Court issued a long-awaited decision on an important issue of U.S. maritime law when it decided Dutra Group v. Batterton (Batterton). The decision is of great interest to shipowners, operators, insurers, seagoing personnel and their families, and others involved in the U.S. maritime industry. The decision is particularly important for those who employ personnel to work onboard vessels and those who may become injured while working. However, the decision may well have ramifications for other maritime personal injury and wrongful death claims, regardless of whether the claimant legally qualifies as a seaman.

The Supreme Court's decision involved the question of whether punitive damages are available to a seaman who suffered a personal injury as a result of the alleged "unseaworthiness" of the vessel on which the seaman was working. Legal unseaworthiness has largely been considered by courts of law as a strict liability cause of action. Historically, such claims were designed to ensure that shipowners did not operate vessels which posed a considerable risk to those onboard, such as of a fire on board or sinking a vessel. In practice, unseaworthiness claims were brought alleging conditions such as a slippery deck, lack of certain equipment, lack of adequate manpower or an untrained crewmember, which allegedly led to a crewmember getting hurt.

The unseaworthiness claim was not created by statute, but rather many years ago by courts through case law. Since the seaman's right to pursue a negligence claim under the Jones Act did not permit the recovery of punitive damages, the "unseaworthiness" cause of action had long been utilized by the plaintiff's personal injury bar as an additional cause of action, for which punitive damages were sought (since they were not prohibited by any statute). The Supreme Court's Batterton decision confirmed that unseaworthiness claims do not carry with them the right to punitive damages, since providing punitive damages for unseaworthiness claims would not conform to Congress' intention in passing the Jones Act and other statutes, which limit recovery to only "pecuniary" damages (economic losses, such as lost wages).

Plaintiffs' lawyers had for over a decade argued that the Supreme Court's 2009 decision of Atlantic Sounding, which permits punitive damages for a shipowner's willful failure to provide maintenance and cure to an injured crewmember, meant that punitive damages were available in all maritime injury cases.

In Batterton, the Court rejected that position. At the same time, the Court also held that Atlantic Sounding remains good law, because the basis for the maintenance and cure claim was historic, but different from the basis for the Congressionally-enacted Jones Act. Therefore, allowing punitive damages for wrongful failure to provide maintenance and cure did not conflict with Congressional policy in enacting the Jones Act.

While if read narrowly, the Batterton ruling is limited to claims for unseaworthiness, it has wider importance. In its recent decision the Supreme Court stated multiple times that its prior decision in Miles v. Apex Marine Corp. remains good law. In Miles, the Court held that while a general maritime law cause of action for the death of a seaman exists, that claim does not include a right of recovery by his or her family members for their loss of "society" due to that death. Maritime law requires uniformity between and among the Jones Act, the Death on the High Seas Act ("DOHSA") and the general maritime law, and since Congress limited damages under DOHSA to "pecuniary loss", no claim for loss of society is allowed. Common law (court-created) remedies for damages in maritime cases should be interpreted to achieve uniformity with statutory remedies provided by Congress such as the Jones Act, the Longshore Act and DOHSA.

The Batterton Court discussed, and rejected 6 to 3, the plaintiffs' argument that courts are free to create new claims and remedies for seafarers, since much of maritime law is judge-made. The Court noted that this may have been true decades ago, but now that Congress has legislated, this opportunity no longer exists. The Court likewise discussed, and rejected, the plaintiffs' assertion based on an 1865 case, that it is more appropriate for an admiralty court "to give than to withhold the remedy". Courts are only free to apply the laws that Congress has passed, not make up new ones.

The demise of punitive damages claims in unseaworthiness cases, and their unavailability in Jones Act cases, means that seamen's injury cases will now be evaluated based on their true worth and the gravity of the injury suffered; claims for punitive damages will not be a club held over the head of shipowners and operators.

Punitive damages are not covered by most marine liability insurance policies, and in any case, by law, they cannot be insured against in almost half the states in the U.S. Therefore, before Batterton, plaintiffs' lawyers used to threaten to bankrupt small companies and single shipowners via large uninsured (and often bogus) claims for punitive damages, which had the effect of driving a wedge between the shipowner and the underwriter, often leading to the need to settle a case for more than it should have been worth.

But injured seamen are not left marooned by Batterton; they still have the right to bring a claim for unseaworthiness, for which, if proved, the shipowner is strictly liable.

That claim has a lower burden of proof than a claim for negligence under the Jones Act, so it is easier to prove in court. Batterton restores the balance of remedies which Congress has mandated.

Joseph Keefe
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Trade, Trump & Trust

As we rapidly churn towards the midpoint of 2019, the maritime sector's biggest story of the year – and arguably its biggest heartburn – surrounds the topic of trade; specifically as it relates to tariffs, fair trade and the ongoing negotiations here in this hemisphere, and across the big pond with the world's fastest growing economy, China. Brace yourself: this won't be a popular read, but you also won't find anything that isn't true within the body of this text.

The impact(s) of the ongoing trade row are far reaching; extending well beyond its effect on the health of international blue water box shipping (in particular). In the heartland, the nation's biggest customer for soy beans just happens to be China, and in the midst of a record harvest and the already difficult logistical (mostly weather-related) situation on inland rivers, that's got a lot of people worried. Closer to home, the Trump administration is using tariffs to leverage some cooperation in solving or at least mitigating the ongoing immigration crisis (there: I said the "C" word, right out loud) from our neighbors to the immediate south.

It's a lot to digest, it changes on an almost daily basis and it is controversial. That the economy has been, up until now and for a sustained period, robust, is also fortunate. You probably couldn't attempt any of this during a recession. Moreover, defining success in such an effort is a moving target and in the end result, there will always be collateral damage.

It was the late (Captain) Timothy Brown, the successful and much admired leader of the Masters, Mates & Pilots union for more than 20 years, who perhaps summed up this type of situation best when he told me a number of years ago, "Joe, the mark of a good deal is one where everyone walks away from the table a little bit unhappy."

Now, I have no idea what Captain Brown thought about trade wars, but when this one is all said and done, his advice will likely be spot on.

No More Signing Ceremonies

As the current trade spat evolved over the past six months, its trajectory didn't surprise me in the least. From the U.S. side, the Trump Administration complained that China had reneged on certain aspects of the deal that had been previously agreed upon. For its part, China says that's just not true.

A recent Reuters article describes how 'China urges dialogue, negotiation to solve the trade row with U.S.' The piece goes on to say, "China's commerce ministry on Tuesday urged dialogue and negotiation to solve trade differences with the United States. It is common to make revisions, suggestions and adjustments in trade negotiations, it said in a statement in response to U.S. government comments that China was pursuing a 'blame game.'" Of course, we're not privy to everything that's happening, but this is tracking eerily similar to another effort that occurred way back in the early 1990's. Stay with me.

Back then, I played squash regularly with a good friend in Houston, Texas. Harry (not his real name) was a young attorney for a large energy outfit based in the Bayou City, and he traveled frequently on business. After one of our usual matches one night, he let me know

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Rik van Hemmen
Rik van Hemmen is the President of Martin & Ottaway, a marine consulting firm that specializes in the resolution of technical, operational and financial issues in maritime. By training he is an Aerospace and Ocean engineer and has spent the majority of his career in engineering design and forensic engineering.

High Speed Container Transport ...
Will it Ever Work?

Every few years I am handed a high-speed container transport proposal. Generally it consists of some type of high speed vessel design that would be able to move containers at high speed and thereby attract a new market by taking a chunk out of the air cargo market and the premium ocean market. Occasionally we are asked to look at the economics for potential investors, and it always falls short of being economically viable. While it is possible to move containers a little quicker over the ocean with faster vessels, from the customer's point of view, the only thing that counts is faster door to door service. Therefore, when offering a faster service, the cargo needs to be sped up through the entire chain, or the sea transport leg needs to be a lot faster.

There are only two ways to make ships faster; make them bigger to take advantage of Froude number effects or install bigger engines and burn more fuel. Neither tends to work in boutique high speed container transport systems.

There is a third way and that is being spearheaded by China in the form of the New Silk Road. Here the physical efficiency of railroads, and its higher speed and shorter route, intends to deliver cargo faster between China and Europe. The new silk road will be a fascinating development to watch. It could well affect large volume cargo movement between China and Europe, but it will be highly unlikely to take over the entire China Europe maritime trade. Moreover, it can never touch the Pacific or Transatlantic trade.

Figure 1: The NvH Line

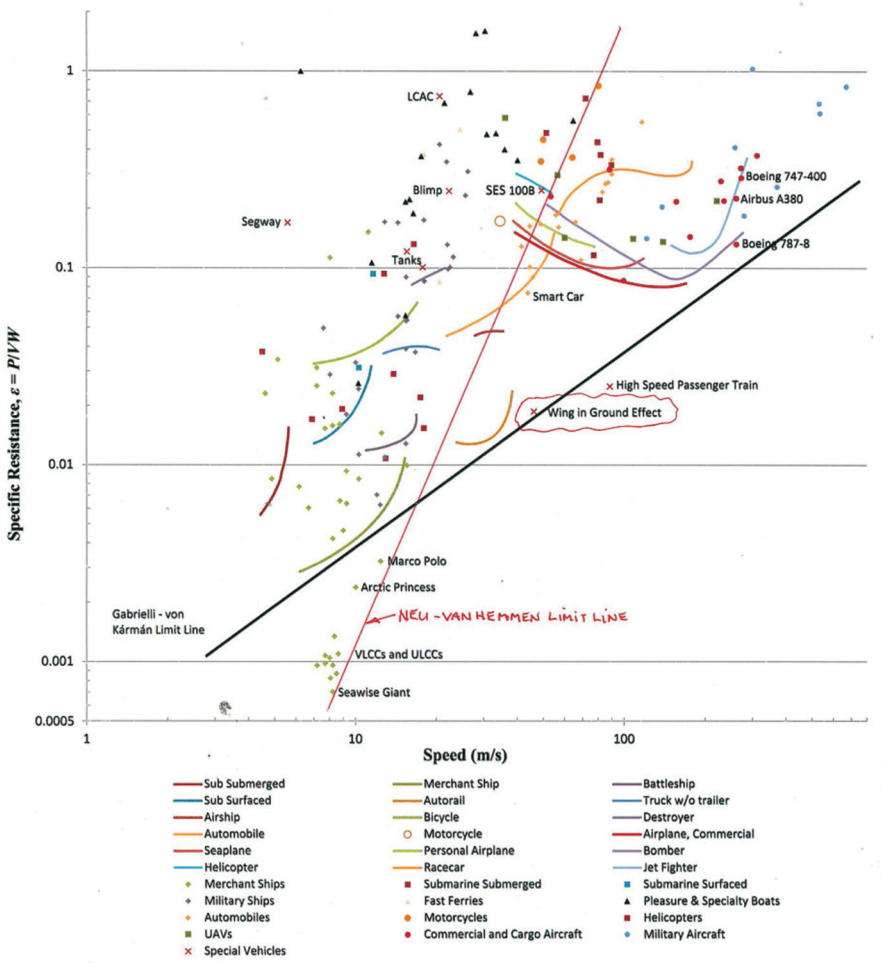


Image credit: Martin & Ottaway, Inc.

But there is another technology that may provide an interesting approach to filling the middle speed slot.

Figure 1 is the Gabrielli von Karman plot (GvK plot) it was developed in the 1950's and provided a very interesting insight into transportation efficiencies. It is not necessary to go into the mathematics, but if a technology finds itself lowest on the plot for a certain speed range it tends to be most efficient.

This plot was updated a number of years ago by Dr. Neu at Virginia Tech as a student project and populated with more modern technology and shows that we have made a little headway with regard to ships (mostly by making them bigger) and airplanes (mostly by increasing their efficiencies).

That update of the graph resulted in an interesting observation by Dr. Neu and me. If you draw a line along the waterborne modes of transport only, there is another line that shows the limits on waterborne transportation technology. I modestly have called that line the Neu van Hemmen line (The NvH line). It shows that, if you operate on the water, you can go faster, but you cannot beat efficiencies of other higher speed modes of transportation.

Meanwhile, for high speed container transport we do not need to go as fast as airplanes, but want to be a lot faster than most boats, and here the Gabrielli von Karman line provides an interesting suggestion. On the plot there are two middle speed outliers. High speed train, and something called Wing In Ground effect. It is often abbreviated as WIG or Wing In Surface Effect Ship (WISES). These vessels are essentially amphibious aircraft that only operate near the surface in ground effect. Under the law and regulations they are considered to be ships, but I would call them airplanes that can't fly that high. They fly no higher than about one half the wingspan (which makes them capable of flying over all types of sea states). During the cold war, the

Soviets made a significant investment in this concept, but it stalled during Glasnost. Interestingly, new technologies such as composites, digital flight control, and much better engines, could move this concept ahead the same way catamarans sailing vessels have exploded in performance since the 80s. WISES are more efficient, but slower, than airplanes and that provides an opportunity for high speed container transport.

Figure 2 is a first pass sketch of what it may look like (I already see various areas for improvement on this sketch, but for illustrative purposes it will do).

The engineering behind it would result in a full length technical paper, but let me start with an interesting scaling issue that occasionally occurs in ship (or airplane design). If you make the wing (or a trimaran crossbeam) big enough, you get tons of deck space and useable volume. So here I sized the wing to fit containers and scaled the WISES from that point. Since I am not being paid to do the engineering, don't for a second think the numbers are correct, but the concept is worth a second look.

What you get is an interesting vessel. It will operate in the 100+ knot range, and might just be able to sufficiently increase door to door delivery time on certain routes to be worth its while.

What I really like is that it also shows some interesting operational features. If you fit the containers in the wing, the structural design is actually optimized, since most of the cargo is fitted in the component that provides the lift. (In aerospace that is called spanwise wing-loading). Once you fit the containers in the wing, the fuselage is only needed for floatation and RO/RO space in the fuselage comes for free. As such, it becomes a pretty decent combi carrier and could really take advantage of things like high value rolling stock or high value lifestock transport.

Loading the vessel is easy and fast, since it can be loaded and discharged at standard container terminals with standard container cranes by mooring it stern to the berth. (As long as there is sufficient channel width)

WISES may be the only solution to higher speed ocean transport. While further study may indicate that it has a fatal pitfall feature (such as not being economically viable or not sufficiently environmentally sustainable), it also shows that, if you start with a concept that has realistic physical potential, you have a better chance at succeeding. While speeding up conventional ships may not bring home the bacon, dipping into the actual physics of transportation and looking for the empty spaces may result in viable solutions.

Even if WISES may not succeed in economically carrying cargo, I continue to think that there must be some mega billionaire out there who would think a WISES would make a supercool yacht. Think of that huge wing with cabins in it, with forward facing windows, and aft facing balconies under a raised wing flap when at rest. And all that speed to go from playground to playground without seasickness!

Figure 2: Sketch of WISES, the 100+ Knot Vessel

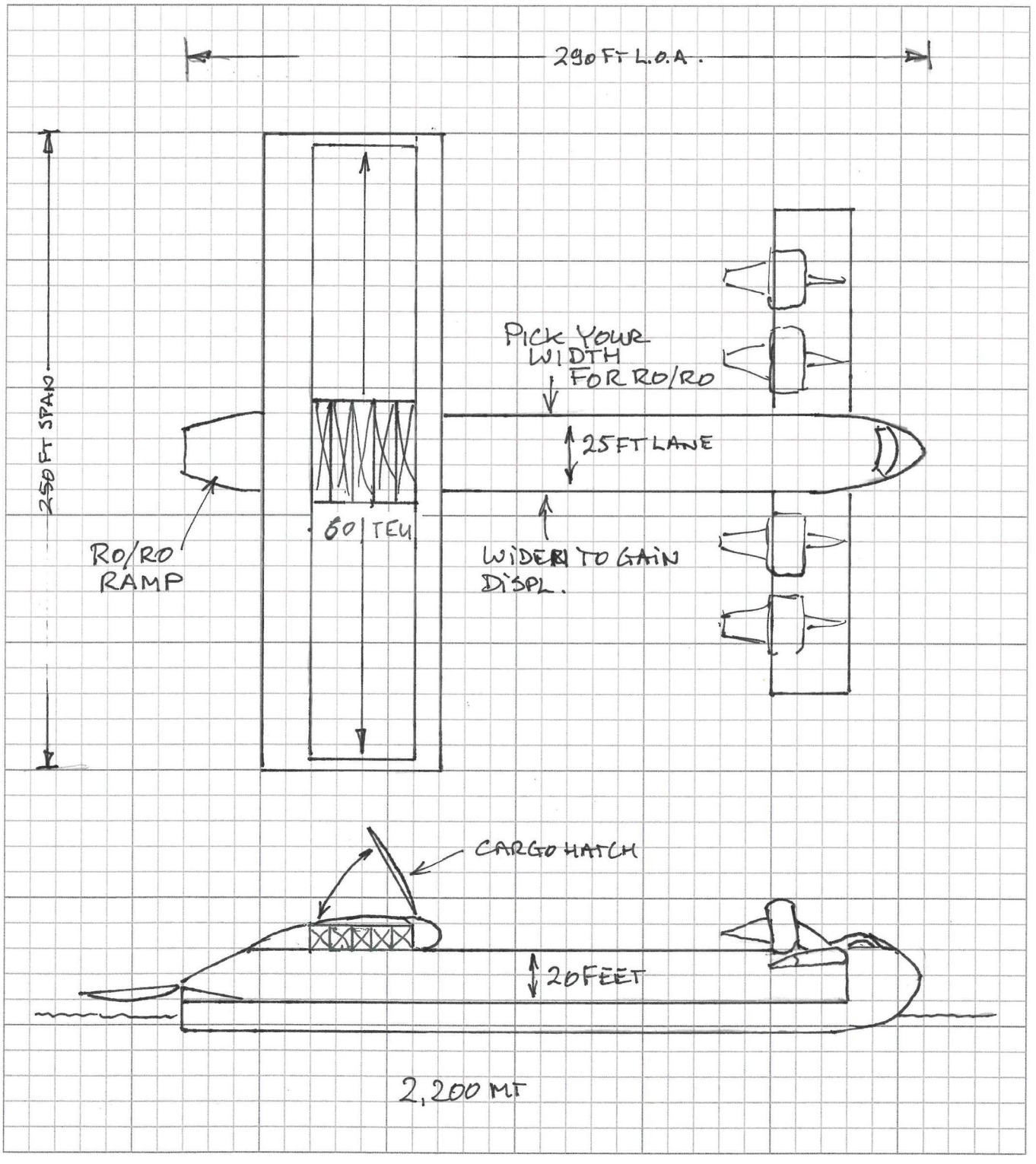


Image credit: Martin & Ottaway, Inc.

For each column I write, *Maritime Reporter & Engineering News* has agreed to make a small donation to an organization of my choice. For this column I nominate Webb Institute and donate to their Webstock Music Festival. Webbies may just be sufficiently weirdly creative to make WISES work.

http://www.webb.edu/

Compass leads the way

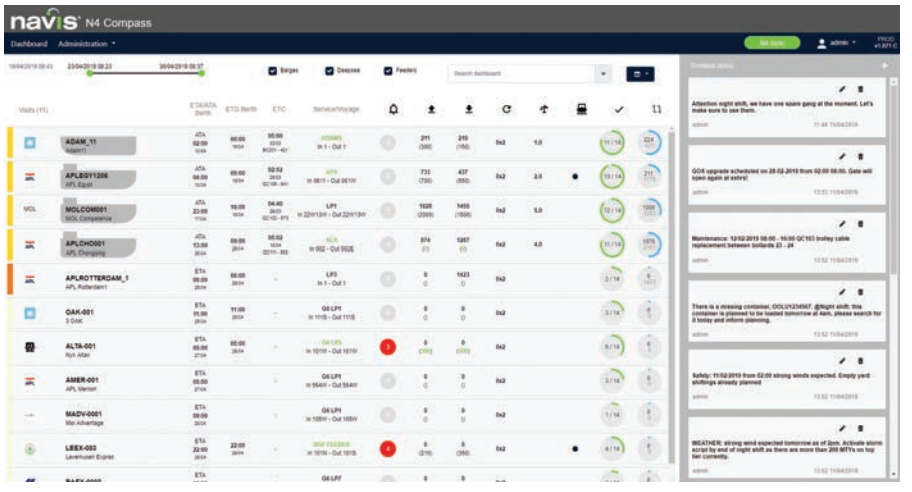
As YILPORT Rolls Out the Navis' Compass Visual Workflow Management Application, the collaborative tool promises improved planning and greater visibility across five terminals. And, that's just the beginning. **By Joseph Keefe**

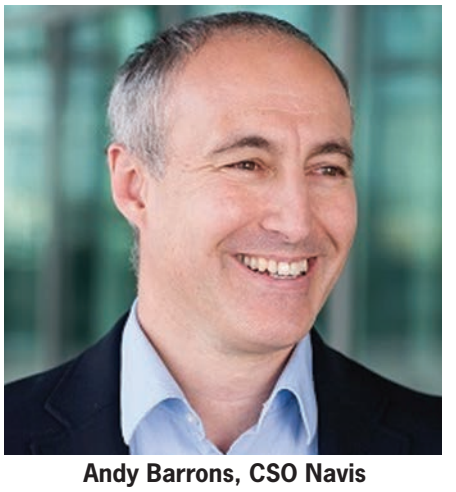
In May, Navis announced that YILPORT Holding Inc. would roll out Navis' Compass visual workflow management application to five terminals that already use Navis N4. The goal is to bring enhanced visibility, communication and collaboration to the planning process across all of the terminals. In a nutshell, the Compass application not only digitizes workflow, but also standardizes the way terminals work to improve the quality of the planning and tracking process to improve the terminal's efficiency.

