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# MARITIME REPORTER AND ENGINEERING NEWS

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October 2017

# Marine Design

## & The Vibrant Adventure Cruise Sector


*Marine Propulsion*
**MAN D&T Debuts the "Game Changer"**

*Interview*
**John Haeflinger, Carnival Corp.**

*Thought Leadership*
**Class Sounds Off on Future Tech**

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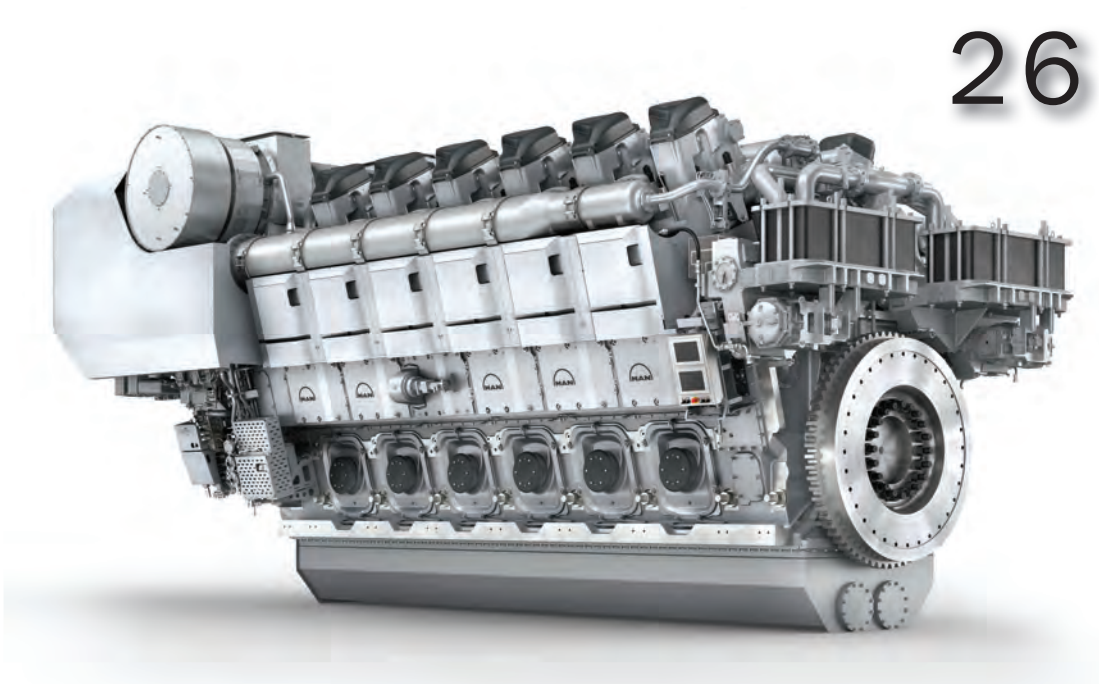


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## Columns

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## THE COVER

**To Boldly Go ...**
The cruise industry is undeniably vibrant, arguably the most active sector of any in maritime. While the big oceangoing ships continue to dominate headlines, it is the smaller adventure and inland river sector that is giving the industry breadth. Our feature on the sector starts on page 40. Special thanks to Finnish maritime innovators Fleetrange and KNL Networks for the cover photo. The duo have reportedly pioneered cost-efficient Arctic situational awareness – the "Fleetrange with KNL" solution. See page 76

Photo courtesy of Photo by Noble Caledonia Expedition Team


# The Adventure

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Photo: Lindblad Expeditions/Ian Strachan

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**Safety @ Sea**
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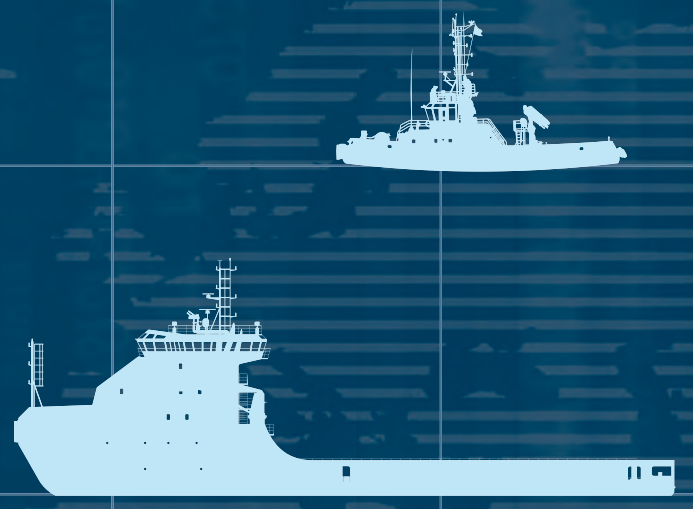

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# Innovative By Design

**Finding a vibrant sector in the marine industry these days can take some effort,** as the offshore energy sector swoon continues in earnest for its fourth year and changing global trade patterns have conspired to keep rates tight in the big three – the bulker, tanker and containership markets.

For those searching under every rock for the next hot market, look no further than the cruise industry. I know, the volume of cruise ships serving the world is paltry in comparison to the number of commercial ships, but the cruise sector is interesting for a number of reasons:

- **Economic impact:** Since I first sat in this seat starting in 1992, the Cruise Line Industry Association (CLIA) has worked tirelessly to tout and build the cruise brand as a whole, and the latest numbers from CLIA prove that the effort has been a success. According to CLIA's 2016 Economic Impact Analysis passengers and crew spent a cumulative $21.9 billion in 2016. Looking at the big picture, the industry had a **$48B impact on the U.S. economy,** generating 389,432 U.S. jobs paying more than $20.5 billion in wages and salaries, powered by nearly 12 million passengers embarking at U.S. ports. Florida remains the cruise king, with 61% of embarkations emanating in the Sunshine State, but there is solid growth in other regions, particularly California.
- **Breadth:** Traditionally the lion's share of the focus has been on the mammoth, billion dollar floating cities that ply the world's oceans, as the trend up until a few years ago was "Bigger." While the big ships still get the big headlines, there is a distinctive change underway, with a burgeoning fleet of smaller, luxurious adventure cruise ships being designed and built, shuttling discerning cruiser to destinations that the larger cruise ships simply cannot access (and, the mainstream cruise crowd cannot afford). Included in this is a growing fleet of inland and river cruise vessels. Starting on page 40 of this edition, Oslo-based contributor William Stoichevski offers insight to the "Designer-Built Cruise Adventure."

Keeping with the cruise theme I am particularly pleased to offer the interview and insights from **John Haeflinger, Carnival Corp.'s** vice president of maritime policy and analysis. To put it simply, Haeflinger and his team are tasked to keep the world's largest fleet of cruise ships running cleaning and efficiently, keeping these floating vacations in ship shape for today's rules and eying emerging rules and trends that will impact ship design and refit over its 30-year lifecycle. His interview starts on page 35.

As this is the "Marine Design" edition, this too is traditionally where we seek C-suite insight from the leaders in classification, as class is literally the 'glue that binds' in terms of melding future tech onto the commercial boats and ships of the world. To be kind to these perpetually moving executives from ABS, ClassNK, DNV GL and LR we decided to keep this tight and tidy, and have limited this virtual 'roundtable' to just **"Three Questions for Class."** Trust that they are good questions, and even better responses, starting on page 54.

Finally, there is a story from Tom Mulligan this month on **Hans Beele's mission to build "Sealing Valley,"** a repository for expertise on the advancement of fire protection and watertight sealing technology for the maritime market. Unfortunately I was unable to personally participate in the festivities to launch the project in late September, but when the project and event came to my attention it gave me cause for pause, and after spending 15 minutes on the phone with Mr. Beele, hearing his passion and financial commitment to the endeavor, I knew it was the perfect story for this edition. Mr. Beele's mission to build his version of Silicon Valley in the Netherlands starts on page 58.

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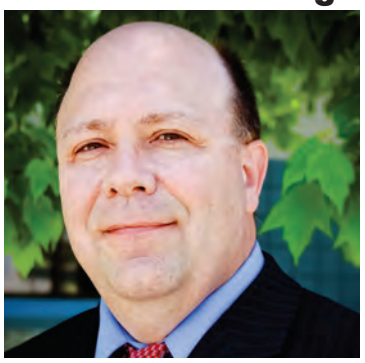




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**Tucci**
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**Henttinen**
Esa Henttinen is Executive Vice President, NAPA, in the NAPA Group, a world leading software house supplying safe and eco-efficient solutions for ship design and operation. Mr. Henttinen holds a Master's degree in Naval Architecture from the Helsinki University of Technology (Aalto University). He has worked with NAPA since 1999.

**Mulligan**
Tom Mulligan entered university at Trinity College Dublin in 1975, graduating in 1979 with a BA Hons Degree in Natural Sciences (Chemistry). He now works as a freelance science and technology writer.

**Pospiech**
**Peter Pospiech has served as chief engineer in the German merchant marine and additionally done field research on big bore diesel engines for ship propulsion, with additional service as a Service engineer. Today, he is a experienced shipping journalist.**

**Stoichevski**
William began working for the AP in Oslo. In 2003, he left the AP to oversee and write for a number of print and electronic energy industry publications in Oslo, where he lives and works. He started writing for Maritime Reporter & Engineering News in 2014.

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## Fincantieri Takes Control of STX France

Photo: STX France

Italian shipbuilder Fincantieri will take effective control of STX France under shared ownership, an Italian government source said on Wednesday, ending a dispute that has soured bilateral relations.
France had angered Italy by ordering a "temporary" nationalization of STX, cancelling a deal in which Fincantieri and another Italian investor had agreed to buy 55 percent.
www.marinelink.com/news/fincantieri-control429776

## Trump Waives Jones Act for "Relief"

President Trump has waived shipping restrictions for Puerto Rico on Thursday at request of the island's governor Ricardo Rosselló and after an outcry from Congress about the scarcity of fuel, food and emergency supplies following Hurricane Maria.
"At @ricardorossello request, @POTUS has authorized the Jones Act be waived for Puerto Rico. It will go into effect immediately," White House Press Secretary Sarah Sanders tweeted this morning..
www.marinelink.com/news/waives-puerto-relief429819

**(See "On Point with Joe Keefe," page 12, this edition)**

Photo by Jose Ahiram Diaz-Ramos / Puerto Rico



## Toyota Backs $1.8 Bln LNG Vessel Order

Japanese car manufacturer Toyota Motor Corporation is turning to LNG-powered ships to transport its cars across the globe, according to a report from Japanese daily Nikkei. The company has backed an investment in up to 20 LNG-powered car carriers with the capacity to carry 7,000 vehicles each, as it is preparing for the environmental regulations that will go into force in 2020.
https://www.marinelink.com/news/japanese-toyota-vessel429420

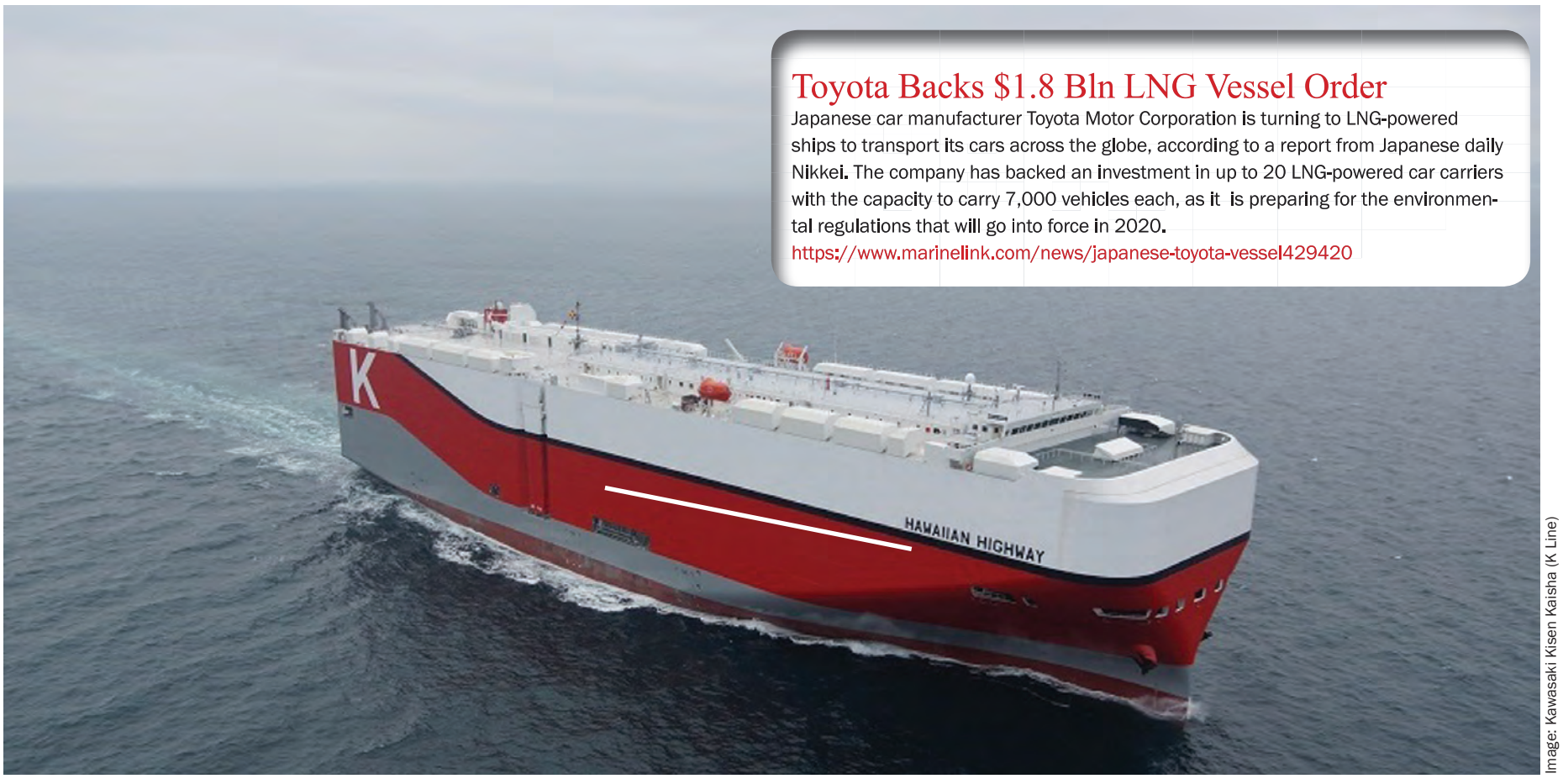


Image: Kawasaki Kisen Kaisha (K Line)

## Shipping Confidence Continues to Rise

© weerasak / Adobe StockPuerto Rico

A recent survey found that shipping confidence reached its highest rating in the past three years in the three months to end-August 2017.

According to the latest Shipping Confidence Survey from international accountant and shipping adviser Moore Stephens, the average confidence level expressed by respondents to the survey was up slightly from the 6.1 out of 10 recorded in the previous survey in May 2017 to a three-year high of 6.2. The improved rating was attributable mainly to increased confidence on the part of owners, up from 6.1 to 6.5. Confidence levels on the part of brokers, meanwhile, fell from 6.4 to 6.3, while managers and charterers recorded more substantial drops – from 6.2 to 5.8 and from 6.4 to 4.7 respectively, the lowest levels in both cases since May 2016. The survey was launched in May 2008 with an overall confidence rating of 6.8.
www.marinelink.com/news/confidence-continues42971

## Cruise Shipping: The $48 Billion Impact

Carnival Corp.

The cruise industry continues the path of unprecedented growth, and according to new figures released in CLIA's 2016 Economic Impact Analysis passengers and crew spent a cumulative $21.9 billion in 2016. Putting additional numbers to the trend, Cruise Lines International Association (CLIA) reports that the industry had a $48B impact on the U.S. economy, generating 389,432 U.S. jobs paying more than $20.5 billion in wages and salaries, powered by nearly 12 million passengers embarking at U.S. ports.
https://www.marinelink.com/news/billion-cruise-impact429986

## CMA CGM: Order for Nine Mega Ships

CMA CGM, the world's third-largest container shipping firm, said it expected operating profits to improve further in the second half as the market continues to recover, and confirmed an order for nine giant vessels. The announcements by French-based CMA CGM underlined a recovery in the industry this year after a prolonged downturn that sparked a series of consolidation deals.
https://www.marinelink.com/news/confirms-order-ships429444


Photo: Port of Long Beach)

# Never Let a Good Crisis **Go to Waste**

*And other well-worn clichés.*

**About the Author**

Joseph Keefe is a 1980 (Deck) graduate of the Massachusetts Maritime Academy and the editor of both Maritime Logistics Professional and MarineNews magazines. He can be reached at keefe@marinelink.com

Some things never change. For example, my good friend and OMSA President & CEO **Aaron Smith** told *MarineNews* magazine readers in September 2016 that, "I'm running out of ways of telling the Board of Directors and membership of the latest unprecedented attack against the Jones Act." That reality is as true today as it was 12 months ago. This latest assault comes in the choppy wake of Hurricane Maria, a storm that recently walloped Puerto Rico. The latest line from Jones Act opponents is that the Jones Act is solely responsible for the slow and painful recovery now underway there. Taking a page from **Winston Churchill**, these folks 'never let a good crisis go to waste.'

Without discounting the horrible tragedy that the storm represents, it is also true that the Jones Act has absolutely nothing to do with whether the needed aid and supplies are getting inland to those who need this help the most. Nevertheless, **President Trump** waived Jones Act shipping restrictions for Puerto Rico at the request of the island's governor, Ricardo Rosselló and after an outcry from Congress about the scarcity of fuel, food and emergency supplies following Hurricane Maria. The move, for the time being, placates local residents and responders who feel that the U.S. flag operators are the cause of not only this crisis, but indeed, all of their problems. Ultimately, when recovery does come, it won't have anything to do with who delivered the goods in the first place.

## If you repeat a lie often enough, it becomes the truth

The residents of Puerto Rico and their leadership have long believed that the Jones Act – that American law that requires that goods and passengers shipped between two U.S. ports be carried on an American flag vessel, crewed by Americans, and built in America – is at the root of all their financial and social woes. Hurricane Maria merely provided the latest pretext for this week's renewed calls for the end of the Jones Act and/or the island's permanent exemption from its requirements. What's really happening in Puerto Rico at the moment, however, tells another story.

The two biggest Jones Act operators in the Puerto Rico markets have permanent operations in PR, employing hundreds. They've built dedicated terminals in the island, they burn (or are planning ) LNG in their state-of-the-art fleet (so that the good people of the commonwealth can breathe easier), and both firms built fit-for-purpose tonnage to meet the island's unique needs (vessels that accommodate the U.S. over-the-road 53' trucking model). I guess your tramp, voyage-charter low price operator would do better. Not so much, actually.

By all accounts, the collective U.S. flag response was remarkable, it was pre-staged and instantaneous – and it is ongoing. My understanding is that they are delivering mountains of cargo daily – some of it going directly onto the multi-million dollar docks built by these turnkey operators. In fact, they've got cargo stacked up that can't be loaded or discharged because their own vessels are already at the docks doing just that in the commonwealth.

The Government Accountability Office (GAO) reports that two-thirds of the ships serving Puerto Rico are foreign flag vessels. As many as 55 different foreign carriers provide imported cargo to Puerto Rico and these registered carriers compete directly with U.S. flag operators. No one is stopping the locals from using more. Nevertheless, the *New York Times* published an OP/ED this week entitled, "The Jones Act: the law strangling Puerto Rico." Another piece claims, "President Trump is denying more aid to Puerto Rico."

**What's the real story?** Thousands of cargo containers are backing up at the port of San Juan, filled with essential goods, relief supplies and other items that the Puerto Rican people desperately need. Sadly, the island lacks the necessary trucks, functioning highways and logistics plan to distribute the goods inland. That logistics nightmare, by the way, existed long before the storm and will continue long after the clean-up is complete; with or without a Jones Act. Who says so? I do. After spending the better part of three blissful years commuting back and forth from this island paradise, I know a little bit about how things do (and don't) get done there.

There is no lack of U.S. flag tonnage or capacity in this trade corridor. In the end, however, the only 'fact' that matters to the general public is that if you tell a lie often enough, the masses will believe that it is true. Because, hey, why let the facts get in the way of snappy *NYT* OP/ED?

## Be Careful What You Wish For

Jones Act naysayers would have you believe that the elimination of this almost 100-year old statute would bring instantaneous and substantial relief to American consumers all across the fruited plain. While that assertion is very much a bone of contention from both sides of the equation, it is the long term impact of such an event which doesn't get nearly enough attention. That's because, while most stakeholders focus on the less than 300 deep draft, blue water ships left in the fleet, the U.S. merchant fleet consists of approximately 40,000 hulls of every shape, size and type. Supporting that fleet are 124 active shipyards in 26 states, creating 110,000 jobs, $9.2 billion in labor income, and $10.7 billion in gross domestic product, or GDP, to the national economy.

According to the U.S. Maritime Administration, economic activity associated with the industry reached 399,420 jobs, $25.1 billion of labor income, and $37.3 billion in GDP in 2013 alone. Make no mistake, all of that will go away with the Jones Act, if it is repealed, including the skill set that exists today to make it possible. Along with that will disappear our ability as an island nation to produce other vessels such as municipal fireboats, tugs, barges, police patrol boats, research vessels and everything else. And if you think it is expensive to build naval vessels today, wait until there are only two yards left who can manage that unique capability.

Jones Act shipping does come at a premium, and that premium pays for itself in the ability of the country to defend itself using a robust sealift capability – the same one that is amply supplying Puerto Rico with goods today – during good times, times of conflict and in dire emergencies. As the cleanup in Puerto Rico continues, hot spots such as the South China Sea, the Middle East, and North Korea all threaten to explode with little or no notice. Can we count on our good friends across the globe to support our armed forces in such circumstances? I'm not so sure about that.

**Senator John McCain** – the U.S. lawmaker who is arguably best known in maritime circles for regularly pushing legislation to repeal the Jones Act – is, without a doubt, a war hero, a veteran and someone who has for years passionately advocated for people and causes that he supports. We can and should celebrate a life of service. As he tries to sell his latest bid to roll back the Jones Act, and just because he's got some oceanfront property in Arizona, that doesn't also mean that we have to buy any. A 23-year U.S. Navy veteran who doesn't understand the inherent value of a robust sealift capacity is the last person who should be leading a discussion of cabotage rules. Yes, we should all be careful of what we wish for.

## That won't play in Peoria

Finally, we circle back to the +/- 220,000 professionals who make up the domestic credentialed mariner pool. We shouldn't expect John McCain or the army of anti-Jones Act lobbyists in Washington to give them a second thought. And, they won't. But, when the next ten-barge tow of North Dakota crude oil passes that 30-barge parcel of grain headed for export in the U.S. Gulf, you had better hope that we can trust the folks who are driving both pushboats. In the absence of an enforceable Jones Act, however, we can't know for sure who is on board either one. And, that's not going to play In Peoria. For that

matter, it won't play in Pittsburgh, St. Louis, Baton Rouge, Cleveland or a hundred places in between. If you simply aren't worried about national security in the context of the necessity of a robust domestic sealift capacity, then what should give you pause is the prospect of a couple hundred thousand, casually vetted foreign nationals threading their way across the heartland on board as many as 39,000 brown water workboats. That won't happen right away, of course; they'll need time to train and acclimate before all of those jobs evaporate from the American landscape. Nevertheless, that's exactly what will happen. All that said, here's the real deal: eliminating one part of the Jones Act is very much like being a little bit pregnant. You either are, or you are not. And, there is either a Jones Act, or there isn't.

## The Inconvenient Truth

Already receiving as much as 75% of what they consume via foreign registered tonnage and free to increase that market share at any time, island residents and their leadership already know – but can't say it right out loud – that the departure of the dedicated U.S. flag shipping model to and from the island would, long term, create as much of a financial crisis as the considerable, insolvent mess they've already created for themselves. Like the celebrations that followed the commonwealth's 'success' in chasing the U.S. Navy from the island almost two decades ago, this 'victory' – should it happen – will also be shallow and short-lived.

Drilling down past all the arguments and carefully crafted campaigns, the real problem here has nothing to do with the Jones Act. Arguably, the best friends that the good people of Puerto Rico have ever had are the professionals at U.S. flag fleets that service the island. Collectively, they've invested hundreds of millions of dollars in the island, its economy and waterfront logistics. The fact that anything at all is getting ashore in the wake of Maria, is ample testimony to the commitment of the U.S. firms that regularly ply these waters. You won't read that in the *New York Times*, or hear about it on Capitol Hill.

It is simpler than all of that, actually. The collective domestic waterfront does a poor job in telling its story, primarily because there are too many voices in the choir. Giving credit where credit is due, the previous U.S. Maritime Administrator, Paul Jaenichen, recognized that reality immediately upon settling into his chair at MarAd. After organizing a series of meetings designed to get everyone into a single room to unify the message, he sadly had limited success in making that happen. After all, you can lead a horse to water, but you can't make it drink. Nevertheless, and unlike Senator McCain, here was a career Navy man who knew the value of robust sealift capacity when he saw it. But, the chronic 'perception' problem still persists today.

**Look at this way:** A recent temporary Jones Act waiver in the U.S. Gulf during the post-storm crisis in the Houston area made a lot of sense. There were legitimate energy concerns, here and across the U.S. East Coast in the wake of that disaster. But, like Puerto Rico, the vast majority of consumer goods and foodstuffs arrive to this region via foreign flag tonnage anyways. And, across the big pond, as soon as the magnitude of the crisis in Texas became apparent, European traders queued up a long line of tankers with refined products to fill the gaps, no doubt with visions of diesel and gasoline price 'spikes' dancing in their heads. You can equate this week's Jones Act waiver for Puerto Rico with the recent release of a few thousand barrels of crude oil from the nation's Strategic Petroleum Reserve (SPR). Both moves were designed to address similar issues, neither provides palpable relief for anyone, but each makes for a nice sound bite on the evening news. I guess that makes people feel better. Anti-Jones Act activists know this only too well. **Let's Review:** This week, we learned that we should never let a good crisis go to waste, primarily because if you repeat a lie often enough, it then becomes the truth. At the same time, stakeholders should be careful what they wish for, because it just might come true. And when that happens, it most certainly will not play in Peoria. Sadly, that's the inconvenient truth. But, is anyone who matters even listening?

Image: MARIN

# Supporting Silent Ships

*Measuring underwater radiated noise from cavitating ship propellers*


## About the Author

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Have you ever had problems talking to someone in a noisy environment such as a busy restaurant? The same happens to marine animals, which use sound to sense and interact with their environment: for communication, navigation, finding prey and even for self-defence. High ambient noise levels, which include a contribution from shipping, have an adverse impact on marine life.

The world's oceans are becoming increasingly noisy. While the size of the global commercial fleet more than doubled since the 1960s, anthropogenic noise in the oceans has actually increased eightfold. This shows that ships are not only more numerous but that individual vessels have also become more noisy due to increased size, speed and delivered power. This often leads to more cavitation, which is one of the main sources of underwater radiated noise (URN).

Recently, shipping noise has received regulatory attention. Class rules include noise limits for fishery and seismic research vessels because self-noise can influence the operability of such vessels. Nowadays, there are URN-related class notations for other ship types. These can be used to show that the URN of such a vessel has been controlled to reduce the impact on marine life.

It is likely that in the near future local regulations concerning URN will come into force to protect marine life in specific sensitive areas.

Furthermore, the European Union has included URN in methodological standards to classify the environmental status of the sea. Presently the focus is on monitoring URN such as the ECHO initiative lead by the Vancouver Fraser Port Authority.

### Model Tests in the Design Stage

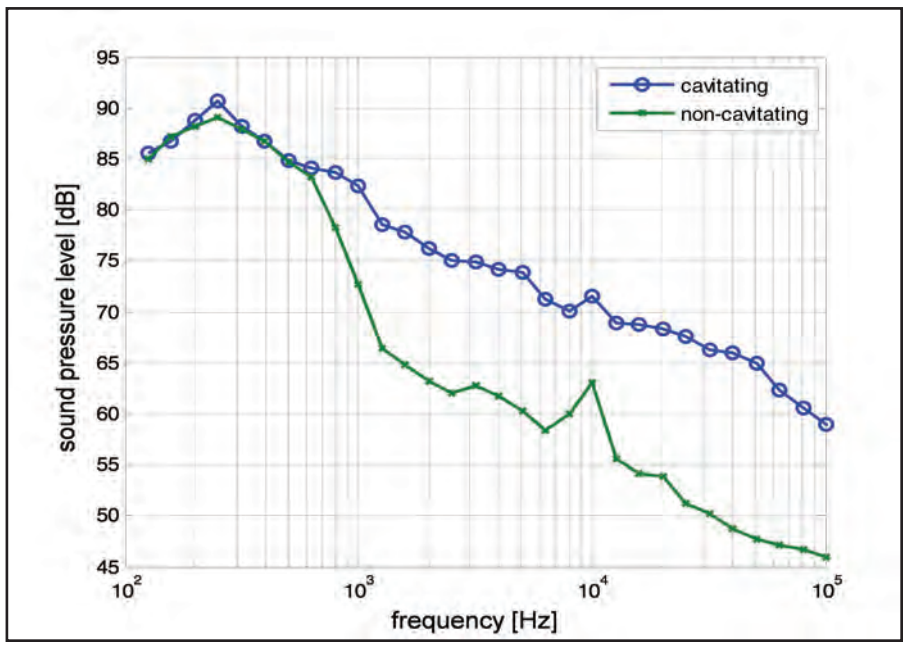
The URN of a ship can be estimated by means of computations and model tests during the design stage. We regularly carry out model tests to determine the URN of cavitating propellers in our Depressurised Wave Basin. This unique facility is a towing tank combining a free surface with the capability to lower air pressure and enabling the use of a complete ship model. Effects such as the wake field, wave pattern and dynamic trim and sinkage of the ship are automatically taken into account.

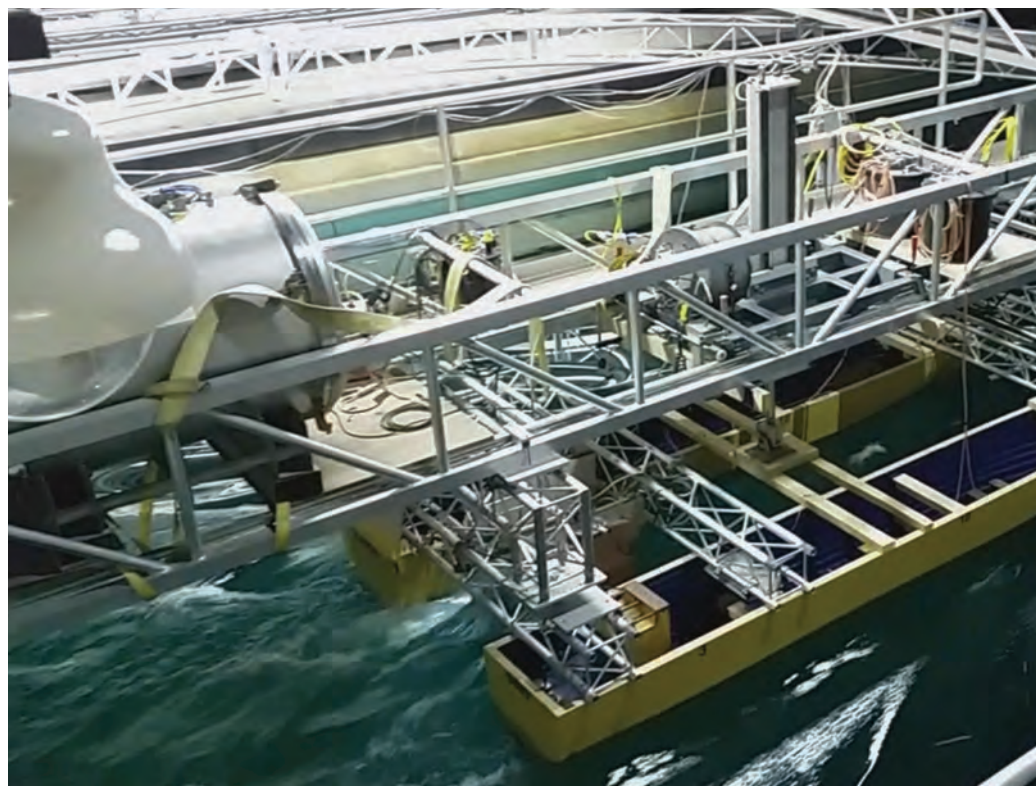
Hydrophones are affixed on a bottom mounted mast to measure the URN below the keel and to the side of the ship. The ship model sails over the hydrophones, thereby mimicking a full-scale noise range. A typical upper frequency limit for the measurements is 20 kHz at full scale.

Background noise has to be low enough to avoid interference with the cavitation noise measurements. The main sources of background noise are the towing carriage and the propeller drive train. Therefore, we have installed a lightweight, silent towing carriage fitted with polyurethane wheels. To reduce noise from the propeller drive train, solid shafts and special bearings are used.

### Background Noise

To check the background noise level we carry out a measurement for non-cavitating conditions or with a dummy hub replacing the propeller. The noise of the cavitating condition should be



at least 3 dB, and preferably more than 10 dB, higher than the (non-cavitating) background noise. The figure shows background noise (green line) and cavitation noise (blue line) measured at model scale.

Test conditions are based on propulsion characteristics of the ship and the scale factor. In some cases a reduction of the cavitation number is applied to mitigate the viscous scale effects on the inception of vortex cavitation. We have recently tested this new method and achieved good results.

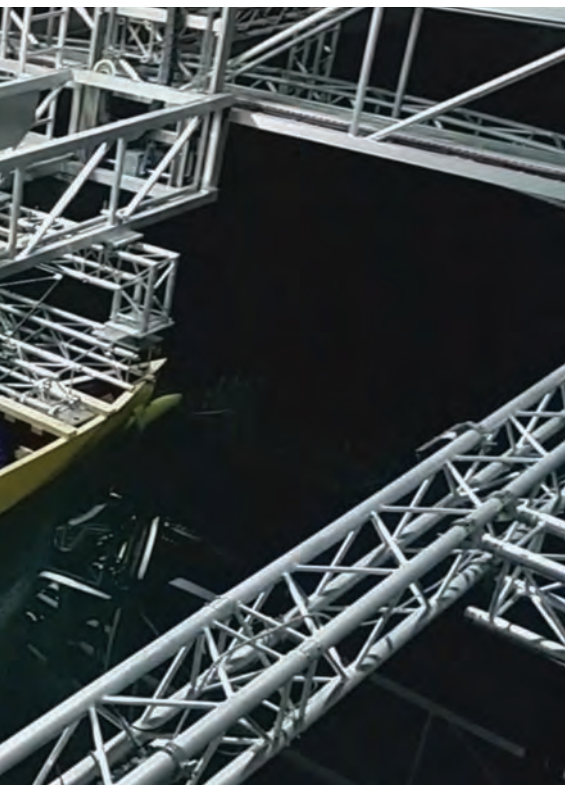
The measured data should be processed accounting for the influence of acoustic characteristics of the facility. Only the part of the measurement where the distance between the noise source and the receiver is smaller than the reverberation radius should be analyzed. Interference between direct noise and reflections of sound from the free surface influences the measured noise levels and should be corrected for. Noise levels are then normalized to a distance of one meter, while taking the time-dependent distance between the ship model and the hydrophones into account. Finally, we convert the results to full-scale values in one-third octave bands.

**Validation Studies**

Several validation studies have recently been carried out to determine the accuracy of the scaled-up results of the URN model tests. One such study was performed within the EU FP7 SONIC project (see MARIN Report 118). Another case is a single-screw merchant vessel for which an extensive full-scale data set is available from the CRS .

These validation studies show that model tests are a reliable way of checking the noise levels from propeller cavitation, which can be used to assess environmental impact. This helps to make shipping silent and to keep the oceans quiet.

**Image: MARIN**



## Recent MARIN papers on URN model tests:

- *Bosschers, J., Lafeber, F.H., de Boer, J., Bosman, R. and Bouvy, A. (2013). "Underwater Radiated Noise Measurements with a Silent Towing Carriage in the Depressurized Wave Basin", AMT'13, Gdansk, Poland*
- *Lafeber, F.H., Bosschers, J., de Jong, C. and Graafland, F. (2015). "Acoustic Reverberation Measurements in the Depressurized Wave Basin", AMT'15, Istanbul, Turkey*
- *Lafeber, F.H. and Bosschers, J. (2016). "Validation of computational and experimental prediction methods for the underwater radiated noise of a small research vessel", PRADS2016, Copenhagen, Denmark*

# The (Software) Link: Design & Operational Safety in Cruise

Esa Henttinen is Executive Vice President, NAPA, in the NAPA Group, a leading software house. Henttinen holds a Master's degree in Naval Architecture from the Helsinki University of Technology (Aalto University).

It seems simplistic to state that a safely designed vessel is able to operate more safely. This is a fundamental reason that ships are designed to safety standards, or required to be designed with levels of operational safety in mind. However, the direct connection between design processes and operational safety is growing due to advancements in 3D design, and data processing and analytics.

The cruise industry is where we can see this developing the fastest, and with good reason. Holidaymakers across the world place their trust in cruise lines, not only that they will have a good time, but also that they will be safe in navigating one of the world's most treacherous environments, the open ocean.

In the cruise segment, safety is intrinsically linked to reputation, demand and profitability. So, safety brings all stakeholders together to find advanced solutions, to set standards, and share best practice despite the highly competitive nature of the industry. The Cruise Lines International Association (CLIA) leads this, instilling a culture of safety driven by information sharing and self-regulation.

**Challenges in Cruise Design**

The data behind ship safety presents a challenge in the cruise industry. A cruise ship can have thousands of rooms, staircases, elevators shafts and over 100 liquid tanks for ballast water, fresh water, grey water, lube oil and more. NAPA takes a leading role in supporting this, and as such, every purpose-built cruise vessel in operation today was designed in initial stages using NAPA software. Our tools help naval architects create the structural design and initial layout for the vessel in a fully equipped 3D CAD model.

Based on the model, the system can make the complex calculations required for compliance with IMO standards on strength and stability. Many of these calculations would be impossible to do manually, including, Index R requirements. Index R represents the damage stability of the vessel – its ability to remain stable and afloat in the event of flooding caused by a collision.

NAPA's software also allows designers to cope with the rapid changes and revisions common to early-stage design work without compromising safety in the slightest. It automatically links mandatory calculations to its 3D model, which gives the designer the freedom to make design changes very quickly. For example, when moving a bulkhead NAPA's takes only a few minutes to recalculate all the necessary information and automatically adapts the internal compartments to fit. Alonside stability, this process also automatically updates calculations on needed steel, welding and costs. This allows much faster design revisions – which are a fact of life in this rapidly evolving segment – as well as allowing the close cost and project management of these bespoke multi-million investments. We have spent decades working closely with yards and cruise lines to ensure we deliver design solutions that deliver usability, flexibility and, above all, safety.

**The Changing Face of Safety in Cruise**

CLIA's role in ensuring cruise safety is increasingly important. At the IMO level, what is required under SOLAS is often updated reactively, based on incidents and accidents that have taken place. CLIA often moves much faster and adaptively, looking at best practice and technologies that can support safety and self-regulating based on that. Because the entire industry uses NAPA for early design stages, each vessel in the fleet already has a 3D model in the same format that can be analysed and

discussed. Advanced analytics and simulations can be applied to those models, creating consistent results that hep the industry understand what they need to know. And when it comes to discussion of specific design elements or processes, regulators, naval architects and owners are working form a single point of reference – a common "NAPA language".

NAPA provides the common framework for the regulations that, before design work has even started, underpin safe design. This helps the industry house, manage, and communicate best practice in safety through the design process into active operation, the information that is received on shore, and responding to an emergency. This is where the next big shift is taking place, applying practical decision-making tools to early design models to support safer operation based on safe design.

**From Design to Decision-Support**

For the last 30 years, every passenger ship has had a fire display in the command room, able to indicate where a fire is located and whether it's expanding. However, the most costly passenger ship incidents, from 1912 to the present day, haven't been caused by the spread of fire through a vessel, but the spread of water – flooding.

Understanding flooding has been a complex process, it requires significant data collection – from knowing inlet points, flow speed, water tight door status – and it also requires significant understanding of fluid dynamics and the algorithms and processing power to put all of those together. NAPA participated in the European Union FP7 project FLOODSTAND, to create algorithms and highly accurate flooding prediction models for passenger vessels and transform our understanding of flooding through data and analytics. From the algorithms developed within the academic context of the EU project we saw the opportunity to help masters and owners alike manage these situations in the rare, but unfortunate, cases where they do happen.

Based on this we developed a comprehensive safety solution to support decision making in flooding situations for passenger vessels.

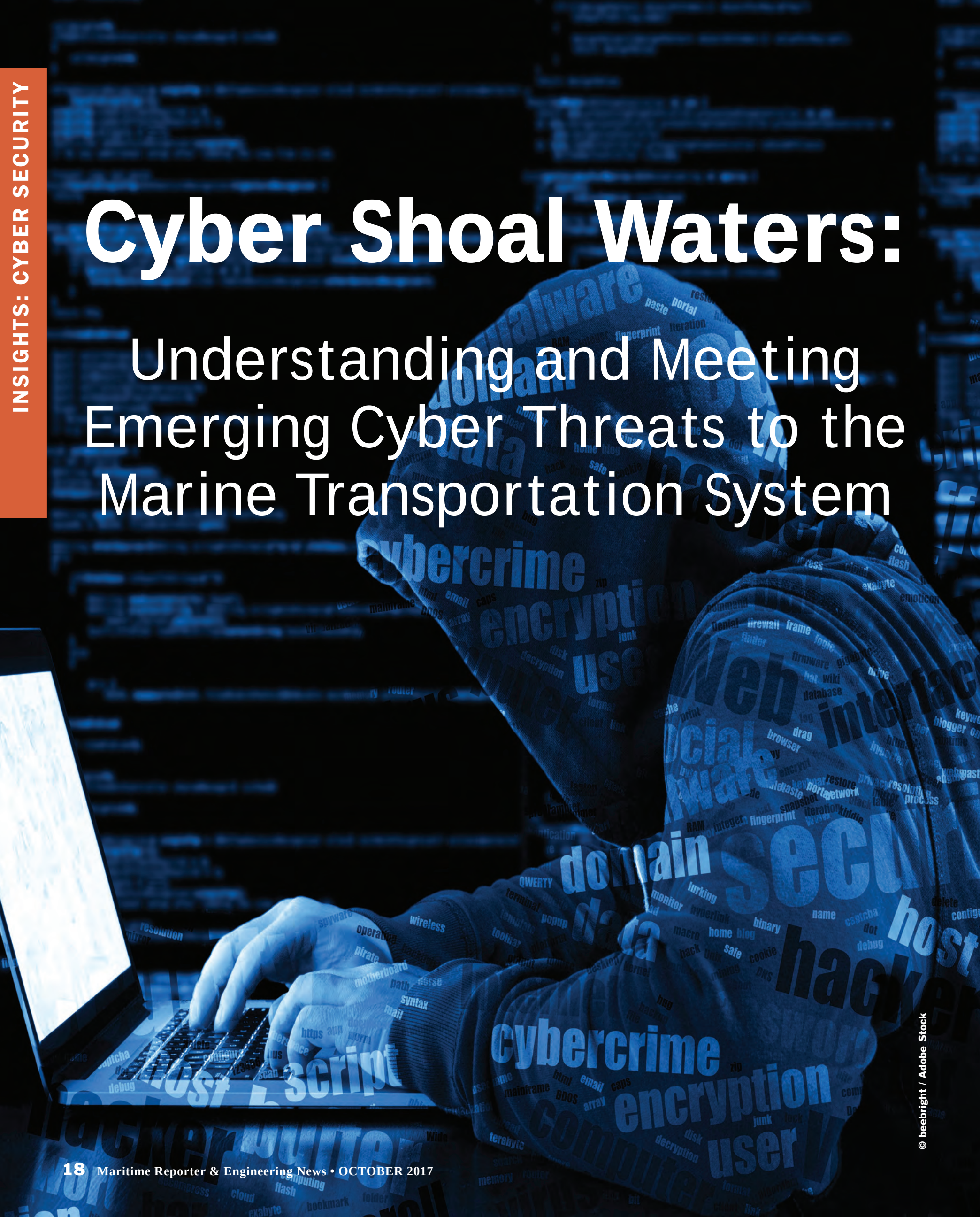
The system can help the crew and master make those essential calls in the critical first 15 minutes of an emergency. It uses the ships flooding sensors to automatically begin working to deliver greater awareness of the situation directly to the bridge. Unique algorithms based on sensor-measured water flow and speed data, understanding of how floods progress on-board, and each vessel's unique NAPA 3D modal – including all compartments – calculate what the extent of the flooding will be, how many compartments are or will be lost, and if the ship will survive upright or if it will not. It uses the sensors on the vessels water tight doors to determine if they are closed, as they should be in almost all situations, and if not, how that will affect flooding and stability.

Critically, this information is displayed in an extremely easy-to-use format, developed by NAPA in partnership with UI specialists and psychologists to be as clear as possible in a stressful emergency.

It provides the master and crew with "time to sink" predictions, the heeling angle and predicted future heeling angles e.g. "Heeling angle will exceed 10 degrees in 50 minutes". Decisions over whether passengers and crew are safer aboard the vessel or if an evacuation should be conducted can then be made based on accurate information about the level of danger the vessel is in. The fast availability of this reliable information removes the need for guesswork and empowers Masters to make confident decisions as soon as possible in an emergency, supporting the crew in saving lives from the earliest opportunity.

# Cyber Shoal Waters:

## Understanding and Meeting Emerging Cyber Threats to the Marine Transportation System

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## By Captain Drew Tucci, USCG, Dr Joe DiRenzo III and Professor Scott Blough

Over the past two months the world has been rocked by three major hacking events that have garnered international notice. These included the EQIFAX event in which 140 million individuals were reported to be possibly compromised, the WannaCry attack and the NotPeyta event. In the past two years the emphasis on the cyber security of the Marine Transportation System, a vital economic cog to the world has come under increasing scrutiny.

In August, trade journals and major international publications such as the UK's Register newspaper highlighted the NotPetya ransomware which resulted in reported impacts across many elements of the Marine Transportation System, including the shipping giant Maersk. The attack shut down operations completely at some facility locations for short periods, and disrupted normal operations for two weeks. Company statements indicated losses in excess of $200 million.

If a nine-figure bill isn't enough to get your attention, consider that the marine industry can expect more of this in the future. It has certainly gotten the attention of the insurance field as cyber experts look for ways to address the spiral development of this issue. Increasing automation including the Internet of Things increases our vulnerability, and we have every reason to believe that the threat, be they state actors, terrorists, criminal organizations, or insiders, will grow. An analysis of this event and some emerging cyber security governance systems for the marine industry can help us understand and prepare for the next event.

At first glance, NotPetya appears to have been a fairly standard ransomware attack – a form of cyber attack where the perpetrator gains access to and locks the owner out of their own files, demanding a ransom (typically paid in bitcoin) for the return of the files.

A ransomware attack on a home computer is, at the least, a significant inconvenience, but not necessarily a disaster. For any sufficiently complex business or organization, a ransomware event can halt nearly all operations – even if IT, rather than OT, systems are impacted. The marine industry – international, mobile, dispersed, contractor dependent, and with status updates demanded 24/7 by global customers – has all the right ingredients for high vulnerability and high consequences to this type of attack.

While ransomware attacks have become increasingly common, the NotPetya attack had some unusual aspects that suggest disruption, rather than the ransom itself, may have been the motive. If so, this has some troubling implications for the marine industry and other aspects of critical infrastructure.

Why should the Maritime Industry Worry About the NotPetya ransomware?

NotPetya employed many common exploit techniques; however, it is the way that NotPetya employed those techniques that moves it into a dangerous arena. NotPetya used automation to move throughout an organization's network, compromising endpoints and rendering the organization operationally defunct. Another concerning issue is the infiltration of the automatic MeDoc software updates. According to Talos intelligence, a forged digital signature for the MeDoc software update contained the initial payload (Fox-Brewster, 2017). Since software updates typically have admin access, it gives attackers an easy

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Professor Scott Blough is a faculty member at Tiffin University, directing Center for Cyber Defense & Forensics.

Dr. Joe DiRenzo is the Director of Research Partnerships for the U.S. Coast Guard R&D Center.

route into the system. This technique bypasses firewalls and other security controls, typically found in components of the MTS, due to the ability to make outgoing connections that are typically encrypted. This type of attack was used in the Flame malware in 2012 and is often associated with nation states. In essence, the attackers were able to weaponize software updates.

Additionally, many researchers have noted that the backend of the ransomware associated with NotPetya is extremely crude. Given the complexity of the weaponization of the MeDoc software update and the multiple attack vectors of NotPetya, one would assume that if the purpose was to collect money, more effort would have gone into designing the backend payment method. Thus, we are left to wonder if it was ransomware scheme or something entirely different. There is also the symbolism factor involved in this maritime cyber attack. Ukraine established a partnership through the NATO Ukraine Charter, which was signed in 1997, much to Russia's displeasure. A cyber attack on Ukrainian infrastructure could be seen as a low risk form of retaliation by Russia, given that the Ukrainian partnership status with NATO would not invoke Article 5. Since NATO is a collective defense organization, an attack on one is an attack on all. Article 5 of the NATO Charter is the seminal document that dictates this collective defense. Since Article 5 was written in 1949 when NATO was formed, it addressed only physical attacks. In 2013, NATO published the Tallinn Manual, which was designed to delineate legally justifiable responses to cyber attacks. The Tallinn Manual 2.0 was published in early 2017 and attempted to expand on the first edition and define the new cyber world in legal terms. Although it attempts to provide a secondary source of law for cyber conflict, it did not explicitly answer the question of employing Article 5 in the event of a cyber attack. Since NATO has not determined the appropriate level of response to cyber attacks against its members covered under Article 5, Russia's risk of NATO retaliation would be minimal given Ukraine's partner status.

**Mitigation Strategies and the Maritime Transportation Security Act**

While it may not be possible to objectively determine the motivation behind the NotPetya attack, the incident shows that the consequences of cyber attacks go beyond credit card and financial fraud. While the attackers may have gained little in bitcoin, the event was a significant economic and marine transportation system disruption.

In the United States, one of the objectives of the Maritime Transportation Security Act (MTSA) is to prevent and prepare for a Transportation Security Incident (TSI), which is "a security incident resulting in a significant loss of life, environmental damage, transportation system or economic disruption". The ISPS Code serves a similar function for the IMO. Despite obvious benefits for overall security, both regimes are focused on terrorism and similar threat actors rather than routine criminal activity, which has dominated cyber attacks up to this point.

The NotPetya attack shows that routine cyber crime can have MTS-wide consequences, and that cyber crime can mask attacks whose actual purpose is to disrupt the MTS or otherwise weaken our trade patterns and infrastructure. In other words, cause a TSI.

The MTSA achieves its goals by addressing security risks at the individual vessel and port facility level, and at port-wide risks. Individual vessel and facility operators conduct a security assessment and develop a security plan for Coast Guard approval. These guidelines will take time to finalize and implement, but in the meantime, class societies and industry groups have already begun to establish their own programs.

At the port level, Area Maritime Security Committees serve as risk assessment, information sharing, and communication forums. In 2013 they

## EVENT Maritime Risk Symposium

Tiffin University, a member of the Department of Homeland Security Coastal Resilience Center of Excellence, in collaboration with American Military University, other local, state, and federal authorities, along with industry, will host the 8th Annual Maritime Risk Symposium (MRS 2017) on November 13-14, 2017 at Tiffin University. This event will focus on maritime cyber security and the maritime transportation system.

MRS 2017 will bring together local, state, and federal authorities, academics, and industry to discuss the threats and challenges to maritime cyber security and the marine transportation system. With a focus on the articulation of current and future maritime cyber challenges and threats, the symposium will outline the implementation and operationalization of a sound maritime cyber strategy.

The symposium will assess threats, vulnerabilities, and recent advancements in both attack vectors and maritime cyber security research to inspire ideas for innovative research that will define the next generation of maritime cyber space. The event will also include a student poster contest to encourage additional academic research in this growing area of cyber security.

**Maritime Risk Symposium Panels**

**Panel 1:** Threats in Maritime Cyber (Case Studies)
**Panel 2:** Afloat Cyber Vulnerabilities
**Panel 3:** Legal & Insurance Issues in Maritime Cyber
**Panel 4:** Advancing Maritime Cyber Security Education & Research
**Panel 5:** Maritime Cyber: An Industry Perspective
**Panel 6:** Maritime Cyber Risk: The Holistic View
**Panel 7:** Maritime Cyber Risk: The National Labs Panel

**www.tiffin.edu/criminaljustice/maritime-risk-symposium-2017**

began to consider cyber attacks a potential TSI to the port, and 22 of 43 have since established cyber subcommittees whose primary role has been to share best practices and educate members on cyber security issues. Many committees have included cyber security threats in exercises and training events. Like the individual vessel and facility plans, the cyber aspects of Area Maritime Security Committees are far from mature, but their multi-agency and public-private membership brings strengths that will be useful in cyber, physical security, and mixed attacks in the future. Information sharing is a vital element to cyber security, and it is here that an AMSC can really shine. While a cyber attack on any given entity may occur at the speed of an electron, organizations may become aware of looming attacks as they creep across the world, or by monitoring social media and other platforms. Some members of an AMSC will also be members of ISAOs and ISACs, others will have internal resources that enable them to identify these threats as early as possible, and to determine effective mitigation strategies. Without any need to expose specific vulnerabilities and impacts, private sector AMSC members can help one another discern the nature of an attack, confirm or dispel rumors, and provide general advice on protection and response actions. Government agency members can provide access to reliable sources of information to the incident, and advise on techniques that will preserve evidence to support forensic analysis and prosecution. The cooperation and information sharing activities of an AMSC can thereby reduce vulnerabilities to and accelerate the recovery from a cyber attack impacting a port community or Marine Transportation System.

**Cyber-Physical Attacks**

The NotPetya attack was not accompanied by any maritime physical attacks on people or infrastructure, but what if it had been? With cargo stacking up and communications systems impaired, port areas might have presented target rich environments with reduced response and recovery capabilities. The sinister synergy between cyber and physical threats becomes more apparent when one considers cyber attacks targeting safety critical IoT devices or physical security systems, such as cameras and sensors.

The potential for a combined cyber-physical attack is a warning to organizations who stove-pipe their cyber and physical security personnel – a not uncommon scenario since cyber security is often managed at the corporate level, while physical security is managed at individual vessels and facilities. AMSC's, whose membership usually includes physical as well as cyber security experts, can help bridge this gap in steady-state environments by conducting exercises and sharing best practices, and through information sharing during actual attacks or periods of heightened threat. Individual vessel and facility security plans should also address cooperation between the cyber and physical security managers.

**The Way Ahead**

At the very least, the NotPetya attack shows that the sophistication of cyber threats is growing along with the marine industry's reliance on cyber technology. Existing government institutions, regulatory regimes, business practices, technical protocols, and research efforts may be adequate to address this threat, but only if we integrate these efforts and approach this challenge with tenacity and creative thought. The patriotic spirit and hard work that the industry embraced after the attacks of 9-11 have vastly improved the physical security and resilience of our marine transportation system.

That same approach will enable us to develop effective approaches to cyber security.

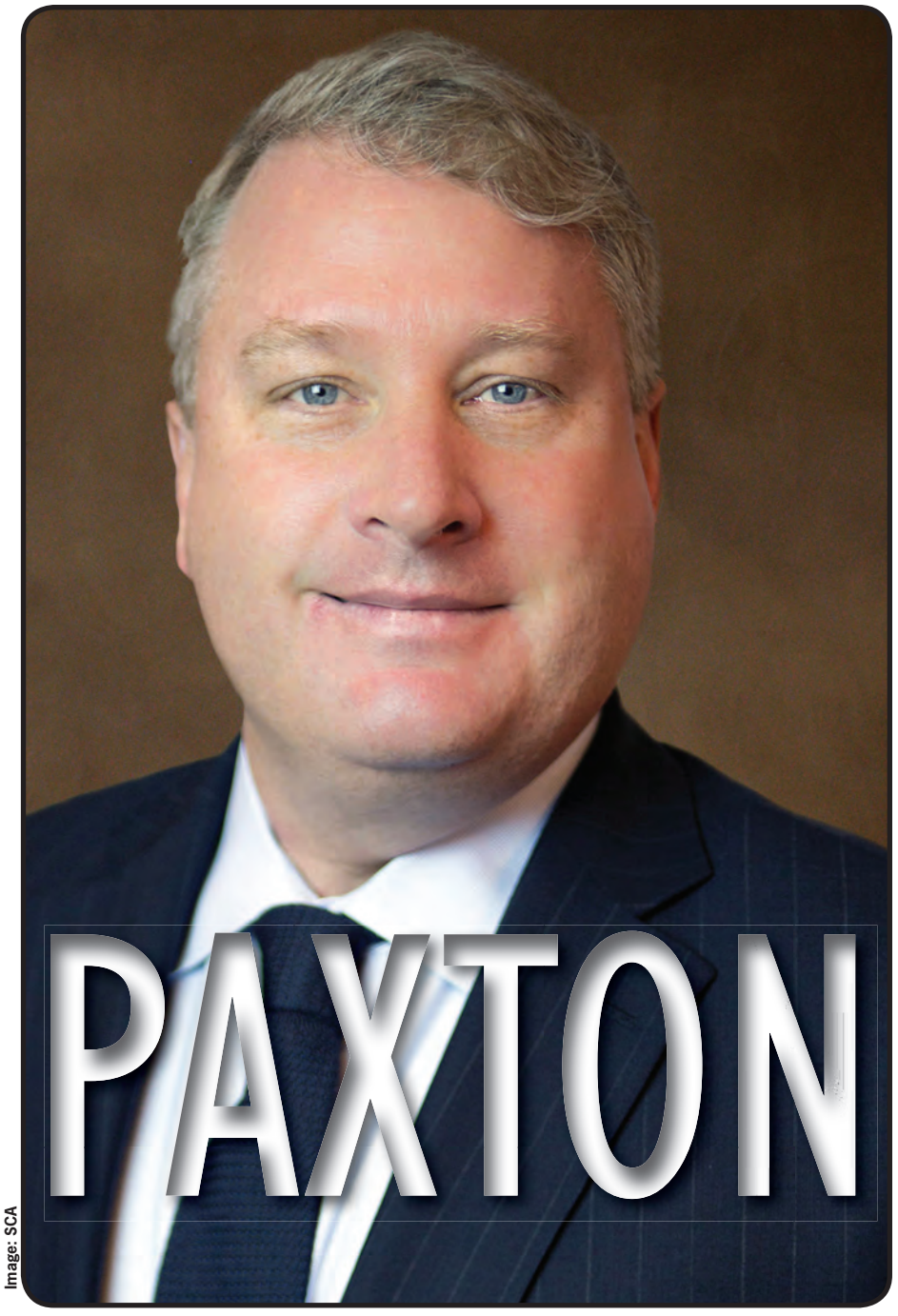



Image: SCA

U.S. Navy photo by Nathan T. Beard

**U.S. Shipbuilding:** The aircraft carrier Pre-Commissioning Unit (PCU) Gerald R. Ford (PCU 78), left, and USS Dwight D. Eisenhower (CVN 69) sit pierside at Naval Station Norfolk.

*Matt Paxton, president of the Shipbuilder's Council of America, shares with* Maritime Reporter & Engineering News *his insights on the opportunities and challenges ahead.*

**BY GREG TRAUTHWEIN**

The United States shipbuilding market is diverse and geographically widespread, tasked to build everything from the most sophisticated military warships on the planet to small ferries, and everything in between. As president of SCA since 2007, Matt Paxton has made it job one to make SCA a unifying voice for the collective industry, a champion of the industry in raising its profile and stature in political and business circles. "Having that singular voice is good for the industry, as it helps us to work more effectively here in Washington, D.C., and it helps us to build up in all four quadrants of the shipbuilding industrial base, which is: commercial shipbuilding, commercial ship repair; government/navy shipbuilding and government/navy ship repair," said Paxton. "Many of our shipyards are diverse, and appear in all four of those quadrants." With that, Paxton gives his insights on what is hot, what is not, and what will drive the U.S. shipbuilding and repair market further faster in the coming years.

**What is the 'state of the industry'?**

I think it depends on where you sit, but to start there is tremendous excitement with the prospects of meeting the challenge of building a 355 ship navy. We also see excitement growing regarding the business to build Arctic icebreakers (for the U.S. Coast Guard), a project which will have a huge ripple effect throughout our industry, as these are complex vessels. (On the commercial side), in the Pacific northwest and offshore Alaska you are seeing a big recapitalization of the fishing fleet. These are big, complex vessels, a real success story, and there is more to come. We are now delivering our first offshore wind vessel. We would like to see that segment grow, but we are realistic about the price of energy right now. Offshore wind is a potential market, and long-term it is encouraging.

**Speaking of energy, the depressed pricing for energy is well into its third year. It has impacted a number of traditional offshore players. How do you see the energy markets?**

The price of oil has impacted a large segment of our industry. We answered the bell when the price of oil was skyrocketing and there was a need to build tankers quickly for that market. Shipyards were able to reconfigure themselves quickly, and that experience helped to show the level of innovation at shipyards in the United States to ramp up.

**Looking ahead, please discuss the SCA Agenda.**

If you are sitting on that navy side of things, it is essential that we end Sequestration, which is something we have been advocating since day one. Once that happens, then we have to get creative on building up this Navy fleet. We have to be serious about alternative funding approaches to shipbuilding. We have to have multi-buy, multi-block contracts to spread out the cost of these vessels. This is going to require a creative acquisition strategy.

On the commercial side, number one is the promotion and protection of the Jones Act. The commercial shipbuilding sector in the U.S. really doesn't ask for much. The Jones Act is critical to maintaining this industrial base (and it's not just the shipyards, as) we (SCA) have more than 100 partner members, members that are critical to the shipbuilding supply chain. The Jones Act is the number one priority to maintain that industrial base. We continue to look at our workforce development too, which is arguably our single biggest challenge.

We need a strong workforce to build both naval and commercial order books. For example, to ramp up to the 355 ship navy will require another 20,000 direct employees to carry out the work, and that doesn't include another 30,000 being employed throughout the entire supply chain and industrial base.

**With the new Administration came new hope for the industrial base. How has that panned out so far?**

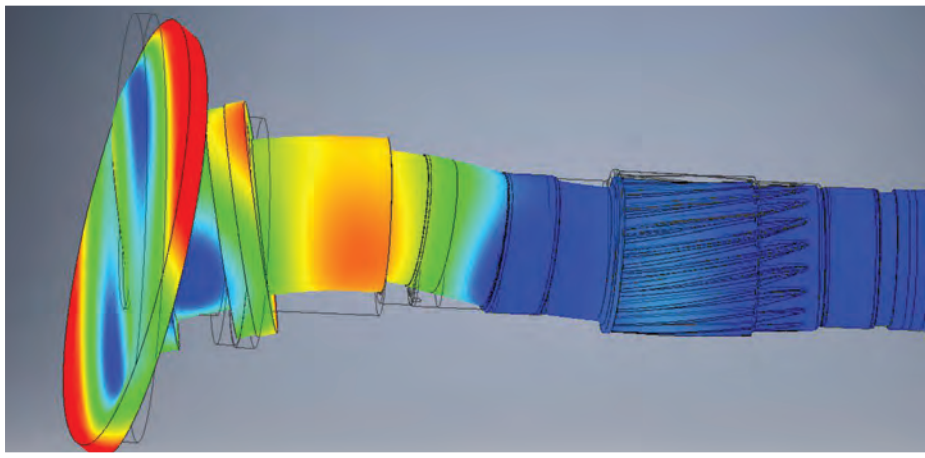
When the Trump Administration came in with the heavy focus on "Buy America" and a focus on shipbuilding, from this Administration there have been a lot of positive signals. Now we need to see them follow through on those positive signals; we need to see the execution of the policy.