The latest rollout of Compass will take place the Yilport Gebze and Yilport Gemlik, both in Turkey, Yilport Oslo, Yilport Setubal (Portugal) and Yilport Ferrol (Spain). The Compass application, says Navis, is easy to implement, with multiple deployment options suitable for every terminal, and utilizes the 'Navis Smart' technology to unlock vast amounts of data within the TOS for greater visibility and speed across all parts of an operation.

The latest rollout follows a successful pilot period with Compass for YILPORT's Oslo terminal. During this pilot, YILPORT utilized Compass to track the planning and execution process for vessels from the Global Logistics Center (GLC) in Gebze, Turkey. Compass aided in making relevant information available to all terminal actors in real time, which helped to reduce miscommunication across locations and will help prevent claims going forward.

During the one month trial period, YILPORT and Navis continued to enhance the Compass application to gather feedback on the priority of features that should be added and how those features should work to best incorporate Compass into the terminal planning processes. This collaboration ensured that Compass incorporated the features that were most valuable to the end users and help YILPORT to reach their strategic targets.





Andy Barrons, CSO Navis

The End of Siloed Data Streams

Andy Barrons, Navis Chief Strategy Officer Andy Barrons describes the compass application as one which seamlessly consolidates multiple data sets into a single view. "Imagine you're running a very busy terminal, you've got multiple vessel arrivals, you've got multiple berths – how do you manage optimize the planning of all those vessel visits? Compass provides an overview that can be shared amongst multiple end users within the terminal. It's a change in the planning paradigm, to some extent, because you've got a team view."

According to Barrons, the next level of Compass comes when the software starts to learn, recognizing the process and can start to be proactive in making a recommendation if there's an exception in a particular work flow. "Ultimately, that's where Compass will develop. The software is looking at all the data and then making decisions of what's the next best move in the terminal."

The initial release of Compass is for terminal planners only. It facilitates end-to-end planning for vessel visits, by the team in the terminal. Over time, the Navis vision is to connect other planning operations within the terminal – barge planning, truck planning, etc. Barrons explains further, "What's exciting about Compass is that it is the start of a new kind of planning paradigm. Compass takes advantage of new technology we're employing called 'Navis Smart.' And, why that's exciting for customers, is that you can build applications on top of the core TOS without having to upgrade the system. A core operating system, you have to upgrade from time to time, to get the new functionality to your team in the terminal."

Through Navis Smart, functionality is delivered much faster to a terminal than it was ever to be done in the past. As a starting point, says Barrons, one of the strengths of Navis is that it is highly configurable. "We're in about 350 terminals around the world. And so when you're building software for a global market, you have to make the software highly configurable in order to meet the different workflow processes or different ways they want to use the functionality. For example, we're working on what's called BI Portal Analytics and Ops Monitoring dashboards. The user can see what happened when they worked that last vessel and how that can be improved in the future.

At Navis, the current view is that data is the biggest untapped asset in terminals. Capturing, combining and analyzing that stovepiped data will eventually drive innovation, says Barrons. Previous improvements involve terminal design, automation, and increased productivity. Looking ahead, Compass is an example of how data that is sitting in multiple different places within a core system can be brought together so that the planning process is easier – and faster.

Compass Points the Way

As terminals evolve, the terminal operating systems that help them get the job done will also become more sophisticated. That sophistication, however, translates into easier metrics, a single source view of all data streams that, in turn, will produce greater efficiencies. Andy Barrons sums it up neatly by saying, "It is really about continuously improving operational performance within these critical nodes in the supply chain."

For its part, YILPORT already uses the Navis N4 Terminal Operating System (TOS) at 9 terminals and they are working to standardize on N4 as their TOS for their strategic terminals. YILPORT's long term vision is to become a top 10 global port operator by 2025. The numbers indicate that the company is well on its way to achieving this target. Recently, YILPORT Holding was ranked as the 12th biggest international terminal operator in the world (source: Drewry's 2017 ranking). As they grow, it looks like Navis will be a big part of their ongoing success.

Reclaim your 'in' box

As the most universal method of electronic communication yet devised, e-mail is inescapable – even at sea. Yet its ubiquity makes it an attractive target for hackers. Fortunately GTMaritime has plenty of ways of stopping malicious mails stowing away on vessels

Email has been part of our computing lives for more than four decades. It's the most reliable, most universal communication method yet devised online. It's free and easy to start using, everyone understands what it is, and it offers a way to reach absolutely anyone. It's no wonder then that more than 250 billion messages are hurtling around cyberspace every day.

The vast majority of the messages flitting from server to server – estimated to be upwards of 90% – are junk, ranging from harmless marketing spam to emails with more dangerous payloads. Today, seemingly innocent emails can be used to trick end users into parting with information or to click on links which trigger malicious activity. Others may target specific types of user through social engineering: the email itself does not contain any harmful code but the apparent originator and method of entry into the network can fool the recipient into carrying out a process which may result in lost revenue.

Electronic communication is now as embedded in life at sea as it is on land. Crew use it for everything: from procuring supplies and spare parts, to submitting paperwork to ports and other authorities, and discussions with shore-based engineers on equipment fixes. This intrinsic flexibility of email means nowadays crew contend with the same unremitting stream of messages and overflowing inboxes as the rest of us.

Modern clients come with features like automated prioritization, thread management and one-click unsubscribe that can help manage the mountain of messages if you let them. However, in the constant battle to reduce the number of unread messages, users can sometimes rush and miss the warning signs that expose spoof

Image courtesy GT Maritime

messages and phishing attempts.

"Dealing with email is an additional cognitive burden on crew who already shoulder responsibility for ensuring the safety of multi-million dollar vessels," says Jamie Jones, Head of Service at GTMaritime. Integral to the company's GTMailPlus solution, for example, is a mail filtering system that protects systems from cyber-threats by continually scanning and sifting millions of email messages before they are beamed onboard by satellite.

"Cybercriminals have become much more adept at disguising spoof messages," adds Jones. "They do their homework into their target audience and compose messages that are unnervingly realistic and plausible. Users need increasingly sophisticated understanding of the content and context of every email they receive to sniff out a rat – and that's an unrealistic expectation, especially when options are available to automate that task."

To date GTMaritime's technology is found on more than 5,000 ships. As more vessel operators sign up the U.K.-based firm has invested proportionately in developing its network and servers to maximize resilience and upgrade their sleuthing capabilities. The company's mail gateways now handle almost 300,000 messages daily – or 105 million messages per year – headed for ships.

Before mail can enter the GTMaritime network, the sending server is checked against multiple reputable blacklist organizations. Servers that do not comply to proper configuration standards are denied a connection.

After a connection is established with a reputable mail relay server, each inbound message undergoes a preliminary inspection to confirm its originating IP address, previous relay servers, sender's address, domain lookups and to detect unusual message headers. Links contained in the body of the message are cross-referenced against domain blacklist databases.

Any discrepancy or suspect practce adds to an overall spam score with messages are rejected if they exceed a preconfigured threshold. Only after passing this initial inspection are messages allowed into the client's relay servers.

While no software can directly control the action of an end user, cybercriminals are practiced at using language and psychological tricks to coerce users into carrying out manual steps which allow or initiate harmful activity. A common tactic is to threaten users with some sort of penalty unless they follow instructions.

GTMailPlus.Advanced Threat Protection (ATP) service introduced deep content inspection, which can detect a new breed of stealth malware designed to fly under the radar of traditional antivirus solutions. Deep content inspection works by testing the payload's behavior in a 'sandboxed' virtual environment – effectively a computer inside a computer – instead of simply checking its surface for known signatures.

Importantly, the infrastructure is designed to be scalable. It is designed to respond almost immediately to accommodate unexpected spikes in traffic, as well as cope with a general upward trend in data flow between ship and shore as vessel owners increasingly adopt digital solutions. To ensure its own service resilience, GTMaritime operates across multiple servers and splits scanning and filtering across five data centers.

"Email is now integral to day-to-day vessel operation, and this isn't going to change," said Jones. "In fact, we are seeing a steady growth in message traffic as owners and operators look to embrace digital and IoT technologies."

BareFLEET MONITORING FOR RED KESTRAL

Reygar said that ferry operator Red Funnel is installing the BareFLEET monitoring system on Red Kestrel - its first dedicated RoRo freight ferry. BareFLEET, a cloud-based monitoring platform that couples remote data collection technology with vessel performance monitoring software, is designed to provide data to optimize vessel performance, monitor fuel use, and cut vessel downtime. BareFLEET will monitor the health of the vessel's two engines and Rolls Royce Aquamaster thrusters, identify the most efficient cruising speed, and report on opportunities for maintenance that will further increase fuel efficiency, such as hull cleaning and engine tuning.

Image:Red Funnel

ClassNK

SOFTWARE SECURITY GUIDELINES

ClassNK released its Guidelines for Software Security to assist with risk management focused on software used onboard vessels. They outline the recommended security measures to take throughout the development, integration, and operation stages of the software. Their release demonstrates a formulation of guidelines and standards that address each layer of the ClassNK Cyber Security Approach announced five months ago. The Guidelines for Software Security were developed in collaboration with ClassNK's partner TÜV Rheinland.

DEAL TO DEVELOP DIGITAL SHIPS

DSME, Korea Maritime and Ocean University, NAPA and AVL announced an agreement – coordinated by DSME – to develop digital ships and other related solutions. The collaboration will cover all aspects of creating comprehensive digital twins: from the acquisition and processing of quality engine room data, ship performance and meteorological data to the training, simulation and human machine interface that will be necessary to turn insights from engine data into practical efficiencies. KMOU faculty members have already started developing a platform in which AR/VR and digital twin technology are embedded.

Data: A clearer view to vessel safety performance

Port State Control inspection records suggest safety standards are improving, but a closer examination that reveals areas for improvement, says Paul Stanley

Transparency of data is key to improving safety in shipping and at first sight, the statistics suggest that the industry is on the right course in terms of compliance. In 2018, Port State Control inspectors in the USCG, Paris and Japan MOUs made more vessel inspections and found fewer deficiencies.

In fact, the number of annual inspections has risen by 4% over the last four years while the number of deficiencies has fallen by 8% over the same period.

It's evidence that the effectiveness of Port State Control has improved since authorities started sharing data and making it publicly available, because deficient owners have fewer places to hide from inspectors, enforcement bodies - or shippers and charterers.

This data, which GNS collects and analyses for use with our clients also demonstrates that while the headline figure is encouraging, there are issues that lie behind the results that need continued vigilance. It also demonstrates the continued importance of data to the safety management process for shipowners and operators.

As the shipping industry becomes more digitalized and embraces a higher level of data sharing in order to achieve a 'digital business mindset', so the need for accurate data and actionable information grows too.

Last year's Global Maritime Forum meeting in Hong Kong identified data sharing as having the potential to overcome fragmentation in maritime safety and how shipping could establish a platform that enables international bodies to collect, analyze and publish safety-related information.

From the PSC data GNS has analyzed, sourced from the combined MoU organizations, there is a clear need for this global data stream - and to make it as widely available as possible if we are to achieve further improvements in safety performance.

Paul Stanley, CEO, Global Navigation Solutions

As might be expected, lifesaving appliances and fire safety measures were the biggest causes of deficiencies in 2018. Some 39% fewer navigation related deficiencies were recorded last year compared to 2014, suggesting that the move to digital navigation has made it easier for vessels to comply.

Issues with Nautical Publications were the third most likely cause of a deficiency in 2018, accounting for 39% of navigation-related deficiencies, perhaps because they are easiest to identify. However, whereas paper chart-related deficiencies fell by 66% over that period, issues related to ECDIS and Electronic Navigation Charts increased by a factor of nearly four as more of the fleet transitioned to digital navigation.

Managing ENC data should be relatively straightforward – though our research has shown that many operators tend to buy too many ENCs and not always the data they actually need.

However, it is clear from digging a little deeper that the industry still has an issue with navigational safety. If we combine all the defects reported in the Safety of Navigation categories, they dwarf the top two categories, despite being much easier to rectify.

It seems obvious that ships will benefit from a single view of their environment in terms of availability of critical voyage and safety data. But according to our research the missed opportunity goes beyond failure to capitalize on just-in-time delivery of navigation data for operational reasons.

Vessel inventories are often not being regularly reviewed against routes, Flag, Port State or technical library requirements and the software installed onboard to help navigate safely isn't being fully exploited.

The core of what we do is about safety and compliance; enabling our customers to benchmark their performance and providing tools that make it easier to identify and rectify problems. Instead of having to sift vast tracts of data, we provide information as a management tool that can be acted on, for every vessel world-wide, whether or not they are a GNS customer.

Using this data even enables GNS to provide clients with information on which vessel types – and which flags - are most likely to have deficiencies recorded. We can also demonstrate the ports at which inspection activity is strongest. Between 2016 and 2018, vessels sailing into Singapore, New Orleans Louisiana and Novorossiysk were most likely to receive the attention of the inspectors.

The first quarter of 2019 has tragically demonstrated how much work is still needed to improve shipping safety. Our belief is that the digital trend is so well established that more owners are recognizing the advantage that data gives them, not just in operational efficiency, but in safety too.

For that, shipowners need the full picture on inspection data and the ability to establish connectivity between reported issues. By creating a detailed picture, vessel by vessel and across a fleet, it is possible to identify defects and spot trends – and put resources in place to address issues before they become deficiencies.

Offshore Wind
One-stop power conversion

With the United States and China about to start their respective offshore wind build-ups, grid operators wondering about the efficiency of their turbines or the emissions-areas compliance of their wind-service vessels will be warmed to know there's someone they can talk to. Yaskawa's The Switch — a Japanese industrial giant's European environmental tech business — is offering one-stop wind-energy shopping. As with shipping, you can order permanent magnet generators, drives and converters for your wind turbines. Take heart. The lingo is the same.

By William Stoichevski

Yaskawa's The Switch is well-placed to hybridize vessels or help convert power from wind turbines. In the U.S., they've quietly built up a $500 million business in low-voltage and medium-voltage drives, with some sales of solar inverters on the side.

Known in the North Sea for permanent magnet generators and frequency converters for wind turbines and marine power and propulsion, The Switch's specialty is where the generator shaft meets the propeller shaft, with efficient drives for power outputs of from 0.5 kW to 11 MW.

Their marine permanent magnet machines can be used as gen sets or motors, and new drives come with configurations that download to a mobile phone and are a shipowner's path to battery-powered hybridization. When Yaskawa bought the company in 2018, that was part of the allure of Wartsila's power drives division, now called The Switch: the bought business offered scale, high-voltage drives, marine-market savvy and "green tech". When acquired, The Switch had been focused on providing wind-turbine drives and marine shaft generators when Wartsila sold it to Yaskawa, which had smaller-capacity generators and a large range of industrial offerings, including its own drives.

Incredibly, permanent magnet generators and frequency converters for wind turbines and ships can be talked about together, if you like one-stop shopping: "In general, the technology is quite similar. But we customize the technology for the specific end application," said The Switch's director of product marketing for marine solutions, Ville Parpala, who didn't mind indulging us.

"Some requirements are different for marine. For example, there are differences for the cooling system. Marine applications can use fresh water, for example, but wind needs closed-loop solutions. The generator speed is also different, and more redundancy is required in marine applications," he says, not minding that we're comparing towering wind turbines to wind-service shipping.

A similar discussion

"There are also different regulations, such as the strict classifications for marine. But in the end, marine and wind are very much alike. In wind, the goal is to put as much quality electricity into the grid (as possible). In marine, the goal is to slash operating costs and fuel consumption."

Similarities aside, the timing of the company extending its global reach is perfect at this the dawn of US — and, it seems, Chinese — offshore wind expansion. By some estimates, the US offshore wind industry alone, still in the planning and acquisition stage, is a $70 billion market in-waiting. According to World Watch Institute, China is hoping to be 40 percent wind powered by 2050.

Yaskawa Environmental Energy, of which The Switch is a part, is the combination of a robotics savvy, mainly low-voltage industrial giant with a high-voltage marine power company which has delivered converters to over 6,000 wind turbines in China alone. The new Yaskawa company has also begun re-equipping part of the Norwegian offshore fleet with multiple-megawatt electrical drives while also kitting out the first, heavy-duty offshore-service vessels.

With the worldwide shift toward installing larger wind-turbines, a major wind-park and wind-carrier consideration in the US and China. The Switch — with its PM machines and converters ranging for applications from 500 kW to 8.0 MW — and the Yaskawa line of medium-voltage converters meet that coming challenge of scale.

Marine scale

In the first encounter with large offshore turbines off the US Eastern Seaboard, the site of Fred Olsen Wind Carrier's 15,000 GT Brave Tern jack-up wind installation vessels wind installation vessel easily handling and installing turbines was a sobering sight for those who had seen the very first turbine assemblies with smaller vessels. Those first installs were bold, given the size of the vessels used.

"In marine, people's lives depend on what you do," said Parpala. "In wind, people rely on the quality of what you deliver. In a highly electrical world, it's important to have high reliability at all times."

As it happens, that pioneering Fred Olsen vessel — now at work in the U.K — was kitted out by The Switch. Apart from its ample specs and cranes, the Brave Tern employs dynamic positioning that allows the vessels to work around the wind turbines while not anchored.

In 2012 and 2013, The Switch delivered the drives for the propulsion machines of both Brave Tern and the Bold Tern. During the build by Lamprell shipyard in Dubai, the three motors that came from another supplier were augmented with The Switch's delivery of three 3,800 kW propulsor drives; three 2,700 kW tunnel thrusters and, in is understood, a DC Hub for each vessel.

Future wind-service vessels look set to face an increasing amount of environmental scrutiny and can expect to one day have to operate as hybrids. New wind players are often national grid managers involved in wind precisely for the green footprint. Even established players with roots in oil, like Equinor, have been known to insist on greener power from their marine suppliers.

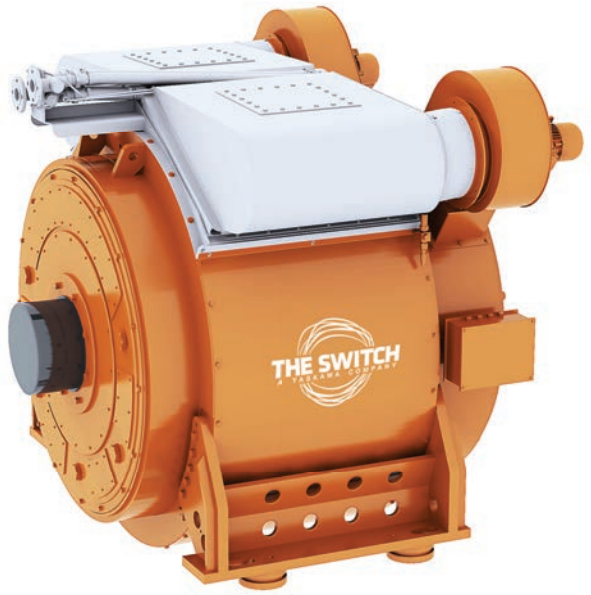
"Our drives match turbine installation vessels very well," Parpala said, explaining that specialized crew carrying vessels are generally too small for the company's multi-megawatt equipment class.

"Generally, we have a good match whenever dynamic positioning is required. Our electrical drives and converters are ideal for any hybrid vessel, especially when they have DP2 or DP3, which is important for wind-supply vessels. Our drive products are already designed and delivered for this.

"The benefits of using our DC-Hub and (Electronic Bus Link, or EBLs) as

Photo: Handout/Fred Olsen Wind Carrier/The Switch

Photo: Handout/Fred Olsen Wind Carrier/The Switch



Photos: (Starting top and proceeding clockwise:

The Brave Tern; Optimal outputs: a wind-turbine permanent magnet generator at The Switch in Deyang; Dual-use: A marine permanent magnet motor from The Switch; Optimized drive: Fred Olsen Ocean's Brave Tern at work.

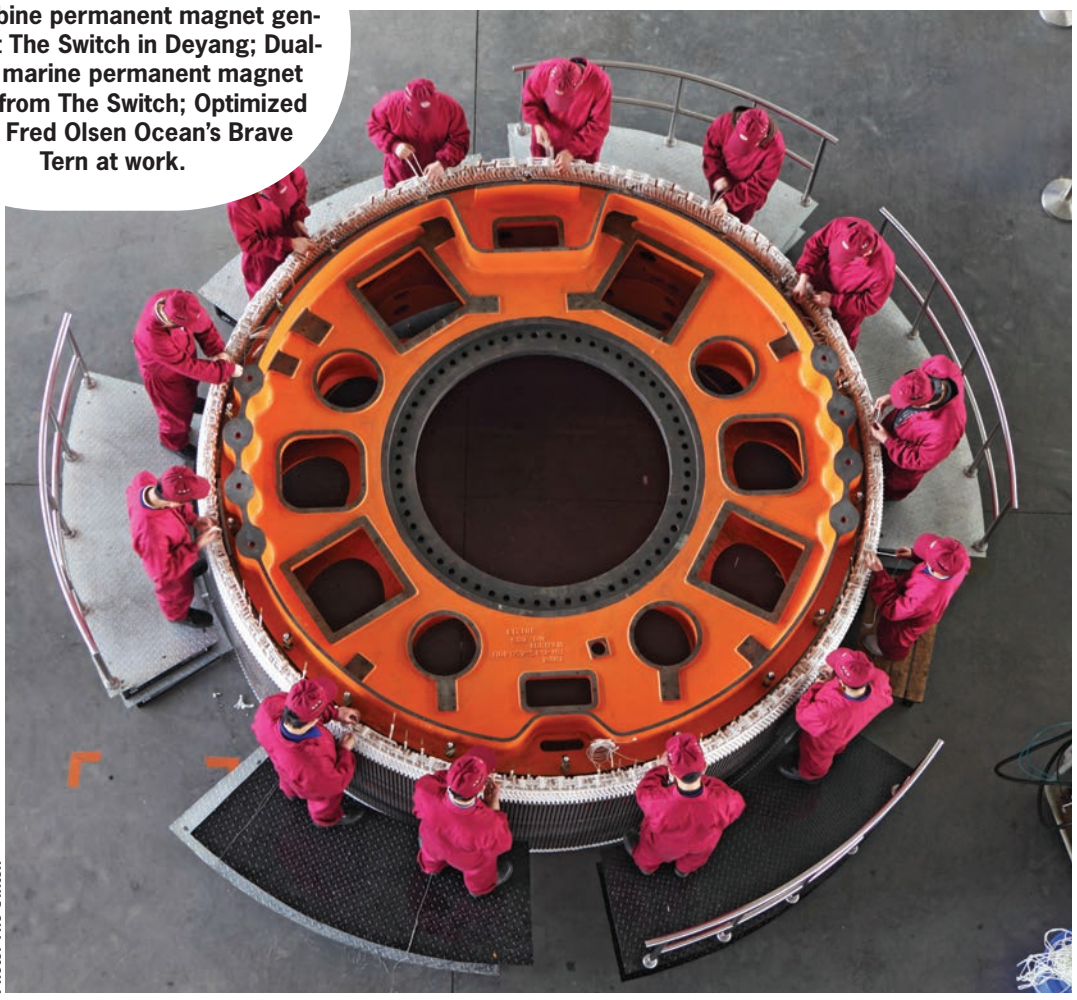


Photo: The Switch

well as our power drives is that you can use batteries for higher lifting capacity," he says, suggesting again that future heavier turbine lifts might need that flexibility.

North Sea Giant

North Sea Shipping Company's subsea construction vessel, North Sea Giant (built 2011), is a Yaskawa retrofit reference that recently made headlines for undergoing a conversion that would give it the kind of performance reliability and power efficiency future wind-service vessels will need.

When we visited Haugesund, the 18,000 GT North Sea Giant was doing sea trials with EBLs installed after undergoing a retrofit for its six, 5 MW engines, its DP3 with variable-speed drive and three hybridizing systems onboard that can deliver full ship power on one engine, if needed.

Like an offshore wind-turbine installation vessel or cable layer, the Giant needed redundancy. Tighter energy management rules demanded efficiency, hence the three DC hubs and EBLs installed for battery loops. An auxiliary generator added the variable speed. "It's a gamechanger for running on a single engine (or DP 3 only)," said Cato Espero, Wärtsilä head of sales for Scandinavia. He adds that the North Sea Giant will cut two million liters per year of fuel costs for its owners, about as much as 2,000 cars per year. Its six engines can run as three, and its three battery packs are similar to the Fred Olsen wind-carrier jack-up vessel. "An electrical bus switch for their vessel cut the cost of operations and of fuel by 50 percent and allows its three different hybrid systems to work as one."

In Norway, of course, government does offer funds for conversions to greener power, and so owners are not paying the full cost. It's a national drive, and "Shipowners say the ships should be easy to convert to new fuel," said Parpala.

China offering

While all of The Switch's current customers for vessel-drive conversions are Norwegians, customers buying the company's converters for wind turbines are largely Chinese and Danish. Their Chinese plants produce components for Chinese land-based wind turbines. The hope is to also get them buying drives for wind-service vessels and offshore wind turbines. "The Chinese move fast to adopt new technology," Parpala asserts, a confident nod to ramping up the Chinese wind energy value chain. "Since the start of our company in 2006, we have delivered 6,000 converters in China for onshore turbines. One of our key Chinese customers also has our converters offshore," he says, adding, "but we have not yet produced any equipment for marine."

The Switch had local manufacturing at several locations in China before the outfit was acquired by Yaskawa. In Hangzhou, The Switch's people work with Finland-based contract manufacturer and system supplier, Scanfil, where they make full-power converters for wind. A factory in Lu'an makes converter components. Beijing and Hong Kong host The Switch sales and after-sales support offices. Asked if floating wind farms like HyWind posed a different challenge, Parpala says, "Generally speaking, it doesn't matter if (they're) floating or fixed foundations, there is not much difference when it comes to the generator design. Some of our customers do have floating projects."

Puttin' on the Ritz

Douglas Prothero, CEO, The Ritz-Carlton Yacht Collect

Photo: The Ritz Carlton Yacht Collection

Douglas Prothero,
CEO, The Ritz-Carlton Yacht Collection.

Photo:
The Ritz Carlton Yacht Collection

By Lisa Overing

tion, discusses the world's first luxury cruise ship line.

As privately owned, luxury yachts near the size of the average cruise ship, behold a new option, which is anything but commonplace: The Ritz-Carlton Yacht Collection. At 624 feet and 11 decks, her exterior profile resembles a sleek superyacht design, not a cruise ship on the horizon. Launched in October 2018 at Hijos de J. Barreras Shipyard in Vigo, Spain, the flagship of the new brand is now in outfitting and interior finishing. The project was co-managed by The Ritz-Carlton Yacht Collection, Marriott and Tillberg Design of Sweden. With a considerably longer shake down period than most cruise ships, delivery is expected for year end with the first cruise departing Fort Lauderdale for the Caribbean in February, 2020. The build cost of the vessel was not disclosed.

Douglas Prothero, Chief Executive Officer The Ritz-Carlton Yacht Collection, is a seasoned mariner, boatbuilder, ship owner and finance professional experienced in yacht charter, adventure cruise and shore excursions. He previously ran Capital Canada, a boutique investment bank in Toronto.

Ritz-Carlton announced The Ritz-Carlton Yacht Collection as its extension in 2017. With headquarters in Miami and offices in Spain and Malta, Prothero drafted seasoned veterans from every sector of the cruise industry for The Ritz-Carlton Yacht Collection, which is a totally new offering especially for the loyal luxury traveler.

"We're putting the brand in places where it otherwise wouldn't appear, often where there will never be a Ritz-Carlton," said Doug Prothero. "We could safely say we are creating a new type of cruiser."

Over half of the passengers booked indicate they're new to cruising, according to Prothero, whose business model is contrarian compared to other cruise ships, but that is by design as part of a totally different guest experience.

There are no show lounges, rather classical music, jazz and local performers. Shore excursions are highly curated, with a concierge team onboard delivering a perfectly customized experience for the most discerning traveler.

"We're not trying to do seven ports in seven days," said Prothero. "We'll do four ports in seven days or six or seven ports in 10 days," he said.

The target cruise yacht client has been most places in the world, possibly even on their own yacht. Itineraries include smaller, more exclusive ports. High-end land excursions include: browsing a museum in Montenegro with its curator; private kayak tours off the coast of Reykjavik, Iceland; visiting a winery in Bordeaux with The Ritz-Carlton Yacht Collection sommelier; or learning to grow baby oysters on a private farm in Sete, France.

While most cruise ship guests roam the average cruise ship spending cash in casinos, bars and other profit centers, The Ritz-Carlton Yacht Collection's all-inclusive fare includes meals and beverages from $5,800 per person for a seven-night Mediterranean voyage. Luxury suites with private terraces tempt guests to not even leave their posh cabin, lest it be to enjoy a cigar in the humidor or intelligent conversation with the onboard art curator. With the highest guest to crew ratio in the industry of 1.21, 246 crew are at the behest of 298 guests, maximum.

Consistent with the interior layout for a megayacht, The Ritz-Carlton Yacht Collection is designed for guests to enjoy social areas without losing their privacy, with suite terraces and public areas providing generous alfresco space.

Referencing the beach club trend on megayachts, Prothero says the stern of ship has a superyacht marina providing

Photo: The Ritz Carlton Yacht Collection

A 'Bird's Eye' view of the Ritz Carlton cruise ship as it will look when delivered later this year. **To the right,** a starboard view of the ship under construction.

Photos:
The Ritz Carlton Yacht Collection

real access to the sea. "The loft suites are unique, there are no terraces on the loft deck," said Prothero, explaining regulations curtail smaller ships putting verandas on lower passenger decks. So duplex suites were designed with a lower level bedroom sporting a panoramic window and an upper level terrace.

With less miles in a typical voyage, itineraries allow more overnights in port, similar to a yachting lifestyle. Shorter voyages also mean consuming less fuel.

"We will be good stewards of our environment in our operations," said Prothero. "We will reduce plastic. We believe those should not be remarkable things, they should simply translate to our daily lives. From the outset we believed the need to focus on our footprint and chose from the early days to design our yachts to burn only low-sulfur MGO."

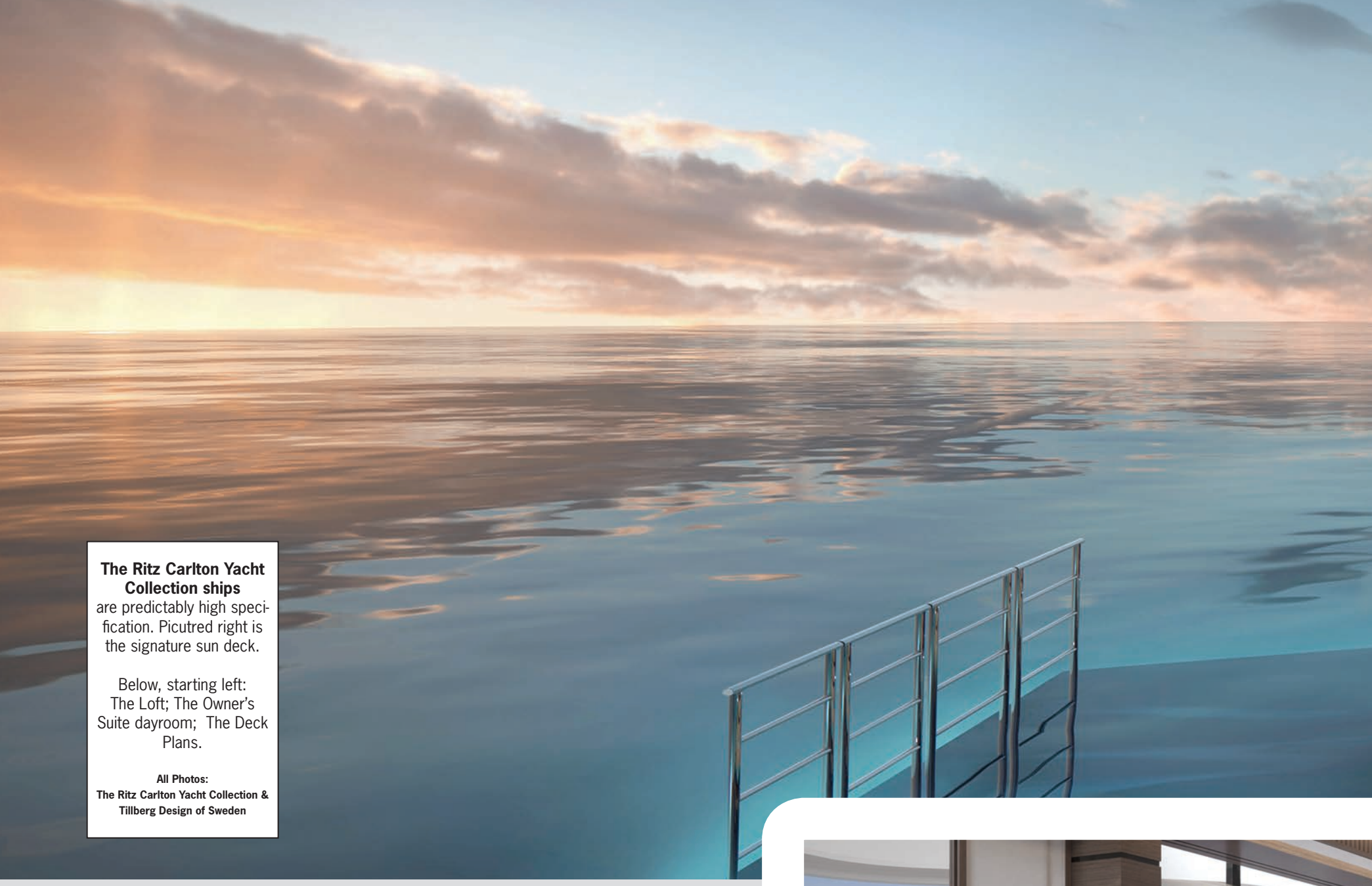
While the itineraries include some remote destinations, Prothero doesn't see entering the expedition cruise ship market at this time. The brand will debut in the Caribbean, with the first two cruise yachts sailing the Caribbean, Latin America, Canada/New England, Mediterranean and Northern Europe. Future cruises include transit all the way through the Saint Lawrence Seaway into the Great Lakes.

"We'll be the only luxury player there," said Prothero. The cruise yachts will be able to call at cities like Chicago but also explore the far edge of Lake Su-

The Ritz Carlton Yacht Collection ships are predictably high specification. Picutred right is the signature sun deck.

Below, starting left: The Loft; The Owner's Suite dayroom; The Deck Plans.

All Photos: The Ritz Carlton Yacht Collection & Tillberg Design of Sweden



perior. The Great Lakes hold a special place in Prothero's heart. While he now lives in Coconut Grove, Fla., Prothero, 55, was born in Port Stanley, Canada near Toronto. From a maritime family, Prothero went to sea at a young age and became a captain and shipbuilder.

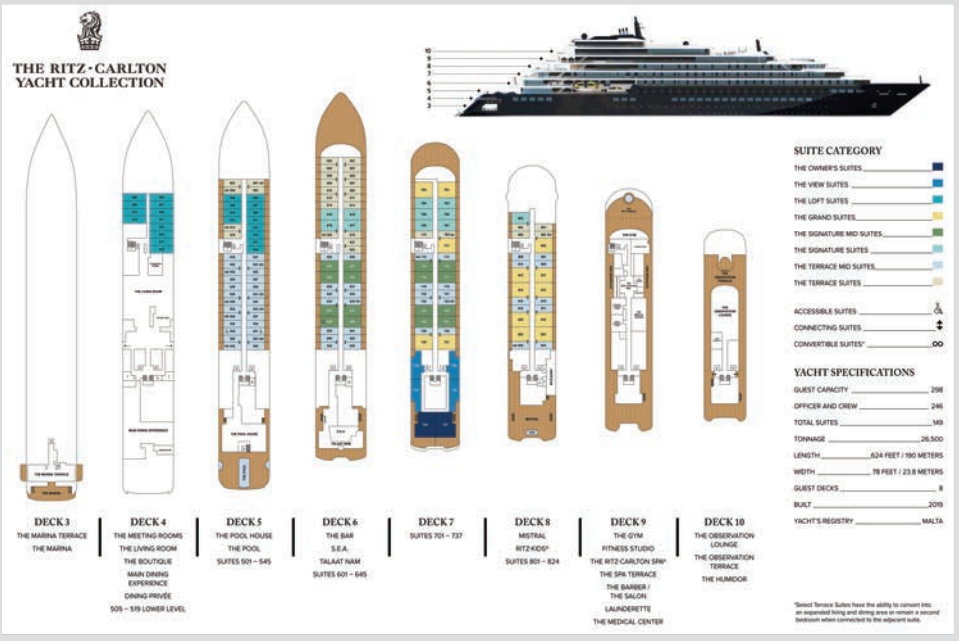
"During one transit of the St. Lawrence Seaway, as we were about to enter a lock, both my mobile phones were ringing," said Prothero. "I said, 'It's time to get off the ship.' That's when I stopped going to sea on a regular basis. That gave me time to grow the business."

A steady, progressive size of vessels and responsibilities enabled Prothero to take this journey with The Ritz-Carlton Yacht Collection. Doug Prothero was a small adventure cruise ship captain who started and operated several maritime businesses, including shore excursion businesses for the cruise industry.

"My first true sailing adventure was on Cuidad de Inca, ex Maria Assumpta, a British square rigger," said Prothero, who was on workboats all his life until sailing on that ship, which was the oldest sailing ship in the world at the time.

"Itinerary planning on the Great Lakes is second nature to me," said Prothero. While he went through the locks as a captain, Prothero also traveled all five Great Lakes as a child, swimming as his parents worked.

"My father, Frank Prothero, was a great, at times, eccentric role model for



me. He was a prominent maritime voice of commercial fishermen for more than 30 years. He embedded my love of the sea. My mother was the publisher and my father would compose and typeset. Together they published a monthly trade magazine, a local newspaper and 25 books. They have one of the largest archives of maritime photography of the Great Lakes region, working fishermen and sailors that we hope can be moved to a museum."

In his spare time, Prothero enjoys working on his own boats. Until recently, he had a 100-foot schooner. He still has a 25-ft. Rinker and a 20-ft. Herreshoff classic gaff rigged sloop.

"The Herreshoff has one lunger Farymann diesel engine," he said. "It was quite a task to find an old timer who knew what they were looking at to rebuild it. She is a real classic beauty."

And where does the founding partner of The Ritz-Carlton Yacht Collection vacation when he is not planning an incredible voyage and cultural experience for the world's most affluent travelers?

"I like to go sailing and camping," said Prothero. "I mean serious, backcountry camping. I love the outdoors and the most remote parts of it. Work is never far from hobby."

INTERVIEW: Fredrik Johansson, MA, Partner, Executive Project Director, Tillberg Design of Sweden

All Images: Tillberg Design of Sweden

Fit for Design

Tillberg Design of Sweden has been a central player in the six-year quest to envision, design, build and launch The Ritz-Carlton Yacht Collection brand. It has had a hand in all design aspects, from vessel exterior and interior, down to the service organization and the crew uniforms, as Fredrik Johansson, MA, Partner, Executive Project Director, explains.

By Greg Trauthwein

"Everything was designed from scratch with one thing in mind: the guest experience," is how Fredrik Johansson neatly summarizes the quest to deliver the Ritz-Carlton brand to the water. The ship, when delivered from Hijos de J. Barreras Shipyard in Vigo, Spain, later this year, will measure 624 ft. in length with 11 decks, able to carry 298 passengers and 246 crew in unrivalled style.

The mission to bring the ship from drawing board to the water was started nearly six years ago when Johansson was invited to Marriott's headquarters to present his team's vision of the vessel, a cruise ship in name but a private yacht at heart. While the plans have changed along the way, the mandate to Johansson and his team was clear from the start, as he remembers the leaders of Marriott saying that they wanted 'the anti-cruise ship.'

The Ritz-Carlton Brand

Like 'Rolls-Royce' or 'Gucci,' the Ritz-Carlton name is a universally recognized symbol of style and excellence, and Tillberg Design of Sweden's mandate to bring that brand to life on the water is unique in that it has had a voice and a hand in the cumulative package. To Johansson, the outstanding design aspect of this ship is "The entity as a whole. From the first impression when you see the ship on the horizon, down to the final design detail and service when you step onboard."

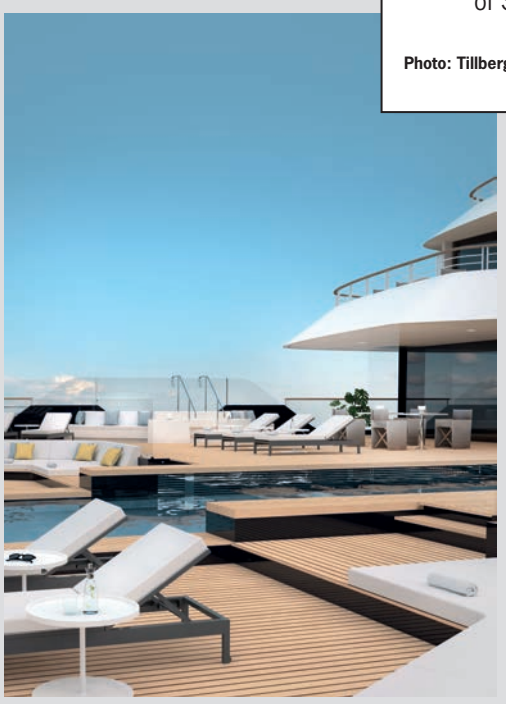
Johansson joined this venerable design house 25 years ago, and has had his hand in a number of signature projects, including the Queen Mary II newbuild. He was one of three partners that executed a management buyout of the firm in 2006, and just last year the partners opened the door to a few key financial interest partners, and today the firm numbers more than 100 employees.

Today he is the point of the spear for Tillberg Design of Sweden, building relationships and getting in on the ground floor of projects to ensure that the project and contract is structured correctly before handing off to his design teams for the details.

While citing 'people' as an organizations strength has become somewhat cliché, in the case of Tillberg Design of Sweden it is a particular point of focus, particularly as the red-hot cruise market maintains momentum, cruise ship build slots become rare and pushed further into the future, and as new, less-experienced shipyards enter the picture.

"The situation in the cruise industry today is unique," said Johansson in assessing the market's current pace. "We had a similar situation in the late 1990s, but today it is unheard of; the owners want their ships built now," but the build slots are increasingly tough to get. Build dates sliding years into the future is a design issue in and of itself. "It is a challenge trying to design something today that will be launched in five years and then sail for 20 years," said Johansson, noting that the design has to be relevant and technically flexible. That's why it is "more important than ever to have an experienced and competent team that can ensure the contracts are structured and executed well."