**Bottom line, is the much-discussed '355-ship' navy going to be a reality?**

I would say that the Administration's 2018 budget is not there yet. With the initial budget proposal we are not seeing all of the trends that we would like to see, but it is moving in the right direction. As I said before, we really need to see multi-ship orders, because that is when the shipyards can really plan forward and make the investments necessary to ramp up.

**Another big project is the rebuilding of the U.S. Coast Guard icebreaker fleet. You mentioned it briefly, but can you update our readers on the status?**

All we know is the DHS mission 'need statement for the icebreaker which reads: "there is current requirement and future projection that indicates the U.S. Coast Guard will need to expand its icebreaker capacity potentially to a fleet of six icebreakers, three heavy and three medium." I read that to you because that's where the excitement is … one is great, six would be better. We should build six. Russia is ramping up its icebreaker fleet, and we really don't have an icebreaker fleet right now.



# Keller Shifts Gears

## 100-year young German manufacturers finds success in demanding dredging & maritime sectors

Satisfaction in overall powertrain reliability often comes down to individual components, starting with the gearbox and gear wheels. To this end C. u. W Keller GmbH & Co.KG, has made investment in its products and processes – $41 million over the last 15 years – to ensure that it remains a strong link in the propulsion chain. Keller's experience in gear wheels and gearbox that spans more than 100 years, with marine applications added to the line-up 18 years ago. In nearly two decades Keller has found success in the maritime sector, getting its start with the repair of marine gearboxes for the dredging industry. This experience led to its first own-designed gear units for fishing and small cargo vessels, and soon thereafter Keller was contracted to supply a 2,200 mm diameter gear wheel for the hopper dredger Lange Wapper for DEME. The gear wheel had to be supplied quickly as the vessel was laid up in Hong Kong following its gearbox breakdown. Keller supplied the gear wheel in five weeks, leading to inquiries from other major dredging companies.

Since that initial job, Keller has gained strong market share in the demanding dredger sector, supplying some 300 gearboxes for 120 dredging vessels.

## Investment Strategy

Between 2007 – 2009 Keller bought several new production machines, including a mill for the machining of gearbox housings up to a weight of approximately 100,000 kg and reportedly the largest gear grinder in Germany for gears up to 4,150 mm in diameter.

A second investment wave came in 2015, where among other things a gear cutting machine was installed for gears up to 4,700 mm in diameter.

But the investment didn't come solely in the form of plants and machines, as Keller saw the need for specialist engineers with experience in marine applications, which included new hires as well as training of existing staff.

Quality of gear design and manufacture is core to the Keller brand, from project inception to final commissioning, and an essential component of the quality control is conveyed to the final test run when drive and gear mechanisms are put through their paces. Support images of the gear toothing are taken and these are then compared with the calculations; the noises and vibrations are measured and the transmission tightness verified. In addition, the bearing temperatures are recorded over a period of several hours.

Testing is especially critical for dredging applications, as certain dredge applications look very simple but are actually complex with effects reaching every other component in the chain. For example, in addition to the classic bearing, shaft and interlocking calculation, comprehensive research has sometimes to be carried out on the deformation and stress behaviour of shafts and the gear-casing structure using FEM. This will be conducted with the aim of optimizing the casing structure due to the immense and additional changing loads that can occur during the dredging process.

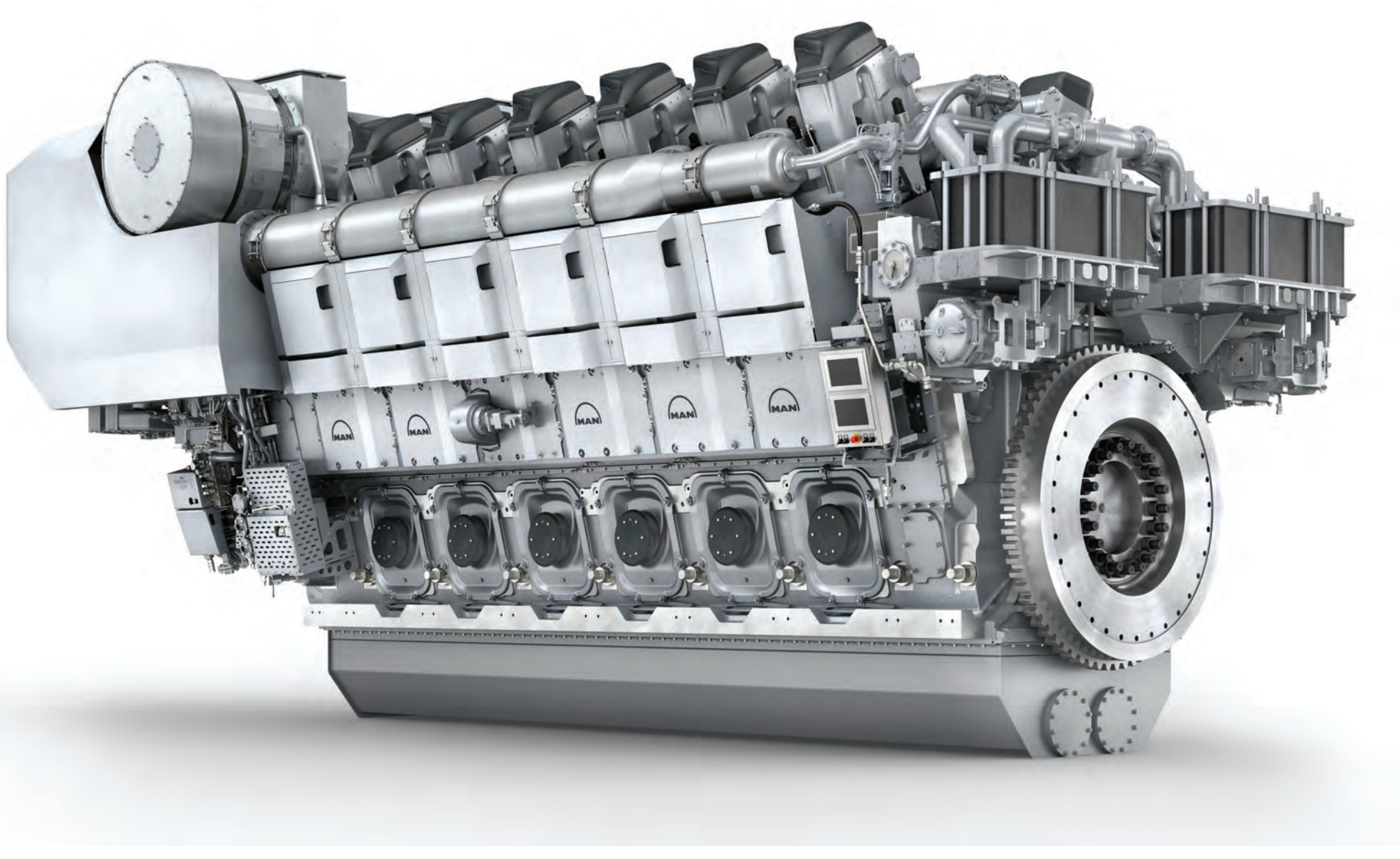
## Burgeoning Dredger Biz

Keller supplied gearboxes for the largest hopper dredger ever build in the Netherlands, the Vox Maxima for Dutch dredging company van Oord, a dredger with two propulsion 15,000 kW gearboxes, each with a generator PTO of 10,000 kW. In 2015 Keller received a purchase order for the supply of a 5000 kW cutter gearbox for the largest cutter ever built in China, the Tian Kun of TDC. With the delivery of the gearboxes, Keller also supplied the complete electrical monitoring control system of the gearboxes. In 2016 Keller was selected by the Belgium dredging company DEME as the supplier of the majority of the gearboxes for the largest cutter suction dredger in the world, Spartacus, reportedly the largest gearbox in the dredging industry.

# MAN Introduces the "Game Changer"

## The new 45/60 CR engine for the next future

**By Peter Pospiech**



***What would Rudolf Diesel say if he could see and compare his engine versus todays' newest diesel engine development from MAN D&T?***
***As the Augsburg based engine maker claims, "A cylinder output of 1,300 kW this engine puts us to the top." The largest version of the new engines is a 20-cylinder unit (20V45/60) comes with a limit-pushing power output of 26 MW.***

## The 45/60CR

The new MAN 45/60CR range is a striking combination of top performance, operational flexibility and reliability. Due to the high power output, best-in-class fuel consumption and very low emissions this new development makes it perfect for every kind of marine application, with a particular focus on Cruise, RoPax, RoRo and Dredger segments, that will be particularly affected by new edicts in designated emission control areas (ECAs). According to MAN the new engine can be used with a mechanical or diesel-electric propulsion drive.

"This 'from scratch' design enables ship owners to satisfy future, even tougher emission legislation by offering a best-in-class fuel efficiency of more than 50%," said Lex Nijsen, VP, and Head of Four-Stroke Marine.

It was Sokrates Tolgos, Head of Sales Cruise&Ferry, who explained the new engines engineering start. "When we embarked on this engine program, we knew we could deliver a set of real performance improvements by moving to a new design. But were these changes what our customers wanted? So, before we put 'pen to paper' and we went out and asked a broad range of operators quite a number of questions."

"Our overall number one design goal was to develop an engine that offers our customers reduced lifecycle costs (best efficiency combined with high power density), a very compact design (required by some applications), and low emissions (e.g. World Bank 2007/2008, IMO Tier II, IMO Tier III with SCR)," said Tolgos.

## Performance, Facts, Figures

Main Engine Data

### Specification

| | |
|---|---|
| Bore / Stroke (mm) | 450 / 600 |
| Minimum centerline distance between two engines (mm) | V: 5,050 |
| Cylinder configuration: Marine<br>Cylinder configuration: Power | 6L, 7L, 8L, 9L, 10L, 12V, 14V<br>12V, 20V |
| rpm ($min^{-1}$) | 600 |
| Power output per cyl. ($kW_m$) | 1,300 |
| Power range: Marine ($kW_m$) | L: 7,800 – 13,000<br>V: 15,600 – 18,200 |
| Power range: Power ($kW_m$) | 15,600 – 26,000 |
| Break mean eff. pressure $p_{me}$ (bar) | 27.2 |
| SFOC*: Marine (g/kWh) | L: 167<br>V: 166 |
| Efficiency*: Power ($\%_m$) | >50% |
| Application: Marine<br>Application: Power | DM (CPP), DE<br>SC, CC |
| Emission: Marine | IMO Tier II<br>IMO Tier III** |
| Emission: Power | WB 2007 / 2008 |




## 1,300 kW Per Cylinder

The MAN 45/60CR has a bore of 450 mm and a stroke of 600 mm resulting in around 9% increase in power per cylinder, compared with the predecessor 48/60. With a displacement of 103 liter per cylinder the 45/60 CR is set to deliver 1,300 kW/cylinder at 600 rpm (7,800 to 26,000 kW) with a bmep of only 25.24 bar, ensuring that the well-known traditional reliability and robustness of MAN marine engines is maintained. Mean piston speed is of moderate 12 m/s.

The engine is a two-stage turbocharged, charge air cooled, non-reversible, medium-speed four-stroke diesel engine which can be operated with all kinds of liquid fuels up to heavy fuel with 700cst.

The so called "game changer" will follow a modular design for ease of production and maintenance. The in-line engine platform for marine use will consist of 6-, 7-, 8-, 9- and 10-cylinder variants spanning a power range from 7,800 to 13,000 kW. The V-type engines consists of a 12V and a 14V powering 15,600 to 18,200 kW. For land applications 12V and 14V provides a power range of 15,600 to 26,000 kW.

The company is making the 45/60CR engine available first as 12V and 14V versions with 6L to 10L variants to follow later. It reports that the engine has been conceived from the beginning as a family concept that will accommodate future derivatives, for example, such as a dual-fuel derivative.

The first set of V-type engines will be available from end-2020 with delivery of the first L-type engines due from 2022.

Alexander Koerber, General Project Manager, who presented the new engine during an event at the Augsburg premises, said, "Next to a frontloading approach, using thermodynamic engine process calculations, we used computational fluid dynamics to simulate and optimize the combustion process. Also, finite elements analysis was used to optimize the engine's mechanical strength and vibration behavior. We then put the power unit to the test on the world's largest, four-stroke, single-cylinder test engine and started the experimental optimization and validation phase."

The new engine is also a new centerpiece of MAN's extended systems approach which reflects in the company's latest generation digital Safety and Control System, SaCoS 5000. Following a decentralized design concept, SaCoS 5000 offers unprecedented data availability and optimized alarm visualization and diagnosis. "Thanks to the new SaCoS, the MAN 45/60CR is not only online-ready but also equipped for the digital future of power generation," said Koerber.

The two-stage turbocharger module rounds off the MAN 45/60CR's superior profile. As MAN Diesel & Turbo describes itself being the pioneer in developing and operating two-stage turbocharging for large-bore engines, a concept which achieves excellent efficiency thanks to a low-pressure and a high-pressure turbocharger arranged in series. "We are the only company in the market that develops both engine and turbochargers," said Koerber. "This unique, in-house competence allows us to truly tailor-design this engine for optimized two-stage turbocharging and to unleash its full potential. It's also noteworthy that, despite the turbo-charging being two-stage, load pick-up behavior is the same as for the single-stage turbocharged 48/60CR engine. Operators thus profit from maximized peak pressure and optimal utilization of the Miller Cycle."

The use of the Miller Cycle enables the engine to reduce the temperature peaks which promote the formation of NOx by early closure of the inlet valve causing the charge air to expand and cool before start of compression. The resulting reduction in combustion temperature reduces NOx emissions.

## A Perfect Fit

Modern shipping faces constant demands to increase efficiency and comply with ever more stringent emissions regulations, amid growing public awareness of its environmental role. The MAN V45/60CR engine enables owners and operators to meet such demands, while simultaneously optimizing operating expenses with unrivaled, low levels of fuel-consumption. Through increasing standardization and using modular sub-components, the new MAN V45/60CR engine also allows faster installation and easier maintenance.

The new four-stroke unit meets IMO Tier II, while IMO Tier III is met with MAN's in-house, compact SCR system; the engine is shortly scheduled for approval by all major classification societies.

"We made calculations, based on a representative load-profile of a cruise vessel, which show that a ship operating with an MAN 45/60CR engine can enjoy a fuel cost benefit of 5 to 12% in comparison with a vessel powered by an equivalent engine from other manufacturers," said Nijsen. "For a cruise vessel of around 120,000–50,000 gross tonnage with 60–65 MW of installed power and an assumed fuel price of $595/t, this translates into annual savings between $1 million and $2.9 million when employing the 45/60CR. And that is what our customers want."

## Extending the Possibilities

The new engine combines the proven characteristics of its predecessor – the MAN 48/60CR – including its in-house common-rail injection system, with the latest innovations in diesel-engine technology such as two-stage turbocharging as previously mentioned here.

The MAN 45/60CR can also be combined with the innovative MAN ECO-MAP 2.0 technology that grants operators the flexibility to run an engine following different SFOC power charac-

teristics, facilitating optimal efficiency at different load points. The latest development with this innovative technology is the integration of the MAN SCR system into ECOMAP, offering even further possibilities to optimize the efficiency of the propulsion system, taking into account fuel and urea prices.

"The Ecomap function can be described as follows: a conventional engine has standard fuel consumption and power output characteristics at 85% load, we program the 45/60CR engine to operate along different performance curves having their optimum efficiency at different loads," said Tolgos, digging into the details. "This offers owners a huge potential for fuel savings in combination with an intelligent power management system, enabling the engines to run around optimal efficiency points regardless of the power requirements."

For the future, gas and dual-fuel versions of the engine are currently under preparation. Also, more cylinder configurations will be added to the 45/60 engine family in the next future.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## *When*

# BJARNE FOLDAGER, MAN DIESEL & TURBO'S VICE PRESIDENT, SALES & PROMOTION

joined the company about one year ago, he replaced an industry icon, Ole Grøne, a ubiquitous figure at MAN D&T who after 40 years has transitioned to an advisor role with the company. We caught up with Foldager in his Copenhagen office to discuss emerging market trends from the perspective of the global marine power leader.

**By Greg Trauthwein**

## Please provide a brief background, with details of your current position.

My direct area of responsibility is sales and promotion of two-stroke engines (for marine and power plants) and marine gensets. The headquarters is here in Copenhagen, but we have representation in all of the big shipbuilding countries, South Korea, Japan and China; as well as good representation in the countries where the ship owners are based. I joined the company in September 2016, and before that I worked for a big Danish ship owner for 25 years in many different roles.

## What attracted you to the position at MAN D&T?

Many things attracted me. It's an interesting company with an amazing history that tracks back more than 250 years. The products have changed many times over, but some of the values remain the same: building new products that surpass the expectations of the customer, a real 'yes we can' attitude. It is an entrepreneurial company, a high technology company, a company which throughout its history has traveled the world to stay in touch with its customers and competitors. There are many amazing people working here, and you can find a sector expert on almost any topic here.

## So essentially, you are selling to your former self? Was there an advantage coming from the ship owner side?

I'd like to start a little broader, because the licensing business model is fascinating. We do the R&D, design and engineering, but we don't actually manufacture any of the two-stroke engines. This licensing model has enabled a truly global reach versus a straight production business model. But it is important to remember that our customers are not only the ship owners. The license builders are also our customers, because they are the ones that eventually pay the royalties. Our customer is also the shipyards and the ship designer. So this is four distinct groups of customers, and for us to be successful we have to understand the needs of all of these groups..

## Which of the four groups of customers, today, are more prominent in the decision making process?

I guess at the moment because the shipbuilding market is down, the ship owners have the upper hand. Many shipyards are hungry for business because the orderbooks are relatively low, and the same can be said for the engine builders. At the moment the ship owners have negotiating power. At the end of the day, it starts with the ship owner.

It's not just about a lower price, though. We have to make sure that the shipyard is supported throughout the construction of the ship. If there is a technical problem with the engine and there are delays, it can get very costly for the shipyard. We have to support the shipyards, not only with the best technology in the engine but with support throughout the construction process. It's not enough to satisfy only one group of customers.

## Obviously many sectors of the maritime market are challenged today. When you look at the market, where do you see opportunity?

Our focus area is merchant ships for two stroke engines: bulkers, tankers, containerships and general cargo ships. In second half of 2016, very few merchant ships were contracted, but in the beginning of 2017 we have seen activity emerging in both the bulker and tanker segments. There have been many 'Letters of Intent' signed, particularly in the bulker sector, and the trick now is turning those LOIs into new orders.

Quite frankly, we have not seen a lot of activity in the container sector, as I think many of the owners are focused right now on the consolidation trend. There are many plans for integration, and in the very large containership sector there is a focus on expansion by merger, so we haven't seen many inquiries for larger containerships.

I think the big question for a lot of ship owners is 'what will happen in 2020?' (and the entering in force of the stricter emission standards from IMO). This is something that could drive an interest in newbuilding, particularly with the orderbook low and prices at an attractive level. The new emission reduction standards entering force in 2020, with the global sulfur level being reduced to 0.5%, is giving ship owners a lot to think about. Fuel costs are the biggest cost to running a ship, and in 2020 their fuel bill

## Foldager on alternative fuels

*"While LNG is an obvious choice, we also are seeing interest in Ethane, and we have two of the world's first two-stroke ethane carrier with more than 3,000 hours running."*

# Voices Bjarne Foldager, MAN Diesel & Turbo


Trauthwein and Foldager in his Copenhagen office.

will go up. I believe now they are evaluating their current fleet to determine if the fleet is competitive, or deciding if now is the time to invest in a new fleet that are more fuel efficient.

## There has been much talk, and now traction, regarding alternative fuels. What are you seeing?

Owners are increasingly considering alternative fuels, calculating the CAPEX investment versus OPEX reward. While LNG is an obvious choice, we also are seeing interest in Ethane, and we have two of the world's first two-stroke ethane carrier with more than 3,000 hours running. There is a growing interest in methanol, too. Compared to LNG, methanol is relative easy to handle. The MAN D&T two stroke engine can obtain the same energy efficiency with methanol as you can with any other type of fuel. We are also adding LPG to the portfolio as a propulsion fuel. The first two-stroke engine with LPG as its fuel is on the way, and you can expect to see one on the water by 2018 or 2019.

Bottom line, after 2020 ship owners may find themselves in a situation where their current ships are no longer competitive. Those who invest in new energy efficient tonnage could find themselves with a big competitive advantage.

## From an MAN D&T perspective, classify the investment necessary in new technology to continually meet evolving regulation and vessel owner demands.

Our job is to help the ship owners to understand which technologies are most beneficial in their specific situation. This all depends on how and where the ship operates; it's about balancing CAPEX versus OPEX. We have the expertise to do these calculations, and help the owner and the shipyard understand which are the best options. That is our job.

## Is there one technology that you see taking the lead, looking at 2020?

If I look at our reference list, those with SCR and those with EGR, it is roughly 50/50 right now. Almost every

case is different. The Exhaust Gas Re-circulation is really interesting (and in the two-stroke sector available exclusively on the MAN D&T engines). EGR reduces NOx to a compliant level – from a Tier II to a Tier III level – by re-circulating the exhaust gas without losing your fuel efficiency.

**That said, it is fair to assume that environmental regulations will get even stricter, a challenge for all. From the MAN D&T perspective, what is the biggest challenge?**

The grand theme for us is 'de-carbonization.' The demand for ship owners to reduce CO2 is only going to grow, and we have to have the technology to help them de-carbonize. We can do this through new technologies like EGR, but we can also do this through the introduction of products that run efficiently on alternative fuels.

We also, as a company, made an investment in Aspin Kemp, a leading company in maritime battery technologies. So the question now is how can we combine the use of batteries with big two-stroke engines to reduce the CO2 footprint? You probably will not see a battery replacing a two-stroke engine in the near future, due to its sheer size. But maybe there is a way to combine these technologies.

Bjarne Foldager, MAN Diesel & Turbo's Vice President, Sales & Promotion

**Another trend is obviously the move toward better using data to improve operations. What is MAN D&T doing in this regard?**

The two big drivers are de carbonization and digitization. The use of data is opening new business models, as ship owners are requesting ways to reduce the OPEX of the ship, the cost of overhaul, including the prediction of maintenance and parts. That involves extracting and using data to predict things. I think what we need as an industry is a platform, similar to an iPhon iOS if you will, that serves a secure platform to transmit data between ship, shore and service providers, a platform to address cyber security concerns and to deliver applications and algorithms that can help ship owners reduce costs by using predictive maintenance. But it all starts by tackling the cyber security issue.

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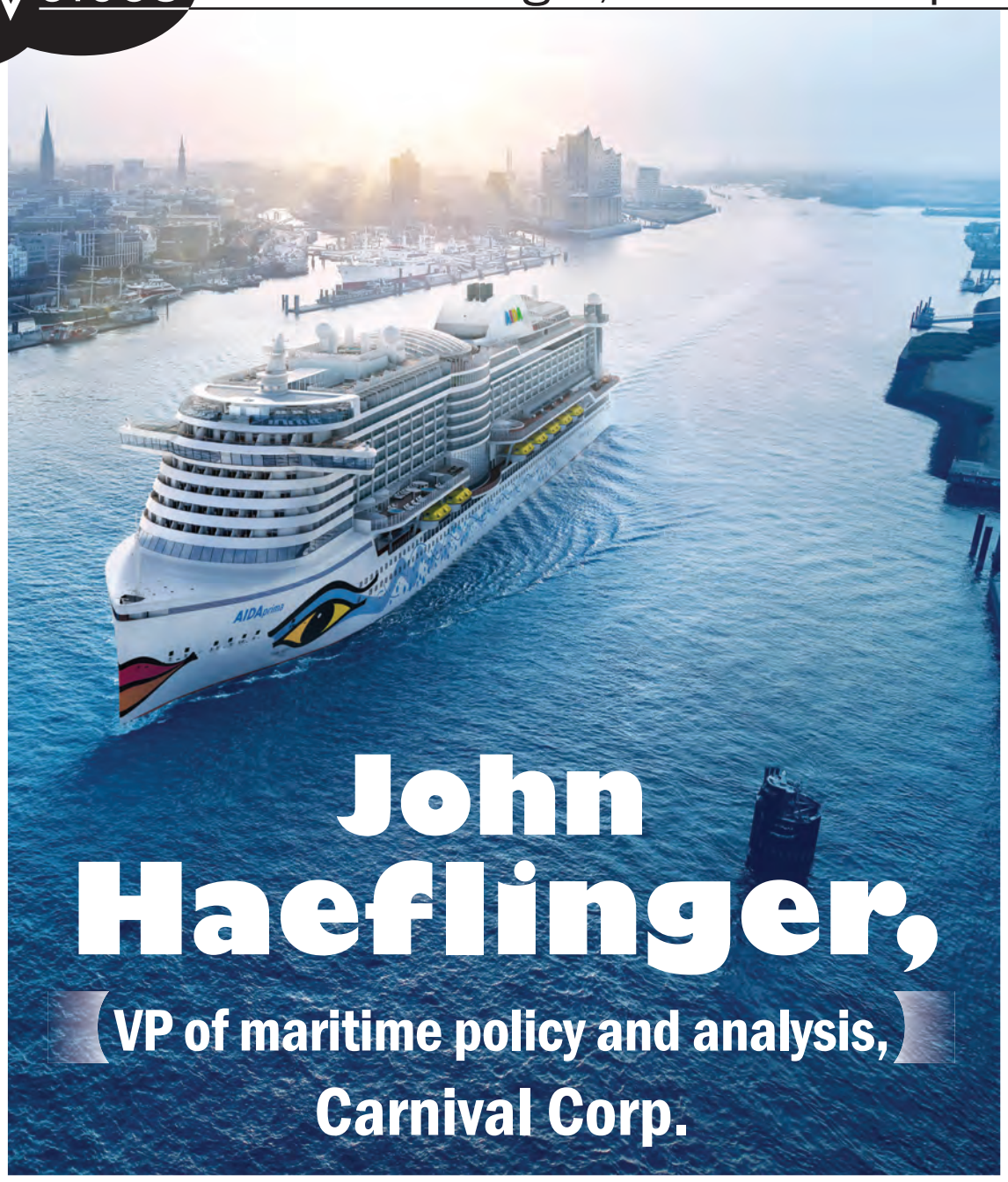



# John Haeflinger,

## VP of maritime policy and analysis, Carnival Corp.

All images Carnival Corp.

***While the cruise industry grows globally in earnest, this maritime niche is under the microscope like no other, operating high profile, high design billion dollar ships in and out of some of the most pristine places on the planet. Tasked to keep the company's ships running efficiently and environmentally sound is John Haeflinger, VP of maritime policy and analysis, who directly oversees the sustainability team at Carnival Corp. Haeflinger shares with* Maritime Reporter & Engineering News *his insights on the tech and technique to keep today and tomorrow's fleet running clean and efficient.***

BY GREG TRAUTHWEIN

With a military background, and MBA and nearly a decade of experience with a top-tier management consulting firm, John Haeflinger brought a well-rounded and systematic approach to the job of running the vast Carnival Corp. fleet of ships cleanly and efficiently. "I started my career as an Officer in the United States Navy, during which I served as a Department Head on a Trident-class nuclear submarine, he said. "In mid-2008, I had an opportunity to join Carnival Corporation as the head of Strategic Projects, a group within the Company that looked for opportunities to further leverage the Carnival portfolio for value. It was a great experience that ultimately led me to my current role, which oversees Maritime Policy for the company.

Haeflinger reports directly to Bill Burke, Carnival's Chief Maritime Officer, and his job includes oversight of Carnival's Health, Environmental, Safety and Security, or "HESS" policies as well as our corporate sustainability and maritime operational risk mitigation programs.

### There is No Silver Bullet

The path to environmental compliance is neither straight nor easy for any maritime entity, particular billion dollar floating resorts that carry thousands

# Voices John Haeflinger, Carnival Corp.



*"Low emission" ships are clearly not a silver bullet concept. "Gadget" solutions like small scale solar panels will not move the needle. Future designs will need to incorporate a broad suite of technologies to further reduce the environmental footprint of ships and will need to address all airborne and waterborne emissions; not just those currently regulated.*

of passengers globally. However in the past five years, Haeflinger concedes that "our leading investment in and development of Exhaust Gas Cleaning Systems (EGCS) has been the 'lead story,' systems that will continue to deliver air emission improvements well into the next "Global ECA" decade."

With environmental standards growing increasingly tighter, he concedes that there is no silver bullet solution, instead a mixed bag of technology and technique that must be jointly developed and deployed to meet and exceed environmental goals.

"Looking 2-10 years ahead, we have clearly committed to emissions reductions through our decision to invest billions of dollars in LNG powered ships (7 of them currently on order)," said Haeflinger. "These ships will run on LNG while alongside and at sea – resulting in a reduced GHG footprint relative to conventional ships." To illustrate Carnival's commitment, Haeflinger puts the investment in perspective: "By 2020, we will have invested well over $1 billion in environmental upgrades to our ships, including the energy efficiency and EGCS investments."

## The Never Ending Challenge

Keeping any fleet in compliance with global, regional and local environmental regulations is no small fleet, particularly challenging for cruise ships, floating cities with thousands of passengers.

"I don't think many people outside of those who live it every day realize the breadth, depth and complexity of the environmental regulatory framework placed on the shipping industry, and it's not getting any simpler," said Haeflinger. "One of the biggest near-term challenges for us is the upcoming waste water quality standards for the Baltic Sea. The stan-

# Voices John Haeflinger, Carnival Corp.

***Arnold Donald**, President and CEO of Carnival Corporation*


dards are extremely difficult to achieve using available on board equipment and the Baltic ports are not all capable of receiving ashore the waste water volumes we will need to offload." Wastewater is just one challenge, and when considering the breadth of environmental investment it is important to first realize that cruise ships are 30+ year assets, with many of the ships in the fleet are operating on older technology. Simultaneously the company must investigate and invest in technologies for the existing fleet while "at the same time we seek radical improvements in the efficiencies of our new ships." Despite the company's considerable investment in LNG, the biggest short to medium term challenge is GHG reduction. "Renewable sources of energy are simply not yet available to us in a way that will allow us to radically reduce our GHG footprint over night," said Haeflinger. "Our investments to reduce hull friction, improve air conditioning system efficiencies, recapture and reuse waste heat, install LED lighting, and even the recent inking of our long-term performance-based maintenance agreement with Wärtsilä which is designed to further improve our main engine efficiency, illustrate the focus we have had and continue to have on making our fleet more energy efficient and reducing our GHG rate, which is our lead 2020 sustainability goal."

"Over the next 10-15 years, it is clear that we as an industry will need to find a carbon neutral fuel – it is unclear exactly what that will be, but we have a number of initiatives in place to evaluate potential options."

## The Power of Partnership

Even a corporation with Carnival's heft is best served by not 'going it alone,' counting on key partnerships to help develop and deliver new technologies onboard. "Choosing partners carefully is clearly important, and we recognize that a good partner who shares goals, vision (and shares in the investment) is worth far more than one who doesn't and is only in for themselves in the short term," said Haeflinger. "Our recently announced partnerships with Shell (for LNG supply) and Wärtsilä (for engine maintenance and energy efficiency) illustrate our interest in and commitment to establishing mutually beneficial partnerships in this space. Equally if not more important has been our relationship with Ecospray, who has been an absolutely instrumental partner in the development of our EGCS program."

Perhaps the biggest challenge for Haeflinger and his team are designing tomorrow's fleet, ships that must entertain and return investment for 30 years or more, all the while meeting ever stricter environmental rules. Haeflinger believes that size and scale will remain important trends, though he does concede the smaller, specialty vessel trend can be profitable in certain segments. And while he and the Carnival team are eager to engage new technologies, they are selective. "From a technical perspective, after scale comes efficiency not only in terms of energy use, but also in terms of environmental impact. However, "low emission" ships are clearly not a silver bullet concept, and "gadget" solutions like small scale solar panels will not move the needle," he said. "Future designs will need to incorporate a broad suite of technologies to further reduce the environmental footprint of ships and will need to address all airborne and waterborne emissions, not just those currently regulated."