While it could be surmised that the Ritz-Carlton vessel would be more 'intimate' and 'private', Johansson says that he sees that trend evolving, even on the larger cruise ships and land-side destinations. "Even the larger cruise ships are (starting) to offer a more personal, intimate experience," as designers of cruise



Fredrik Johansson, MA, Partner, Executive Project Director, Tillberg Design of Sweden

Photo: Tillberg Design of Sweden

ships increasingly monitor and incorporate design and service trends seen on land facilities, Johansson said.

While there are inherent challenges in any vessel design and construction project, Johansson considers the task to build the overall brand for the Ritz-Carlton vessel and service the greatest challenge of this specific project. But with all of the moving parts and personnel, the detailed design and high tech onboard, he likes to bring it back to the basics.

"You have to be methodical, punctual and precise in all that you do from the outset," is how he neatly summarizes his team's success in this unprecedented period of cruise industry growth. "Today everyone is in such a hurry … they want it quickly, and we have many projects in motion. The key is having experienced people to properly structure and execute the project. As a company, we have to grow on the design side, but also on the project management side."

*"Everything was designed from scratch with one thing in mind: **the guest experience**"*

Photo: AIDA

Cruising in Style

As the cruise market continues a torrid pace of growth and expansion, so too grows the number of exhibition and conferences to discuss design and interior outfit of cruise vessels, large and small. In a few months a new expo opens in Hamburg, this one 'powered by SMM', the world largest and best shipbuilding exhibition in the world.

Ship designers and architects are experts at merging design and safety on board cruise ships. The considerations that make the difference will be on top of the agenda of the Marine Interiors specialist panel discussions during the Seatrade Europe conference program.

To make sure that cruise passengers will feel comfortable in every respect, designers and architects leave nothing to chance when designing ship interiors. Based on the shipowner's suggestions they develop restaurants, bars, suites and spas down to the tiniest detail. But when it comes to implementing their concepts, the designers always depend on suppliers executing their plans precisely so everything will fit seamlessly. At the Marine Interiors Cruise & Ferry Global Expo, powered by SMM, which will take place from September 11-13 2019 in parallel with Seatrade Europe – Cruise and River Cruise Convention at the Hamburg Messe fair complex, designers can find top-ranking suppliers. From light installations to chinaware, through to custom-manufactured coffee tables, the exhibitors at the new Marine Interiors fair cover the entire value chain.

Fancy & Safe

Finding competent project partners is one thing; complying with strict safety regulations another. The art of implementing regulatory requirements on board a cruise ship in an aesthetically pleasing way will be the subject of a panel discussion titled "How to design to comply" at Marine Interiors. The panel will be moderated by David McCarthy, Marine Projects & Communications Director at AD Associates. McCarthy has nearly 25 years of professional experience in hospitality, cruise operations, ship newbuilding and renovation. His advice to future ship designers: "Go and experience things, touch the materials, and take in the ambience with all your senses. This was a great piece of advice I received during my early career at sea."

The notion that safety always comes first even for designers of cruise ships is more than familiar to Siegfried Schindler and Kai Bunge, the founders and Managing Directors of Partner Ship Design. "The basics for a safe ship are created during the early concept development stage.

The first step is to subdivide the ship into fire zones and watertight partitions. Planning the escape routes and the lifeboat positions is the second step, material selection the third," says Schindler. Appropriate safety certificates must be provided for all materials used on a ship: They are subject to the IMO's SO-

Photo: Hamburg Messe and Congress

Photo: Hamburg Messe and Congress

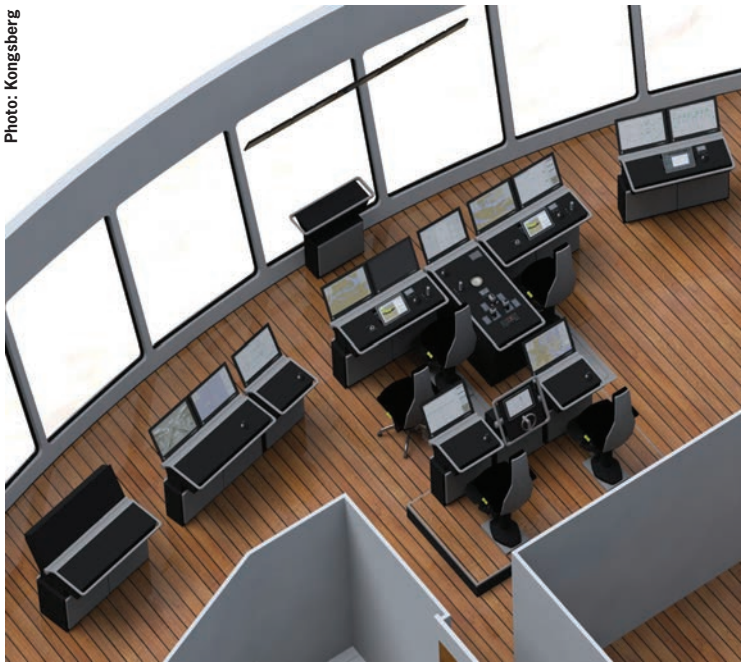


Photo: Kongsberg

LAS requirements. The main objective is to minimize the use of readily flammable materials. For example, laminate is preferable to solid wood. The same safety-first approach applies to on-board furniture: Rounded edges and corners on cabinets, beds et cetera help reduce injury hazards at high sea, said Bunge. In his contribution to the conference program the designer will discuss further important considerations.

Unique & Classy

Despite all the strict regulations and limitations of creative freedom, conference participants attending the second Marine Interiors panel discussion "How design helps to convey, define or create brand identity" will learn how brand values can be incorporated into design concepts to help create a unique identity for each cruise brand.

Tal Danai, founder and CEO of the art consulting and curating agency ARTLink.Inc, is someone who knows about the effects of art on this unique identity. "At the moment we are curating collections for five large cruise ships as well as five luxury hotels, and we are developing and operating galleries on board 14 ships," says Danai. He will explain to conference participants why the impact of art goes far beyond simple decoration, and why cruise ships are a perfect environment for presenting art.

From a Cuban-inspired flair or the sophisticated atmosphere of a lounge to a nature-loving approach that transcends into every design detail, it is the target audience that determines the ambience. For example, TUI Cruises places great emphasis on design quality, generous spaces, and tranquillity. Stark color contrasts are a no-no; the individual spaces on board are always decorated using one particular family of colors. "In the case of the new 'Mein Schiff 2', we are relying even more on well-known designers.

This ship will complete a journey we have begun on other newbuilds: Its interior decoration will offer both, broad variety, and at the same time great harmony," says Wybcke Meier, CEO of TUI Cruises. Designer Patricia Urquiola is once again on board in this project. A native of Spain, she had already designed the suites of the new "Mein Schiff 1".

For Urquiola working in this unfamiliar environment has been a special treat: "I love being close to the sea. I had great fun elaborating the unique spirit of this place on board a cruise ship."

In the case of the expedition cruise ship "Hanseatic Nature" by Hapag-Lloyd Cruises which put to sea recently, Christian Klein and Johannes Jensen of Oceanarchitects were in charge of interior design. Their concept revolves around nature: For example, the structure of the flooring imitates the irregular shapes of ice floes. Some of the wallpapering feels like fish skin; and the water flows from faucets resembling corals.

Visitors of the Marine Interiors trade fair will be able to learn from exhibitors how ideas such as these can be implemented. Competent experts will include the fittings specialists from Franke Aquarotter, the hospitality equipment consultants from Hagola, and the RP Technik safety experts.

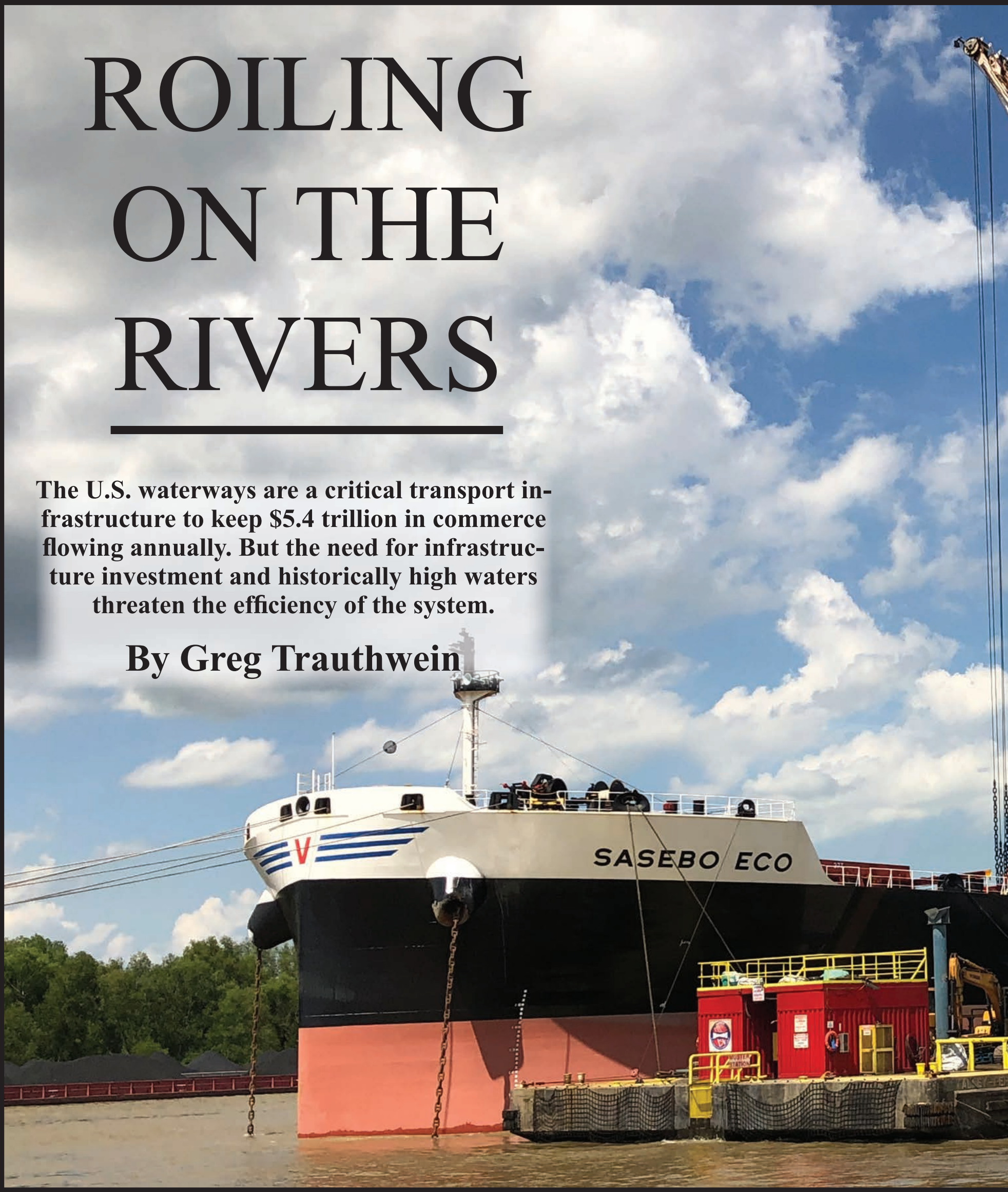
Pictured from the Left:

AIDAprima entering Hamburg; Marine Interiors Cruise & Ferry Global Expo, powered by SMM, which will take place from September 11-13 2019 in parallel with Seatrade Europe – Cruise and River Cruise Convention at the Hamburg Messe fair complex; "Smart" Dimmable Windows for Cruise Ships from Vision Systems; K-Bridge Integrated Bridge System (IBS) with K-Pos Dynamic Positioning (DP) functionality for two ultra-luxury, purpose-built expedition cruise newbuilds.

ROILING ON THE RIVERS

The U.S. waterways are a critical transport infrastructure to keep $5.4 trillion in commerce flowing annually. But the need for infrastructure investment and historically high waters threaten the efficiency of the system.

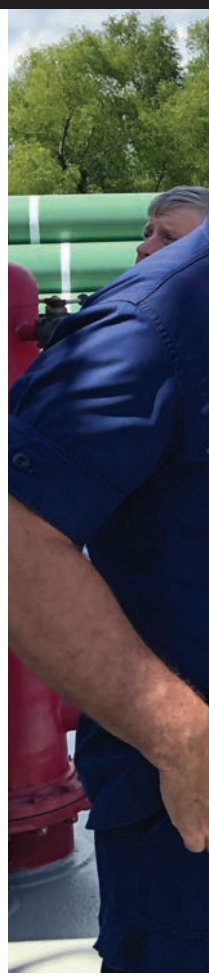
By Greg Trauthwein



Associated Terminals & Turn Services run an impressive mid-stream cargo transfer operation in the Mississippi River. Historically high waters and swift currents in this critical waterway challenge the speed, efficiency and safety of all river-borne operations.

Photo: Greg Trauthwein

Flying into New Orleans with Admiral Karl Schultz, Commandant, USCG, provides a 'birds eye view' on the robust and diverse business in and around the lower Mississippi River. Photo: Greg Trauthwein



ADMIRAL SCHULTZ ON U.S. SHIPBUILDING

"The Coast Guard is building ships. We're planning to build 25 Offshore Patrol Cutters, we're still building Fast Response Cutters, we're building National Security Cutters, we're positioned to start building Waterways Commerce Cutters and now we're building Polar Security Cutters. **We've never been building five classes of cutters (simultaneously) in my 36 years here; it's a banner time and we have to keep the capital funding stable and predictable,** and we need more "cow bell" with respect to operating funds for readiness issues and people initiatives."

Last month Maritime Reporter & Engineering News was invited to join Admiral Karl Schultz, the Commandant of the United States Coast Guard, on a trek to New Orleans for an underway tour onboard a mid-stream transfer operation in the Mississippi River. As the U.S. inland waterway system has endured historic water levels for more than six months, the destination provided a perfect backdrop to discuss several key messages coming from USCG leadership: the maritime industry's critical role in facilitating U.S. commerce; the need for investment in Coast Guard and maritime infrastructure to keep that commerce flowing; and the importance of collaboration between government and industry on the national, regional and local levels.

Numbers don't lie, and a quick 'by the numbers' look at the U.S. maritime industry is enlightening: 95,000 miles of shoreline, 25,000 miles of navigable channels, 361 ports, 50,000 federal aids to navigation, cumulatively support more than 30 million jobs and $5.4 trillion in economic activity.

The United States is a maritime nation, yet when it comes to transportation and infrastructure spending it could be argued that maritime is the Rodney Dangerfield of the transport sector, as compared to road, rail and air, maritime it doesn't get due respect.

Admiral Karl Schultz, the 26th Commandant of the United States Coast Guard, is on a mission to change that.

Now nearly a year in the top job, Admiral Schultz – starting with the "Maritime Commerce Strategic Outlook" released in October 2018 and continuing to and through a recent day trip to New Orleans for a discussion with local maritime, port, logistics and government stakeholders along a unique and critical maritime corridor – is determined to inextricably link the health and welfare of the U.S. economy to the safety and efficiency of its waterways.

"We are committed to the Maritime Commerce Strategic Outlook as a 10-year plan to raise the visibility of the importance of the Coast Guard to our nation's commerce and economic prosperity," said Admiral Schultz. "When it comes to conversation about infrastructure, the Coast Guard needs to be a part of that conversation," noting that, for example, the Coast Guard's fleet of 35 river tenders averages 52 years old.

"The average citizen doesn't necessarily worry about the maritime industry, the ports and the trades, they don't worry because they say 'I get all of my stuff at Walmart'. Well guess what? Ninety percent of it comes via the maritime transportation system through the ports," said Admiral Schultz. "I think it's important

Photos: Greg Trauthwein

Photo by Petty Officer 3rd Class Alexandria Preston

to have the conversation that links $5.4 trillion in annual commerce to the marine industry. And I think it's important to have the conversation in government that when you talk about investment in infrastructure, maritime infrastructure and the Coast Guard need to be a part of that conversation and a part of the equation."

From Brown to Blue

Anyone who has been to New Orleans knows the unique nature of the place and the culture, and it stands out too in terms of the maritime infrastructure. It is the literal crossroad where brown water and blue water meet, a critical corridor transporting energy supplies and an estimated 80 percent of the country's farm products from inland states to global markets.

The Port of New Orleans is a vibrant and growing multi-modal port which ranks second among U.S. ports in total tons of cargo (127.6 million tons) and number 10 in terms of value of cargo ($59.7 billion).

A unique characteristic of this area is its' ability to conduct mid-streaming cargo operations, a system which unloads barges traveling from up-river states to blue water ships anchored in the river, helping to save time and money versus traditional dock and load systems. While the recent record high waters and rapid currents have slowed operations by Associated Terminals, the stevedoring company, and Turn Services, the maritime company, cargo operations have continued; an impressive workflow as barge-mounted high-tech cranes transfer cargo to a literal conveyor belt of barges.

With all of its impressive facilities, systems and personnel, the region, like the rest of the maritime world, is at the mercy of Mother Nature, and in the past six months conditions locally – and in fact throughout the entire Mississippi River system – have been severely challenged by the weather.

Since December of 2018 the Mississippi River system has endured historic high waters and flooding, conditions that slow the efficiency of commerce on the waterways and increase the risk of maritime operations.

"(Today) I saw a unique, once in an almost 100 years circumstance in regards to the water levels on the river," said Admiral Schultz. "The stakeholders in the 8th Coast Guard district (the largest Coast Guard district in the country encompassing 28 states) are used to dealing with the high water and the low water, but this is historic."

The high water impacts all levels of operations due to the higher flow rates and increased risk of accidents due to severe currents hampering the ability for industry to safely get their goods to market. The historic flooding has also shut down parts of the river system preventing farm-

ADMIRAL SCHULTZ ON COLLABORATION

"I like to think of us as a "common sense regulator"; **we rely on partnerships, and within those partnerships you have to try to be a voice of reason.** I get the sense from industry that we are using common sense. Being a regulator and being a good partner is not mutually exclusive. It's helpful for the regulatory agency to have a good relationship with the industry it regulates. Are there disagreements? Yes. But I think you can work through a lot of issues using common sense and forward thinking."

Picured, starting top left:

Admiral Karl Schultz, Commandant, USCG discussing the situation on the Lower Mississippi River with Lt. Governor **Billy Nungesser** – State of Louisiana; **Brandy Christian** – President and CEO, Port of New Orleans, a key stakeholder in the region; and Admiral Schultz, **Captain Kristi Luttrell**, Sector New Orleans Commander, and **RADM Paul Thomas** – Eighth District Commander.

A CAPABLE USCG

"I want a Ready, Responsive and Relevant Coast Guard. Whether it's an act of nature or a terrorist attack, the Coast Guard has to be ready to respond. It's about being trained and prepared. It's having capable leadership across the regions. We put empowered leaders in the field that build collaborative relationships in the field. **As Thad Allen said, 'we must be jurisdictionally multilingual,'** meaning we are able to talk the National Security Agency (NSA) as easily as we do the local sheriff, and we can make them all feel that they are contributing to the maritime challenges of the nation."

ICEBREAKERS

"We have the 6-3-1 strategy (to acquire them). We're getting the one, we have the funding and we're off to the races. **Now we're having the broader conversation about six (icebreakers—at least three of which will be Polar Security Cutters).** I'm excited to talk about the necessary capacity to operate in the high latitudes. It is absolutely essential to our national interests."

FUNDING

"We do about a billion dollars worth of work in support of DoD combatant commanders around the globe, and I'm still funded at the same level for that work that the service was in 2001 ($340 million). **18 years without an increase.** I'd like to see that funding number move closer the level of contribution."

INVESTING IN SHIPS & BOATS

"The Coast Guard is building ships. We're planning to build 25 Offshore Patrol Cutters, we're still building Fast Response Cutters, we're building National Security Cutters, we're positioned to start building Waterways Commerce Cutters and now we're building Polar Security Cutters," said Admiral Karl Schultz. "We've never been building five classes of cutters (simultaneously) in my 36 years here; it's a banner time and we have to keep the capital funding stable and predictable, and we need more "cow bell" with respect to operating funds for readiness issues and people initiatives." In keeping with his mission to steer the Coast Guard conversation towards its relevance in $5.4 trillion in commerce, the previous hodgepodge of river and construction tenders, a fleet that averages 52 years old, is being rebranded as the Waterways Commerce Cutters. "The good news is we're recapitalizing our fleets, it's a good news story for U.S. shipbuilding," said Admiral Schultz. "The U.S. Coast Guard has to be in the infrastructure conversation."

Credit : VT Halter Marine and Technology Associates, Inc.

ers from shipping their commodities down river. It is a strain on an aging system and infrastructure has global impacts for delivery of goods in a just-in-time economy.

"Down here it's a system of systems, with the port, the service companies (Turn), there are a lot of stakeholders in the region including the government, from Coast Guard to the USACE," said Admiral Schultz. "The system really needs everyone to bring their best to the game when there's an elevated risk posture. This goes from the mouth of the Mississippi all the way up to the Great Lakes. It's a national situation."

"Technically Smart People are Central"

In helping to maintain $5.4 trillion in commerce flowing on the waterways, Admiral Schultz knows that his Coast Guard must strive to cultivate and keep the best-of-the-best beyond the five-year service obligation coming out of the Coast Guard Academy, and he counts staying relevant to the next generation as another challenge and area of intense focus. "We can't be 10 years behind general society in terms of technology," said Admiral Schultz. But when the conversation turns to technology, particularly in terms of increased sophistication and automation of ships and systems, the conversation quickly turns to cyber. "Think about automated ships and facilities. With those automated ships and facilities comes risk, technical and cyber risk. With all of the technology comes increased vulnerability," said Admiral Schultz. "We're building out our cyber capability at the Coast Guard. I have about 300 positions today on cyber at the Coast Guard, and the 2020 budget has about another 60 bodies as we have to defend Coast Guard networks from attack and we have to bring a cyber regulatory face to the waterfront. We need to build our own technical experts in this area."

To that end there is a new cyber major at the Coast Guard Academy, with the class of 2022 being the first with graduates with a cyber degree. "After their five-year commitment from the academy is over, though, I can't afford for all these young people to jump ship" for higher paying jobs in the private sector, said Admiral Schultz. Here, and in the case of other groups with unique skill sets, he maintains that the Coast Guard must "think differently and be flexible," citing how the DoD is bringing in people with unique skill sets but no military experience and immediately elevating them in rank. "Maybe the Coast Guard has to do that too," said Admiral Schultz.

While cyber security is an obvious point of focus, Admiral Schultz said that the evolution of technology in the maritime sector – from autonomous ships to dealing with different commodities (LNG & LPG, for example) require expertise within the Coast Guard to regulate. "We have to generate and re-generate expertise, we have to make people feel valued and want to stay as part of the brand," said Admiral Schultz. "Technically smart people are central."

2019 GREAT SHIPS

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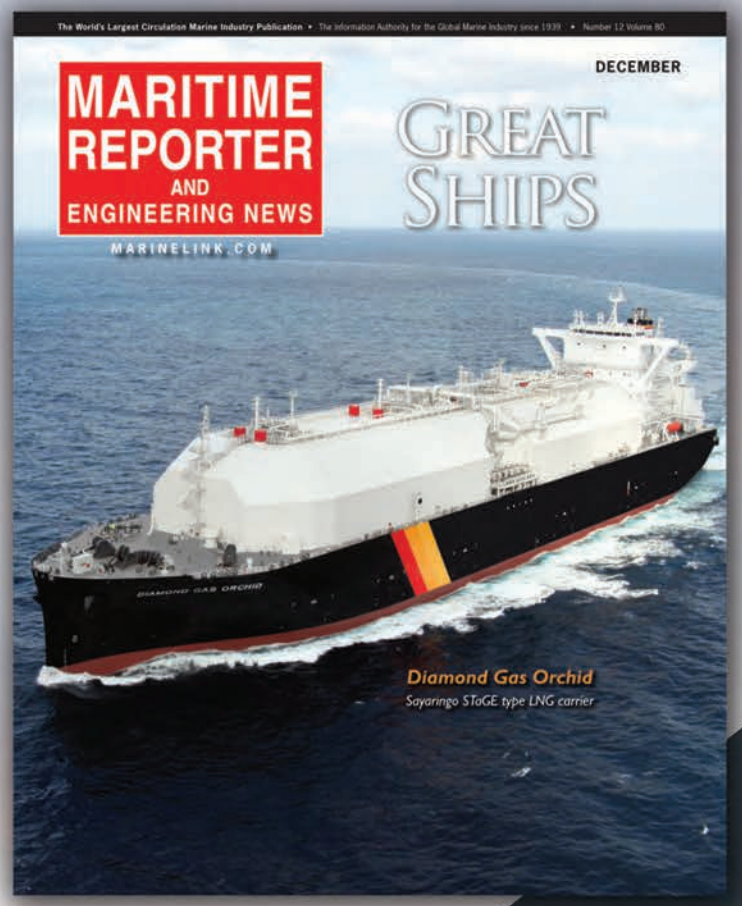

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MARITIME REPORTER AND ENGINEERING NEWS

SHIPPING LOSSES DROP, NEW DANGERS EMERGE

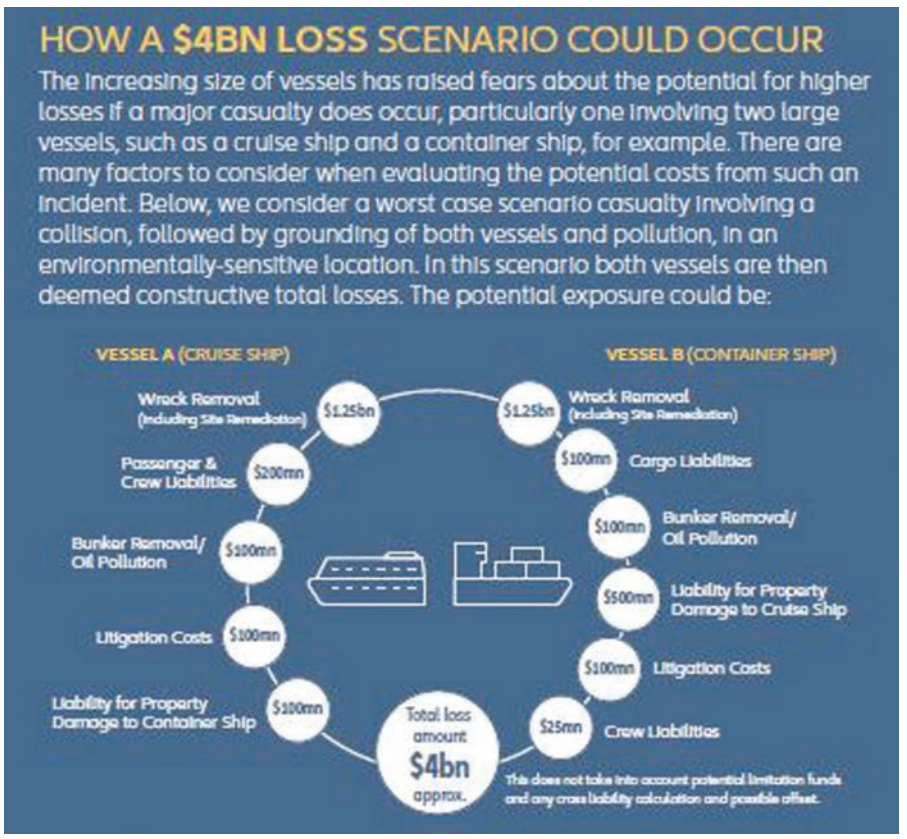
As the maritime industry digests a host of new emission and fuel regulations, in tandem with a fast-evolving technological evolution that promises more automation and fewer crew onboard ships and boats, a sharp eye is being kept on the matter of safety at sea.

According to Allianz Global Corporate & Specialty SE's (AGCS) Safety & Shipping Review 2019, a new bar has been set in terms of safe shipping, as large shipping losses are now at their lowest level this century, having declined by more than 50% year-on-year [in analyzing reported shipping losses over 100 gross tons (gt)].

The report found that in 2018, 46 total losses of vessels were reported, down from 98 losses 12 months earlier, driven by a significant decline in activity in the global loss hotspot, South East Asia, and weather-related losses (10) halving after quieter hurricane and typhoon seasons. There were 207 total losses reported in 2000.

While the number of total losses is a positive, it is balanced with the fact that the number of reported shipping incidents overall (2,698 in 2018) showed a scant 1% year-on-year decline, with machinery damage accounting for more than a third of the 26,000+ incidents over the past decade – twice as many as the next highest cause, collision. Machinery damage is one of the most expensive causes of marine insurance claims, accounting for more than $1 billion in five years[1].

"Today's record low total loss activity is certainly influenced by fortunate circumstances in 2018, but it also underlines the culmination of the long-term improvement of safety in the global shipping industry," says Baptiste Ossena, Global Product Leader Hull & Marine Liabilities, AGCS. "Improved ship design, technology, tighter regulation and more robust safety management systems on vessels have also helped to prevent breakdowns and accidents from turning into major losses. However, the lack of an overall fall in shipping incidents, heightened political risks to vessel security, complying with 2020 emissions rules and the growing number of fires on board bring challenges."



Global Hot Spots

The South China, Indochina, Indonesia and Philippines maritime region remains the top loss location, with 25% of losses occurring here in 2018 (12), down from 29 losses a year earlier. The East Mediterranean and Black Sea (6) and the British Isles (4) rank second and third. Even as conditions improve, Asia will remain a hotspot for marine claims due to its high level of trade, busy shipping routes and older fleets. However, newer infrastructure, better port operations and more up-to-date navigation tools will help to address challenges.

Cargo ships (15) accounted for a third of vessels lost around the world in the past year. The most common cause of ship losses remains foundering (sinking), which has accounted for more than half (551) of the 1,036 lost over the past decade. In 2018, 30 cases were reported.

Fires continue to generate large losses on board with the number of reported incidents (174) trending upwards. This has continued through 2019 with a number of recent problems on container ships and three significant events on car carriers. Misdeclared cargo, including incorrect labelling/packaging of dangerous goods is believed to be behind a number of fires at sea. Meanwhile, the loss of hundreds of containers over board from a large vessel in early 2019 provides a reminder that damaged goods is the most frequent generator of marine insurance claims, accounting for one in five over five years.

Emissions Compliance

On the regulatory side, emissions compliance, most immediately in regards to regulation limiting sulphur oxide emissions from January 2020 to 0.5%, is looking like it will be a game- changer for the shipping industry. With only six months to go, there are still more questions than answers, as vessel owners wrestle with the means and cost of compliance. The potential risk to shipping extends beyond the tech, as owner are dealing with wide-ranging implications for cost, compliance and crew. Several large ports globally are even considering deploying "sniffer drones" to detect environmental rule-breakers, while at the same time focus on bunker quality and supply takes center stage.

Maritime Security

There remain several large geopolitical risks for the shipping community, led by a spate of recent attacks on tankers in and around the Straight of Hormuz. Political instability and risk is nothing new in shipping circles, but it has heightened around the globe and increasingly poses a threat to shipping security, trade and supply chains through conflicts, territorial disputes, cyber-attacks, sanctions, piracy and sabotage. In addition, continued political instability and violence have led to the growing number of migrants at sea and an increase in stowaways on commercial vessels, which place obvious stresses on ship owners and crew.

47%

Of the 522 incidents recorded in Arctic Waters over the past decade, **47% of the incidents were to to Machinery Damage/Failure.**

$60B

The estimated annual potential cost of the move to low-sulfur fuel. "The switch to low-sulfur fuel will require operational and engineering actions, which, if not done properly, can have a wide-ranging impact. The switch will also have wider implications for the fuel supply chain, including the availability and cost of fuel," says Captain Andrew Kinsey, Senior Marine Risk Consultant at AGCS.

Piracy incidents increased in 2018 to more than 200 – and Nigeria is now the top global hotspot.

A few other hallmark traits of the global maritime market in 2019:

• **Larger Ships = Larger Losses:** The warning bell from insurers has been ringing for years that bigger ships equals bigger risks, and today that has become a reality as evidenced by the growing number, and cost, of incidents such as fires on large container vessels; major losses on car carriers, which average two a year; engine failure; and even the loss of cargo overboard, all of which are potentially offsetting safety and risk management improvements. With the bigger ships, individual incidents can easily result in claims in the hundreds of millions of dollars, if not more.

• **Cargo and fire risks mount:** Container-carrying capacity has almost doubled over the past decade, which brings both promise and peril. Fires and explosions on board continue to generate large losses with an incident occurring every 60 days on average. Fire activity increased in 2018 with 174 reported incidents – a trend which continued through early 2019. Misdeclared cargo is an ongoing problem

• **Trusting Tech:** The growing use of connected technology in the maritime sector is a positive for safety and claims, a necessary evolution to effectively plug into and create a seamless transport logistics chain. Electronic navigation tools, ship-to-shore communications and the greater use of sensors have the potential to improve navigation and help avoid incidents. Sensors can also reduce machinery claims through performance monitoring and early intervention and help mitigate cargo losses. Yet, at the same time, accidents continue to happen due to overreliance on technology – even down to crew members being on their phones when a loss event occurs. In step with this is the evolution of automation and the prospect of crewless ships. While the technology has matured, much work needs to be done on the regulatory, safety and insurance fronts.

• **Cyber Threats:** While it's difficult to declare any topic 'the' main concern in something as broad and dynamic as maritime, if the cyber threat is not the number one concern in shipping today, it is arguably "1A". Technological advances also means cyber losses will be an increasing feature of marine claims going forward. Companies are responding with an uptick in cyber security assessments while some insurers are looking to clarify so-called "silent" exposures.

$1.6B

The value of marine insurance losses that involved **some form of human error**, based on an evaluation of nearly 15,000 liability claims.

TOTAL LOSSES: 1990 to 2018

1990: 218	1998: 235	2006: 157	2014: 89
1991: 292	1999: 193	2007: 171	2015: 106
1992: 301	2000: 207	2008: 150	2016: 99
1993: 307	2001: 194	2009: 132	2017: 98
1994: 259	2002: 173	2010: 129	2018: 46
1995: 247	2003: 173	2011: 99	
1996: 253	2004: 153	2012: 127	
1997: 206	2005: 149	2013: 111	

Vessels over 100GT only

Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

ALL CAUSES OF TOTAL LOSS: 2009 - 2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
Foundered (sunk)	62	64	46	55	70	50	66	48	60	30	551
Wrecked/stranded (grounded)	24	25	20	27	21	18	20	20	15	9	209
Fire/explosion	14	12	9	14	15	6	9	12	8	4	103
Machinery damage/failure	7	4	6	15	1	5	2	10	9	1	60
Collision (involving vessels)	13	10	3	5	2	2	7	2	1	1	46
Hull damage (holed, cracks etc.)	8	5	3	7	1	5	2	4	5	1	41
Miscellaneous	2	6	2	2	1	2		1			16
Contact (e.g harbor wall)	1			2		1					4
Piracy	1	2	1								4
Missing/overdue		1						2			3
Total	132	129	99	127	111	89	106	99	98	46	1,036

Vessels over 100GT only

Source: Lloyd's List Intelligence Casualty Statistics
Data Analysis & Graphic: Allianz Global Corporate & Specialty

LOSSES IN FOCUS

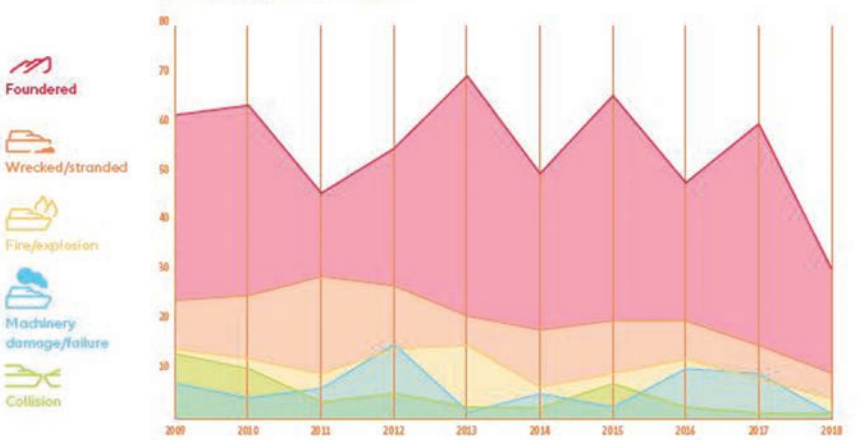
The analysis over the following pages covers both total losses and casualties/incidents. See page 48 for further details

TOTAL LOSSES BY TOP 10 REGIONS
2009-2018 AND 2018

TOTAL LOSSES BY CAUSE
2009 - 2018

Foundered (sunk/submerged), wrecked/stranded, fire/explosion, machinery damage and collision are the most frequent causes of total losses over the past decade, accounting for over 90% of all reported cases.

TOP 5 CAUSES OF LOSS



Hydrogen:
The rise of bulk Hydrogen in Norway

By Joseph DiRenzo, PE

Imagine a power distribution network where excess renewable energy from hydropower, wind, solar, and nuclear energy is converted to hydrogen and used as transportation fuel in the maritime industry. With the allure of a zero emissions fuel, a number of ship owners are starting to seriously consider hydrogen for newly built vessels. As a bold first step, the country of Norway has provided a number of grants to leading maritime companies to conduct feasibility studies into various aspects of this emerging technology sector. Central to this discussion is "how" hydrogen will be transported from its source to end-users.

Norwegian based companies, Moss Maritime and Wilhelmsen Ship Management, together with Norwegian energy giant Equinor and class society DNV-GL recently conducted a feasibility study to analyze the technical and economic aspects of such an undertaking. Tor Skogan, Vice President of Liquefied Natural Gas (LNG) at Moss Maritime, and Per Brinchmann, Vice President of Special Projects at Wilhelmsen, provided insight into the emerging market for bulk liquid hydrogen in Norway. With a grant from Innovation Norway, a state-sponsored research organization, these companies embarked on a technical study to design a carrier for transportation of liquefied hydrogen in bulk with a 9,000 cubic meters capacity which would serve an integral role in an emerging hydrogen economy.

Per A. Brinchmann (left), VP Special Projects at Wilh. Wilhelmsen Holding ASA & Tor Skogan, VP of LNG at Moss Maritime.

Photos coutesy Wilhelmsen & Tor Skogan

A Growing Market for Bulk Liquid Hydrogen

Based on discussions with experts in the maritime hydrogen field, ferries and cruise ships are likely to be the first types of vessels to adopt this technology."It starts with short sea and small operations [such as fast ferries]…There will be a market for liquefied hydrogen coming up in Norway" explained Mr. Brinchmann pointing to FLAGSHIPS, a grant from the EU's Research and Innovation program Horizon 2020, to build and utilize hydrogen ferries. A press release from Horizon 2020 indicated that one of the first liquefied hydrogen ferries in the world will be operated by Norled, a local transportation provider in Norway, to be used on the Finnøy route north east Stavanger by 2021.

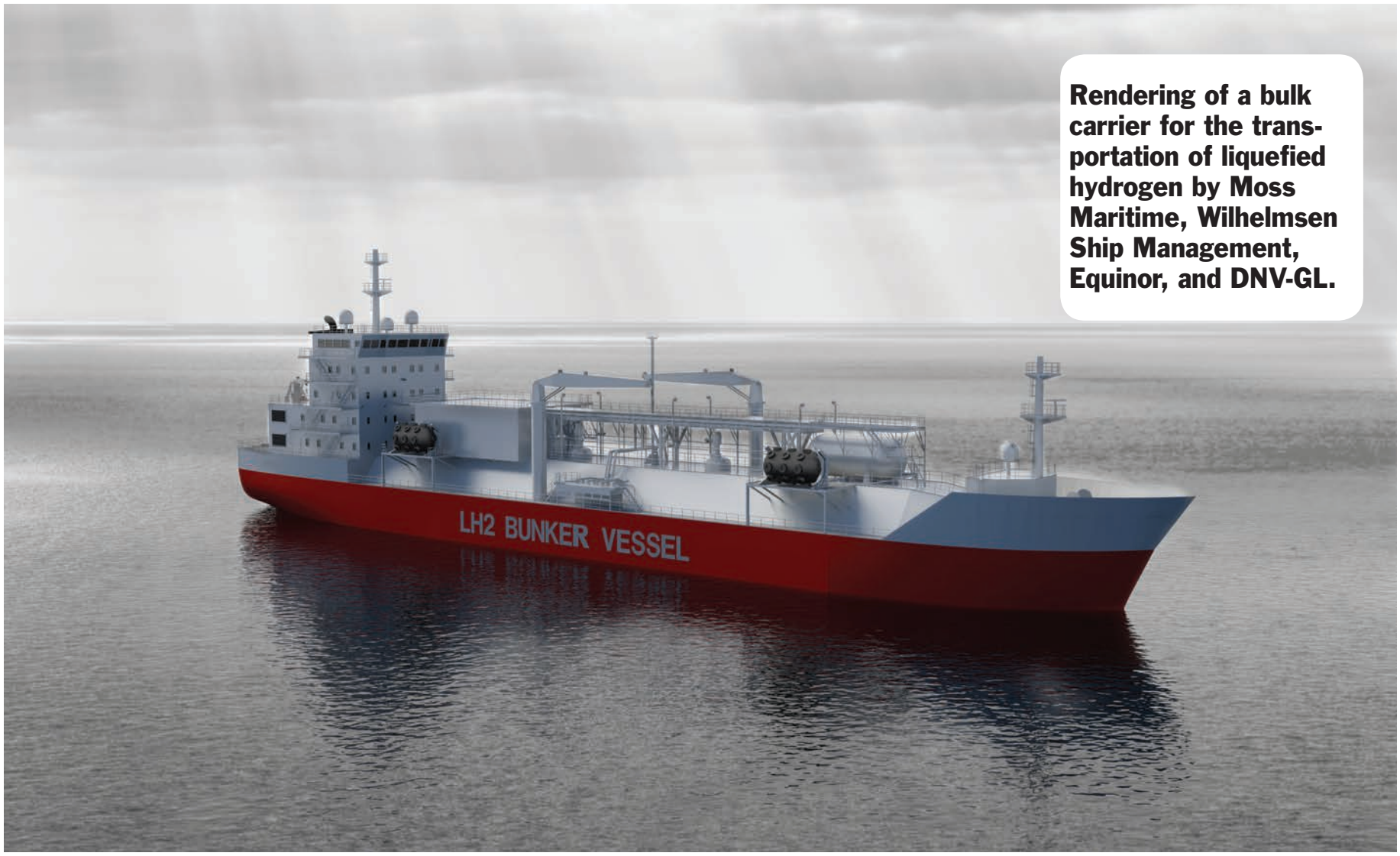
To further develop the hydrogen value chain, Moss, Wilhelmsen, Equinor and DNV-GL set out to design a bulk carrier to supply liquid hydrogen to proposed ferries and cruise ships operating in the Norwegian fjords. When mapping the different methods and production sites for liquefied hydrogen, the group considered both "green hydrogen" generated via electroloysis from renewable energy sources and "blue hydrogen" from steam-methane reformation combined with carbon capture. In the electrolysis process, water is split into hydrogen and oxygen through a process which utilizes electrical current and specialized membranes. Steam-methane reforming combined with carbon capture, on the other hand, involves the combustion of petroleum products, generally natural gas, and the capture and storage of the carbon emissions after combustion.