With all of the investment in making ships more environmentally benign, simultaneously addressing other areas of technology on the ship could be lost. But not on Carnival.

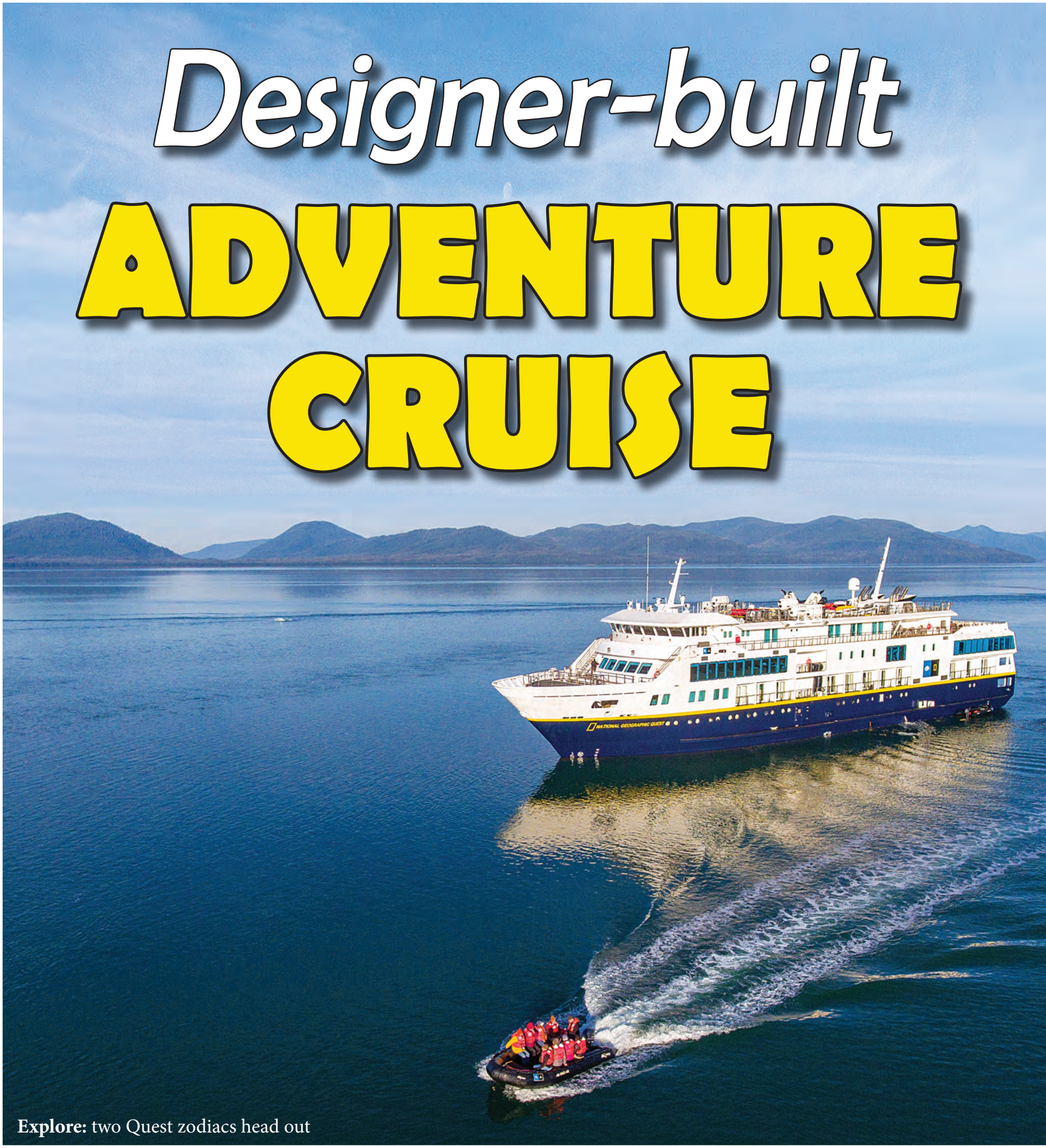
"I also see further (and likely a step-change) integration and use of new technologies, including remote key system performance monitoring software, intelligent condition-based maintenance programs, and automated decision aids/tools for the crew to drive further efficiencies and lower impacts. I also see developments in the area of better integrating the human element into new ship designs. Optimized bridge and engine control room designs will be supported by training, in our case, through our global, state-of-the-art training facility in Almere, outside of Amsterdam, in the Netherlands."


# The LNG Push

With the laying of AIDAnova's keel in Germany on September 6, 2017, Carnival Corporation marked the official start of construction for a total of seven cruise ships that will be fully powered by liquefied natural gas (LNG). Meyer Werft lowered the first building block into place for AIDAnova, the first cruise ship worldwide that can be operated both at sea and in port with LNG. In the presence of AIDA President Felix Eichhorn, Bernard Meyer, CEO of Meyer Werft, and Tim Meyer, CEO of Meyer Werft, two trainees named Louisa Trö-bner (AIDA Cruises) and Martin de Boer (Meyer Werft) placed the traditional lucky coin under the first of a total of 90 blocks.

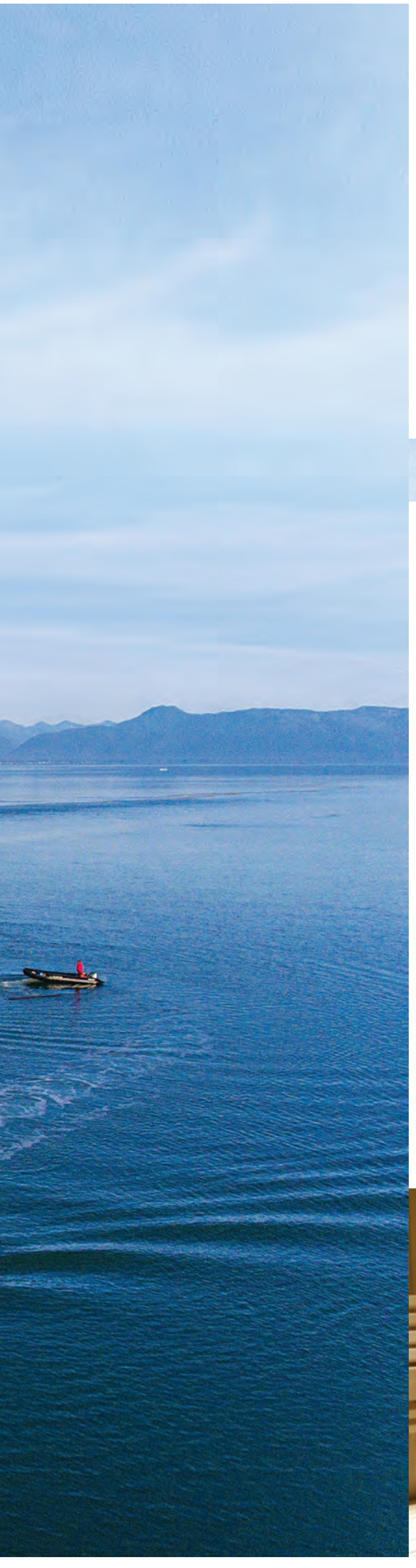
Arnold Donald, president and CEO of Carnival Corporation, together with Bernard Meyer, CEO Meyer Werft, Michael Thamm, CEO Costa Group and Carnival Asia, David Dingle, Chairman Carnival UK (P&O Cruises UK), Neil Palomba, President of Costa Cruises, and Felix Eichhorn, President of AIDA Cruises, - gave the official "full steam ahead" signal, ringing in a new era of the commercial use of low-emission LNG in cruise travel. The seven LNG ships for cruise brands Carnival Cruise Lines, Costa Cruises, Carnival UK, and AIDA Cruises will be built by Meyer Werft in Papenburg (Germany) and Turku (Finland) and commissioned between 2018 and 2022.

# Designer-built ADVENTURE CRUISE




**Explore:** two Quest zodiacs head out

Photo: Lindblad Expeditions/Ian Strachan



*The 2016 Polar Code has its first luxury-adventure cruise adherents for the long, new ice-free seasons in the high latitudes. Likewise, many designs winning over owners and explorers target exotic Asia-Pacific destinations. Competition is fierce among "designer-shipyards" seeking to build their designs, but their creations could face fewer hurdles to construction than the designs of independents without a yard. Concepts bound for the slipway have something else in common: new davits for large numbers of water craft.*

## BY WILLIAM STOICHEVSKI

"In addition to our nine shipyards, the Vard group of companies comprises specialized subsidiaries that focus on particular areas of expertise," Vard business development manager, Holger Dilling, tells us about Vard Design, Vard Electro and Vard Accommodation for HVAC. "In the cruise segment, we can draw on expertise in the wider Fincantieri Group." They're competitive words. Not far away, another of Norway's famous shipyards, Ulstein, has been pouring on the pressure with adventure cruise designs of its own.

Vard was first out, obtaining interest last year from Hapag-Lloyd Cruises of Germany and French cruise company Ponant for two builds: now, a contract for the design and construction of an expedition cruise vessel for Australia's Coral Expeditions. Despite the in-house knowhow, Dilling says not all suppliers for the Coral project have been decided on.

Ulstein's adventure cruise concepts have long been drawn-up. Now, "in the nick of time" — in their 100th year — the X-bow's proponents have secured an order with China Merchants Group Shipyard for Chinese tour operator and ship ower, SunStone Ships.

When it comes to cruise, however, both Norwegian yards have stiff competition paddling into a business stream expected to pick up the slack for stalled offshore markets. Yards like Portuguese WestSea (Martifer Group) or Nichols Brothers Boat Builders in North America are near or already out with designs of adventure vessels of their own. NBBB for Lindblad Expeditions, and WestSea with Rolls-Royce propulsion and power help on the MV National Geographic Quest. Then there's Dutch shipbuilder Damen's second sale of its 75-meter luxury expedition yacht for the tropics and the polar latitudes. "The SeaXplorer 75 stands out with not only a dive center and submersible hangar, but also a complete floating heliport for two aircraft," a communique trumpets. Competition is serious in this segment, especially in and around 2,500 GT, but also up to 7,000 GT.

Then come talented designers like Monaco's Stefano Patrovich, renderer of an adventure cruise vessel conversion concept for an out-of-work Norwegian offshore service vessel, or OSV. Norwegian news E.24 suggests cash-strapped Kleven yard could do the Patrovich OSV conversion.

"Niche segments offer new opportunity," said DNV GL department head for cruise vessels, Bjorn Berger, before adding, "There's (little building) capacity for new, smaller cruise vessels until 2025." That was in 2016, but there's still little yard capacity for smallish but complicated cruise concepts. Kleven, NBBB, Vard and Ulstein's Chinese yard partner were among few yard slots available when the opportunity came. Big Cruise ships have the other spots occupied.

**Luxury:** guests enjoy a Lindblad Expeditions sauna.

Photo: Lindblad Expeditions/Sisse Brimberg & Cotton Coulson


**“Marina platforms”: Vestdavits davits with hoisted dinghies on an aft deck designed for easy disembarkation.**

**Photo: Lindblad Expeditions/ Sisse Brimberg & Cotton Coulson**

## CLASS-AWARE

Noteworthy among the other type of adventure cruise yard work to do is Ulstein’s refit in July 2017 of the older ship Ocean Adventurer for owner Adventurer Partners and cruise operator Quark Expeditions. This conversion of the Yugoslav-built ice-strengthened vessel from 1976 is a sign that newer adventure cruise vessels are needed to meet an IMO Polar Code that takes special aim at passenger safety and safe, clean operations.

“The existing (adventure cruise) market is very old vessels,” says Steven Sawhill, a principle consultant for DNV GL and a former U.S. Coast Guard Commander.

“There’s an expectation that they’ll be renewed.” He confirms that passenger numbers to the (Arctic and) Antarctic have been going up steadily. In the Antarctic — fully-booked destination of the MS World Explorer designed by Giuseppe Tringalis and being built by WestSea Yard — the high-time for adventure tourism was “07, 08,” Sawhill says, adding that it’s surging again.

Numbers dropped after the heavy fuel oil ban of 2011, but “2016-2017’” is a booming adventure-cruise year. He shows numbers indicating the number of tourists touching ground in the Antarctic this year will reach 32,000 versus 20,300 between 2011 and 2012!

Slow year 2013 saw 86 passenger vessels in the Arctic alone, according to AIS data and Sawhill, a regular speaker at “various arctic shipping conferences.”

## DAVITS DECISIVE

The key to easy passenger expeditions to wilderness areas are a vessel's handling of RIBs, dinghies, kayaks, Zodiacs and waterjets. When Lindblad's Quest brings adventure travelers in close for a personal view of nature's wonders, a Vestdavit TSB-2500 davits will deploy its Zodiacs and kayaks astern and hoist these once passengers step back aboard ship via a small step. This 238-footer with 50 cabins and a twin-screw diesel engine will explore Baja, Costa Rica and

# Adventure Cruise


Panama in winter and Oregon, Washington, Alaska and Canada in summer, so lots of water craft. Quest passengers will get closer to marine life via bow cams and the cameras of an onboard ROV. Quest, now on its maiden journey, will have a sister ship in spring 2018.

Interestingly, Bergen-based Vestdavit — a well-run, multi-million-dollar davits-producer — is opening an office in Seattle after success serving the offshore sector, the U.S. Navy, USCG, NOAA and now adventure cruise. A U.S. sales and after-sales office will be run by Magnus Oding who confirmed the delivery to NBBB. Produced in Norway, the company's multiple-boat MissionEase handling system was shown for the first time at NorShip 2017 after tests aboard an offshore service vessel. Seen on a YouTube video depicting an X-bow hull, MissionEase allows boats to be moved safely and quickly on "cradles" — "even in high seas or during a vessel listing." Boats and equipment feed to the davits for launch or stowage after retrieval. The system avoids overhead cranes and "slow" slinging procedures to overhead gantries in favor of the hydraulic cradles that move craft to stowage, maintenance, preparation or launch zones. "It links seamlessly with single-point davits" to deploy or recover boats from both sides of a vessel so one operator on a remote can "launch and recover the mission boat, including all on-deck handling." The system seems made for the stable, dry environment of an expedition cruise vessel's "mission (equipment) bay."

## WARMER CLIMES

Vard's Coral order marks the cruise segment's other focus areas — the tropics and the Asia-Pacific — also require "tailor-made solutions" for a customer's cruise concept and destinations.

"VARD has entered into a firm contract for the design and construction of the vessel, so this one will definitely be built," says Holling. Prior to the new contract, Vard had six luxury expedition cruise vessels under contract: four for PONANT and two for Hapag-Lloyd. Hoping to match that success, Ulstein's quest for adventure cruise success has lead to the opening of a new design department in Norway's marine research capital, Trondheim. In May, the Ulsteins penned a letter of intent for "at least one" CX104 expedition cruise vessel between Ulstein Verft, the builder, and an unnamed owner. Then came the Chinese seeking a 100m CX103.

When built, the CX104 design rendered by Ulstein Design & Solutions will be 120 m long and wrapped by an ice-class "belt" for "polar capability". Delivery is set for 2019. The company has several CX designs, but only the 103 and 104 appear to be in our "adventure cruise" envelope due to their smaller size of 7,000 GT to 10,000 GT and stowage for adventure craft. Other Ulstein drawings show cruise vessels of from 17,000 GT to 25,000 GT.

The new contract with China Merchants Group to build a CX103 for their client SunStone includes an Ulstein design and an equipment package for one vessel and options for another nine ships. The SunStone CX103 expedition vessel is 104 meters long, 18 m wide and built to keep 255 passengers comfortable. Polar Code PC6 denotes Safe Return to Port and Virtual Anchorage, a nod to the new stricture's focus on ice operations.

"(The Polar Code) is goal-based code. You can't say what's required because it demands … what a vessel can do or cannot do," says Sawhill. So, the tour operator, perhaps, rather than Ulstein, will have to "define the activity, the hazards … the operational measures". Leave it to Ulstein to "select (The Code's) design measures," is how we interpret it.

It'll be interesting to see whether the extra X-bow space afore becomes "underwater observation lounges" or recreational areas "such as large cinemas," rooms for kids or a spa.

## MORE SUN

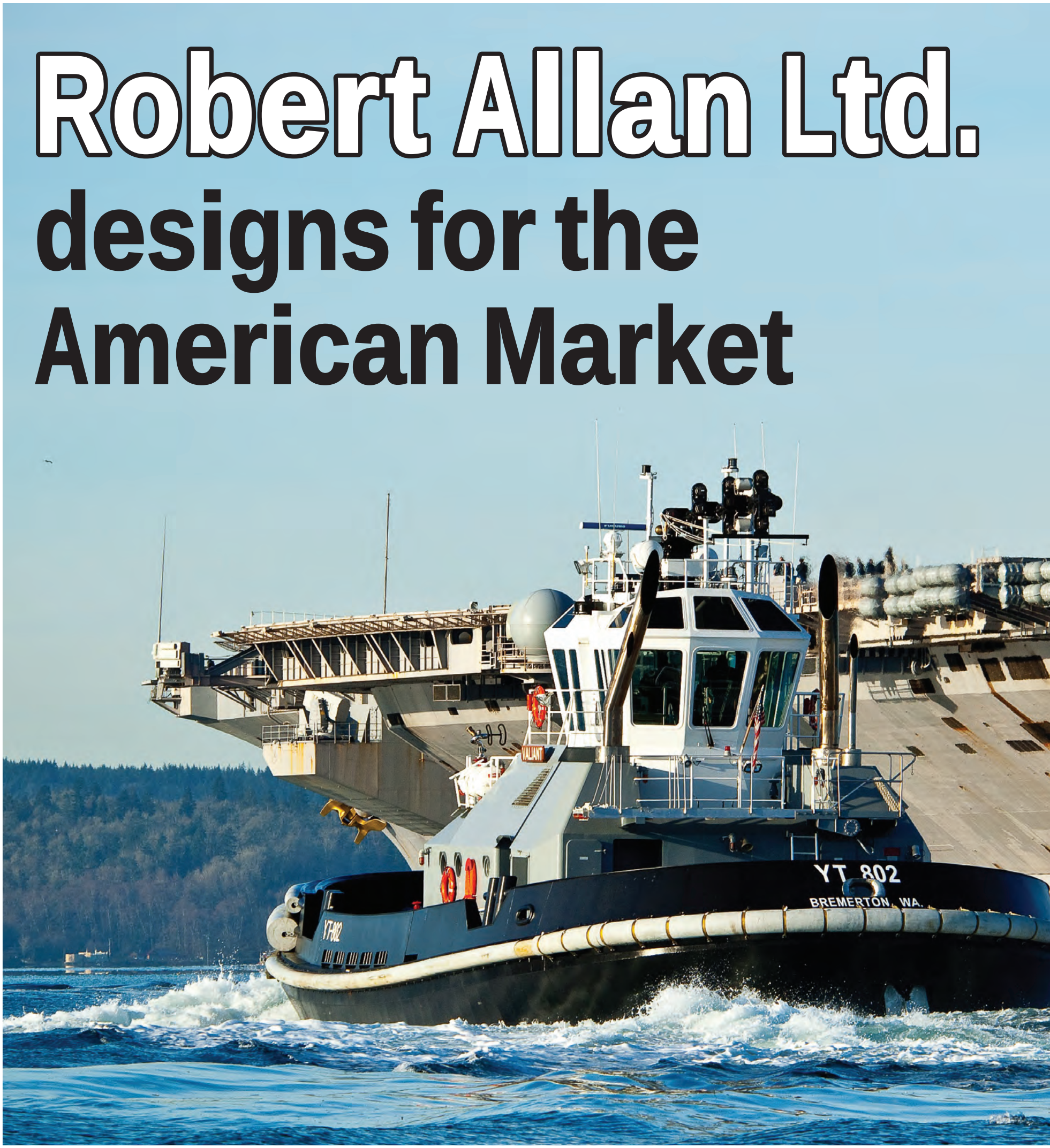
For experienced expedition cruise ship builder Vard, the September 2017 pact with Coral to design and build a luxury expedition vessel shows the efficacy and the challenge of being a designer-yard versus just a designer. The 93.5 m VARD 6 01 design that'll be built at Vard Vung Tau in Vietnam for early 2019 will have comfort for 120 adventurous travelers and an environment geared for daily shore expeditions and briefings on destinations that include the Great Barrier Reef, Papua New Guinea and South Pacific islands.

"Independent designers may propose concepts, but from there it is a long way to a complete project that can actually be realized," Dilling said.


**VARD 6 01 for Coral Expeditions**

Image: courtesy Vard Design

# Robert Allan Ltd. designs for the American Market





## BY ROLAND H. WEBB
### Senior Vice President
### Robert Allan Ltd.

Being based just across the open border between Canada and America since 1930, Robert Allan Ltd. has developed a deep understanding of the American market and just how our ship designs can be tailored to suit our neighbors' requirements.

America is unique in many ways. The current designs of American towing vessels are largely the result of domestically focused requirements not encountered elsewhere. As a result, Robert Allan Ltd. has had to learn to treat America as unique and not to assume means and methods used elsewhere will suit the U.S. market.

A simple example is the use of the U.S. Standard system of measurements as opposed to the metric system in use elsewhere. Our designs are metric with frame numbers starting aft and running forward; however, we can and do willingly provide designs in U.S. standard dimensions and increments of frame spacing, using angles instead of bulbs etc., and have even figured out how to reorganize frame numbers running from bow to stern.

All joking aside, it is fair to say the U.S. market is very competitive and demanding. Based in Vancouver, BC, only a few short hours away from Seattle by car, it is not surprising that Robert Allan Ltd. began selling fishing vessel designs to U.S. clients as early as the 1960s, and tugs in 1970 and continues to do so. Early customers included Dunlop Towing and Puget Sound Freight Lines of Washington State. They were followed by Hawaiian Tug & Barge and Shaver Transportation who both acquired versions of the Cates 2,400 hp ASD ship handling tugs initially developed for use in Vancouver harbor. We continue to work hard to understand the market and will never assume we are entitled to ongoing participation.

Some of our U.S. clients include G & H Towing, Signet Maritime, Wilmington Tug, Foss Maritime, Harvey Gulf and the U.S. Navy, to name a few. Bay-Houston Towing Co. and Suderman & Young Towing Company have recently ordered total eight more improved Z-Techs for use in Gulf Coast ports, increasing their fleet to 24 such vessels. G & H Towing will operate these vessels. This new design incorporates sponsons for increased stability when performing escort towing duties, with the additional benefit of reduced motion in seaway.

Signet Maritime has built and/or oper-

# Vessel Design


ates 10 tugs of Robert Allan Ltd. design that work in ports along the U.S Gulf Coast. The most recent of these was the RApport 2400 Class vessel Gladys B built by Signet (at the Signet shipyard in Pascagoula) for E.N. Bisso & Son. Inc. Other recent deliveries include the RAmparts 3200 Class design vessels Signet Arcturus and Signet Polaris built for Signet by Patti Marine Enterprises in 2014, and the Signet Magic (also built at the Signet shipyard in Pascagoula)

The U.S. Navy has six Z-Tech tugs operating with the Pacific Fleet from bases in Japan and Washington State. These vessels were built by J. Martinac at Tacoma, Washington from 2007-2012. A tender for six more tugs for this client is underway as this article goes to print but no final selection of the design or builder has been announced.

Harvey Gulf now operates the largest version of the RAmpage family, our "Swiss Army Knife" AHTS design. This unique vessel, the Harvey Stone, was built by Eastern Shipbuilding and delivered in 2016. With a bollard pull of 117 short tons from a Tier 4 diesel electric hybrid plant in a compact yet efficient hull, 212 ft. (65 m) in overall length, this unique multi-purpose vessel performs a full range of services for the Shell Stone offshore field.

On the West Coast, Diversified Marine Industries of Portland have been building Robert Allan Ltd. designs since the turn of the century. Two new "enhanced" RAmparts 2400 class vessels, the Michelle Sloan and Lela Franco were completed by them for Harley Marine Services in 2015 making 10 in total. This year two more vessels of the same class, the Dr. Hank Kaplan and Rich Padden will also join the Harley fleet.

Earlier this year, the first U.S. built Rotor Tug, ART Trident, was delivered to Seabulk Towing of Fort Lauderdale, Fla., by Master Boat Builders of Bayou La Batre, Ala. This new and unique Robert Allan Ltd. design, which was initially conceived and developed by Rotortug B.V. of the Netherlands, will truly raise the bar for ship-handling operations in U.S. waters. Three of these vessels will be delivered to Seabulk from the Master Boat Builder facility, with the third vessel in this series (the Trinity) scheduled to be delivered at the end of this year.

While we are probably best known to

American owners for our towing vessel designs, we are also active in the fireboat market with 10 vessels of eight very unique designs having been built and delivered to major U.S. cities since 2001. Philadelphia, Boston, Baltimore, Portland, Maine, Chicago, Los Angeles, Long Beach and New York all have new fireboats designed by Robert Allan Ltd. protecting their waterfronts.

On the horizon, amongst the known designs, is a new vessel for the Saint Lawrence Seaway Development Corporation which will be the first true ice-breaking towing vessel built in America for generations. To be based at Massena, N.Y, this new vessel is developed from the recently completed TundRA 3600 class vessels Ocean Tundra and Ocean Taiga, built in Quebec for service in Canadian waters. The solicitation to select the builder is underway and award is expected later this year.

On the broader horizon is the new world of the so-called neo-panamax container ship that the new Panama Canal has made practical and numerous. These highly efficient behemoths are already calling at U.S. ports on both coasts, and coupled with the simultaneous buildup of oil and LNG exports, they will create a demand for even more powerful and reliable tugs. The 70 to 80 ton bollard pull datum of today will increase quickly as more capability is required by Port Authorities and pilots. Insurance companies, who underwrite the risk of such larger vessels navigating in restricted waterways, will support this need and ship owners will see the prudence of requiring proportionally capable tugs to be available on a 24/7 basis.

Typical examples of what the future already holds are the recently completed Robert Allan Ltd. designed RAstar 85 Class escort tugs and the ART 85-32W Class Rotortug design now under construction, all for service at Port Headland, Australia's busiest iron export facility. See: ***http://ral.ca/2017/04/11/rastar-85-for-western-australia/*** and ***http://ral.ca/2017/05/31/art-85-32w-fortescue-metals/***

Progress won't stop there; even more powerful and capable designs are being developed to ensure the towing vessels of tomorrow will match the demands of their time. Standby!

# *Profile:* Foreship

*As the maritime regulatory regime evolves quickly, ship owners increasingly require guidance to help them navigate an ever-changing technical quagmire. Finland-based Foreship is a force in this regard.*

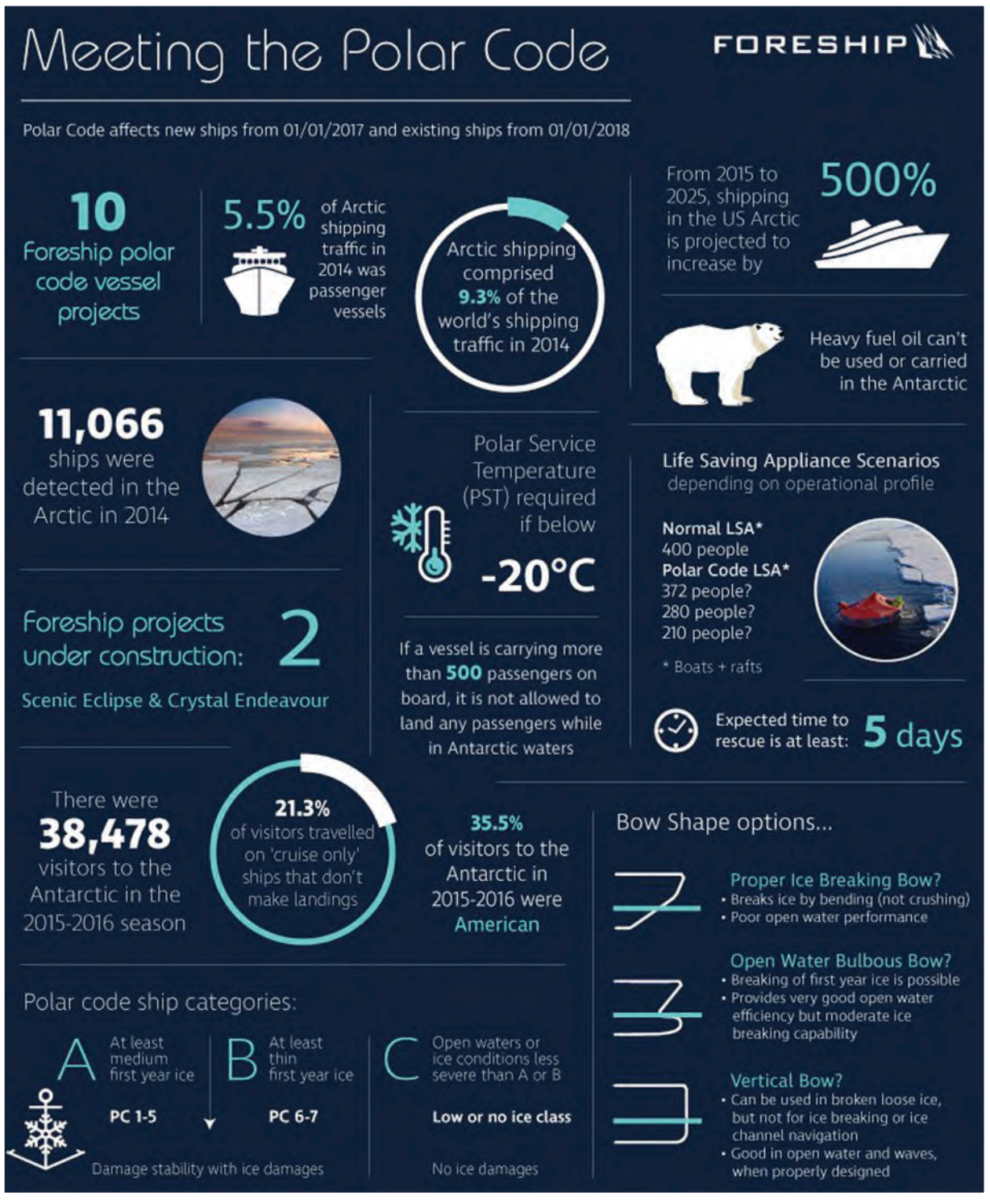
By Greg Trauthwein

Credit: © adimas / Adobe Stock

Finnish maritime prowess is legendary, particularly when it comes to the cruise ships and polar vessel sectors. Foreship aims to continue this legacy, an employee-owned company with a specialty in ship design and engineering. In an industry that is mobile and global, Foreship's rapid rise is a testament not only to its Finnish roots but also to the evolution cycle of the maritime industry itself. Vessel owners and operators are today besieged with a glut of new regulation which effect technical demands onboard ships and boats, and maintaining specialized knowledge in-house is not always practical or efficient.

Enter Foreship, a company that started with three people in 2002, growing to more than 80 people today. While the company logged more than 1,000 reference projects in its first decade alone, projects spanning across cruise and passenger vessel, commercial cargo and offshore segments, the company's 'bread and butter' is the cruise sector.

"We customize our services to fit what the customer actually needs," said Mattias Jorgensen, Business Development Director, Foreship. "If we see a growing demand – as we did with ballast water management and also with energy efficiency and hybrid technology – we will grow to fill it. In fact (earlier this year) we hired a head of new technology (Jan-Erik Räsänen) who has about 20 years of experience in dealing with battery, energy efficiency and energy storage."



*"The Polar Code is not a one-size-fits-all proposition. In the best case scenario, there are minimal effects; in the worst case, it's an entirely different ship."*

**Markus Aarnio,**
**SVP & Co-Founder, Foreship**

*If we see a growing demand – as we did with ballast water management and also with energy efficiency and hybrid technology – we will grow to fill it.*

**Mattias Jorgensen, Business Development Director, Foreship**

This experience could prove particularly timely, as Jorgensen said that there is a groundswell of demand for increased battery and energy storage technologies onboard cruise ships. "You have seen many such projects on ferries, but not so much on cruise ships But it is out there, it is coming," said Jorgensen. While battery technology and energy storage is emerging, the requirements for ballast water management systems (BWMS) are here and now.