"Liquefaction plants are expensive", stated Mr. Brinchmann. "This is a volume game... How do we create the volumes needed to justify the high investment costs?"

Besides the good-will created from deploying vessels which do not produce emissions during operations, the Norwegian government is planning on issuing regulations which would encourage ship owners to adopt zero-emission vessels in certain operating areas.

Mr. Brinchmann explained, "The Norwegian government announced that after 2026 to be allowed to go into our heritage fjords in Norway, you must be emissions free. Cruise vessels coming to Norway after 2026 will not be allowed to go into specific fjords because of emissions unless they shift other types of fuel. This is a strong signal to the industry that you need to change. Over time that will force some of the operators who want to go into the fjords…to change to hydrogen".

In addition to specific Norwegian



Rendering of a bulk carrier for the transportation of liquefied hydrogen by Moss Maritime, Wilhelmsen Ship Management, Equinor, and DNV-GL.

Photo credit: Moss Maritime.

fjords, Svalbard, the austere arctic island located north of the Norwegian mainland, may also be an emerging market for liquefied hydrogen. In a push by the Norwegian government to transition from coal, authorities are considering hydrogen and fuel cells to power the island. Mr. Brinchmann stated, "One option is to ship hydrogen from Tjeldbergodden, [a site near Trondheim where Equinor has a methanol plant and gas receiving terminal], to Svalbard. This vessel was designed to handle the transport of hydrogen to supply Svalbard. [Our] grant from Innovation Norway was mainly based on the Svalbard case".

Engineering Innovation and Challenges

Moss Maritime, the original designers of the prolific Moss Liquefied Natural Gas (LNG) carriers, served as the technical lead for the bulk liquefied hydrogen carrier feasibility study. Leveraging over 50 years of designing cryogenic systems for LNG carriers and floating LNG terminals, the company set about developing a design for a 9,000 cubic meter bulk liquefied hydrogen carrier with bunkering capability.

"There are many similarities between liquefied natural gas and liquefied hydrogen" explained Mr. Skogan. "One of the important points [during the feasibility study] was to define the various operation modes of the vessel and thereby specifying the equipment that is needed for the vessel".

"When approaching relevant vendors in the market we concluded that most, if not all equipment, which is needed on such a vessel is more or less ready to be proposed by the supplier. We saw some small gaps where some of the suppliers will continue to work to get their products to be ready to be offered. I would say it is quite close". Mr. Skogan went on to indicate that the study revealed no "showstoppers".

The feasibility study also covered considerations for handling boil off gas (BOG), which occurs naturally from the heat ingress from outside of the storage tanks. "We concluded that by using vacuum insulation we end up with a BOG rate which is so low that we can manage [the BOG] without a reliquefaction plant on the vessel, which is advantageous for CAPEX and OPEX" said Mr. Skogan. A reliquefaction plant, found on most LPG carriers and some LNG carriers, cools BOG and converts it back into a liquid. "This means that after the loading operation at the terminal the vessel can sail to multiple destinations with the tanks closed. The tank pressure will increase as a result of the natural heat ingress and the offloading operations but will be within reasonable design pressure of the tanks". Mr. Skogan clarified that this design was selected to reduce the cost and complexity of the design. Without delving into proprietary information regarding tank construction, Mr. Skogan explained that vacuum space and special insulation materials are required to achieve the low BOG rates for the two 4500 cubic meter tanks proposed for the vessel.

Next Steps

With a number of liquefied hydrogen projects throughout the world at different stages of execution, Mr. Skogan and Mr. Brinchmann proffered that they are ready for the next step. "At such a feasibility level, we are not far away from producing documentation which could be [the] basis for an Approval In Principle which is a first technology step which is often being used to demonstrate that the technology could be introduced to the market", stated Mr. Skogan.

As an immediate next step, Mr. Skogan indicated the team would "Work more in detail [with] the various ship operations including those related to commissioning and de-commissioning of the storage tank system, and also focus more on the specifications of relevant equipment and materials". To flesh out this level of detail, Mr. Skogan called for a "specific project where we could tailor the design in order to meet the certain project requirements" based on a specific customer's needs.

It was clear from the discussion with Mr. Skogan and Mr. Brinchmann that interest in maritime bulk hydrogen will continue to grow as regulatory bodies throughout the world call for stricter emissions across all transportation sectors. Moreover, it is clear that Norway will continue to be one of the global epic-centers for research in maritime hydrogen.

Future Fuels

Ammonia as Marine Fuel

Fuel:	LHV [MJ/kg]	Cost [euro/ton]	Cost [eurocent/MJ]
MGO	42.7	650	1.5
HFO	40.0	400	1.0
HFO 0.5% S (2020)	40.0	500	1.3
HFO 0.5% S (2020)	40.0	800	2.0
Brown ammonia	18.6	300	1.6
Green ammonia (now)	18.6	850	4.6
Green ammonia (future)	18.6	<400	<2.2

According to research by C-Job Naval Architects, ammonia can be safely and effectively applied as a marine fuel to reduce emissions from the maritime industry. As with other alternative marine fuels, the question is not 'if' rather than 'when'.

"Actual adoption is all depending on the business case. Influence factors are: A) a cargo owner willing to pay more for clean transport, B) low cost renewable electricity to make cheap green ammonia and C) means that increase fossil fuel prices like CO2 taxation and higher oil price," said Niels de Vries, Lead Naval Architect, C-Job Naval Architects. "So I expect around 10 years will be needed before this happens and the first vessels start using this. Ship last 25 years so there is quite some inertia of the market to move a in certain direction."

The research uses a new concept design, an ammonia carrier fueled by its own cargo, to study the concept of using ammonia as a marine fuel and achieve a significant reduction in greenhouse gas emissions in shipping. It shows ammonia can be used as marine fuel if a number of safety measures are included in the design. "Reviewing all ammonia power generation options, the Solid Oxide Fuel Cell (SOFC) is clearly the most efficient," said de Vries, the research lead. "However, it does have practical challenges as the power density and load response capability are not on an acceptable level yet. Therefore, in the short term applying the internal combustion engine is the way to go."

According to de Vries, the research has been ongoing for nearly two years. "The consortium of C-Job, Proton Ventures and Enviu started in October 2017 with further looking into ammonia as a marine fuel using an ammonia carrier fueled by its own cargo as a concept," he said. "Until September 2018 we setup scope and did a preliminary research. I aligned my master thesis with this and started it in September 2018 and worked on it until June 2019."

de Vries has been exploring renewable fuels for ships such as ammonia since 2016 for C-Job Naval Architects and has now completed several years of research culminating in his Master Thesis 'Safe and effective application of ammonia as a marine fuel' at TU Delft. He says: "While this research is unique in its scope and provides a valuable first step

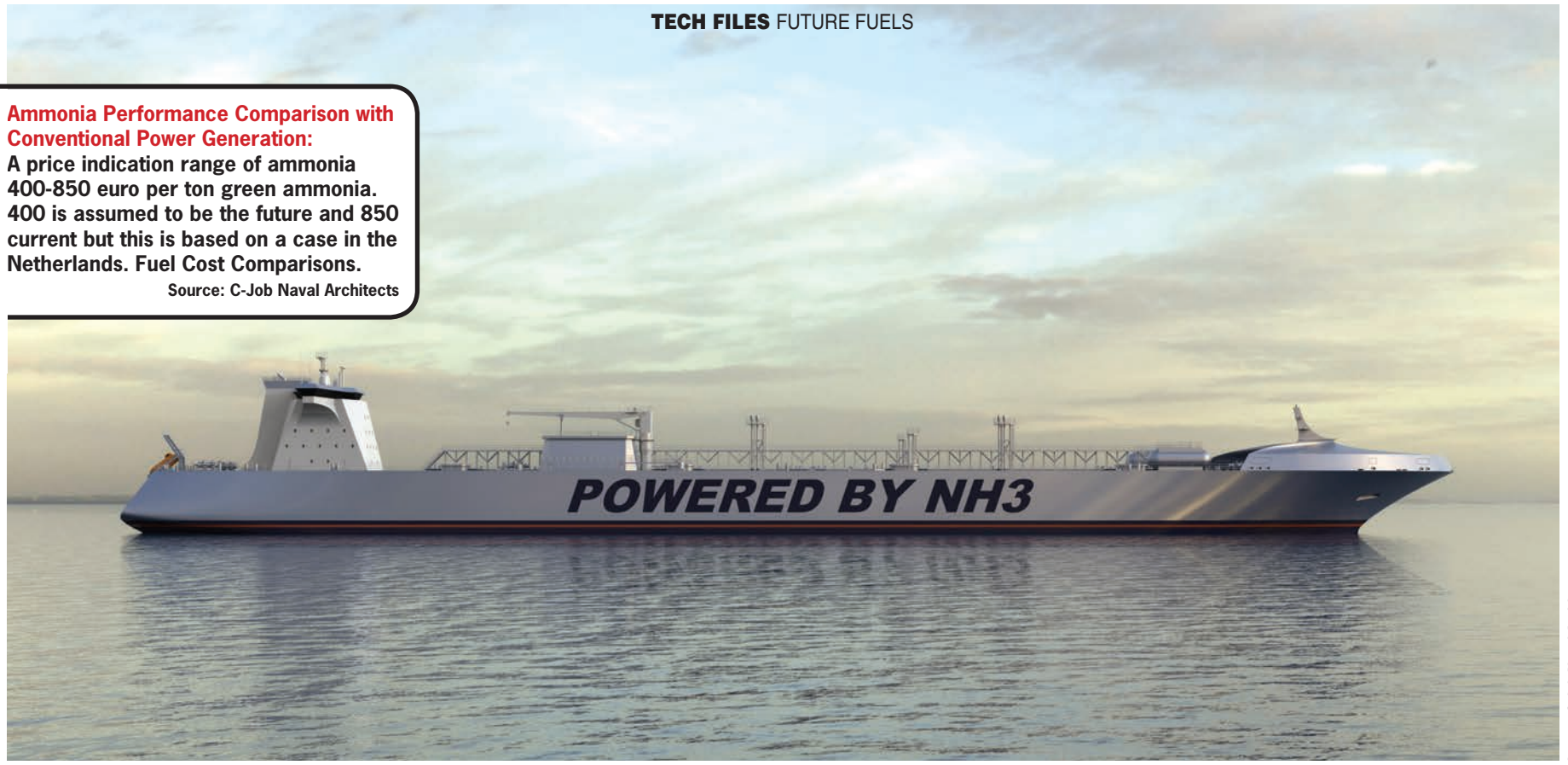


Image: C-Job Naval Architects

Ammonia Performance Comparison with Conventional Power Generation:
A price indication range of ammonia 400-850 euro per ton green ammonia. 400 is assumed to be the future and 850 current but this is based on a case in the Netherlands. Fuel Cost Comparisons.
Source: C-Job Naval Architects

towards the application of ammonia as a marine fuel, further research is still required to explore its full potential and feasibility."

The research is timely with the International Maritime Organization (IMO) goals to reduce total annual GHG emissions by at least 50% by 2050 compared to 2008 and eventually fully eliminate harmful emissions, the matter of emission reduction has leapt to the fore in importance for the global maritime industry. As with any tech evolution, challenges persist. "Design challenges are further development of fuel system design including further involvement of class, ammonia fuel storage, development of ICE using diesel + ammonia (MAN ES is currently working on this)," said de Vries.

But as has been the case with other alternative fuels, namely LNG, there are certain logistics considerations, too.

"The basic infrastructure is there as ammonia is produced, traded and transported," said de Vries. "Yearly production is at 180 million ton per year, approximately 10% of that 18 million ton per year is transported oversees. Further development of that to also make it suitable as bunker facility is the main challenge which include, rules and regulations and investments of ports."

C-Job has a track-record of using the latest technologies to design sustainable and future-proof vessels and the company has felt for a number of years that ammonia could be a viable and promising option for a clean and sustainable fuel. While it is natural that ammonia could be used on an ammonia carrier, de Vries said there is potential for other types of vessels, too.

"We definitely see potential for other ship types as well like bulk carriers and container vessels and several others," he said. "Unique new challenges would be mainly focused on ammonia storage as this was already covered by ammonia as cargo for the ammonia carrier."

‘Blade Crawlers’

Could help to keep offshore wind farms generating

Drones and crawling robots outfitted with special scanning technology could help wind blades stay in service longer, which may help lower the cost of wind energy at a time when blades are getting bigger, pricier and harder to transport, Sandia National Laboratories researchers say.

As part of the Department of Energy’s Blade Reliability Collaborative work, funded by the Wind Energy Technologies Office, Sandia researchers partnered with energy businesses to develop machines that noninvasively inspect wind blades for hidden damage while being faster and more detailed than traditional inspections with cameras.

“Wind blades are the largest single-piece composite structures built in the world — even bigger than any airplane, and they often get put on machines in remote locations,” says Joshua Paquette, a mechanical engineer in Sandia’s wind energy program. “A blade is subject to lightning, hail, rain, humidity and other forces while running through a billion load cycles during its lifetime, but you can’t just land it in a hanger for maintenance.”

Routine inspection and repair, though, is critical to keeping these megablades in service, Paquette says. However, current inspection methods don’t always catch damage soon enough.

Sandia is drawing on expertise from avionics and robotics research to change that. By catching damage before it becomes visible, smaller and cheaper repairs can fix the blade and extend its service life, he says.

- In one project, Sandia outfitted a crawling robot with a scanner that searches for damage inside wind blades.
- In a second series of projects, Sandia paired drones with sensors that use the heat from sunlight to detect damage.

Inspecting, repairing wind blades in the field presents big challenge

Traditionally, the wind industry has had two main approaches to inspecting wind blades, Paquette says. The first option is to send someone out with a camera and telephoto lens. The inspector moves from blade to blade snapping photos and looking for visible damage, like cracks and erosion. The second option is similar but instead of standing on the ground the inspector rappels down a wind blade tower or maneuvers a platform on a crane up and down the blade.

“In these visual inspections, you only see surface damage,” Paquette says. “Often though, by the time you can see a crack on the outside of a blade, the damage is already quite severe. You’re looking at a very expensive repair or you might even have to replace the blade.”

These inspections have been popular because they are affordable, but they miss out on the opportunity to catch damage before it grows into a larger problem, Paquette says. Sandia’s crawling robots and drones are aimed at making noninvasive internal inspection of wind blades a viable option for the industry.

Crawling robot finds hidden damage

Sandia and partners International Climbing Machines and Dophitech built a crawling robot inspired by the machines that inspect dams. The robot can move from side-to-side up and down a wind blade, like someone mowing a lawn. On-board cameras provide real-time, high-fidelity images to detect surface damage, as well as small demarcations that may signal larger, subsurface damage. While moving, the robot also uses a wand to scan the blade for damage using phased array ultrasonic imaging.

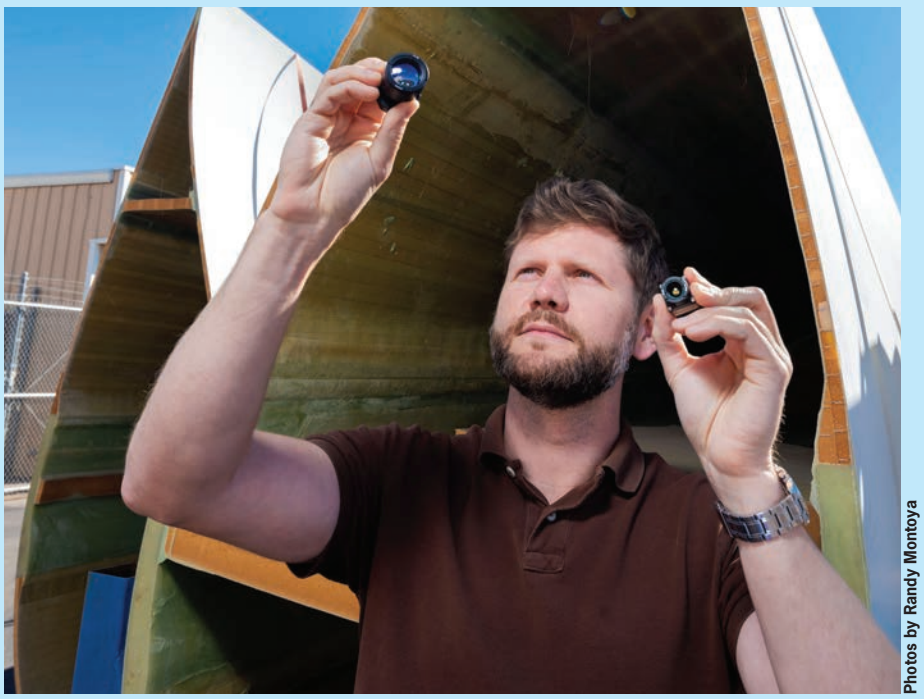
The scanner works much like the ultrasound machines used by doctors to see inside bodies, except in this case it detects internal damage to blades by sending back a series of signals. Changes in these ultrasonic signatures can be automatically analyzed to indicate damage.

Sandia Senior Scientist and robotic crawler project lead Dennis Roach says that a phased array ultrasonic inspection can detect damage at any layer inside the thick, composite blades.

“Impact or overstress from turbulence can create subsurface damage that is not visually evident,” Roach says. “The idea is to try to find damage before it grows to critical size and allow for less expensive repairs that decrease blade downtime. We also want to avoid any failures or the need to remove a blade.”

Roach envisions the robotic crawlers as part of a one-stop inspection and repair solution for wind blades.

“Picture a repair team on a platform going up a wind blade with the robot crawling ahead,” Roach says. “When the robot finds something, remotely-located inspectors can have the robot mark the spot so that the location of subsurface damage is evident. The repair team will grind away the damage and repair the composite material. This one-stop shopping of inspection and repair allows the blade to be put back into service quickly.”



Photos by Randy Montoya

Ray Ely of Sandia National Laboratories inspects the cameras to be tested on drones that use thermography to detect hidden wind blade damage.

Drones use heat from sunlight to reveal blade damage

Sandia worked with several small businesses in a series of projects to outfit drones with infrared cameras that use the heat from sunlight to detect hidden wind blade damage. This method, called thermography, can detect damage up to a half inch deep inside the blade.

“We developed a method to heat the blade in the sun, and then pitch it into the shade,” Sandia mechanical engineer Ray Ely says. “The sunlight diffuses down into the blade and equalizes. As that heat diffuses, you expect the surface of the blade to cool. But flaws tend to disrupt the heat flow, leaving the surface above hot. The infrared camera will then read those hot spots to detect damage.”

Ground-based thermography systems are currently used for other industries, such as aircraft maintenance. Because the cameras are mounted on drones for this application, concessions have to be made, Ely says.

“You don’t want something expensive on a drone that could crash, and you don’t want a power hog,” Ely said. “So, we use really small infrared cameras that fit our criteria and use optical images and lidar to provide additional information.”

Lidar, which is like radar but with light instead of radio frequency waves, measures how long it takes light to travel back to a point to determine the distance between objects. Taking inspiration from NASA’s Mars lander program, the researchers used a lidar sensor and took advantage of drone movement to gather super-resolution images.

“I jokingly describe super-resolution as like a detective on a TV crime drama when they tell a tech to ‘enhance, enhance’ an image on a computer.”

A drone inspecting a wind blade moves while it takes images, and that movement makes it possible to gather a super-

resolution image.

"You use the movement to fill in additional pixels," Ely says. "If you have a 100 by 100-pixel camera or lidar and take one picture, that resolution is all you'll have. But if you move around while taking pictures, by a sub-pixel amount, you can fill in those gaps and create a finer mesh. The data from several frames can be pieced together for a super-resolution image."

Using lidar and super-resolution imaging also makes it possible to precisely track where the damage on a blade is, and lidar can also be used to measure erosion on blade edges.

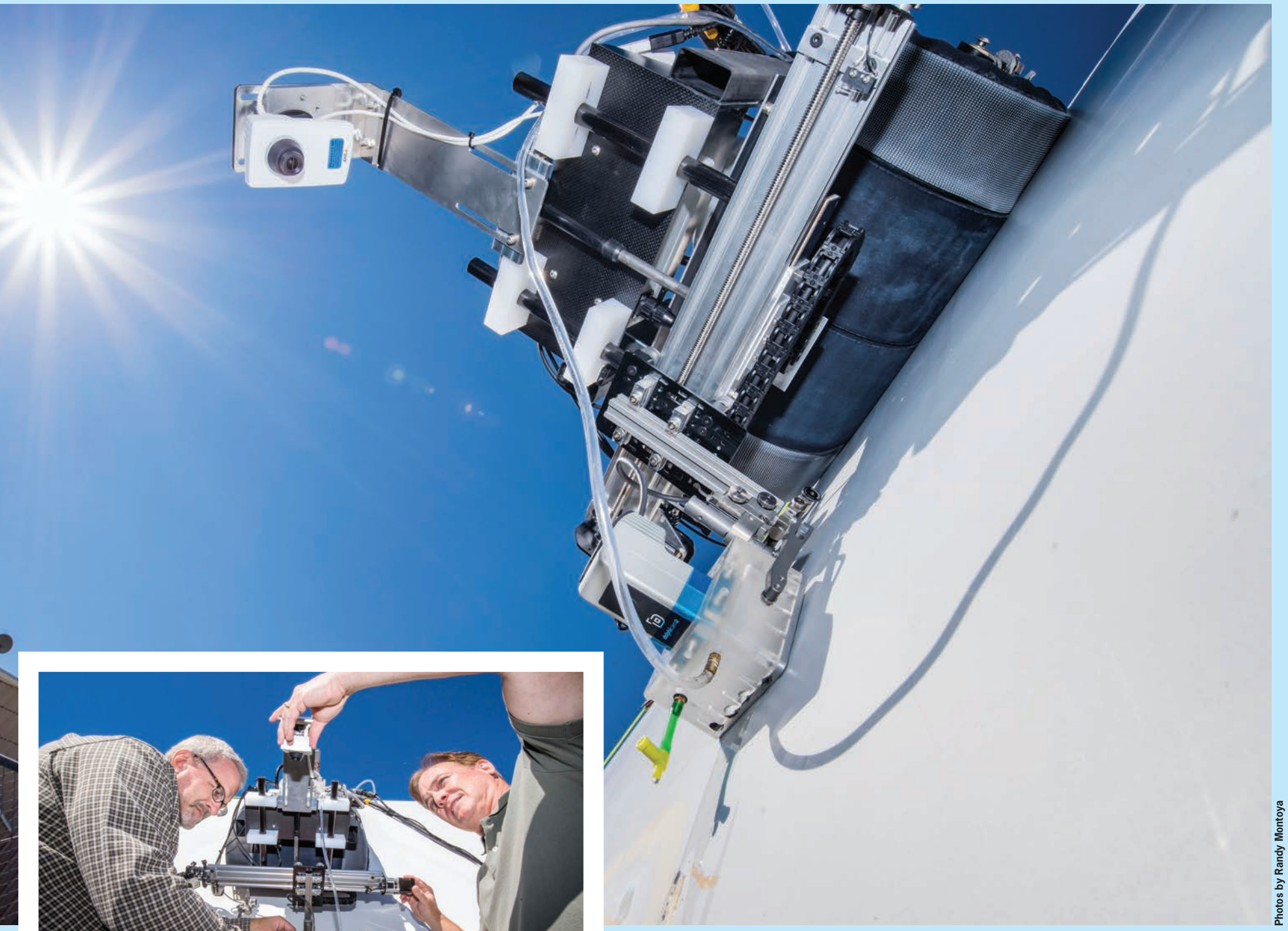
Autonomous inspections are the future

Autonomous inspections of bridges and power lines are already realities, and Paquette believes they also will become important parts of ensuring wind blade reliability.

"Autonomous inspection is going to be a huge area, and it really makes sense in the wind industry, given the size and location of the blades." Paquette says. "Instead of a person needing to walk or drive from blade to blade to look for damage, imagine if the inspection process was automated."

Paquette says there is room for a variety of solutions and inspection methods, from a simple ground-based camera inspection, to drones and crawlers, all working together to determine the health of a blade.

"I can envision each wind plant having a drone or a fleet of drones that take off every day, fly around the wind turbines, do all of their inspections, and then come back and upload their data," Paquette says. "Then the wind plant operator will come in and look through the data, which will already have been read by artificial intelligence that looks for differences in the blades from previous inspections and notes potential issues. The operator will then deploy a robotic crawler on the blade with suspected damage to get a more detailed look and plan repairs. It would be a significant advance for the industry."



Photos by Randy Montoya

Sandia National Laboratories researchers use crawling robots and drones with infrared cameras to look for hidden wind blade damage to keep blades operational for longer and drive down the costs of wind energy. INSET: Tom Rice, left, and Dennis Roach of Sandia National Laboratories set up a crawling robot for a test inspection of a wind blade segment.

Photo: Greg Trauthwein

NorShipping: A "Koselig" Event

By Joseph DiRenzo, PE

KOSELIG

is a Norwegian adjective used to describe situations that give a feeling of comfort, warmth, and relaxation. The NorShipping exhibition and conference, one of the largest in northern Europe, could definitely be described as koselig. Occurring in Oslo, Norway between June 4th and June 7th, the conference featured close to 1,000 exhibitors from around the world. With the prominently featured Blue Economy Hall, terms such as marine sustainability and environmental ocean awareness held the center stage at a number of the events. In true Norwegian fashion, most of the major press announcements were delivered in semi-intimate gathers with copious amounts coffee by maritime CEOs and VPs who enjoyed being called by their first names. he NorShipping conference felt less like a gathering of competitors keen on sizing one another up and more of a gathering of old colleagues and friends.

As one Norwegian maritime executive quipped over an over-priced beer, most of the executives who run the major shipping and maritime technology companies in Norway "went to the same school and worked with one another at some point in various Scandinavian companies… they are all basically friends". This coziness was present in the way several Scandinavian based global competitors have clustered together to develop business opportunities in marine automation and green shipping. Moreover, many of the companies rallied around common themes throughout the conference.

These themes included advancing maritime automation, addressing marine pollution, and connecting marine sensors for the better management of commercial shipping.

AUTOMATION

Two noteworthy events featuring marine automation included the unveiling of the Autonomous Control Station (ACS) for the Yara Birkeland, one of the largest fully autonomous container feeder vessels projects in Europe, and the announcement by the OneSea group to include three additional marine technology stakeholders towards the advancement of self-guided shipping. Both events marked continued progression toward the commercialization of autonomous shipping

The first big announcement occurred during a dinner event at Wilhelmsen Ship Management on the first day of the conference. Massterly, a joint venture between Wilhelmsen and Konsgberg, captured the imagination of those in attendance by unveiling the ACS at Wilhelmsen's main office in Lyskaer.

Tom Eystø, CEO of Masstery, said the following during the unveiling. "We are developing this control station for the Yara Birkeland…[and] will sail the vessel for the first two years with a skeleton crew onboard. We will be monitoring it from this control center…and we will have access to everything that we have onboard [the Yara Birkeland] in the control center".

With striking similarities to the actual bridge of a larger vessel, the ACS included screens displaying the ship's ECDIS, radar, alarm monitoring system, and plant status. The control station also featured visual displays which projected images that one would see from the bridge of the vessel. During the unveiling of the ACS, Massterly ran a simulator showing the proposed route of the Yara Birkeland including navigational obstacles like bridges and other ves-

sels. Once the Yara Birkeland and ACS are placed into operation, the command center will have two controlling stations, one primary and one back-up, manned by an operator as well as a shift supervisor which oversees the daily operations of the ship including cargo management and voyage planning.

Referencing human factors studies on the remote management of autonomous ships, Tom Eystø indicated that one operator could manage up to "six or seven ships depending on where they are in the voyage". Mr. Eystø went on to explain that when two ships were mooring simultaneous, the shift supervisor may divide the mooring operations between two different operators at two different control stations.

Speaking on the overall design philosophy for the Yara Birkeland, Mr. Eystø stated that "the ship is not depending on interfacing with the shore control". Rather, remote operators would only interact with the vessel during "exception handling" scenarios, which was described as situations requiring a higher level of critical thinking and maneuvering. As a marked departure from other autonomous vessel projects, this function could reduce the man-power required to operate the vessel and may result in operational expenditure savings over the life of the vessel.

A similarly impactful announcement was delivered the next day by the One Sea group which is an autonomous maritime technology incubator organized by the Finland based Digital, Internet, Materials & Engineering Co-Creation (DIMECC) company. The One Sea group announced that they were including satellite communications company INMARSAT, Monohakobi Technology Institute (MTI) which is a R&D subsidiary of the Nippon Yusen Kabushiki Kaisha Group, and the Royal Institute of Naval Architects into their organization of marine companies. These three companies joined the ranks of ABB, Business Finland, Cargotec, Ericsson, Finnpilot Pilotage, Kongsberg, Tieto, and Wärtsilä in working towards the goal of "developing the first autonomous maritime transport system by 2025".

Known for operating the Jaakonmeri test area, one of the first international test areas for autonomous maritime vessel technology, the announcement marks continued synergy in autonomous shipping. The group will focus on advancing rules and regulations for autonomous shipping, ethics, and standards and integration for autonomous marine components.

Pollution

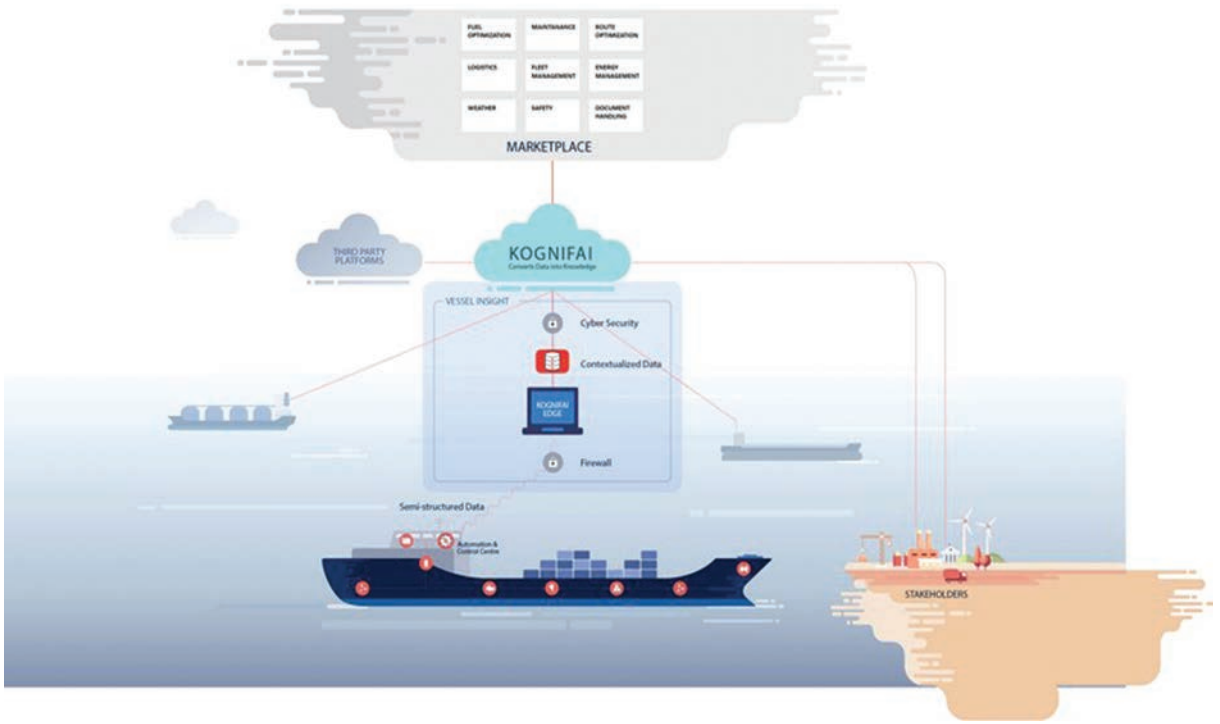
The NorShipping conference also served as a public forum for governments and international governing bodies like the United Nations (UN) and class societies like the American Bureau of Shipping (ABS) to announce plans and strategies related to sustainable ocean use, marine emissions and climate change.

The prime minister of Norway, Erna Solberg, joined by Lise Kingo, CEO & Executive Director of the UN Global Compact, used the conference to promote Norway's ocean strategy and a UN strategy document entitled Global Goals, Ocean and Opportunities. Pub-

United Nations: Erna Solberg, prime minister of Norway, (holding document) and Lise Kingo, CEO & Executive Director of the UN Global Compact (right of Mrs. Solberg) at the announcement of the UN's Global Goals, Ocean and Opportunities.
Photo: Joeseph DiRenzo

Wilhelmsen: Tom Eystø, CEO of Massterly, unveiling the Autonomous Control Station at Wilhelmsen's office.
Photo: Joeseph DiRenzo

ABS: Dr. Kirsi Tikka, EVP and Senior Maritime Advisor, ABS, announcing the Setting the Course to Low Carbon Shipping vision document.
Photo: Joeseph DiRenzo



KONGSBERG:
Rendering of the connected sensors and systems within Kongsberg's Vessel Insight system.
Photo: Kongsberg Marine

YARA:
Marine Gas Scrubber.
Photo: Yara Marine

lished by the UN Global Compact, a UN sponsored group to assist companies in aligning their operations with UN principles, the strategy laid out 17 "Global Goals" divided into the categories of a healthy, productive, and well-governed oceans.

"All the 17 goals are deeply interconnected and they are all expressing the systemic connections that we all live by and live from in this world" stated Mrs. Kingo during the announcement.

Standing next to Kingo on-stage, Solberg explained how the strategy document was aligned with Norway's national strategy for its maritime commons. "The key object for Norway's ocean strategy is to promote sustainable economic growth through responsible management. We do that because we live on the ocean. We have most of our GDP out of the ocean. We have our biggest knowledge-base based on the ocean...And I think Norwegians are closely connected to it"

A number of concepts outlined in the UN strategy document were central themes during the Nor-shipping conference by class societies. For example, ABS specifically discussed the operational and technical implementation of several of the UN's maritime goals during the announcement of its 2030 outlook and 2050 vision document. During the ABS press announcement, industry experts discussed methods and technologies ship owners could consider to meet IMO 2030 and 2050 Green House Gas (GHG) goals in a document titled Setting the Course to Low Carbon Shipping. According to ABS' vision document, "the main strategies to help shipping meet the IMO's emissions goals for 2030 include: establishing speed limits; coordinating 'just-in-time' arrivals of ships at ports, design refinements such as hull optimization and propeller optimization, and enhancements to design efficiency, such as those mandated by the IMO's Energy Efficiency Design Index (EEDI)".

Central to the discussion were minimum emission per tone-mile which must be met to achieve 2030 and 2050 IMO goals. According to an April 2018 announcement by the IMO, targeted emissions reductions would be a minimum of 40 percent per cargo tone-mile by 2030 and a 50 percent reduction in overall GHG emissions by 2050, compared to 2008 levels.

An expert panel chaired by members from Maritime Strategies International (MSI), Herbert Engineering and ABS discussed the different operational and technology solutions which should be considered to achieve 2030 and 2050 emission targets.

According to Dr. Kiris Tikka, Executive Vice President and Senior Maritime Advisor at ABS, "the big factor in getting to 2030 is probably going to be speed control…We also expect there will be addition [interest] in LNG as a fuel and that will have a contribution towards 2030".

Noting that altering the operational profile and speed of existing technology would not achieve 2050 targets, ABS contracted Herbert Engineering Corporation to develop designs for two concept container ships. One design was for a 2,000 TEU feeder ship and the other

was for a 14,000 TEU container ship. Each vessel design was modified from a baseline concept that could run on HFO to alternate designs which would accept hydrogen fuel cells and liquid biofuels.

Tikka described these top level designs as "aspirational realistic designs". "They are aspirational in the sense that they are for the future, but they are realistic in the sense that they were developed using the same principles that you would develop any basic design".

Other conversations during the Nor-Shipping conference focused on the immediate concerns related to IMO's 2020 regulations on SOx emissions. A brief interview with Peter Strandberg, CEO, Yara Marine Technologies, illuminated some of the benefits and challenges related to maritime gas scrubbers

When asked about the balance between reducing local SOx emissions and the additional fuel used to power the scrubbers, Strandberg offered the following, "you will consume a little bit more fuel because of the energy [required to power the scrubber], but to cooperate with HFO then the scrubber is the best alternative… Either you can refine it twice [at the refinery] and have double CO2 [emission] or you can put [HFO] directly on the vessel and burn it there. If you have the HFO and scrubber you will reduce your particle emission up to 80 percent".

Further discussions with Strandberg revealed a public debate on the efficacy of closed loop versus open loop gas scrubbers. SOx scrubbers pass exhaust gas from marine engines through a "scrubbing cloud" of water droplets which capture emission particles from the exhaust gas. In the open loop configuration, the water used in the scrubbing process is discharged overboard while in the closed loop configuration water is recirculated and treated with either caustic soda or Magnesium Oxide. Referring to a recent ban by Singapore on open loop scrubber, Mr. Strandberg stated "We, the scrubber suppliers, have to do a better job to inform the public and the government about the scientific facts". He went on to reference past and on-going work with DNV-GL to assess the environmental impact of open, closed, and hybrid gas scrubbers.

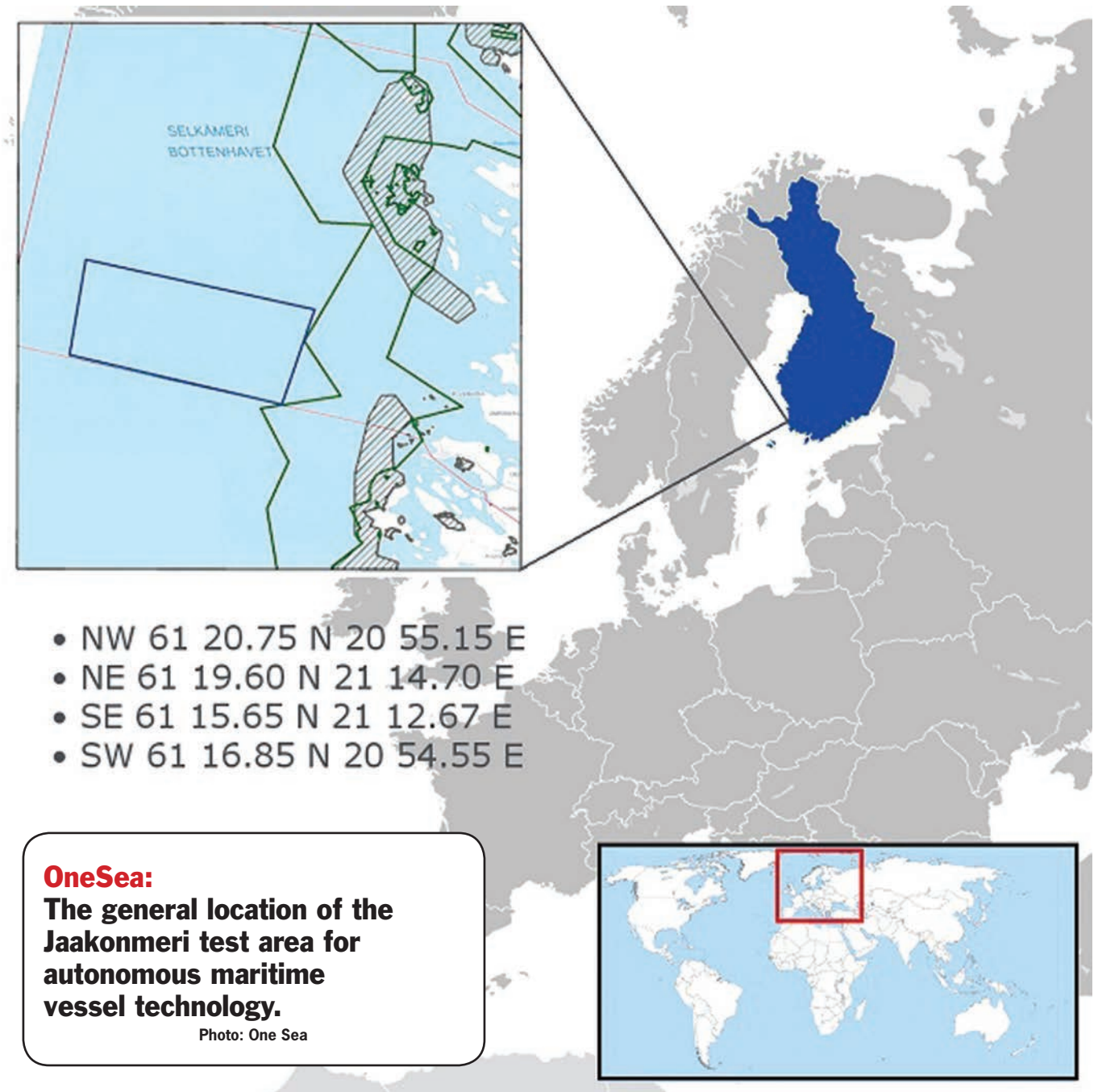
With 2020 IMO regulations taking effect at the beginning of next year and 2030 and 2050 GHG targets following closely behind, there was a palpable tension from maritime stakeholders attending the Nor-Shipping conference when debating the best ways to achieve these targets. The prevailing frustration stemmed from uncertainly in how these upcoming IMO regulations would be applied and changed over time.

Ship Management

In additional to operational changes, and alternate fuel systems, there were a plethora of companies at Nor-Shipping offering products designed to optimize ship management and produce fuel saving from interconnected marine systems and advanced analytics. More specifically, several companies claimed that optimized decision making could be made by artificial intelligence and underlying algorithms.

To support the growing amount of data being sent from ship-board sensors to shore-side servers for analysis, INMARSAT announced plans to partner with Airbus Defense and Space to launch a series of new satellites in the coming years. According to INMARSAT's press announcement, this additional investment was made to support an expansion of the Fleet Express product which is a combination of the legacy Fleet Broadband L-band service and the newer high speed Global Xpress Ka-band service.