## BWMS

With the ratification of the BWMS rules by the International Maritime Organization (IMO) in September 2016, Foreship has noted an almost immediate and marked increase in inquiries from vessel owners in need of assistance to fit a system onboard.

"As the Ballast Water Convention is now finally ratified, we see now an increase in interest in technical solutions and services," said Jorgensen, estimating that inquiries have grown four fold since ratification.

The Ballast Water Management Convention enters into force on 8 September 2017 and requires all ships affected to have a treatment system on board to neutralize invasive species discharged in ballast water in time for their "first IOPP renewal survey." Most ships will therefore need a BWTS between 2017 and 2021.

"We have a project with Norwegian Cruise Line (NCL), advising them on the implementation of their ballast water solution," he said. NCL had already chosen the Alfa Laval's PureBallast 3.1 BWMS solution, and Foreship was brought in to advise on the implementation, which includes producing all of the classification drawings, assisting in getting approval from class, and spearheading coordination among the owner, the manufacturer and the shipyard to get the system onboard and installed smoothly.

At the time of the interview, an agreement was in place with NCL for five ships – Norwegian Dawn, Pearl, Sky, Jade and Spirit – while Foreship was working toward a pact to cover the entire NCL fleet.

But like a snowflake, no two BWMS retrofits are alike, and Jorgensen cautions that the worst mistake to make as a fleet owner is to assume that a 'one-size-fits-all' approach will work, even for sister ships.

"The biggest challenge is that you have to look at each ship individually," he said. "Even if they are sister ships, after they have been in operation for 10-15 years there are differences. You have to look at each ship individually and fit the system that is right for that ship: it's never plug and play, it always has to be analyzed from a ship point of view, and also from an owner point of view to determine what is best solution for that (specific) ship."

## Adventure Cruising @ the Poles

The current boom in the global cruise sector has evolved to the extremes, the North and South poles to be exact, and a number of companies are racing to take ships into waters which were previously inaccessible to all but the heartiest explorers. But with promise comes potential peril, as the business case for taking 1,000 souls on a 'bucket list' trip for tens of thousands of dollars per head must be tempered with the responsibility to keep them safe in the event of an accident.

Enter the Polar Code from the IMO.

IMO adopted the International Code for Ships Operating in Polar Waters (ie: Polar Code) to make it mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). The Polar Code entered into force on January 1, 2017.

While the Polar Code is intended to cover the full range of shipping-related matters relevant to navigation in waters surrounding the two poles – ship design, construction and equipment; operational and training concerns; search and rescue; and, equally important, the protection of the unique environment and eco-systems of the polar regions, according to Markus Aarnio, SVP & Co-Founder, Foreship, compliance with the code is not as arduous as it may sound, particularly if a ship will not be built to break ice.

"Many people think that the Polar Code is something that can be very difficult ... but truthfully it can be something

difficult, but it can be something that is really easy," said Aarnio.

He said that the way in which the vessel is ultimately outfitted depends on where and when it will sail. For example, if you're sailing in an area where historically you only see ice 1% of the time, you don't design the ship to break ice, you design the ship for the conditions that it will sail in the other 99% of the time, he said.

The Polar Code covers the full range of design, construction, equipment, operational, training, search and rescue and environmental protection matters relevant to ships operating in the inhospitable waters surrounding the two poles. Currently Foreship has a couple of references in this regard, including an agreement fo parts of the basic design as well as design, purchasing and production assistance of the Endeavor class luxury expedition yachts being built at MVWerften Shipyard in Germany

When considering building a ship to Polar Code, Aarnio advises a few critical areas to consider:

- ***Hull form:*** *If you want to break ice, the hull is affected because the propulsion and the rudders will be different. "There is a small penalty on the power, but with minimal icebreaking capability than the impact is not that great at all."*
- ***Ice Strengthening/Ice Class:*** *With the Polar Code you don't need ice class, but if you want to go to further extremes, ice strengthening – which adds to the ship's weight and power requirement – could be affected.*
- ***Stability:*** *If the ship will be in these areas during the very cold times, you must factor in the weight of ice formation on top of the ship and the effects of this ice mass on ship stability. "You need stability margin for the ice on top of the ship."*
- ***Life saving appliances:*** *Pending sailing pattern, if the ship is a heavy duty polar code ship it means there will be a need for extra food, clothing and survival gear on the lifeboats, for example. In addition, there could be the need to carry tents and food for setting up camp on the ice.*

The Polar Code, similar to the ballast water management system, is not a one-size-fits-all proposition, rather it depends on the type of ship, the number of people onboard, and the projected sailing profile. "In the best case scenario, there are minimal effects; in the worst case, it's an entirely different ship," said Aarnio.

By Greg Trauthwein

# Three Questions for Class

*People are busy. So in approaching the 'Class Roundtable 2017', it was decided to keep it simple, asking leaders in class for their take on the industry's hottest trends.* **Spoiler Alert!** *Digitalization, the Cloud and Emissions Reduction are pervasive themes. But read on for exclusive insights from ABS, ClassNK, DNV GL and Lloyd's Register on the driving trends for the coming generation.*

## 1. What do you see as defining the technology trend?

**Dr. Kirsi Tikka, ABS**

Of all the technological trends that will impact maritime operations, a dramatic increase in the connectivity of systems may bring the widest changes. The ships will become more automated and connected, with the ultimate target of autonomy. And digital platforms for trading will connect cargoes with ships.

Along with the rest of the industry, the future of classification will be based on data collection and analytics. Data will support maintenance and class decisions and survey activity will no longer be driven by calendar dates but by the condition of the vessel. The goal will be safer and more efficient shipping supported by reliable data and less intrusive surveys. To reach this goal ABS is investing in the building blocks that will take us there. Cyber safety and security, data management and data quality, condition and performance-based criteria are critical for providing improved levels of safety and reliability.

**Knut Ørbeck-Nilssen, DNV GL**

In terms of technology, at DNV GL we believe that we are seeing a paradigm shift due to digitalization. The way we deliver value is changing, brought on by a revolution in information technology. We are starting to rely on new networks and new ways of working. The Cloud offers limitless computing power and storage capacity. The additional power made available through the Internet of Things (IoT) and machine learning provides opportunities that were previously unthinkable. As the shipping industry becomes more connected we will see positive impacts that spread throughout the whole transport sector. With more timely and detailed information on cargo, routes, and the operation and condition of assets supply chains can be more adaptable and efficient. For example, if we can get a better picture of vessel arrival times, we could not only cut fuel consumption and lead times, but organize the port and hinterland chain to maximize efficiencies for on-shore workforce, maintenance activities, even in class inspections. The development and spread of cloud based technologies and computer power, will change not only how we manage data but how we design, build and test vessels, their systems and components.

Data platforms and digital twins, with advanced software and simulation capabilities, will give us greater control of systems – including the ability to evaluate, monitor and intervene in the operations of a vessel or fleet in near real time.

One of the ways we are addressing this is that DNV GL is creating a specialized Digital Solutions organization, consisting of 1,000 digital experts, to leverage the full potential of an increasingly digital world. This will be a new stand-alone business, but at the same time to further support DNV GL's digital transformation, a Chief Digital Transformation Officer will also be recruited.

As in the past, 5% of DNV GL's operating revenue will be invested in long term research and development and in short term innovation activities to develop and modernize our service portfolio. But going forward, more than 60% of all R&D or innovation funds will be allocated to developing digital solutions.

**Nick Brown, LR**

Autonomous Systems (note not Autonomous ships – although we already see examples of autonomously operating small craft for specialized local duties), greater use of technology to control systems on board, allow remote diagnostics and remote control as necessary to supplement skills and capability on board.

Alternative means of energy storage and power distribution will also be important, driven by environmental conscience and legislative pressures. The general advance in technology is all linked – for example, the all-electric ship may lend itself better to autonomous control provided the challenges of energy storage and management can be addressed. Such technologies enable performance improvements and efficiencies – cost savings for business, reduced energy consumption and emissions for the environment – but adoption has its challenges too. New roles, working practices and business models may re-

***The future of classification will be based on data collection and analytics.*** Data will support maintenance and class decisions and survey activity will no longer be driven by calendar dates but by the condition of the vessel. The goal will be safer and more efficient shipping supported by reliable data and less intrusive surveys.

**Dr. Kirsi Tikka,**
ABS Executive Vice President for Global Marine

sult. LR is investing in Thought leadership through the GMTT 2030 series of industry reports, Joint Industry projects, new rules and class notations, new skills and training.

## 2. What do you see as defining the legislative trend?

**Nick Brown, LR**
Global Fuel Sulphur cap and the move towards a multi fuel future. Some of the technologies mentioned above will contribute to addressing this challenge – alternative fuels such as LNG, methanol, LH2, energy efficient systems with reduced emissions such as battery storage, hybrid arrangements, DC distribution networks.

**Dr. Kirsi Tikka, ABS**
Shorter-term, environmental regulation – particularly around emissions – has the potential to be operationally disruptive if regional regulations are not globally co-ordinated and designed to meet common goals. For the past year, ABS has designed and released a suite of compliance-focused software solutions aimed at preparing shipowners to measure and submit the required fuel-efficiency/consumption metrics. Longer term, class rules and international regulations must adapt to the new technology and digital world. We are working with industry and regulators to help ensure that whatever emerges is practical, fit for purpose and safety-centric.

**Knut Ørbeck-Nilssen, DNV GL**
Over the next decade there is likely to be a continuous escalating pressure from regulators on owners and operators to reduce emissions to the air and water. This is an area where we, as a classification society, must respond to the needs of our customers and provide practical advice so they can comply with these regulations. Over the last 12 months, the "big three" of major environmental regulations (Sulphur cap, EU MRV, and BWMC) have dominated the regulatory calendar and supporting the industry in preparing for these pieces of legislation has been at the top of our agenda at DNV GL. On the global sulphur cap we provide a range of services to help customers choose the right compliance option, ranging from retrofitting scrubbers, exploring alternative propulsion options such as LNG or battery and hybrid solutions and carrying out feasibility studies to help our customers make the best choices for their business. DNV GL has also developed a range of apps and services to help customers prepare for the EU Monitoring, Reporting and Verification (EU MRV) regulation and achieve MRV readiness. The Ballast Water Management Convention (BWMC) is the last of these "big three" regulations. To support owners, we recently published a report on ballast water management to provide guidance on the upcoming regulations and an overview of the different types of systems.

> To provide worldwide access to class documentation, **DNV GL customers will be able to use electronic certificates starting in October 2017.** Accessible through our customer portal My DNV GL, electronic certificates will eliminate paper handling, reduce the administrative burden on all stakeholders, and a validation solution will ensure that electronic certificates are just as safe as paper.
>
> **Knut Ørbeck-Nilssen,**
> CEO of DNV GL – Maritime

## 3. The energy market is down, technology adoption is up, political instability is rampant. How does this all affect class?

**Dr. Kirsi Tikka, ABS**
The fast pace of technology development requires organizations to be agile and able to adapt to continuous change. The era of smart shipping will require convergence of traditional and non-traditional skill sets with the capability for innovative and critical thinking that supports both new ideas and experience-based knowledge.

To encourage convergent thinking across our organization, ABS is actively hiring people with non-traditional skills from non-traditional sources and blending them with our traditional knowledge of structures, machinery, mechanics and electrical systems to support the next generation of safety systems.

We are changing the way we identify talent by creating a leadership culture that promotes analytical capability, fast learning, convergent thinking and the ability to manage and exploit disruptive technologies. We are creating a culture that recognizes the importance of data, one that rewards continuous adoption and relearning.

**Knut Ørbeck-Nilssen, DNV GL**
As the digital transformation of the industry accelerates, DNV GL must uphold the high standards we have set, but

# ClassNK on …

## The defining technology trend …

The smart use of IoT is going to improve and optimize numerous functions in operations and ship management. Over the next 10 years we believe that the availability of data-driven analytics will determine the future of our industry. From ClassNK's point of view, ICT will be one of the biggest drivers behind change in the industry. Advances in data transmission technology and ICT have the potential to change the way of ship surveying. For example, ClassNK has announced its R&D roadmaps, which includes revolutionizing survey process with the development of robotics instruments of surveys utilizing ICT. The aim is to develop a technology that could reduce the time for ship surveying activity relieving ship owner's burden and further improving the quality of service that we provide.

ClassNK has focused a portion of our resources on developing the latest technologies and solutions to open up the advantages of Big Data to the maritime industry. At the forefront of these efforts is the flagship project, Ship Data Center Co. Ltd. (ShipDC). ShipDC operates a land-based center collecting data from ships in operation using VDR, data logger and other sources, as well as weather information at sea. By developing a platform through which data can be centrally controlled and used at a low cost, we aim to maximize opportunities for big data utilization.

## The defining legislative trend …

Environmental regulations are putting the onus on the industry to get in compliance. SOx and PM stricter regulations are coming into force in 2020, and installing Exhaust Gas Cleaning Systems, which reduce the amount of SOx and PM in ship emissions, is one method for complying with the regulations in addition to use of the compliant fuel. Another important regulation is the EU Monitoring, Reporting, and Verification of CO2 emissions. ClassNK was one of the world's first societies to receive accreditation from the UK-based national accreditation body as an EU MRV verifier. ClassNK can now assess Monitoring Plans, verify Emission Reports and issue DOCs in accordance with the EU MRV regulation. In addition, ClassNK has released "ClassNK MRV Portal," service on website, to support company's data handling/submission for MRV certification.

Now that the Ballast Water Management Convention has formally entered into force, shipowners must also focus efforts on the operational and installation aspects on the ballast water management systems to ensure successful implementation and compliance with the regulations. ClassNK developed 3D laser scanning technology ClassNK-PEERLESS, offering shipowners the opportunity to assess how to retrofit BWMS on their ships quickly, using 3D laser scanning to accurately measure available space automatically, without the time-consuming manual work. ClassNK-PEERLESS takes point data from 3D laser scanners and converts them into 3D models with in 1 to 2 days, while these procedures were handled manually taking 10 to 14 days.

## The energy market is down, technology adoption is up, political instability is rampant. How does this all affect class?

As radical changes in energy markets and political instability are unpredictable and uncontrollable, it is difficult to take appropriate action beforehand. On the other hand, since technology acceleration would be made on progress and have great impact on all the industries including maritime industry and class, it could be promoted and accelerated by ourselves. Actually, ClassNK are committing to treat many kinds of new technology on its collaborated R&D with many industry partners.

During the past few decades, ClassNK has continued to develop many classification services improved using ICT. In the coming years, we are continuing promoting such kind of technologies, for example, in R&D Roadmap, detailing its vision and goals for projects in the near future, as Remote Survey Technologies (Drones, etc.), Development of Survey Robots, Rationalization of Surveys utilizing Digitalization and Safety Evaluation Technology for Autonomous Ships, etc. In others, ClassNK continuously moves ahead on technology acceleration for the benefit of customers.

Class society needs technical capabilities to realize technical innovation. ClassNK considers that technical innovation needs to be promoted to earn customer satisfaction. However, the mission of ClassNK has never been changed, that means, ClassNK is dedicated to ensure the safety of life and property at sea and protecting the marine environment.

more than that make sure that we are providing the support the industry needs to respond to the challenges of today and of the future. This is why for the last several years at DNV GL we have been working on a series of "Modernizing classification" initiatives. It is a process that goes back to the development of the new DNV GL rule set and we have been building on it ever since.

As an example, to provide worldwide access to class documentation, DNV GL customers will be able to use electronic certificates starting in October 2017. Accessible through our customer portal My DNV GL, electronic certificates will eliminate paper handling, reduce the administrative burden on all stakeholders, and a validation solution will ensure that electronic certificates are just as safe as paper. In addition, electronic certificates are easy and convenient to share.

DNV GL will also start using intelligent software agents to help customers find the best time and place to book a survey. The introduction of the Simple Survey Booking tool will simplify survey booking, fitting inspections into the customers' schedule while saving time and costs. Its features include notifications about the best time to order surveys and audits and notified shortly before the due date of the next survey. It also proposes the scope of the survey and states how long a survey of this scope would take. A list of approved service suppliers in each port will help operators to find out whether an in-water survey can be performed in a specific port.

Over the last two years our surveyors have been carrying out a number of surveys using camera-equipped drones to check the condition of remote structural components on board ships and offshore units. DNV GL has built a network of trained drone pilots based in Piraeus, Singapore, Houston

and Shanghai. This allows us to offer drone survey inspections from any of these hubs.

To help the industry address potential cyber hazards, DNV GL has also published a Recommended Practice (RP) on "Cyber Security Resilience Management." Developed in cooperation with customers, the RP provides guidance on risk assessment, general improvements to cyber security, and the verification of security improvements and management systems.

Finally, one of the most important projects for us now and in the next several years is our new industry data platform Veracity. It will bring industries together in digital eco-systems, enhancing the exchange of data, creating new insights and building new services. For DNV GL - Maritime, Veracity is a tool that will play a key role in class services, especially in terms of quality assurance. It will help us to deliver modern class services, particularly on the operational side. The key aspects of the platform are data quality assessment as well as access and security controls, and it may also give us the possibility of playing an extended third party role in the quality assurance of digital value chains.

**Global Fuel Sulphur cap and the move towards a multi fuel future** (is the driving legislative trend). Technologies to address this challenge – alternative fuels such as LNG, methanol, LH2, energy efficient systems with reduced emissions such as battery storage, hybrid arrangements, DC distribution networks.

**Nick Brown,**
LR Marine & Offshore Director

**Nick Brown, LR**

If anything I believe it has made the independent role of class even more important. Class needs to continue to be the custodian of safety and environmental standards and their implementation but also ensure that new technology when it is designed into future designs is fit for purpose and no less safe than today's designs. We also have new areas where we can help support the industry such as cyber security threats to operational technology.

Where new technology is inserted into the marine industry, new failure modes and threats are potentially introduced so this only increases the scope of class to provide assurance that the overall asset remains in accordance with accepted standards for safety and environmental performance. With remote operational access, the boundary of the ship system becomes less distinct so new standards addressing access to the ship have been required. Part of the challenge is also addressing the changing role of the human in the system lifecycle – not only in operation, but right from the initial design and through construction (and indeed our own interventions are changing through remote presence technologies such as sensor arrays and drones). Class needs to remain vigilant so that such intervention, in whatever form, continues to add to the overall assurance case for the asset, our clients and society in general.

## Hans Beele's Mission to Build

# Sealing Valley

BY TOM MULLIGAN

Photo courtesy Beele Engineering

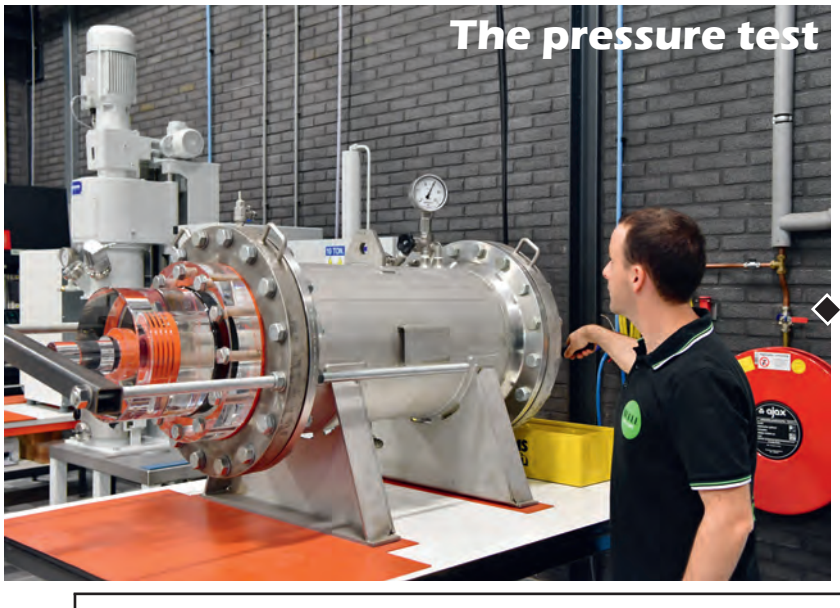
*Sealing Valley is a new concept that has been developed by Hans Beele, President of Dutch engineering specialist Beele Engineering. He will invest in a center of expertise for the advancement of fire protection and watertight sealing technology to provide the highest possible levels of safety. Modeled on Silicon Valley, Sealing Valley will create a concentrated center of know-how, with shipboard and marine safety a prime focus area. It will be here that expertise, creativity and daily installation practice will come together in a campus set-up. Beele says that Sealing Valley will strive to change the general industry safety mentality from a reactionary one to a much more proactive approach, and describes his vision in an exclusive interview with Tom Mulligan of* Maritime Reporter and Engineering News.

**What gave you the idea of establishing Sealing Valley, was it a pressing need within the fire protection and watertight sealing industry or was it a 'moment of insight' in which you recognized that the Silicon Valley model had potential application in your industry sector?**

Ever since the development of our first sealing system 45 years ago, we have visited and seen thousands of installations with cable and pipe transits that were or should be sealed in a way such that people and assets would be protected against the risks represented by water and fire. During these visits, as well as during many discussions on fire safety and water tightness, I realised in particular that awareness of these risks was not what it should be. Instead of talking about safety, most of the discussions focused on talking about costs. Trying to convince people over many years that sealing devices are in fact safety devices, I felt that sealing against fire and water was generally not a priority issue. We are obliged to install these systems because of legislation, but having seen the status of such devices, if present at all, on a regular basis, it ended up for me as a mission based on the idea that "we care, so we will do it better".
Having considered several options, I came to the conclusion that starting an expertise center would be the best way of resolving this problem. Creating an environment that combines expertise, research, development, training, education and even a pilot plant seemed to me to be the ideal solution. Sealing Valley will, therefore, be the ultimate source of answers to any sealing-related questions. And as an 'all inclusive' expertise center, we will be able to translate market problems into practical solutions.Having such a single hub of expertise and knowledge that can be shared with the industry is the ideal means by which to transfer know-how on shipboard fire and flood safety and improve the way companies choose, order and install sealing systems in order to ensure life safety.

The new building

The fire test


The pressure test

Photos courtesy Beele Engineering

**What reaction from the sealing industry, its end-user sectors, relevant government departments, NGOs, other bodies or even the general public have you had to the idea so far?**

We have found that everywhere we tell our story there is agreement with what we have to say. We have seen many people applauding the idea that fire safety and water tightness should be lifted to a higher level. However, strangely enough, it proved to be difficult to mobilize supporters to undertake action. But action is a vital necessity to improve safety! This requires not only knowledge, which we are willing to share, but also bundling expertise with others. Sharing know-how and expertise from daily practice is necessary to secure the cooperation needed to ensure life safety. Changing processes is not an overnight show. Apart from the will to change, it might not be the right time, nor might it fit in with the daily business of people. In short, we would like to achieve a fundamental minset change to create awareness of what the consequences would be if we didn't raise the safety bar.

**What precisely are the aims and objectives of the project?**

First of all, the transfer of know-how and expertise on how risky situations could become safer. It's aimed at every professional in the safety chain. No doubt, test procedures and certificates must be a part of this chain. We want to contribute to the optimization of the safety chain and therefore we focus on young engineers, the ones that will shape our fire-safe future. We want to make sure that there will be a generation that really understands the importance of fire-safe and watertight sealing systems.

Of course, we will also target regulators and certification organisations and other parties that are involved in legislation. Certificates are of vital importance for our industry. But, since they are vital, they should also be clearly specified and understandable for anyone working in the field. We have noticed many times that there is a significant gap between the certification process and the final field application. This has really caused me to ask why we could not make it all clearer, more uniform and more understandable for the people at the end of the chain, the ones that have to install these safety systems. What about service life and durability? A disaster strikes unannounced. Sealing Valley will contribute to a better awareness of safety in the industry, from developer to surveyor. To cover this chain, we will be working on creating a new mindset towards sealing technology. This is also why we consider the younger generation of engineers to be of such importance. On the other hand, we will try to interest suppliers of raw materials in working with us to get the optimum safety out of products and systems. And, as we already do on a regular basis, we will be offering partnerships with customers to fine-tune the process of fitting on-board applications. This also means that Sealing Valley will open its doors to those who work on the practical application of systems. What are the best installation practices? How can an installer make sure that his installation work is guaranteed for decades? Sealing Valley will allow us to invite installers and other parties involved to our center so that they can experience and assess the impact of their work.

**Is there a range of specific goals with a timetable or is the emphasis more on changing the 'philosophy' of the sector from a reactive approach, for example in response to natural or man-made disasters, to a more preventative one?**

We have always been a company with a proactive approach. This is because we think that it's all in the saying: better safe than sorry. And it is our objective to turn the sector from reactive to proactive. Sealing Valley will be developed in phases, with the first phase planned for opening next year. As soon as the doors of Sealing Valley open, we will start educating, training and informing the market. There will be the latest IT and telecom technologies so that we can train and exchange knowledge with those who aren't able to visit Sealing Valley live. Engineers who want to become a certified installer can visit Sealing Valley for an official installers' training and make sure systems are applied in the way they were planned. The last thing we want after developing products and systems to the highest standards is that these are installed improperly. And apart from the training and education facilities, we will carry out R&D into sealing technologies right from the start of the Sealing Valley project.

**With Sealing Valley, Beele Engineering intends contribute to increased safety for crews and the protection of ships and offshore platforms. Test and field application: the discrepancy between these will certainly be one of the themes to be discussed in setting up Sealing Valley.**

**Once you decided to go ahead with the project, how did you start to implement it and whom did you approach to help you 'get it off the ground'?**

At the start this project, we will build up a team of professionals working nonstop on Sealing Valley. This multifunctional team, with expertise ranging from building and construction to mechanical engineering and from materials management to marketing, will be able to educate and train not only our own task force, but also engineers, installers and new staff. This team should be able to communicate with those involved with procedures and certification to establish the basis for developing an understanding of safety awareness. The team is initially headed by myself and I feel excited every day that we are working on this project. And let us hope that once the basics are in place, the project will be taken over by others. Ultimately, it is all about sharing knowledge and capabilities to bring about improvements.

**How did you determine what funding would be needed and where did you get this from? How will the project be funded going forward?**

Ever since I started in this business, I have had one philosophy: make sure we stay financially independent. So far we have succeeded in this. Even in times of recession we have been able to invest in the future. When I launched my plans for Sealing Valley I expected that no bank would be prepared to get on board. This is why we will fund Sealing Valley, our investment in a safer future, privately, from start to finish.

**Can you explain the concept in more detail? How, in practical terms, will it achieve its goals? Are any of its objectives focused specifically on the maritime and offshore industry sectors? Are there any maritime or offshore industry trade bodies, associations or any of the class societies involved in the project in any way?**

Ever since the founding of our company we have been serving the maritime and offshore sectors. At present, the class societies are not involved in the Sealing Valley project, however, our goal is to solicit cooperation from those involved in every sector of these markets, after all, it's in everyone's best interest to improve shipboard safety.

Meanwhile we are working to set up the first training courses, with personal certification by a Notified Body,f ollowed by field inspection for an industrial complex. Sealing technology is also of importance for many other markets. Energy, water and wastewater, building and construction, and infrastructure are just a few of the sectors that we also want to cover. Of course, we want to cooperate with others: it's in the nature of Sealing Valley.

However, this requires means that all parties must be focused on the same objectives: creating a safer place to work and live by raising the standards for fire-safe, smoke and watertight sealing technology.

**How will Sealing Valley educate the industry about shipboard safety and what educational programs will it put in place?**

The basis for the educational program will be our wealth of know-how and experience. This covers all theoretical and practical aspects of sealing technology. We want to create better awareness of regulations and standards and the impact of these on daily installation practice by sharing this knowledge. The situation now is that people start thinking about fire safety and water tightness after an accident has happened. People ask themselves 'why did we do it that way?' Our goal is to have installers, engineers and everybody else who is involved in the sealing technology business think about the consequences before starting any operations. The safety chain is a long one and starts in the R&D labs of companies, moving through testing, approving and certifying the system to the final application in the field. There are many parties involved in this process: owners, yards, surveyors, installers and many more. We will develop educational programs that not only increase their knowledge of sealing technology but that will also enable these parties to understand each other's perspective and their role in the safety chain.

**How will the success of the project be monitored?**

In the short term, the success of Sealing Valley will be monitored by recording the amount of training that we give. However, what's more important is its success in the long term. We want to raise awareness and know-how of fire safety and water tightness, so in that sense the project's success will be measured by the amount of cooperation that is realized once the industry is aware that the current system needs an update. Improving installations and long-term performance in the worst of conditions will be the ultimate result.

**How do you see Sealing Valley growing and the concept developing in the future? Would you be willing to promote the idea to other industries?**

We see a great future for an initiative such as this. We feel it as an obligation to the market and to society to contribute to safety. And, based on the response received so far, there is enormous interest in Sealing Valley. Exporting the concept could be an option, but we would rather first make this a big success before exporting it to other areas. Sealing Valley is an ambitious project based on a sense of reality and on the recognition that the current situation regarding safety is not optimal. We are free from politics, and can move swiftly in a refreshing way. At the same time, we invite decision- and policymakers to engage with us so that a broader platform will become available for increasing safety for those who frequently brave the oceans away from their loved ones.

# Bima Suci

## The Indonesian navy's new sail training ship

More than three years after completing the first outline sketches, Spanish naval design and architecture firm Oliver Design has completed outfitting the interiors for the Bima Suci, the Indonesian navy's new sail training ship.

This spectacular vessels is one of the largest tall ships in the world and measures 364 x 44 ft. with a 14.8 ft. draft. Built at Freire Shipyards in Vigo, Spain, the new training ship sports 36,200 sq. ft. of sails, five decks and capacity for a crew of 200

Oliver Design also carried out turnkey architectural design for Bima Suci, which is just a bit smaller than the largest naval sail training ship currently in service, Peru's 115-m BAP Unión, which came into service last year and also involved design work from Oliver Design.

The new barque-rigged training ship has replaced the veteran Kri Dewaruci, built in Germany in 1953, to become the new jewel in the crown of the country's navy. It will operate as a "floating ambassador", paying courtesy visits to ports around the world. The Bima Suci is named after a mythological Javanese hero, a symbol of force, bravery and righteousness, who is depicted on the figurehead.

Oliver Design's part in the project centers on the architectural design of the ship and the interior design – no easy task given that the Bima Suci has five decks and will have a crew of up to 200. Inside the hull, more than 21,500 sq. ft. of interiors have been carefully distributed, with mess rooms, cabins, offices, weapons locker, store rooms and all the services a crew of this size


Photos courtesy Freire Shipyard

# Ship of the Month


Photos courtesy Freire Shipyard


requires (sick bay, barber shop, laundry, etc.). There will also be areas for training cadets and an imposing area designed for use as the captain's cabin and for receiving visitors. There are two bridges on the main deck, one for steering the ship and a second for training cadets.

**Requirements**

As a military vessel, distribution on board is strictly hierarchical, with cadets, crew, instructors and officers all bunking in separate areas. The contract also required meeting strict regulations on thermal and acoustic insulation and fireproofing, as well as demanding conditions on durability and ease of maintenance of the materials used. As well as designing the interiors to these specifications, Oliver Design also took charge of building them, including the installation of insulation, primary deck covering, decorative flooring, bulkheads, ceilings, furniture and a vast range of decorative details. The interiors are of particularly high quality, and floors and furniture in the most representative areas are timbered in fine woods.

A team of 30 staff worked on the project over an 11-month period. The ship was launched in October last year, and was officially delivered to the Indonesian Navy on September 12, 2017.

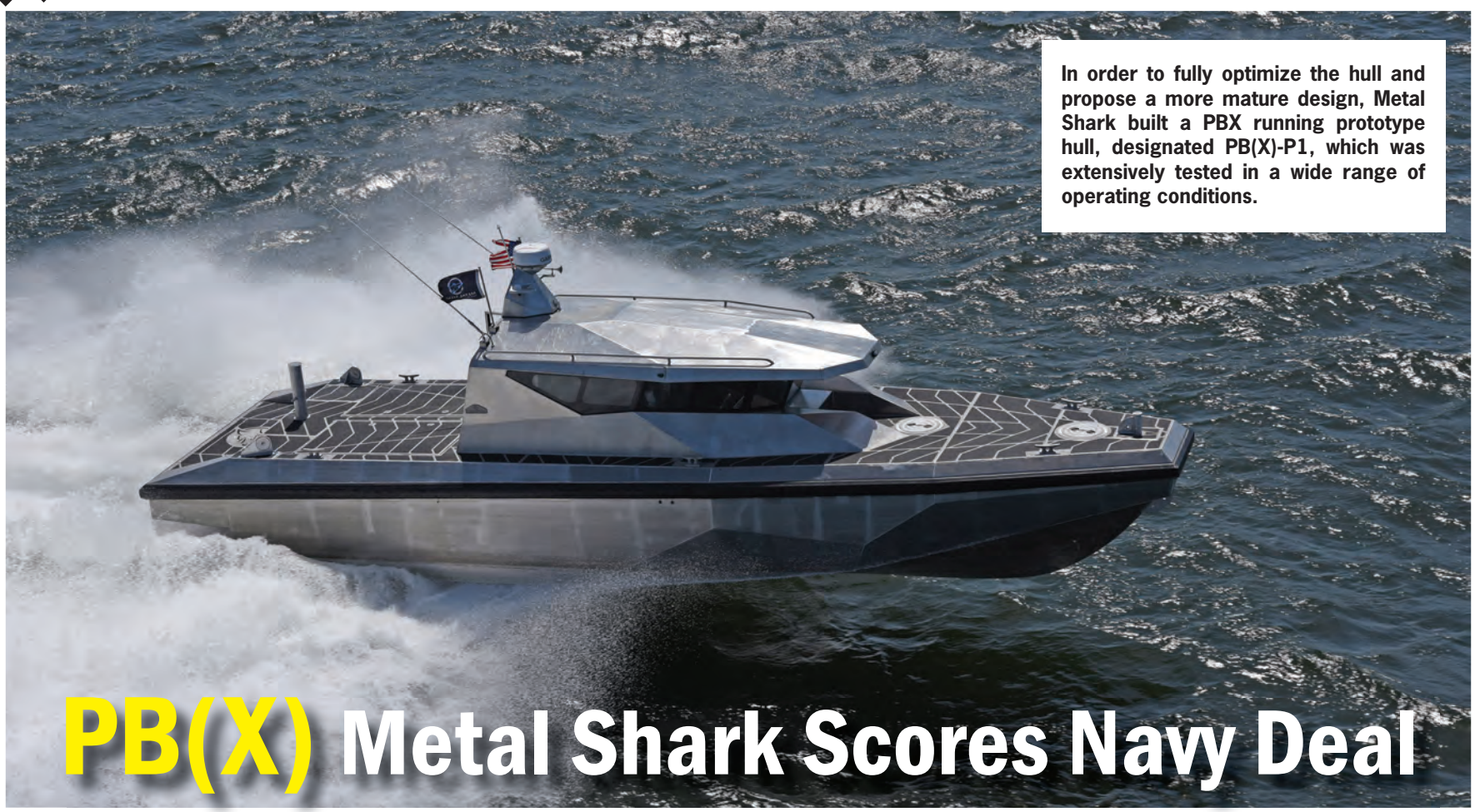
Oliver Design, based in the Basque Country (Spain), has long experience in designing and fitting out classic sailing ships. Jaime Oliver, the firm's founder and CEO, worked with the former Celaya shipyards on planning and construction of the training ships Guayas (Ecuador), Gloria (Colombia), Simón Bolívar (Venezuela) and Cuauhtémoc (Mexico), all built on Bilbao's Nervion estuary in the 1970s and 1980s. Juan José Alonso was the last manager of the shipyard, which closed in 1988 and was in charge of contracting and construction for these four iconic vessels. He has been brought in as a consultant on the Bima Suci project.

In 2006, Oliver Design also participated in alteration and upgrade work to the Spanish navy's Juan Sebastián Elcano and in design and outfitting of the Corwith Cramer, used to train students from the Sea Education Association, Boston University (USA). It was the first training vessel in the world to be certified by the U.S. Coast Guard and the last ship to be launched at the Celaya Shipyards in 1988. The contract for design and construction of the Bima Suci was signed in the Indonesian capital Jakarta in November 2012, following an international competition called by the country's defense ministry, which attracted a dozen tenders. Freire shipyards' successful tender was submitted with the collaboration of Oliver Design, who were responsible for the architectural design and interiors, and the German firm Detlev Loell & Partners, which supplied the rigging and sails. Construction of the vessel began in the shipyard in Vigo in October 2015.

The Indonesian Navy's new cadet-training ship combines a classic design with the latest naval technologies. Its 1,300 kW main engine can reach speeds of 12 knots, with a maximum speed under sail of 15 knots. Like its predecessor, the ship will take part in international races and good-will missions.

A crew of 66 sailors, under the command of Captain Sutarmono, have been carrying out sailing exercises on board the Bima Suci before undertaking on September 18 the maiden voyage to its home port in Surabaya, on the north coast of the island of Java. The journey is expected to take around 60 days from the port at Vigo.

***Watch the Sea Trials of Bima Suci at https://vimeo.com/234972052***



In order to fully optimize the hull and propose a more mature design, Metal Shark built a PBX running prototype hull, designated PB(X)-P1, which was extensively tested in a wide range of operating conditions.

Metal Shark

# PB(X) Metal Shark Scores Navy Deal

Metal Shark won the contract to produce the U.S. Navy's next-generation patrol boat, the PB(X), the replacement for the fleet of force protection boats currently in use with Navy Expeditionary Combad Command's Coastal Riverine Forces (CRF). Subject to annual appropriations, the Navy intends to replace approximately 100 to 160 of its existing 25-ft. and 34-ft. CRF patrol boats with the larger and more modern PB(X) platform over the next 15 years.

The Navy has placed an initial, immediate order for 11 of the new vessels. Under the terms of the award, potentially worth over $90 million, Metal Shark will build up to 50 PB(X) vessels for the Navy, along with trailers, spares and training packages, as well as technical support. The winning PB(X) design is a 40-ft., welded-aluminum pilothouse patrol boat designed by Metal Shark's in-house engineering team. The PB(X) is powered by twin diesel inboards and water jets. Metal Shark designed a moderate aft deadrise, wide-waterplane, sharp-entry hull form that not only achieves 35+ knot sprint speeds while displaying superb dynamic stability in a range of conditions, but also offers enhanced handling and greatly reduced operating cost at the 10-15 knot escort and cruise speeds where the vessel will spend the bulk of its operational life.

The PB(X) features ballistic protection and can be armed with a range of crew-served and remotely operated weapons systems.

The PB(X) will be built at Metal Shark's Jeanerette, Louisiana production facility, which specializes in the rapid, serialized assembly of military patrol boats.

Other significant military fleet builds currently underway at the facility include ongoing production of the Navy's 32' Force Protection Boat – Medium (FPB-M) and 26' High Speed Maneuverable Surface Target (HSMST), and the U.S. Coast Guard's 29' Response Boat – Small (RBS).

# MV Werften Delivers River Cruise Ship

Just a few weeks after delivery of the Crystal Bach, shipbuilder MV Werften delivered Crystal Mahler, the second of four Rhine Class ships for client Crystal River Cruises. After the ceremonial change of flags, the ship was christened at the outfitting quay of MV WERFTEN in Wismar.

Like its sister vessel, the 135 x 11.4-meter wide river cruise ship was specifically designed for exploring Europe's rivers. It complies with the highest safety and navigation standards, including a permanently staffed, state-of-the-art navigation system as well as Azimuth thrusters for optimum maneuverability.

The design of the luxury ship was intending to resemble that of private yachts. The interior of the Crystal Mahler boasts light and airy public areas with floor-to-ceiling glass walls as well as spacious suites with horizontal sliding windows. Other onboard facilities include three gourmet restaurants, a spacious spa and fitness area and a swimming pool with a glass roof.

The ship carries 110 guests in 55 all-balcony suites along with a crew of 68.

MV Werften

Lauren Barfield, godmother of the Crystal Mahler, releases the bottle of champagne

## Sanmar Delivers for Svitzer

The delivery of Svitzer Avon to the Port of Bristol in the U.K. signals the completion of Sanmar's six boat build contract as part of Svitzer's tugboat replenishment program known as the Silver Bullet Project. The conclusion of this order brings the collaboration between the Turkish tug builder and Canadian tug design specialist Robert Allan Limited (RAL) to a number in excess of 150 vessels. All six of Svitzer's new high performance tugboats are RAL designed RAstar 2800 E designs designated by the builder as the Sanmar Terminal Class measuring 28.2m x 12.6m. Each has a bollard pull in excess of 70 metric tons derived from a propulsion plant comprising a pair of MTU 16V4000 M63 diesel engines, each rated 2,000 kW at 1,800 rpm, and each driving a Schottel SRP 460 fixed pitch Rudderpropeller unit in ASD configuration. However, a number of modifications to the standard class were incorporated to meet this customer's operational needs and other preferences and have been ABS classed with Towing Vessel and FIFI1 notations.

## Gowind 2500 Corvette

Naval Group

Naval Group delivered its first Gowind 2500 corvette to the Egyptian Navy. The ceremony last month took place in Lorient in the presence of Admiral Ahmed Khaled, commander in chief of the Egyptian Navy, Hervé Guillou, President and CEO of Naval Group and senior officials of the French Navy and the French armament procurement agency. Delivered just 36 months after the order was placed, the corvette Ens Elfateh is the first of the four units ordered by the Egyptian Navy.

The corvette Ens Elfateh is the fourth vessel to be delivered to Egypt by Naval Group. It forms part of a strategic and long-term partnership with Egypt. For the record, Naval Group delivered a FREMM frigate in 2015 and two Mistral-class LHDs in 2016.

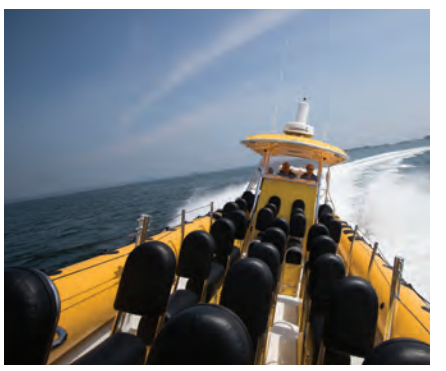
The particularly modular design of the Gowind corvette allowed Naval Group to respond to the specific expectations of the Egyptian Navy, whilst ensuring particularly attractive delivery lead times. The same Gowind design is now offered to other clients keen to acquire a high-performance and "sea-proven" vessel, which demonstrated during its sea trials that it fully delivers on all its promises.

Ribcraft

# RibCraft 12.5

The largest offering in the RibCraft line, the RibCraft 12.5 delivers the ultimate offshore platform. By combining RibCraft signature deep V hull and bow sheer with an extended waterline and generous beam the 41 ft. RIB makes easy work of virtually any sea condition.

Designed for extended passages and operations requiring large payload capacities, the 12.5 offers incredible design flexibility. From a simple center console for optimal work space to multiple seating arrangements for crew and passenger transport to cabin arrangements for all weather protection or overnight accommodations, this flagship model answers the needs of tour operators, security and patrol operations, military applications, and discerning recreational boaters alike. Standard equipment includes: Center console; 450 gallon fuel capacity; Hydraulic steering; 1670 dtx Hypalon tube with 11 chambers; Pressure relief valves; and more.



**Ribcraft 12.5 Specs**

| | |
|---|---|
| LOA: | 41 ft. |
| Beam: | 11.5 ft. |
| Internal Length: | 36.1 ft. |
| Internal Beam: | 8.2 ft. |
| Tube Diameter: | 22 in. |

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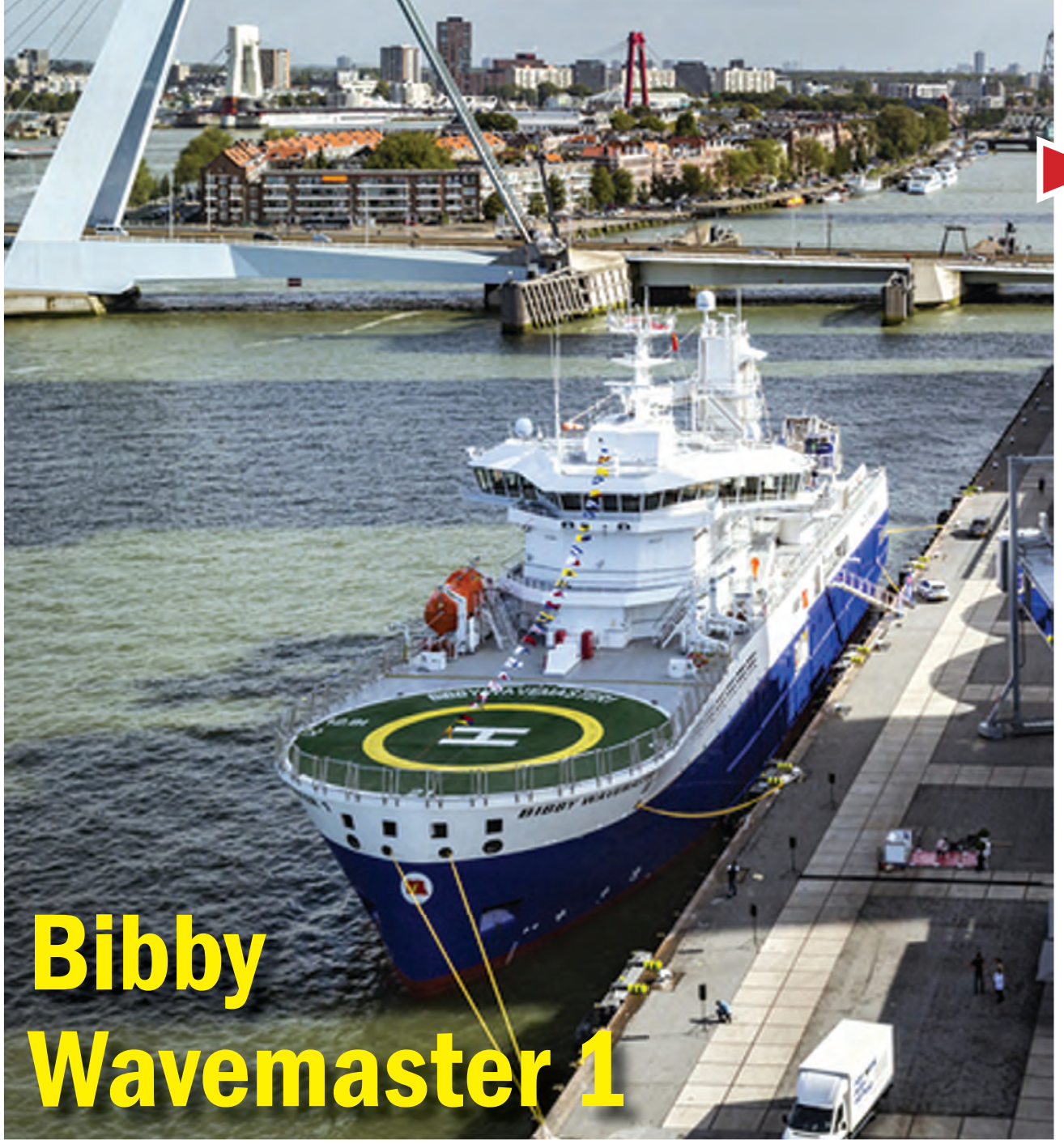


Damen

# Bibby Wavemaster 1

The naming ceremony of the Bibby WaveMaster 1 took place on September 6 at the cruise terminal in the Port of Rotterdam in front of more than 125 guests from the U.K.-based Bibby Group, Damen and a range of industry partners. More than 10 members of the Bibby family attended while the Damen family was represented by Chief Commercial Officer Arnout Damen. The naming, by Lady Sponsor Jacky Blaikie, is the culmination of a program that began nearly four years ago to develop a vessel that could meet the needs of the offshore wind industry in an efficient, economic and environmentally-responsible way.

The Bibby WaveMaster 1 is the first of Damen's new class of purpose-built Service Operations Vessels (SOV) with Walk-to-Work (W2W) capability. The Damen Group identified the need for such a vessel in 2013 following consultations within the offshore renewables industry and launched a research program that set out to develop an entirely new concept from the ground up in cooperation with a number of key suppliers.

The design that came out of this process combined DP-2 and a new motion-compensated gangway with an innovative hull design, a revolutionary internal layout, and a comprehensive range of additional innovations designed to increase efficiencies and reduce costs.

# Bulk Shipping & Lightering

The extensive network of rivers and channels that make up the waterways of the area around Ho Chi Minh City, gain an added complexity with the Saigon River that runs parallel to the Mekong Delta.

The shallower inland waters require a wide range of specialized boats. Among these are the lightering ships that bring cargos from deep draft ships, up to shallow draft inland ports. A recently delivered series of 60 by 12-meter vessels for the lightering of bulk cargos used Cummins engines.

The small ships carry 1,520-ton cargos, such as coal or cement, in a single large hold set between the forward pilothouse and an aft accommodation block. The single engine, a Cummins KTA19-M3, provides 600 HP to a 6:1 reduction gear. The Cummins dealer, Song Long Engineering Services Co Ltd. of Ho Chi Minh City, supplied the engines. With the Saigon River crowded with heavily laden small boats, speed is restricted so the 600 HP is more than adequate and safe for the passage.

The boats are designed with double hulls to provide multiple ballast tanks to maintain a limited air draft on empty voyages and to clear the low bridges. These boats play an important role in developing river shipping in an effective manner.

# Positive Signals

*The Sealite story starts similar to other engineering stories: a problem identified, a solution imagined, a product created in a garage. The product that Jeff Procter created in 1982 to help better mark aquaculture sites has grown into an international marine and aviation illumination powerhouse with manufacturing on three continents and presence globally. As Sealite prepares to move into its new purpose-built factory in Australia,* Maritime Reporter & Engineering News *speaks with Chris Procter, CEO, Sealite for his insights on the path ahead.*

**By Greg Trauthwein**

All photos courtesy Sealite

The Sealite story starts in 1982 when it began manufacturing marine aids to navigation.

"My father started the business literally from the garage," said Chris Proctor, noting that accounting was his father's day job, but Jeff Procter was, and is, an avid electrician, hobbyist and inventor. Sealite, in fact, was literally born on a local fishing trip, when Jeff noticed that one of the first aquaculture farm sites were using cheap roadside markers as perimeter markers for the aquaculture farm.

He thought, "I can do better than that," said Chris. So he made a product, took it down to the local farmer and asked him to try it. "That's how it all began: spotting a need and fulfilling it."

From those humble beginnings in Melbourne, Australia, the company grew slowly, but eventually started to rapidly expand its product and service offering, and today its range of navigation aids has expanded to include; marine lanterns, high-precision sector lights, leading lights, bridge lighting, rotationally-molded buoy products, power-systems, and products to provide safe environments for maritime customers worldwide.

## The Tech Turn

In the early years Sealite continued to grow, albeit slowly as up until the late 1990s the business remained an after hours and weekend endeavor for Jeff Procter, primarily serving aquaculture farms around Australia. "It was in the late 1990s that LED technology became bright enough to make a navigation marker out of it, and that's when he moved from incadescent to LED," said Chris. "That was when the business really started to take off."

In Chris' estimation, a key strength of the business is not only identifying a need, but simultaneously finding the best technology to fulfill that need. "Incadescent to LED was a huge paradigm shift because an LED can last 60,000 hours, where as an incadescent needs to be changed every six months," said Chris, a change which saves millions of dollars in service alone when considering the vessel and personnel resources that must be taken to get out and access the light.

"We are constantly looking at new technologies to help expand our business, from monitoring and control technologies, effectively eliminating the customer's need to physically visit the light offshore; to accessing the asset remotely via satellite or VHF," said Chris.

In summarizing the key differentiators of Sealite's products verus others in the marketplace, Chris is succinct: "Engineering around optical design, engineering around mechanical fitting, circuitry and software."

"You might think of aids to navigation as a boring product, but in fact there is actually a lot of technology built in," said Chris. "We have just recently introduced some products that use BlueTooth, meaning that a coast guard vessel can pull along side, and instead of getting off of the ship to access the buoy to check things like battery voltage and latern functionality and other diagnostics ... they can do it from a tablet from their vessel. This is saving time and money while also reducing risk."

Keeping up with advances in technology means investing in design and manufacturing facilities, and since the early 2000s Sealite has steadily invested in itself, in Australia as well as the U.K. and U.S. The culmination will arrive next year when Sealite opens its new 95,000 sq. ft. purpose-built factory in Australia.

# Safety @ Sea


***"We have just recently introduced some products that use BlueTooth,*** *meaning that a coast guard vessel can pull along side, and instead of getting off of the ship to access the buoy to check things like battery voltage and latern functionality and other diagnostics ... they can do it from a tablet from their vessel.* ***This is saving time and money while also reducing risk."***

***Chris Proctor*** *(right), CEO, Sealite pictured with his father & Sealite founder* ***Jeff Proctor***

***Sealite manufactures products used globally that are engineered for a long, cost-effective life. And soon it will be domiciled in its new purpose-built HQ in Australia.***

## The Family

Chris came into the business in 2001, and while he has a Bachelor's degree in Science, he counts his Masters in Marketing as the perfect counter balance to his father's accounting mind. "I don't know if I ever realized that this was something that I wanted to do; it's just what I did," said Chris.

Building on innovative ideas and products, evolving them from the garage start-up to the full company and factory scale  is a slippery slope, with the failure rate far exceeding success. In this regard, Chris said a key pivot point for the company was profesionalizing the manufacturing process. "When you grow from the garage to 140 people in three countries (Australia, U.K., U.S.) the bigget change is putting in place the systems and processes to ensure that people in multiple locations have access to the same knowledge and database, and are 'working off of the same page,'" said Chris.

Chris takes a cue from his father's management style in helping to keep everyone working toward the same goal. "Getting out, talking to people, literally wandering around to find out what they are doing and how they are doing it – from the factory floor to your customers – is paramount to our success," said Chris. "My father is still in when he can be, working in engineeering and product development, helping to identify new opportunities. I don't think that he'll ever be out of the business, nor would we want him to be."

## Custom AtoN

Like any industry, the aids to navigation business is competitive, but it's fragmented, too, according to Chris Procter. "There are many buoy manufactureres, there are several LED manufacturers, but there really is no other company with a global footprint that has the whole system to sell turnkey solution for ports & port facilities, from manufacture to installation and maintenance.

The Sealite advantage according to Procter is the company's penchant for bringing in-house almost all aspects of design and production, from design to tooling and mold making. While Procter admits that this is a capital intensive approach in terms of plant, equipment and people, he believes the benefit is bigger: "Our key strength is our ability to offer a turnkey solution with our own propietary products. This is really attractive as we can better control the quality and the cost, and we can offer a high level of customization when a customer needs it." Another advantage is manufacturing on three continents, meaning manufacturing some of the larger buoy products closer to the customer, with tremendous cost savings in shipping.

> **On cyber security**
>
> ***A physical aid is hard to hack.***

## Virtual AtoN

While Sealite is game to adopt new technologies and it has partnershisp to offer virtual aids to navigation, according to Chris Procter, CEO, most customers still prefer a physical produce. "Most of our customers are opting for a real navigation aid where we have a buoy, a light and an AIS transponder broadcasting its position. It is a permanent installation, and we're doing a lot of that work in the U.K. for instance, predominently for offshore wind farms. We (and many of our customers) see VATONs as complimentary, not replacement for real aids." And in a world where the size and scope of cyber attacks continues to grow, Procter offers a blunt assessment of real versus virtual: "A physical aid is hard to hack."


BARKE high-lift flap rudders for

# Dredge Magdalen

Van der Velden Marine Systems (VDVMS) in conjunction with Ships Machinery International, Inc. (SMI) equipped the newly launched Jones Act Trailing Suction Hopper Dredge (TSHD) with BARKE high-lift flap rudders. The dredge Magdalen (hull 256), is under construction at Eastern Shipbuilding Group, Panama City, Fla., and is scheduled to be delivered to its owner, Weeks Marine, before the end of 2017.

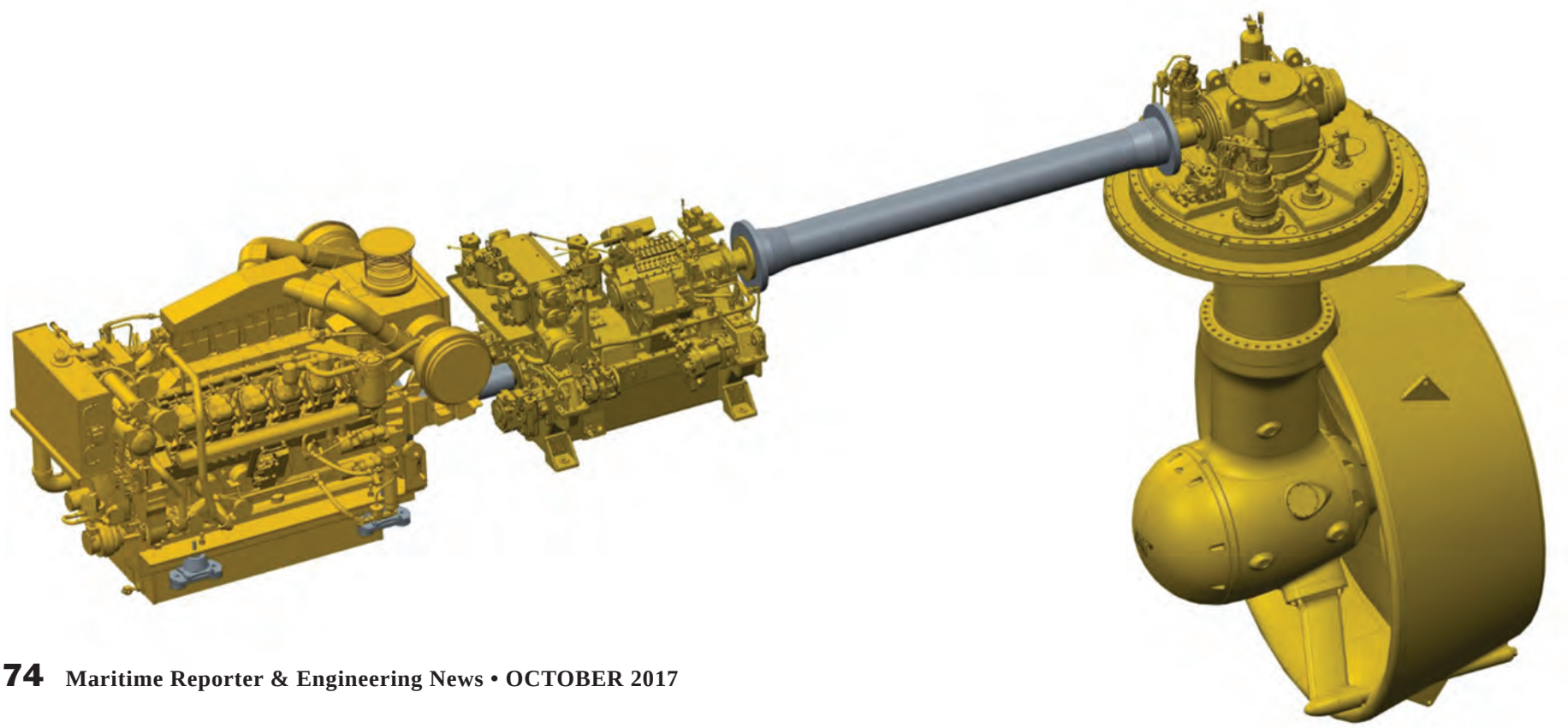
VDVMS has long experience in providing one of the most effective rudder design for this type of vessel, as dredgers have requirements for precise steering while maneuvering at very slow speed at one moment and then they require accurate and efficient course keeping when not in dredging mode.

Magdalen measures 356 x 80 ft., with a molded depth of 27.2 ft., and features efficient, clean-burning engines and state-of-the-art frequency drives to power the vessel's pumps, jetting and other electrically driven systems. Magdalen has twin GE 16V250 main engines producing 5,685hp each, and a GE 6L250 auxiliary engine producing 2,009hp. Two 3,400kW shaft generators and a 1,500 kW auxiliary generator make up the ship's primary power generation plant. In addition the vessel is also equipped with a Caterpillar C18 emergency/harbor generator that produces 425 kW. Magdalen is outfitted with a 730 kW fixed pitch tunnel thruster unit.

# New Propulsion System from Caterpillar Marine

Caterpillar Marine, partnering with Caterpillar Innovation & Technology Development Division (ITDD), is in the process of developing a proprietary advanced propulsion system for marine applications. The Cat Marine Advanced Variable Drive (AVD) is a patented system that leverages Caterpillar's experience with heavy duty continuously variable transmission (CVT) technology, advanced controls and power system integration knowledge.

In this joint development, ITDD is leading a cross-functional innovation team to develop and validate a fully integrated marine propulsion system from bridge interface down to the propellers. "Thanks to the flexibility enabled by the innovative Caterpillar AVD technology, the speed of the vessel's engines can be modulated and optimized independently from the speed of the fixed pitch propellers. The speed of the propellers can be varied continuously throughout their full speed range. In addition, the power of the main and auxiliary engines can be channeled independently or jointly to propel the vessel," said Igor Strashny, Caterpillar ITDD Engineering Manager with responsibility for Advanced Marine Propulsion. "These features provide superior vessel performance and maneuverability while facilitating significant improvements in fuel and operational efficiency. Caterpillar AVD technology is a cost effective and fully integrated hybrid propulsion solution that reduces maintenance costs and has conventional service requirements. The system is scalable to meet requirements of a wide range of vessel types, applications, power levels and enables effective downsizing of engines without the loss of performance," said Strashny.



Caterpillar

Twiflex

**The Twiflex Turning, Locking & Braking (TLB) System consolidates three usually separate interfaces and functions into one design package.**

## Turning, Locking Braking System

During the operational life of a ship or ocean going vessel, regular maintenance of the propulsion shaft and propeller is required to ensure that all components are operating efficiently and safely. Part of the process requires aligning and locking the shaft in place to enable this work to be carried out by the ship's engineers. Twiflex Ltd. has launched a Turning, Locking & Braking (TLB) System that provides a compact solution to allow the shaft position to be set and locked when the vessel is stationary.

The Twiflex TLB consolidates three usually separate interfaces and functions into one design package. The modular TLB system is configured to allow customers to select and install one of the turning, locking and braking functions individually or choose paired or complete turning, locking and braking functionality depending on project requirements. The system was originally commissioned by a manufacturer of marine propulsion systems for a next generation, ice-breaking vessel. The manufacturer wanted a solution which could be easily operated to perform multiple functions. Twiflex Ltd. was approached because of its extensive experience providing braking systems for marine applications. Twiflex engineers designed and delivered the complete package so that it could be quickly integrated with the rest of the drive train.

The Twiflex TLB-180 includes a split disc with gear tooth profile which is mounted onto a customer supplied flange, making the need to disassemble the propulsion shaft unnecessary. An integrated motor driven geared pinion (Turning Gear) engages with this disc to provide up to 140 kNm turning torque at 0.6 rpm in either direction. Two direct, hydraulically applied, spring released caliper brakes acting on the disc provide 180 kNm braking torque and along with a manual locking device, can be used to hold the propulsion shaft.

The Twiflex TLB is now available with turning torques up to 454 kNm, braking torques up to 862 kNm and a variety of turning speeds. The complete system is supplied with brakes, actuation and locking devices, controls and hydraulics and will be delivered as an engineered product, built in-house to meet specific application requirements.

# 3D Printed Propeller

A prototype of the world's first class approved ship's propeller manufactured using 3D printing techniques has been produced by a cooperative consortium of companies that includes Damen Shipyards Group, Rotterdam Additive Manufacturing LAB (RAMLAB), Promarin, Autodesk and Bureau Veritas.