Representing a source of this expanded maritime system data, Kongsberg maritime held a press announcement to unveil the Kongsberg Vessel Insight system. Described as a "vessel-to-cloud data infrastructure", Kongsberg Vessel Insight is a combination of hardware and software to conduct a broad range of data analytics related to fuel consumption, engine state and load, and generator state. Looking out over the conference hall, one was able to grab a brief glimmer of the future state of ocean going vessels. Over time, vessels will be more automated and produce fewer emissions. Decision making including route planning and ship maintenance will occur seamless between the few individuals onboard a vessels and a support team ashore. Wizened sailors, fleet managers, and business-minded investors will be joined by techies, programmers, and data analytics professional to propel the maritime industry into the next century.



OneSea:
The general location of the Jaakonmeri test area for autonomous maritime vessel technology.
Photo: One Sea

Hatteland Technology

Hatteland Technology

Hatteland Technology unveiled a new product and integrated solutions portfolio with focus on control, monitoring and the maritime Internet of Things (IoT). The all-new Series E panel computer range is designed to offer a dependable all-in-one solution for diverse maritime applications. Providing screen clarity at a competitive price, the Series E panel computers will be available in 15.6-, 21.5-, 24- and 27-in. sizes. The new Series E products will provide tangible cost savings for maritime technology and equipment manufacturers as well as systems integrators, and come with Hatteland's reputation for long service life, software flexibility and exceptional optical bonding technology.

www.hattelandtechnology.com

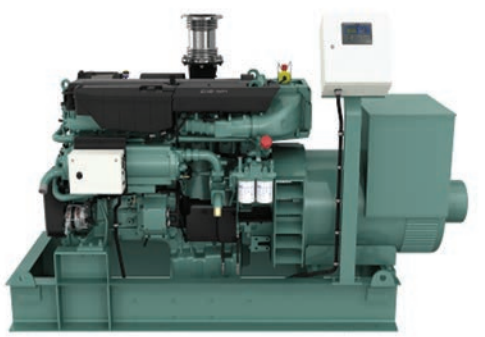
Wärtsilä Unveils Navi-Planner

Wärtsilä unveiled its new Navi-Planner voyage planning and optimization solution, developed by Transas, a Wärtsilä company. The new Navi-Planner makes use of the connected ECDIS. The new connectivity allows tedious onboard voyage planning to be cut from 5 hours to 30 minutes.

The new Navi-Planner uses one of the world's largest navigational databases, as well as artificial intelligence to auto-create a route that is safe to sail. It calculates weather optimization, supports hazard identification, creates a voyage plan, and provides at all times the latest charts and data automatically. In addition, it enables onshore fleet operators to remotely monitor their vessels in real-time, record navigational near misses, and support incident investigation and playback.

www.wartsila.com

Wärtsilä



Volvo Penta

Volvo Penta Gives D16 Marine Genset More Spark

Responding to the trend for more electrical power for vessels' auxiliary systems and hybrid drivelines, Volvo Penta has given its D16 genset a recharge, upgrading it to meet 450 and 500kw. The IMO II-compliant engines now produce 479 kWm at 1,500 rpm and 532 kWm at 1,800 kWm corresponding to a 50 Hz genset providing 450 kWe and a 500 kWe delivery at 60 Hz. The upgraded and stronger engine represents the most powerful Volvo Penta MG engine in the toughest marine genset rating, ensuring high output and a 3% reduction in fuel consumption.

www.volvopenta.com

ITLINK

Marlink's ITLink Portfolio

Marlink launched ITLink, a portfolio of IT solutions for standardizing, simplifying and automating IT operations at sea and delivering substantial time and cost savings related to on board network IT administration and management through advanced dashboard and intelligent applications. The ITLink suite is designed to service the maritime industry as a standalone service with fleet wide standardization and digitalization for ship owners. This is more important than ever to ensure to take all the advantages of remote IT intervention onboard, 24/7 monitoring of onboard IT environment and increase the level of compliance with reference to upcoming regulations such as IMO2021 and TSMA version 3. ITLink also provides deep transparency via an IT-specific advanced online dashboard, which includes continuously updated PC and server status information. ITLink is available standalone or fully integrated.

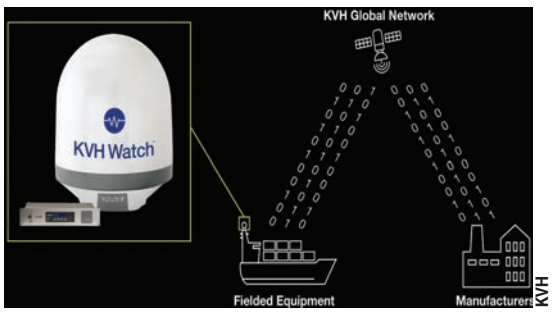
www.marlink.com

Wilhelmsen Cargo Hold Cleaner

Wilhelmsen's Unitor CargoClean HD improves performance of its predecessor but requires just half the volume of chemicals previously needed. Refined several times before the Wilhelmsen team felt their complex alkaline micro emulsion cleaner was strong enough to test against the best of the rest onboard a vessel, the new concentrated formula of Unitor CargoClean HD consistently produced the best cleaning results. Specifically designed for the dirtiest cargoes such as heavy coal and petcoke residues, it removes often difficult stains at the first attempt. Doing so with need for significantly less volume of the product, than other brands, and indeed their own Aquatuff HF, the recommended dosage rate is just 10 percent.

www.wilhelmsen.com

Wilhelmsen



KVH

KVH Watch IoT Connectivity as a Service

KVH Industries introduced an all-inclusive, no-commitment, Internet of Things (IoT) Connectivity as a Service program utilizing global VSAT communications. KVH Watch is designed as the connectivity solution for remote equipment monitoring and intervention by maritime equipment manufacturers and IoT application providers. With remote monitoring, manufacturers can act in real time, minimizing expensive service calls and ensuring that their equipment is performing at its peak for the maritime operation. KVH designed the IoT connectivity solution with cybersecurity as an essential feature.

www.kvh.com

ExxonMobil

ExxonMobil's Mobilgard M420

ExxonMobil added Mobilgard M420 to its range of advanced marine lubricants. Mobilgard M420 is a 20 BN oil that has been tested specifically for use in medium speed engines using fuels that comply with the IMO global 0.50 percent sulfur cap. The lubricant has received No Objection Letters from leading engine builders, including MAN ES and Wartsila.

With the marine fuel landscape changing in the lead up to 2020, Mobilgard M420 has been formulated for use on vessels running on 0.50 percent or 0.10 percent sulphur fuels.

www.exxonmobil.com

Shell Brings 58% Cost Savings

Shell Marine's medium-speed engine oil Shell Gadinia proved its value with PT Indo Container Line (ICON Line), which confirmed that reduced lubricant consumption led to longer oil-drain intervals and costs down by 58%. Calculations made immediately after comparative trials for the Indonesian shipping line showed that a 58% cut in lubricant costs is available to ICON Line through the use of Shell Gadinia S3. Annualized, this is equivalent to saving $16,900 per vessel.

Shell Gadinia S3 40 is a high-quality, multi-functional diesel engine lubricant which is particularly suited for medium-speed main or auxiliary engines burning fuels with sulfur contents up to 1%, protecting against oxidization and thermal degradation and minimizing lacquering.

www.shell.com

Shell

Cummins

Cummins & IMO Tier III

Cummins' solution for IMO Tier III emission regulations is to use proven Tier II engine technology and add a Selective Catalytic Reduction (SCR) aftertreatment system. A unique feature will allow the ship's crew to manually "pause" the SCR system whenever operating outside of a controlled emission area. Fleet owners with existing Tier II Cummins engines can add the SCR system, recalibrate the electronic control module and meet both Tier II and Tier III standards.

The aftertreatment system has a modular design utilizing a Vanadia-based catalyst that can be serviced by a single crew member through an access panel. It can be operated with either 32.5% or 40% concentrations of DEF.

www.cummins.com

Iridium

Iridium's First GMDSS Terminal

Iridium Communications and partner Lars Thrane unveiled the Lars Thrane (LT) 3100S terminal designed to operate on the Iridium network for Global Maritime Distress and Safety System (GMDSS) vessel carriage requirements, with service targeted to launch in January 2020. This is a terminal designed to provide global GMDSS services. With the LT-3100S, mariners have an all-in-one system that can meet Safety of Life at Sea (SOLAS) convention vessel carriage requirements, while also serving as a primary or companion communications system. The new terminal will offer GMDSS services, along with voice, texting, and data services with a built in GNSS/GPS receiver. The terminal also supports the SSAS, Anti-Piracy/Citadel Comms and LRIT.

www.iridium.com

Kongsberg: Vessel Insight

Kongsberg unveiled Vessel Insight, a subscription-based service addressing the key challenges for digital adoption in the maritime industry, given the complex and customized integration of systems and equipment on board, which renders standardization challenging. Accessing sufficient quality data securely from vessels has historically been so costly that it largely nulls out the potential gains in operational expenditure. Vessel Insight addresses this challenge. Vessel Insight enables customers to cost efficiently capture and aggregate quality data from their assets, and securely transfer them to the cloud. Through the Kognifai Marketplace, customers get access to a large range of leading applications and services.

www.kongsberg.com

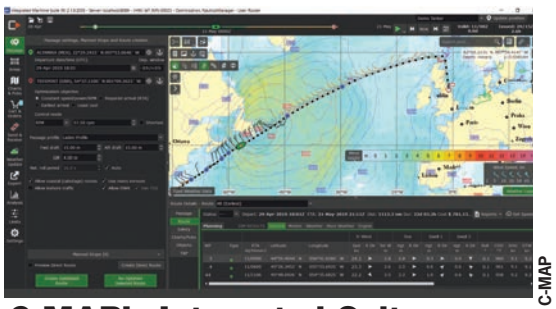
Kongsberg

ABB

ABB Debuts New Compact Turbocharger

ABB Turbocharging launched the new A255-L and A260-L turbochargers optimized for small and medium bore two-stroke diesel and gas engines. Scaled down from the A100-L and A200-L designs, the new models offer a smaller size while retaining key design features incorporating the latest rotor component technologies. Their compact design allows installation flexibility in modern, space-optimized engine rooms. The A255-L and A260-L offers the marine engine market, turbocharger technology with more power density with a smaller frame size. For ship owners, these new turbochargers deliver high efficiency, lower fuel consumption and emissions.

www.abb.com



C-MAP

C-MAP's Integrated Suite

C-MAP released C-MAP IMS 2.1, an upgrade of its Integrated Maritime Suite (IMS) with new features for navigational chart and publication management and even more powerful voyage optimization. A modular onboard software suite, IMS 2.1 is designed to improve operational efficiency and streamline voyage planning and nautical information management. The newly enhanced NauticalManager module supports a modern and efficient workflow for automated chart and publication management, and a comprehensive set of simple-to-use but powerful tools for route planning, graphical and quantitative analysis of weather and navigational considerations. IMS Voyage Planning is available free of charge to C-MAP commercial chart customers.

www.c-map.com

MIROS Speed Through Water

Miros launched Miros Speed Through Water, a dry-mounted, radar-based system. "Access to accurate speed through water data will enable improvements in the application of ship performance optimization protocols. This, in turn, will lead to significant cost efficiencies for ship owners. This is a breakthrough in efficient and data-driven ship performance management and an important contribution to ambitious goals for lowering emissions in the industry," said Andreas Brekke, CEO, Miros. As a part of a 6-month pilot-project, BW Dry Cargo is testing the new technology on its BW Rye newbuild. BW Dry Cargo's Managing Director, Christian Bonfils, believes Miros' technology can contribute to significant (10%) fuel savings for the company.

www.miros-group.com

Andreas Brekke, CEO, Miros

Photo: G. Trauthwein

OSM Maritime's OSM ON

OSM Maritime introduces OSM ON, which uses the company's Maritime Operations Center in Singapore – which digitally connects all vessels under OSM management, and all activities with real-time visibility and transparency – to provide 24/7 response and risk management support services. Bjoern Sprotte, COO & President at OSM Maritime, said, "from the outset the center has offered 'always on' fleet and business support services, but – together with tech start-ups - we've looked at finding new ways to fully unlock the value of the data we gather for the benefit of our customers, in the context of the unique industry experience and expertise OSM is built upon. OSM ON is a product of that drive."

https://osm.no

GNS: "Navigation as a Service"

GNS will sell all digital and paper nautical charts and publications at cost, as part of its Voyager Navigation as a Service (VNaaS) solution. VNaaS customers will pay an annual software license fee to access a complete set of software and data analytics tools that enable officers onboard to order the charts and publications they need for each voyage and shore-based stakeholders to control and manage navigation purchasing and compliance more effectively.

The new GNS Voyager Navigation as a Service (NaaS) offer provides shipping companies with:

- Savings through the purchase of digital and paper charts and publications at cost price;
- Transparency of the cost of navigation supplies;
- Tools to actively reduce consumption of charts and publications across fleets;
- Enhanced voyage analytics to enhance vessel operations;
- Automated chart and publication ordering as well as simpler chart and publication compliance and update management for the vessel including V Drive for safer transfer of ENCs to ECDIS;
- Voyager PC healthcheck software to support cyber security onboard.

www.gnsworldwide.com

MR TV was set up in Oslo for NorShipping 2019. See Paul Stanley, CEO, GNS @
https://www.marinelink.com/videos/video/the-digital-ship-navigation-as-a-service-100336

Trade, Trump & Trust

(Continued on page 57)

that he was about to head to China on business, and that he'd probably be gone at least ten days. I didn't think too much of it, except to make a mental note to thumb through my rolodex for someone else to play squash with, while he was gone.

Four days later, however, the telephone buzzed and my secretary (surprisingly) advised, "It's Harry, line 1." I picked up and after exchanging pleasantries, he asked, "You want to play tonight?" I replied, tongue-in-cheek, "Sure, but I'm not flying to China to do it." He laughed and said, "I'm back a little early. I'll tell you about it later. I've got the court for 6:30. See you there."

It turned out that his firm had sent no less than ten executives and attorneys to China for what was to be a signing ceremony. Upon arrival, it was Harry's job, along with three or four other attorney colleagues, to read the fine print in the documents to ensure that it said exactly what had been agreed to in previous negotiations. This was not the case. Not even close, actually. But, the Chinese negotiators apparently figured that, with the Americans having sent ten people half way around the world at great expense to consummate an important deal, that they'd get a few more concessions by changing the deal at the last second. Actually, not so much. Stop me if any of this sounds familiar.

They hadn't been in country for even 48 hours. But, six months of trust had been broken in less than two days. The lead executive from the energy firm told his subordinates (that would be Harry and friends) to go back to their hotels, pack it up and get ready to fly back early. And, that's just what they did. Now back in the USA, after our match and over a beer with my friend, I asked, "So, what happens now?" He paused dramatically, took a long pull off that longneck and then deadpanned, "No idea. But, I'm told there won't be any more signing ceremonies."

NAFTA

Meanwhile, the North American trade drama is also playing out, if not in the same way, then in a similarly choppy fashion. There is much discussion around the use of tariffs as a punitive measure to exact what the United States government thinks is a minimum standard of behavior and cooperation in other areas; the illegal immigration situation on the southern border, for starters. I'm not qualified to say if the threat of escalating tariffs is the right way to go about getting what we want, but it does seem to be one of the few things left in the executive branch's tool box to solve the increasingly expensive logistical nightmare of border security. On the other hand, and when it comes to North American trade, I do have one or two opinions.

The concept of North American free trade – or what has come to be known as NAFTA – is a nominally good idea. NAFTA – with Canada – that is. Think about it: why wouldn't you want to enjoy a mutually beneficial trade policy with a neighbor whose environmental, social, humanitarian and ethical standards are as close as one can globally get to what (we say) we believe in? I hope that we come to terms with our northern neighbors – our friends – in a fair and equitable way, and stay that course for many years to come. Looking to our southern border, that goal remains elusive and I'm afraid that's the way it will stay.

Negotiating trade with a country where environmental standards are lacking, corruption is the rule rather than the exception, and the treatment of labor (I'm being kind) remains far below what we consider to be minimum benchmarks, is problematic. This is a country blessed with all the energy in the world and yet, today, finds its national petroleum firm's financial rating battered to 'junk' status. And, to say that the humanitarian crisis that exists on the other side of the border is being happily exported to the United States would not overstate the gravity of the situation.

Intestinal Fortitude

I can't remember a time when this much was riding on so many trade spats. So much so that global equities markets have been rattled; time and time again. And, I'm no different than anyone else. I'm not getting any younger and I don't want this situation to impact my bottom line any more than the nation's soybean farmers want it to impinge upon theirs. As I begin to move my financial positions (at the direction of my financial advisors) to places of (supposedly) less risk, my children's 529A college accounts have been sitting in money market positions for almost two years. Yep: I missed A LOT of the upside. I was also able to sleep at night knowing that whatever I'd saved (so the nation's finest universities can stay in business), also wouldn't evaporate overnight during the next financial crisis.

To be clear, much of the previous paragraph should NOT – especially considering that time-honored Keefe family tradition of 'buying high and selling low,' – be construed as financial advice. That said; I guess you could say I'm having a loss of intestinal fortitude. If so, then I'm probably not alone in that overcrowded life raft. That's not to say I think we shouldn't take a harder line when it comes to global trade policy. I do.

When it comes to China, we know exactly who we are dealing with. Or, heck; we certainly should. This is a country where by their own admission, fossil fuel emissions will peak in 2030 – or at about the same time California says that the Golden State's ports must be emissions free. Naturally, China wants to be treated as a third world, emerging economy for the purposes of the so-called Paris Climate accord while at the same time enjoying first world trading privileges. It shouldn't work that way. But, to date, it has, and unless something changes, that's exactly what will continue to happen.

And, wasn't it just this week that China pulled its WTO suit (which claimed it to be a 'market economy') just in time to make sure that the result did not become official? Within that battle, China was – according to a Reuters report – on course to lose the bulk of the case, with only some minor points going in its favor. Indeed, China is no more of a market economy than it is an emerging nation with third world privileges when it comes to environmental issues.

Defining Victory

Can a trade war be won? I don't know. I'm willing to bet that MM&P's Captain Timothy Brown, if he were with us today, would define victory as the mutual 'give and take' of honest negotiation, that eventually yields a compromise that everyone can live by. That should be everyone's ultimate goal. It's certainly mine.

Donald Trump didn't start this trade war. It's been going on for decades. He is, however, the first President in recent memory to push back and do something – anything – about it. In terms of policy, you can argue about the uneven delivery, the lack of tact or even the previously accepted protocol that he typically ignores. And, you might even be right about all of that.

Really, the only thing that matters is to ask, "Do WE have the intestinal fortitude to ride out the short term pain on the way to long term prosperity?" Do you?

To keep up with Joe Keefe's blogs, visit:

https://www.maritimeprofessional.com/blogs/post/trade-trump--and-trust-15576

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Email: c.hernandez@sfbarpilots.com
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Email: julie@blountboats.com
P.O. BOX 368 Warren, RI, 02885 USA
Description:
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Salary: $ Negotiable , Contract , Company Employee
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Job Location: Malabo Equatorial Guinea Malabo, 240 Equatorial Guinea
Contact
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Email: bernard.felizardo@alduco.com
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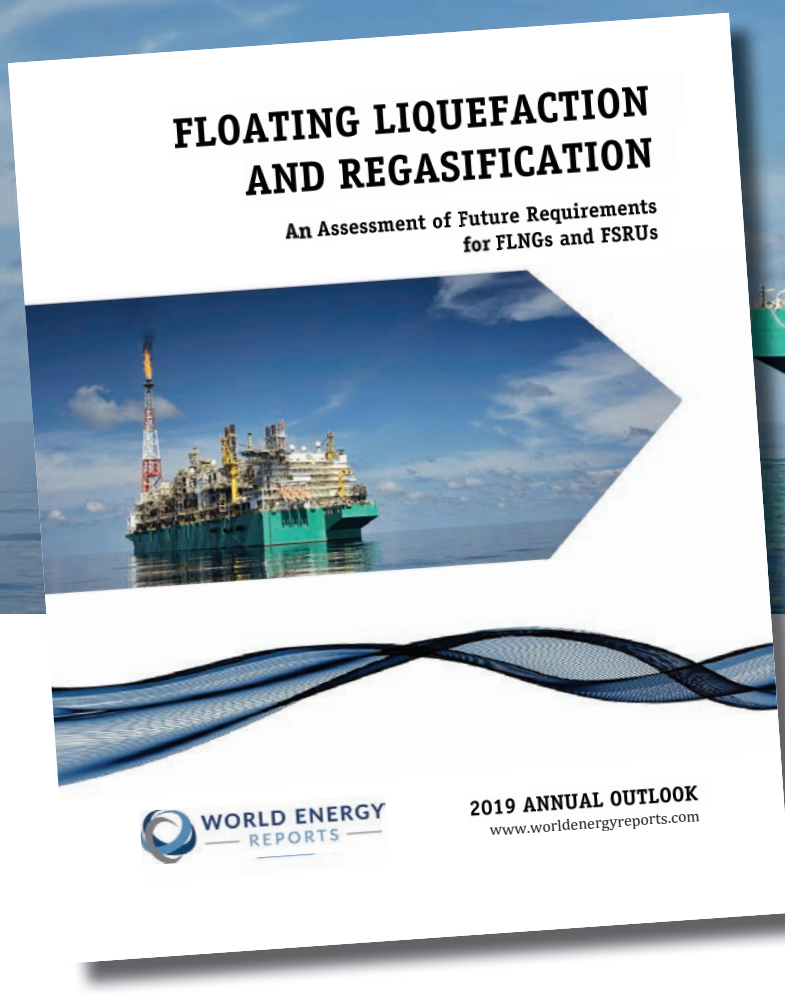

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