The 1,350mm diameter propeller – named WAAMpeller – was fabricated from a Nickel Aluminium Bronze (NAB) alloy at RAMLAB in the Port of Rotterdam. The propeller was produced with the Wire Arc Additive Manufacturing (WAAM) method using a Valk welding system and Autodesk software. The triple-blade structure uses a Promarin design that is used on Damen's Stan Tug 1606. With production complete, the WAAMpeller will be CNC milled at Autodesk's Advanced Manufacturing Facility in Birmingham, U.K.

The 400kg prototype 3D printed propeller represents a steep learning curve of the understanding of material properties, according to Kees Custers, Project Engineer in Damen's R&D department. "This is because 3D printed materials are built up layer by layer," Custers explained. "As a consequence, they display different physical properties in different directions – a characteristic known as anisotropy. Steel or casted materials, on the other hand, are isotropic – they have the same properties in all directions."

Because of this critical difference, one of the first steps was to carry out extensive testing of the material properties of the printed material to ensure compliance to Bureau Veritas standards. "This involved printing two straightforward walls of material – then using a milling machine to produce samples for lab testing of tensile and static strength," Custers said.


Damen

"The challenge has been to translate a 3D CAD file on a computer into a physical product. This is made more complex because this propeller is a double-curved, geometric shape with some tricky overhanging sections," Custers said.

Highlighting RAMLAB's capacity to print objects with maximum dimensions of 7x2x2 meters, said Wei Ya, Postdoctoral Researcher from the University of Twente at RAMLAB, "For large scale 3D metal deposition, the WAAMpeller is really groundbreaking for the maritime industry."

This first prototype WAAMpeller will be used for display purposes, and planning for a second example is underway. "We start production of a second propeller with class approval later next month – using all the lessons we have learned over the past few months," Custers noted. "We are aiming to install this second one onto one of our tugs later this year."

# Finnish Know-How & Arctic Situational Awareness

It is widely accepted that Finland houses a treasure trove of information regarding Arctic operations, courtesy of its geographic location and long experience in the region. This knowledge base has expanded further, as Finnish maritime innovators Fleetrange and KNL Networks have reportedly pioneered cost-efficient Arctic situational awareness – the "Fleetrange with KNL" solution – using a combination of IoT, Cloud and 3G/HF hybrid telecommunications technology. The solution includes up-to-date weather-, ice-, ship tracking and sensor data and sustains critical email communications in areas where satellite communications are expensive, unreliable or non-existent.

The companies are also reportedly the first in the world to provide Arctic maritime situational awareness, IoT and communications using technology independent of satellites.

The technology trial has successfully been completed onboard Salén Ship Management's luxury Expedition Cruiser "Hebridean Sky" during her Arctic season around Svalbard. The trial included the Fleetrange IoT cloud platform which uses KNL's long-range – up to 10 000 km – 3G/HF hybrid communications technology to provide Arctic situational awareness between the ship and shore side office as well as sustaining critical operational email communications for the captain. The trial was conducted during Hebridean Sky's Arctic season 2017, where the ship was fitted with KNL's patented cognitive and software defined radio equipment and Fleetrange IoT units. The Fleetrange cloud-based situational awareness solution was used to deliver up-to-date weather data and ice charts automatically to the ship and receiving IoT sensor data from the ship.


Photo by Noble Caledonia Expedition Team

# Floating Offshore Wind Turbine Design

University of Maine

The American Bureau of Shipping (ABS) has completed the design review of the Front End Engineering and Design (FEED) documentation for the VolturnUS, a floating offshore wind turbine (FOWT), developed by the University of Maine Advanced Structures and Composites Center.

"UMaine is pleased that its innovative design became the first floating wind turbine concrete semi-submersible hull to be reviewed by ABS, and found to meet the ABS requirements," said Dr. Habib J. Dagher, P.E, UMaine Composites Center executive director and principal investigator.

"After 10 years of development, this is a major milestone for our program, and we expect the VolturnUS hull concept to continue to attract private investment from the U.S. and around the world. Nearly 70 percent of the U.S. offshore wind resources can be captured using the UMaine VolturnUS technology, and we are looking forward to working with offshore wind developers across the U.S."

The patented VolturnUS, developed by the UMaine Advanced Structures and Composites Center is based on a concrete four-column semi-submersible hull concept. In 2013, the UMaine team successfully tested the feasibility of the concept by developing a 1:8 scale model and deploying it in Castine, Maine. Maine Aqua Ventus I, GP, LLC, is now leading a full-scale, two turbine demonstration project called New England Aqua Ventus I, a 12 megawatt (MW) floating offshore wind pilot project to develop a clean, renewable energy source off Maine's shores.

This pilot project will demonstrate the innovative VolturnUS at full-scale as a viable and economical alternative for offshore wind developments in water depths greater than 50 meters.

## ABB Digitalizes Maritime Maintenance

ABB has added 'Fleet Intelligence' to its ABB Ability Collaborative Operations software, providing a single overview of their ship system maintenance needs. Fleet Intelligence is designed to deliver greater efficiency and more precise inspection scheduling, better spare parts availability, asset protection and prolonged equipment service life, helping to minimize the requirement for service engineer visits. It combines cutting-edge IT for marine equipment maintenance planning, including advanced analytics of data in the cloud, with ABB's domain knowledge and technical services support remote operational centers.

"Moving away from theoretical maintenance based on supplier manuals means that the customer can create work orders that feed into a planned maintenance system based on actual need rather than service manual generalities," said Kenneth Nakken, ABB Marine & Ports Head of Digital Service. "Closing the loop on maintenance assessment, equipment monitoring and analytics gives customers the application they need to fully digitalize vessel operations."

Fleet Intelligence harnesses the integration at the heart of shipboard ABB Ability systems such as Integrated Automation and Remote Diagnostics.

Sea Machines

## Sea Machines
# First Autonomy Product for Marine

Sea Machines Robotics released of the company's first product, an Autonomous Control System for commercial marine vessels, the Sea Machines 300. The company claims that this is the world's first industrial-grade control system that is standardized for work boats. The technology is designed to provide an upgrade in vessel operations by enabling remote and autonomous control of conventional boats, courtesy of:

- **Direct Remote Command**, which is remote joystick control of a boat with a 1-kilometer range. Giving an operator the flexibility of not being confined to a vessel during operations; boosting productivity and safety of many traditional marine tasks.
- **Autonomous Command**, is Sea Machines computer control which pilots a boat in preplanned or routine long duration missions with real-time self-awareness to keep the vessel on plan, on course, away from obstacles, while giving increased capability, predictability, amplified safety, and operator peace of mind.

Sea Machines is going to market by offering the Sea Machines 300 system to offshore and near shore vessel operators, boat builders and a network of retrofit partners.

The Sea Machines 300 is built on marine industrial Siemens components and computers. It interfaces with vessel instruments and systems and is ready to integrate with an array of propulsion configurations. The system takes data from typical navigation sensors for real-time awareness and perception, including DGPS, AIS, and radar. All autonomy system components are mounted in a marine IP67-rated electrical enclosure.

The system is supplied with a user interface, called Sea Machines TALOS, which provides computer controlled autonomy options, or direct joystick control. TALOS can also control multiple vessels from a single station. In autonomy mode, the user can select from programmable commands such as: planned waypoint tracking/grids, collaborative navigation with other vessels, all while incorporating multi-objective decision making. The Sea Machines 300 features embedded collision avoidance algorithms and abides by parts of IMO's COLREGs navigation rules.

**Retail price of the Sea Machines 300 system is $98,500 and it is available for order.**

## Wärtsilä Bridge for Mega Yachts

Wärtsilä was contracted to supply its Nacos Platinum integrated bridge system for two new mega yachts; one an 85 m long vessel and the other 91 m long, being built in Greece. In addition to the systems, Wärtsilä will also provide the project management, engineering, pre-wiring of the consoles and system commissioning services, thus delivering a complete solution.

**www.wärtsilä .com**

Wärtsilä

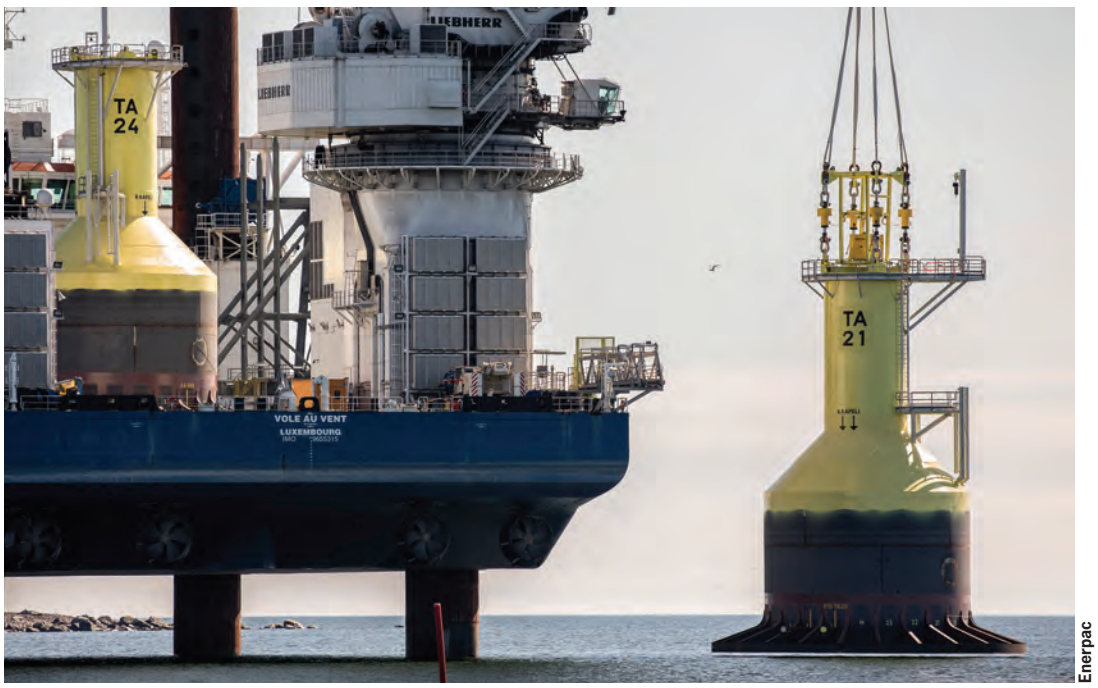
## Kelvin Hughes Rolls Out New ECDIS

Kelvin Hughes introduced its latest (ECDIS) designed for commercial ships as well as naval and coastguard patrol vessels. Available as a standalone ECDIS or as part of a truly multifunction bridge display network with multiple operator positions, the new ECDIS is type approved to meet the latest International Hydrographic Office (IHO) and International Maritime Organization (IMO) standards. It offers an optional mil-spec processor with advanced LED display hardware in a fully integrated, easy to install and retrofit, console package.

**www.kelvinhughes.com**


Kelvin Hughes

# Offshore Wind Base Positioning



Enerpac

A Synchoist load positioning system, from Enerpac Heavy Lifting Technology, has been used by Finnish wind power production company, Suomen Hyötytuuli Oy, for the installation of gravity base foundations at the Tahkoluoto Offshore Wind Farm, Pori, Finland. The Tahkoluoto Wind Farm is the world's first offshore windfarm designed for operation in ice conditions. Operated by Suomen Hyötytuuli Oy, the Tahkoluoto Offshore Wind Farm includes 10 offshore wind turbines, each with a capacity of 4.2 MW. Following preparation of the seabed to provide a level surface, the hollow gravity base foundations weighing up to 500 tons were installed. During lowering through the splash-zone and positioning on the seabed, the Synchoist system was used below the crane hook to ensure the foundation remained as close to vertical as possible. This prevented damage to the leveled seabed surface and facilitated the subsequent addition of the turbine tower.

To handle the foundation lift without distorting the transition piece flange used to connect the turbine tower, an X-frame lifting tool was developed that connected to the flange. It comprised a lifting frame with four SyncHoist, self-contained PLC-controlled, double acting, push-pull hydraulic cylinders at each corner, and diesel hydraulic powerpack with battery back-up.

High precision maneuvering of the foundation by the Synchoist system was performed wirelessly by an operator working alongside the foundation installation team. This allowed the operator to lift and lower each cylinder independently to balance, tilt and position the load in response to feedback from four leveling sensors on the foundation.

During installation, the level of the foundation was measured, and where necessary adjusted, at every stage of the lift. At the quayside before the lift – this was to establish the centre of gravity for each foundation, on the vessel, just above the water, 3-4 m into the splash-zone, and 5 cm above the foundation.

# Snakes, Not Ladders

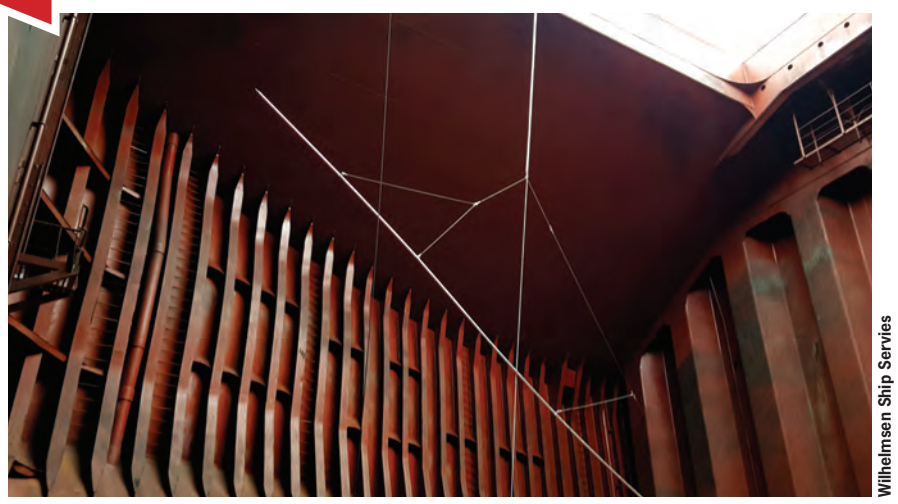
Wilhelmsen Ships Service (WSS) is launching a new line of cargo hold cleaning equipment enabling crews to get the right cleaning results, irrespective of where stains are located, scaffolding, ladders and specialist-cleaning crews are no longer required. Expanding its cargo hold cleaning line in direct response to clearly identified customer needs, WSS has developed a high pressure lance and add-on heating system tailor made for cleaning difficult to reach areas of the hold.

**Dubbed Anaconda, because of its size and power, with the high pressure lance measuring over 20 meters and attached hose 25 meters, WSS believe cargo hold stains in elevated areas should no longer pose vessels crews any problems.**

"The price of the complete kit may at first glance seem prohibitive, but compare it to several failed attempts at cleaning the hold or the typical outlay for a professional cleaning gang for a single job," said Mark Oliver Wittburg, Product Marketing Manager, Cleaning Solutions, WSS. "The Anaconda system will all but pay for itself after its second use".

With specialist, third-party cargo hold cleaning gangs charging anything between $10,000 and $50,000 per job, depending on the circumstances, providing the vessel's crew with the right tools to achieve the correct cleaning results first time around will be preferable for many owners and operators.

**www.wilhelmsen.com**



Wilhelmsen Ship Servies

## Type Approval for Cyber Enabled Components

As the marine industry moves toward the incorporation of digital, connected solutions onboard ships, Lloyd's Register (LR) released Type Approval Requirements for components within Cyber Enabled Systems on board Ships. According to LR, introduction of this type approval procedure is important, as it defines a critical point in the evolution of smart technology implementation within the marine and offshore industry – delivering an assurance system that provides confidence in the market for the supply of cyber enabled components.

The type approval procedure will address:

**1. Production quality assessment in the supply chain**

**2. Marine environment testing for cyber enabled components**

**3. Verification of the cyber functions, such as communication and cyber security**

Shipyards and designers will be able to select type approved component parts to build cyber enabled 'smart' ship systems with a new level of confidence and quality indication. Manufacturers of components will be able to demonstrate their product as meeting LR's requirements on the above and differentiate their products in the market.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# Rolls-Royce, Google Cloud Ink Landmark Deal

Rolls-Royce

The maritime industry's exhaustive push toward autonomy just received a boost in the form of a deal signed between Rolls-Royce and Google to develop further its intelligent awareness systems.

The agreement was signed at the Google Cloud Summit in Sweden, and it **allows Rolls-Royce to use Google's Cloud Machine Learning Engine to further train the company's artificial intelligence (AI) based object classification system for detecting, identifying and tracking the objects a vessel can encounter at sea.**

"While intelligent awareness systems will help to facilitate an autonomous future, they can benefit maritime businesses right now making vessels and their crews safer and more efficient," said Karno Tenovuo, Rolls-Royce, SVP Ship Intelligence. " By working with Google Cloud we can make these systems better faster, saving lives."

Google Cloud Machine Learning Engine uses the same neural net-based machine intelligence software which powers many of Google's products including image and voice search. Machine Learning is a set of algorithms, tools and techniques that mimic human learning to solve specific problems. Machine learning methods analyse existing data sets with the objective of learning to recognise patterns in training data, making predictions from previously unseen data.

The bigger the data set the more complex the patterns the model can recognize and the more accurate the predictions. Today, well trained machine learning models can perform predictive analytics faster and better than a human.

Rolls-Royce will use Google Cloud's software to create bespoke machine learning models which can interpret large and diverse marine data sets created by Rolls-Royce. Rolls-Royce's expertise in the maritime sector will be used to prepare the data to train models, ensuring that it is relevant and in sufficient quantity to create statistical significance. As part of the machine learning process, the models' predictions are evaluated in practical marine applications, allowing the models to be further refined.

# Cloud Fleet Manager Software

OSM Maritime Group will introduce Cloud Fleet Manager (CFM) from Hamburg-based software provider Hanseaticsoft as part of its business digitization strategy. Using Hanseaticsoft's Cloud Fleet Manager the company intends to improve and accelerate its internal business processes and increase the quality and availability of its data for employees and customers. It also wants to increase connectivity for staff and improve its customer communications.

OSM Maritime will use the CFM portal as a central data and information platform - the system will replace other technology including its existing decentralized data storage system. With more than 11,000 employees distributed globally, it was particularly important for the company to allow them to connect them with each other easily to further strengthen their collaborative relationships. Since the CFM is cloud-based, a single database can be used and accessed independently of location and time. This approach brings additional value, not only because the employees are able to interact in an intelligent way, but also there is no further need to manually request and forward information. The company wants to further optimize its processes and create interactive, virtual teams that meet the requirements of the maritime industry.

With the introduction of Cloud Fleet Manager, the company has deliberately chosen a new generation of fleet management.


OSM Maritime Group

**"Many shipping companies have been stuck in the past due to their adherence to antiquated processes and software solutions,"** said Bjoern Sprotte, Managing Director of the Technical Management & Services division. **"With increasing digitalization it is important to adapt to changing events and market requirements and not only to react but also to develop innovations together with partners."**

Additionally, the field of inspections is undergoing further modernization. In the future, the Inspection Report App will be used in order to no longer rely on pen, paper and camera. With this, it is possible to perform the entire process completely digitally, simply and quickly on a smartphone or tablet. The company was particularly impressed by the ability to create questionnaires directly on a smartphone, to fill them out and then synchronise the results with the office. A subset of all 500 vessels managed by the company that is supervised by the technical management, is initially equipped with the software.

## Hunter Marine Chooses MarineCFO Solutions

Hunter Marine

Hunter Marine's Operations Division has selected MarineCFO's Vessel 365 fleet optimization technology, along with Endurance Personnel for managing time cards, scheduling and personnel reporting functions, and Endurance Maintenance, a complete maintenance solution from scheduling, outside services and capacity planning to quality control. Darrick Lee, Hunter Marine Purchasing Manager said the company will use MarineCFO's suite of products to achieve Subchapter M compliance and to help streamline existing business processes. According to MarineCFO, its Vessel 365 product exceeds SubChapter M recordkeeping requirements as a Towing Vessel Record and as an alternative TSMS recordkeeping solution. Vessel 365 stores Subchapter M mandated "objective evidence," helping to minimize operators' exposure to Jones Act litigation.

HydroComp, Inc. provides technical software for ship resistance and propulsion predictions, propeller sizing and propeller design. Our unique products and consulting services in the areas of forensic analysis, submersibles, propulsion analysis and propeller design highlight our distinct capabilities. We address the needs for greater fuel efficiency, cost savings and increased productivity.
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Autoship Systems Corporation (ASC) is a marine software developer of load planning software, loading instrument software and integrated CAD/CAM programs. For over 35 years ASC has continued to provide innovative software solutions that save clients valuable time and money on each project they undertake.

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sales@autoship.com • www.autoship.com

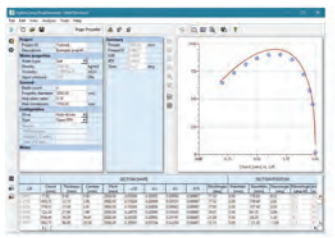
Adept Solutions

L-R; Adept Solutions' Client Director, Steve Penman and Managing Director, Richard Alderson

## Software Specialist's North Sea Contract Coup

Adept Solutions announced a major North Sea contract win, providing hydrocarbon accounting services to Maersk Oil UK. The seven-figure contract is the company's largest North Sea contract to date, and comprises the build and provision of a bespoke, integrated production management system for Maersk's Culzean field. The agreement also includes support and maintenance services until 2027. Established in 2006, Adept Solutions provides accurate hydrocarbon accounting, via its innovative AXIS software. Providing a definitive, single source of verified production information, it is designed to be easily configured to the individual requirements of each client. The AXIS product range includes: AXIS Production, providing a comprehensive solution for production data management; AXIS Tanker, supporting tanker scheduling for FPSOs and onshore storage facilities and AXIS Gas, used to manage the commercial gas process.

## New Features to HydroComp PropElements 2017



HydroComp, Inc. implemented new features to HydroComp PropElements 2017 – the propeller "design for performance" code. While built upon the same analytical code-base as an earlier version of PropElements, it is touted as a novel program that tackles the component-level hydrodynamic needs of naval architects. The latest update offers a predictive tool that can handle custom and semi-custom propeller analysis, and allow naval architects (and propeller specialists) to investigate propeller iterations at later design stages. Now, HydroComp PropElements can evaluate a propeller or walk a design much closer t o 3D CFD in a shorter time frame and at reduced cost, according to the developer.
Key upgrades include:

- New interface using the HydroComp common GUI (as found in PropCad and NavCad).
- Deployed with equivalent "Premium Edition" features, such as scripting, batch processing, and floating network licensing.
- New high blade-loading curvature correction for low Jaccuracy.
- Interactive smoothing of pitch and/or camber during the optimum design process.
- Ability to define a nozzle or tip-gap "effectiveness."
- Added section cavitation criteria for chord and nose radius.
- Calculation of body forces for CFD and FEA. (Now a vital companion for higher-order analyses)
- Prediction of induced volumetric flow rate (for "pump action" applications).
- Additional data exchange with NavCad (for initial design) and PropCad (for manufacture).

## Brightoil: New Online Trading Platform

Brightoil launched a new suite of online tools that it says are designed to transform the way bunker fuel is traded globally. Brightoil Bunker Online E-Delivery platform is live and includes a Forward Fixed Price (FFP) facility making the process of buying bunkers anywhere in the world faster, easier and more transparent. The new facility enables customers to lock-in bunker cost for up to nine months forward thereby reducing exposure to major price swings. The features of the new E-Delivery platform include:

- Price Risk Management providing real time FFP indications; up to nine months forwards are tradable;
- No initial margin or margin calls;
- Online nomination of FFP contracts for physical delivery and optional cash settlement.

Brightoil says the platform gives bunker buyers security and transparency to a level that has never been available in the market before. The platform is accessible via PC, Mac, iOS and Android mobile apps.


ABB

## ABB Software for Stena Line

Stena Scotia's fourth generation DEGO IV speed governor and actuation system adds roll-damping and a new fuel-saving dimension to vessel performance management software. An upgraded vessel control software package is delivering measurable operational efficiency gains to Stena Line for the freight ferry Stena Scotia within a month of commissioning, said ABB, whose DEGO IV advanced speed governor and actuation system onboard has been enhanced so that control over the vessel's propulsion system minimizes roll and rudder movements, delivering a new way of saving fuel while also improving crew comfort. The 120-trailer capacity, twin-propeller Stena Scotia is deployed in daily Ro-Ro services between Rotterdam and Killingholme in the U.K. The efficiency gains available using the DEGO system depend on ship type, sea conditions and the type of autopilot used. First installations of DEGO IV, made across 10 vessels, indicate fuel saving potential in the range of 5-7 percent, with roll reduction between 20-40 percent and rudder reduction of 15-60 percent, ABB said. **www.abb.com**


Incat Designs

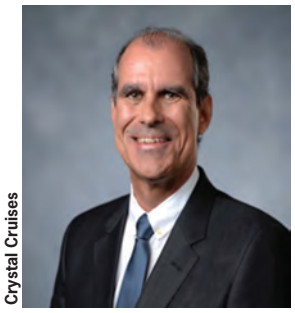
Hercus


Transas

Coles


Damen

L to R: Hadewych Reintsema, Andrea Trevisan & Henk Grunstra, Damen


Crystal Cruises

Wolber


Mass Maritime

MMA Honors Wiernicki



## Obituary: Philip Hercus, Incat Designs

Incat Crowther announced the passing of **Philip Hercus**. As the founder Incat Designs, Phil is one of the forefathers of Incat Crowther, and indeed the marine design industry in Australia. Hercus' contribution to the industry was immense. In the 1980s, he pioneered the introduction of aluminium catamaran passenger vessels in tourist areas such as the Great Barrier Reef before developing the Wave Piercing Catamaran. In 1990, one of these vessels won the Hales Trophy for the fastest crossing of the Atlantic Ocean for a commercial vessel. Phil was awarded the Order of Australia in 1995 for his services to the industry. In addition, Phil gave many young draftsman and naval architects their start in the industry, many of whom went on to form their own design businesses that have kept Australia at the forefront of the field.

## Transas CEO Frank Coles Honored

Transas Chief Executive **Frank Coles** won 'gold' in the Most Influential People of the Year category of the 2017 Golden Bridge Business and Innovations Awards, an award which acknowledges his ability to communicate his vision for the maritime industry in the digital age. The Golden Bridge Awards are an annual industry and peer recognition program based in San Francisco that honors the Best Companies, Products, Innovations, Management Teams, Executives and Influencers from around the globe. A master mariner and maritime lawyer by training, Coles was selected by the Golden Bridge judging panel for his ability in being the driving force behind the maritime industry's digital age and a new world of automated shipping. Coles is passionate about the need for "competence not certification."

## Giaever to Take Over as CFO at NAT, NAO

**Bjorn Giaever** will take up his position as the new chief financial officer (CFO) at Nordic American Tankers Limited (NAT) and Nordic American Offshore Ltd. (NAO) from October 16, 2017. Outgoing NAT/NAO CFO, Turid M. Sorensen, will leave her administrative duties before the end of 2017.

## Trevisan to Head Damen Cruise Sales

Damen Shipyards Group appointed **Andrea Trevisan** as its new Sales Director Cruise New Building. The announcement coincides with Damen's ambitions to further expand its standing in the Expedition and small size Cruise Vessels market. Trevisan will oversee Damen's global commercial and marketing activities with regard to new build cruise vessels. "I will be a sort of Damen brand 'Ambassador' for the cruise industry, working in close coordination with our well established regional sales organisation and with my colleagues **Henk Grunstra**, Product Director Cruise and Ferries, and Mrs **Hadewych Reintsema**, Design and Proposal Manager Cruise."Manager Cruise."

## Wolber Named New CEO at Crystal Cruises

Genting Hong Kong appointed travel industry veteran **Tom Wolber** as President and CEO of Crystal Cruises, effective September 15. Wolber brings to the role over three decades of experience in general management, operations, newbuild construction and business development. He joins Crystal most recently from the Walt Disney Company where he served in various executive roles for 28 years, 10 of which were with Disney Cruise Line where he served as Senior Vice President of Operations. Wolber succeeds outgoing president and CEO **Edie Rodriguez**.

## Wiernicki Named MMA's Person of the Year

**Christopher J. Wiernicki**, Chairman, President and CEO of ABS, was recognized for his distinguished career of excellence, innovation and service to the maritime industries by the Massachusetts Maritime Academy (MMA) as this year's recipient of the Maritime Person of the Year Award on September 21, 2017 in New York City. Wiernicki holds a Bachelor of Engineering in Civil Engineering from Vanderbilt, where he was later inducted to Vanderbilt University School of Engineering Academy of Distinguished Alumni; a Master of Science in Structural Engineering from George Washington University, where he was later elected to the George Washington University Engineering Hall of Fame; a Master of Science in Ocean Engineering from Massachusetts Institute of Technology (MIT); and completed Harvard University's Advanced Management Program.

## Michelsson to Join Evac

Evac appointed **Tomas Michelsson** as the President, Offshore and Merchant business area, effective January 8, 2018. Michelsson will replace the former President, Claes Rudling, who has retired during the summer.

## Parpala Joins The Switch

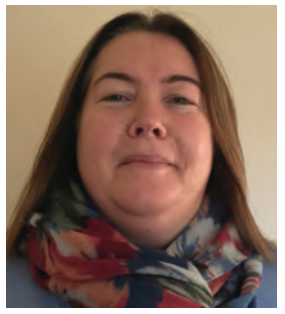
The Switch has recruited **Ville Parpala** as Director, Product Marketing, Marine Solutions, as it targets its ambition of achieving growth of 200 percent in the marine segment across the next five years. The firm, a specialist in the development and supply of advanced drive train solutions, said it will leverage Parpala's vast experience and con-

Evac

Michelsson

The Switch

Parpala



Stone Marine Services

Hall

BMT Group

Haycock

Crowley Maritime

L to R: Comerford, Yonkman and Sayvetz with Crowley's Victoria Ellis. Not shown: Kent Treptow.

tact book, to push its ability to deliver enhanced efficiency, cost savings and environmental performance to the shipping industry worldwide.
Parpala joins The Switch from Marioff Marine, where he spent almost three years as Area Sales Manager for Germany and Italy.

## Stone Marine Names Hall Ops Manager

Stone Marine Services promoted **Gwynneth Hall** to the position of Operations Manager. She will be responsible for operations across all the Stone Marine Services Group companies and report to the Directors. Hall, who has a degree in business and finance, has been with the company for the last 14 years during which time she has held positions in Accounts, Service Co-ordination and Management, and Human Resources.

## Haycock to Lead Biz Dev at BMT

BMT Group subsidiary BMT Asset Performance has appointed **Paul Haycock** as Business Development Lead for Surface Systems. Haycock joins BMT after 35 years in the Royal Navy, serving on a variety of ships and in a diverse range of environments.

## Crowley Awards Scholarships

Crowley Maritime Corp. awarded four California Maritime Academy (CMA) students with Thomas B. Crowley Sr. Memorial Scholarships during the Containerization and Intermodal Institute's Connie Awards dinner in Long Beach, Calif. Crowley's **Victoria Ellis**, manager, regulatory training, presented the awards to recipients **Samuel Comerford, Alex Yonkman, Kent Treptow** and **Tyler Sayvetz**.

- Comerford, class of 2020, is a sophomore from Fallbrook, Calif., and a marine transportation cadet. He chose to attend the Academy because he believes a career on the water would be an "awesome adventure," and is setting his sights on a cadet position on a Crowley ship in the future.
- Yonkman, class of 2018, is a junior from Whidbey Island, Wash., majoring in marine engineering technology, with a minor in marine science. After graduation, he hopes to work on a research vessel.
- Treptow, class of 2018, is a junior from Huntington Beach, Calif., and has returned to college to pursue a second degree in marine transportation because of the potential for "an interesting career combining relatively high earnings and a desirable schedule."
- Sayvetz, class of 2017, is a senior marine transportation cadet from Vashon Island, Wash. While operating tour boats in Seattle, he chose Cal Maritime "as a way to upgrade [his] license and enter a hands-on industry full of interesting career possibilities."

## Glander Promotes Three

Glander International Bunkering has made three internal promotions in its Dubai office: former sales manager **Morten Langthjem** will take on a new role as managing director; **Alex Margaritis**, former team leader and senior bunker/lubricant trader, will take over Langthjem's former position as sales manager; and **Hernan Ortiz** will be appointed to a newly created role as business development manager.

## Phoenix Hires Long, Turner

Phoenix International Holdings, Inc. announced that **Matthew Long** has joined the company as General Manager (GM) of its Largo, Md. headquarters office, and **Troy Turner** has been appointed as Area Manager for itsBayou Vista, La. Location. Long will oversee all aspects of Phoenix's government and commercial deep ocean search and recovery service lines, as well as the company's Engineering and R&D work, while Turner will be responsible for overseeing and directing the day-to-day activities of the Bayou Vista office, and actively pursuing growth opportunities for all Phoenix services in the area.

## Hasuly Joins The Shearer Group

The Shearer Group, Inc. (TSGI) announced a new addition to its naval architecture, marine engineering and marine surveying firm, **Anne Hasuly**, P.E. Hasuly has recently joined TSGI as a naval architect. She is a licensed Professional Engineer in the state of Texas and holds a B.S. in Naval Architecture & Marine Engineering from the University of New Orleans.

## NAVTOR Opens U.S. Office

E-navigation specialist NAVTOR said it has set its sights on the U.S. shipping market with a new office opening in Seattle. The Norwegian business, which has built a global network of facilities since forming in 2011, has, until now, serviced the territory from its Norway headquarters. However, growing demand has prompted the team to establish NAVTOR USA Inc. The new office opened in Seattle's central business district. City native **Todd Allen**, who has worked as U.S. Area Sales Manager for NAVTOR from Norway since 2016, will drive the growth.

## GAC Announces IT Appointments

The GAC Group announced two key IT management appointments as the group aims to maximize the effectiveness of digital tools to serve


Glander Bunkering
Ladekjaer


Phoenix Intl.
Long


Phoenix Intl.
Turner


TSGI
Hasuly


Navtor
Allen


Wärtsilä
Wärtsilä Gear Box



and grow its global business. **Facundo Mendoza**, previously Senior IT Manager, has been appointed as Group General Manager – Technology Business Management (TBM). **Helena Lemon** has joined GAC as Technology Business Manager – Management Information.

### Siemens to Build Wärtsilä Marine Gear Boxes

Wärtsilä and Flender (Siemens AG, Mechanical Drives) reached an agreement that will transfer the assembly and testing of Wärtsilä's marine gear box portfolio to the Siemens Mechanical.

### Winch System from Curtiss-Wright

Curtiss-Wright's Defense Solutions division was selected by Raytheon Integrated Defense Systems to provide its innovative winch system technology for use in a new Variable Depth Sonar (VDS) for the U.S. Navy LCS class.

### Conrad Awarded 9-Barge Build Contract

Conrad Shipyard was awarded a contract to build four anchor barges, two deck barges and three crane barges for Great Lakes Dredge & Dock Company LLC (GLDD), headquartered in Oak Brook, Ill. The four anchor barges will be built in Louisiana at Conrad's Morgan City Shipyard, and the deck and crane barges will be built at its shipyard in Orange, Texas.

### MacGregor Sets up Head Office in Singapore

MacGregor, part of Cargotec, has established a head office in Singapore, bringing to an end a period of more than three years where the company operated with a virtual head office. MacGregor president **Michel van Roozendaal** and vice president of finance **Jani Oksanen** will relocate to Singapore as of October 1, 2017.

### C-Job Naval Architects Turns 10

What started as a small naval architectural office 10 years ago has grown into an established and well-respected company. Using various projects and a growing number of in-house disciplines to demonstrate how the Dutch ship design firm C-Job Naval Architects has developed, Managing Director Basjan Faber looks back at some of the most significant moments of the previous decade. "In terms of vessels, there have been numerous milestones," Faber said. "The St. Pierre – a Trailing Suction Hopper Dredger – was probably the first, for which we provided the concept, basic and detailed Design. Another memorable project was the cargo vessel Atlantic Dawn." With regard to C-Job's scope of expertise, clients approach the company for all the major disciplines of ship design. This includes naval architecture and hydromechanics, mechanical engineering and structural engineering. "As we have grown, we have consistently looked at the expectations of our clients. We have developed into a company that has all the in-house skills to design a product with fully integrated mission equipment."

### Vard Wins Cruise Contract

Vard Holdings Limited won a contract for the design and construction of an expedition cruise vessel for Coral Expeditions of Australia. Developed by Vard Design in Norway in cooperation with the customer, the vessel is specially designed for

## New Ship Repair Facility in Portsmouth

Britain's largest independent ship repairer and marine engineering services provider Burgess Marine announced that in partnership with Portsmouth City Council it has opened a new ship repair facility within Portsmouth Commercial Port, U.K. Burgess Marine Ltd. and MMD Shipping Services Ltd, part of Portsmouth City Council, launched this new strategic partnership in style with an emergency three-day alongside docking for Wightlink Ferries. The quay, over 100m in length, offers both 'flat water' and 24/7 access to a 100T crane. The facility is ideal for commercial shipping, yachts and defense centric tonnage.

**A new partnership between Burgess Marine and MMD Shipping Services Ltd, part of Portsmouth City Council, launched at Portsmouth Commercial Port with emergency work for Wightlink.**

**(Photo: Burgess Marine Ltd.)**

Conrad

**Cutter Suction Dredge Alaska previously delivered by Conrad to Great Lakes Dredge & Dock.**

Kleven

**Kleven Verft in Ulsteinvik, Norway.**

small ship expedition cruises to remote and exotic destinations in the regions of Asia-Pacific. The VARD 6 01 design measures 93.5 x 17.2 m, with room for 120 guests. The ship environment is geared for daily shore expeditions, lectures and briefings. Delivery is scheduled from Vard Vung Tau in Vietnam in 1Q 2019.

### Investors Give Kleven a Boost

A group of investors has pumped nearly $40 million into Norwegian shipbuilder Kleven. Norwegian cruise, ferry and cargo operator Hurtigruten and its owners, Petter A. Stordalen and TDR, will be the largest partner in the newly established company, with a 40% share. Current owners, John Kleven AS and H-Invest AS are bringing new funds to the company. Additional investors include Åge Remøy and Magnus Roth's InYard Invest, Lürssen-Group, and Per Lillebø. Kleven is currently building hybrid powered expedition vessels MS Roald Amundsen and MS Fridtjof Nansen for Hurtigruten.

### Silversea Orders Newbuild from Fincantieri

Silversea Cruises has place an order worth about $371.4m) with Fincantieri for the construction of a new ultra-luxury cruise ship. The new vessel, tentatively named Silver Moon, will be a sister ship of Silver Muse, delivered in April at Fincantieri's shipyard in Sestri Ponente, Genoa. At 40,700 gt and with a capacity to accommodate 596 passengers on board, the ship will maintain the small-ship intimacy and spacious all-suite accommodations.

### RSC Bio EALs Available through Drew

RSC Bio Solutions said its Environmentally Acceptable Lubricants (EALs) are now available through Drew Marine's global supply chain network, which is capable of delivering to more than 900 ports worldwide. The following RSC FUTERRA and RSC EnviroLogic products are currently stocked and delivered by Drew Marine:

- **RSC FUTERRA HF Series** renewable hydrocarbon hydraulic fluids are Ecolabel certified and formulated to withstand extreme conditions and corrosion while operating in severe environments. Available in 46, 68 and 100 viscosity grades. Typical applications include stern tubes, controllable pitch propellers, stabilizers and various deck equipment.
- **RSC EnviroLogic GO Series** readily biodegradable synthetic gear oils are formulated for harsh marine applications. Available in 68 and 100 viscosity grades. Thrusters, controllable pitch propellers and ancillary equipment are some of the typical applications that use gear oils.
- **RSC EnviroLogic Grease** biodegradable Lithium Complex grease is designed for multipurpose use in harsh marine applications, including RO/RO ramp latches, steering gear and centralized pump systems with extended distances.

**RSC Bio Solutions Gains Kawasaki OEM Approvals:** The company also announced that it has received OEM approvals for use in Kawasaki Heavy Industries' Controllable Pitch Propellers (CPP) and side thrusters.

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### Rolls-Royce Acquires Rights

Rolls-Royce acquired from G+L innotec the exclusive rights of use for a new tech for the electrically-assisted charging of off-highway combustion engines in the power range above 450 kW. The new invention from the development and engineering services provider based in Laupheim in southern Germany is protected by patents and has thus not been available on the market to date. Rolls-Royce plans to offer engines of its MTU brand with this technology as of 2021.

### Torqeedo Acquired by DEUTZ

Engine manufacturer DEUTZ acquired Torqeedo, provider of electric drive systems for watercraft. As an independent subsidiary of DEUTZ AG, Torqeedo will continue product development under its established Torqeedo brand and with its current leadership.

### EVAC to be Acquired by Bridgepoint

Evac is to be acquired by private equity group Bridgepoint. Headquartered in Espoo, Finland, Evac was established in 1979 and to date has completed more than 20,000 marine, 2,000 offshore, and 2,000 building projects for customers around the world. The company has offices in Brazil, China, Finland, France, Germany, South Korea, Norway, Sweden and the U.S., as well as representatives in more than 40 countries. Since 2014 Evac has been owned by the IK VII Fund. In the course of the fund's ownership, Evac has achieved strong growth, with turnover increasing by 55% and, in 2016, exceeding €100 million for the first time in the company's history.

### LGH Acquires JDN's UK Hire Div.

Lifting Gear Hire (LGH) has acquired the Aberdeen, Scotland-based hire division of JD Neuhaus (JDN) Ltd., a manufacturer of hoists and crane systems for extreme environments. JDN, headquartered in Germany, will retain its other U.K. divisions, including sales and repair, and will remain an LGH supplier. The value of the transaction was not disclosed. The acquisition, which comes less than a year after LGH re-launched in the U.K. after a 10-year sabbatical, enhances the company's already substantial fleet of JDN products, principally air operated hoists. LGH will now be able to offer air hoists up to 100t capacity plus accessories. The Dyce facility will become LGH's third U.K. site, alongside Atherton, Manchester; and Rainham, London. In addition to infrastructure, the purchase includes four JDN employees who will be supported by existing LGH personnel and trained on the company's software and processes. In the short term, no additional recruitments are planned.

### IMS Buys OceanSaver Assets

Norway's IMS group AS signed a purchase agreement with the OceanSaver Trustee to acquire the ballast water treatment system manufacturer's intellectual property, certificates and assets following its bankruptcy filed on September 13, 2017. OceanSaver had sold approximately 200 ballast water treatment systems and was among the first suppliers to be approved by IMO, to successfully complete the stringent test regime by the U.S. Coast Guard and to obtain a USCG type approval in December 2016.

Insufficient liquidity has led OceanSaver's board of directors to file a petition to dissolve the company. In total, approximately 70 employees in Norway, South Korea and China will be affected. OceanSaver was among the first suppliers be approved by IMO and to successfully complete the stringent test regime by the U.S. Coast Guard and obtained a USCG type approval in December 2016.

MARITIME REPORTER AND ENGINEERING NEWS

# EDITORIAL CALENDAR

## JANUARY

Ad Close: Dec 21

### Ship Repair & Conversion

MARKET: Ferries & Riverboats
TECHNICAL: Maritime Propulsion Guide
DESIGN: U.S. Navy: Fleet of the Future
PRODUCT: Ship Repair Tools
SPECIAL REPORT: Bunker Fuel

**BONUS DISTRIBUTION**
**PVA Maritrends:** Jan 28-31, Savannah, GA

## FEBRUARY

Ad Close: Jan 22

### Cruise Ship Annual

MARKET: Clean Water Technologies
TECHNICAL: Satellite Communications: (IOT)
DESIGN: Emission Technologies: An Eye on 2020
PRODUCT: Green Marine Fuels & Lubricants
SPECIAL REPORT: Cruise Ports

**BONUS DISTRIBUTION**
**Seatrade Cruise Global:** Mar 5-8, Ft. Lauderdale, FL
**CMA Shipping 2018:** Mar 12-14, Stamford, CT
**Asia Pacific Maritime:** Mar 14-16, Singapore
**Green Ship Tech:** Mar 21-23, Copenhagen, DK

## MARCH

Ad Close: Feb 21

### Annual World Yearbook

MARKET: Maritime Simulation
TECHNICAL: Dredging
DESIGN: Cranes, Davits & Hoists
PRODUCT: Marine Coatings & Corrosion Control
SPECIAL REPORT: Marine Medicine

**BONUS DISTRIBUTION**
**Sea Japan**: Apr 11-13, Tokyo, Japan
**Sea-Air-Space:** Apr 9-11, National Harbor, MD
**Clean Waterways:** Apr 4-5, St. Louis, MO
**NACE Corrosion:** Apr 15-19, Phoenix, AZ

## APRIL

Ad Close: Mar 21

### Offshore Energy Annual

MARKET: Offshore Wind Power
Technological: Cyber Security
DESIGN: RIB & Patrol Boat Report
PRODUCT: Marine Rope and Cable
SPECIAL REPORT: The Autonomous Ship

**BONUS DISTRIBUTION**
**OTC:** Apr 30- May 3, Houston, TX
**AUVSI Xponential:** Apr 30- May 3, Denver, CO
**Danish Maritime Days:** May 2-4, Copenhagen, DK

## MAY

Ad Close: Apr 20

### Marine Propulsion Edition

MARKET: Mediterranean Cruise & Ferry
TECHNICAL: Fuels, Lubricants & Additives
DESIGN: Workboat Design & Construction
PRODUCT: Navigation: Marine Electronics, Radar & ECDIS
SPECIAL REPORT: U.S. Coast Guard Annual

**BONUS DISTRIBUTION**
**Inland Marine Expo:** May 21-23, Saint Louis, MO
**Posidonia 2018:** Jun 4-8, Athens, Greece
**Marine Money Week:** Jun 18-20, New York, NY
**ITS 2018:** Jun 25-29, Marseille, France
**Seawork:** Jul 3-5 Southampton, UK

## JUNE

Ad Close: May 21

### Green Marine Technology

MARKET: U.S. Navy Report
TECHNICAL: Hybrid propulsion systems
DESIGN: Fire Safety Systems
PRODUCT: Pumps, Valves, Pipes & Insulation
SPECIAL REPORT: Energy Efficiency Systems

**BONUS DISTRIBUTION**
**Electric & Hybrid Marine World Expo:**
Jun 27-29, Amsterdam, NL

All information may be subject to change

MARITIME REPORTER AND ENGINEERING NEWS

# EDITORIAL CALENDAR

## JULY

Ad Close: Jun 21

### Marine Communications Edition

MARKET: Tugboat, Towboat & Barge
TECHNICAL: Oil Spill Response & Recovery
DESIGN: Offshore Accommodation
PRODUCT: Maritime Software Solutions
SPECIAL REPORT: Maritime Robotics & Drones

**"MR White Papers: Edition 1"**
**Special Content Electronic-Only Version Edition**

## AUGUST

Ad Close: Jul 20

### The Shipyard Edition

MARKET: Heavy Lifting Solutions: Maritime Cranes, Winches, Windlasses & Capstan
TECHNICAL: Big Data
DESIGN: Icebreakers
PRODUCT: Ballast Water Technologies
SPECIAL REPORT: SMM Technology Preview

**BONUS DISTRIBUTION**
**SMM 2018:** Sep 4-7, Hamburg, Germany
**GasTech 2018:** Sep 17-20, Barcelona, Spain

## SEPTEMBER

Ad Close: Aug 21

### Maritime Port & Ship Security

MARKET: Controls & Bridge Automation
TECHNICAL: Marine Firefighting, Safety & Salvage
DESIGN: Interior Design: Onboard Amenities
PRODUCT: Welding & Cutting Equipment
SPECIAL REPORT: U.S. Navy Report

**BONUS DISTRIBUTION**
**SHIPPINGInsight:** Oct 10-12, Stamford, CT
**Commerical Marine Expo:** Oct 17-18, Providence, RI

## OCTOBER

Ad Close: Sep 21

### Marine Design Annual

MARKET: Ship Classification Societies
TECHNICAL: Deck, Hull and Tank Coatings
DESIGN: Naval Architecture & Marine Engineering
PRODUCT: Software Solutions: CAD/CAM
SPECIAL REPORT: Propulsion, Thrusters & Gears

**BONUS DISTRIBUTION**
**SNAME:** Oct 23-27, Providence, RI
**EURONAVAL 2018:** Oct 23-26 Paris, France
**Seatrade Middle East:** Oct 29-30 Dubai, UAE

## NOVEMBER

Ad Close: Oct 22

### Workboat Edition

MARKET: Alternative Marine Fuels
TECHNICAL: Clean Water Technologies
DESIGN: Offshore Wind Power
PRODUCT: Multi Mission Boats; Patrol, Escort, Fire and Search & Rescue

**BONUS DISTRIBUTION**
**Workboat Show:** Nov 28-30, New Orleans, LA
**MAST:** Nov 28-30 New Delhi, India
**World Maritime Technology Conference:**
Dec 4-7, Shanghai, China
**Clean Gulf:** Dec 4-6, Houston, TX
**INMEX China:** Dec 5-7, Guangzhou, China

## DECEMBER

Ad Close: Nov 21

### Great Ships of 2018

MARKET: U.S. Navy Report
TECHNICAL: The Autonomous Ship
DESIGN: Marine Engine Guide
PRODUCT: Deck Machinery PRODUCT Guide

**"MR White Papers: Edition 2"**
**Special Content Electronic-Only Version Edition**
**Submission Deadline: Nov 15**

All information may be subject to change

# BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mark O'Malley at momalley@marinelink.com

### ANCHORS & CHAINS

Anchor Marine & Supply, INC., 6545 Lindbergh Houston, Texas 77087 , tel:(713) 644-1183, fax:(713) 644-1185, david@anchormarinehouston.com

### AUTOMATIC IDENTIFICATION SYSTEM

Saab AB (publ) TransponderTech, SE-589 41 Linkoping , tel:46 13 180000, fax:46 13 182377, Info.transpondertech@saabgroup.com

### AUTOMATIC SELF-CLEANING FILTERS

Forsta Filters, 8072 San Fernando Road, Sun Valley, CA , USA

### BARGE FABRICATION

McDonough Marine Service, 3500 Causeway Blvd., Suite 900, Metairie, LA , USA , tel:(504) 780-8100, fax:(504) 780-8200, pstant@marmac.net

### COMMUNICATIONS

David Clark Company (Wireless Headset Communication Systems), 360 Franklin Street, Worcester, MA 77060, USA , tel:(800) 298-6235 , www.davidclarkcompany.com/marine

### COMMUNICATIONS SERVICE

Delta Wave Communications, Inc., 8001 Hwy 182 E. Morgan City, LA 70380 , tel:(985) 384-4100, fax:(504) 617-6393, tom.clark@deltawavecomm.com contact: Tom Clark

### CORDAGE

Helkama Bica Oy, Lakimiehenkatu 4, KAARINA FI-20780, Finland , tel:+358-2-410 8700, sales@helkamabica.fi , www.helkamabica.com

### CRANE - HOIST - DERRICK - WHIRLEYS

DMW MARINE GROUP, LLC, 1123 St. Matthews Rd Chester Springs, PA 19425 USA , USA , tel:(610) 827-2032, dw@dmwmarinegroup.com contact: Doug Weidner, dmwmarinegroup.com/

### CYBER SECURITY

Gnostech Inc., 650 Louis Drive, Suite 190, Warminster, PA , tel:(215) 443-8660, sales@gnostech.com , www.gnostech.com

### DECK MACHINERY- CARGO HANDLING EQUIPMENT

Allied Systems Company, 21433 SW Oregon Street, Sherwood, OR 23462, USA , tel:(503) 625-2560, cranes@alliedsystems.com, www.alliedsystems.com

JonRie InterTech, LLC, 982 Whispering Oak Circle, Manahawkin, NJ , USA , tel:(609) 978-3523, bjdme@marinewinch.com contact: Brandon Durar, www.marinewinch.com

### DRILLS

Hougen Inc., 3001 Hogan Drive Swartz Creek, MI 48473

### DRY DOCK TRAINING

DM Consulting, 12316 Dormouse Road, San Diego, CA 92129, USA , tel:+1 858-705-0760, joe@drydocktraining.com

### EDUCATION

San Jacinto College, 8060 Spencer Highway Pasadena, TX 77505

### FILTRATION

Harmsco, 7169 49th Terrace Place Riviera Beach, Florida 33407

### FIRE FIGHTING

In-Mar Systems, 3011 S Ruby Avenue Gonzales, LA 70737 USA , tel:(225) 644-7063 ext 11, glynn@inmarsystems.com contact: Glynn Grantham, www.inmarsystems.com

### FUEL TESTING/BUNKER SURVEYS

Seahawk Services, 1501 Grandview Ave, West Deptford, NJ , USA

### FUEL TREATMENT

Advanced Power Systems / Fitch Fuel Catalyst, 18 Hemlock Drive New Hartford, CT.06057 , USA , tel:860-921-0009, info@fitchfuelcatalyst.com , www.fitchfuelcatalyst.com

### GLASS

Garibaldi Glass, 8183 Wiggins Street, Burnaby, BC. V3N 0C4 , tel:604.420.4527, fax:604.421.7678, duaner@garibaldiglass.com contact: Duane Rose, garibaldiglass.com

### GROUNDING & EARTHING BRUSHES

Sohre Turbomachinery, Inc., 128 Main Street, Monson, MA , USA , tel:413-267-0590, fax:413-267-0592, tsohre@sohreturbo.com contact: Tom Sohre, www.sohreturbo.com

### HYDRAULIC BRAKE CALIPERS

Twiflex by Altra Industrial Motion, 2800 Fisher Road, Wichita Falls, TX , USA , tel:(844) 723-3483, twiflex.info@twiflex.com , www.altramotion.com/market/marine/home

### HYDRAULIC SYSTEMS

Bay Ship & Yacht Co, 2900 MAIN ST. #2100 ALAMEDA, CA 94501 USA , tel:(510) 337-9122, rmaguire@bay-ship.com or ndelgavio@bay-ship.com contact: Richard Maguire or Nick Del Gavio, www.bay-ship.com

### LIFESAVING EQUIPMENT

CM HAMMAR AB, August Barks Gata 15 SE-421 32 Västra Frölunda (Gothenburg), Sweden , tel:+46 31 709 65 50, info@cmhammar.com , www.cmhammar.com

### LIFT EQUIPMENT

Kleeco, 10110 S. M43 HIGHWAY Delton, MI 49046

Lifting Gear Hire, 9925 Industrial Drive Bridgeview, IL 60455 , tel:708 598-4727 ext 111, christina.Czeszewski@lgh-usa.com

Tandemloc, 824 Highway 101(FONTANA BLVD) HAVELOCK, NC 28532

### MARINE TRANSPORTATION

Central Boat Rentals, Inc., P.O. Box 2545, Morgan City, LA , USA , tel:985-384-8200, fax:985-384-8455, earl@centralboat.com or gary@centralboat.com

### MARITIME TRAINING & SCHOOLS

Chesapeake Marine Training Institute, 3566 George Washington Mem. Hwy, Hayes, VA , USA , tel:(804) 642-0123, fax:(804) 642-1743, information@chesapeakemarineinst.com , www.ChesapeakeMarineInst.com

El Camino College, 13430 Hawthorne Blvd., Hawthorne, CA , USA , tel:(310) 973-3147, psutton@elcamino.edu

### MECHANICALLY ATTACHED FITTINGS (MAFS)

Viega, Mountain View Corporate Center Building 1, Suite 395 12303 Airport Way, Broomfield, CO , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

### MILITARY PATROL CRAFT MANUFACTURERS

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com , www.brunswickcgp.com

Tampa Defense USA, 4350 62nd Avenue North, Pinellas Park, FL , USA , tel:(813) 792-2114 / (813) 843-8737, robert.stevens@tampa-yacht.com

### MONITORING SYSTEMS

SPM Instrument, Inc., 780 Bailey Hill Rd. Suite #3 Eugene, OR. 97402 , USA , tel:541-687-6869, info@spminstrument.com , www.spminstrument.com

### NAVAL ARCHITECTS, MARINE ENGINEERS

3GA Marine, 208-1497 ADMIRALS RD VIEW ROYAL, Victoria BC Canada V9A 2P8

Bristol Harbor Group / The Shearer Group, 99 Poppasquash Road, Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, gbeers@bristolharborgroup.com contact: Greg Beers, www.bristolharborgroup.com / www.shearer-group.com

Brunswick Commercial & Government Products, 420 Megan Z Avenue, Edgwater, FL 80204, USA , tel:(386) 423-2900, kelsey.nemeth@whaler.com

Gilbert Associates, 100 Grossman Dr. Suite 205 Braintree, MA 02184 USA , tel:(781) 740-8193, jgilbert@jwgainc.com contact: John Gilbert, www.jwgainc.com

### PIPING INSTALLATION AND SERVICES

Tube-Mac Piping Technologies Ltd., 853 Arvin Avenue Stoney Creek, Ontario , tel:(905) 643-8823, fax:(905) 643-0643, sean.kennedy@tube-mac.com

### PRESS FITTINGS

Viega, Mountain View Corporate Center Building 1, Suite 395 12303 Airport Way, Broomfield, CO , USA , tel:904-315-3899, fax:888-782-6188, paul.switzer@viega.us contact: Paul Switzer, www.viega.us

### PROPELLERS

Hale Propellers LLC, 2 Custome Drive Old Saybrook, CT. 06475 USA , tel:860-399-4600, r3@halepropeller.com contact: Randy Hale, www.halepropeller.com

### PROPULSION CONTROL SYSTEMS

BAE Systems - HybriDrive Solutions, 1701 North Street, Endicott, NY , USA , tel:(607) 770-2083, carol.gorenflo@baesystems.com

### PROPULSION EQUIPMENT AND SERVICES

(Twiflex) by Altra Industrial Motion, 2800 Fisher Road, Wichita Falls, TX , USA , tel:(844) 723-3483, twiflex.info@twiflex.com , www.twiflex.com

### SEALS

Seco Seals, Inc., 1370 Logan Ave. Unit K, Costa Mesa, CA , USA , tel:(714) 546-3478, sales@secoseals.com contact: Jim Scott, www.secoseals.com

### SEATING

In-Mar Solutions, LLC, 3011 S Ruby Avenue Gonzales, LA 70737 USA , tel:(225) 644-7063 ext 15, toby@inmarsolutions.com contact: Toby Whitfield, www.inmarsolutions.com

The Springfield Marine Company, 1093 N. Cynthia Drive, Suite #1 Nixa, MO 65714

### SHIP REPAIR

Malin International, 320 77th street, Pier 40/41 Galveston, TX 77554

Metal Trades Inc., 4194 Highway 165 (PO Box 129) Yonges Island, SC 29449 USA , tel:(843) 889-5143, mdean@metaltrades.com contact: Megan Dean, www.metaltrades.com

### SHIPBUILDING-REPAIRS, MAINTENANCE, DRYDOCKING

Blohm+Voss GmbH, Hermann-Blohm-Strasse 3 20457 Hamburg Germany , tel:+49 (0) 40 3119 1400, shipservices@blohmvoss.com , www.blohmvoss.com

St. John's Ship Building, 560 STOKES LANDING ROAD Palatka, Fl. 32177 , USA , tel:386-328-6054, sganoe@stjohns-ship.com contact: Steve Ganoe, www.stjohnsshipbuilding.com

### SHIPYARDS

Grand Bahama Shipyard Limited, P.O. Box F-42623, Freeport, Grand Bahama , Bahamas , tel:+1 242-350-4000, enquiries@gbshipyard.com

### SURFACE PREP TOOLS

Water Cannon, 4300 West Lake Mary Blvd. Units 1010-424 , USA , tel:321-800-5744, sales@watercannon.com , www.watercannon.com

### VIBRATION AND THERMOGRAPHY (IR) TESTING AND PROGRAMS

Condition Analyzing Corp, 23 White Street Eatontown, New Jersey 07724 , USA , tel:800 586-8435, cac@cacvibe.com,www.cacvibe.com

### WASTE WATER TREATMENT

Environmental Marine, Inc., 711 Colyer Rd., Bronson, KY , USA , tel:(606) 561-4697, bobkenison@aol.com contact: Bob Kenison, www.envmar.com

### WATER JET SYSTEMS

Marine Jet Power Inc., 6740 Commerce Court Drive Blacklick, OH 43004-9200, USA, Columbus , tel:(614) 759-9000 , www.marinejetpower.com

### WINDSCREEN & WINDOW WIPERS

In-Mar Solutions, LLC, 3011 S Ruby Avenue Gonzales, LA 70737 USA , tel:(225) 644-7063 ext 15, toby@inmarsolutions.com contact: Toby Whitfield, www.inmarsolutions.com

Day Mate
California Maritime Academy
Full Time
Category: Vessel Operations
Job Location: 200 MARITIME ACADEMY DRIVE, JOB BULLETIN 26-0708 VALLEJO, CA, 94590-8181 USA
Contact
Email: noemails@jobelephant.com
Work Phone : (707) 654-1140
200 Maritime Academy Drive Vallejo, CA, 94590 USA
Description:
Day Mate
Classification – Administrator I
Time base – Full-time
This recruitment will remain open until filled. A review of applications will begin Wednesday, October 4, 2017 and the review period may end at any time thereafter.
ABOUT THE CALIFORNIA STATE UNIVERSITY MARITIME ACADEMY:
Established in 1929, California State University Maritime Academy, a campus of the California State University, is the only degree-granting maritime academy on the West Coast. Situated on the shore of the Carquinez Strait 30 miles northeast of San Francisco, the campus serves a student population of approximately 1060 undergraduates and 50 graduate students. The campus currently offers undergraduate degrees in Mechanical Engineering, Facilities Engineering Technology, Marine Engineering Technology, Marine Transportation, Global and Maritime Studies, and Business Administration.
A master's degree in Transportation and Engineering Management is offered as well as a number of extended learning programs and courses.

Assistant Engineer
California Maritime Academy
Full Time , Engineer
Category: Engineer / Naval Architect
Job Location: 200 MARITIME ACADEMY DRIVE, JOB BULLETIN 26-0708 VALLEJO, CA, 94590-8181 USA
Contact
Email: noemails@jobelephant.com
Work Phone : (707) 654-1140
200 Maritime Academy Drive Vallejo, CA, 94590 USA
Description:
Assistant Engineer
Classification – Administrator I
Time base – Full-Time
This recruitment will remain open until filled.

Survey Technician
TerraSond
Salary: $ DOE , Part Time , Entry level
Category: Shoreside Operations
Job Location: 539 N. Carancahua Street, Suite 2200 Corpus Christi, TX, 78401 US
Contact
HR Manager
Email: bburke@terrasond.com
Work Phone : 907-745-7215
Cell Phone : 907-947-1242
1617 South Industrial Way, Suite 3 Palmer, AK, 99645 USA
Description:
Position: Conduct hydrographic and Geophysical surveys in a team environment, verifying the accuracy of collected data, preparing data, and client deliverables. This is a temporary hourly position with potential opportunity for direct hire.

Boat Operator
TerraSond
Salary: $ DOE , Full Time
Category: Vessel Operations
Job Location: 539 N. Carancahua Street, Suite 2200 Corpus Christi, TX, 78401 US
Contact
HR Manager
Email: bburke@terrasond.com
Work Phone : 907-745-7215
Cell Phone : 907-947-1242
1617 South Industrial Way, Suite 3 Palmer, AK, 99645 USA
Description:
Position: The Boat Operator is responsible for the safe and effective operation and navigation of TerraSond vessels and may serve as a liaison to chartered vessels. He or she oversees personnel and vessel safety, documentation, maintenance, crew training and ensuring that TerraSond Limited is in compliance with all applicable state and federal rules and regulations. The Boat Operator assists with vessel, facility, and vehicle maintenance and performs additional duties as assigned.

Chief Steward
Military Sealift Command
Salary: $ $46,442 , Full Time , Mid Career
Category: Shipboard Officer / Personnel / Crew
Description:
Title, Series, Grade (Code) Chief Steward WM 9968-28/9968-29 (804) Base Salary: $46,442 Type of Appointment: Excepted Service Career-Conditional Opening Date: October 2, 2017 Closing Date October 16, 2017 Location: Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.
Relocation expenses are not authorized for this position
















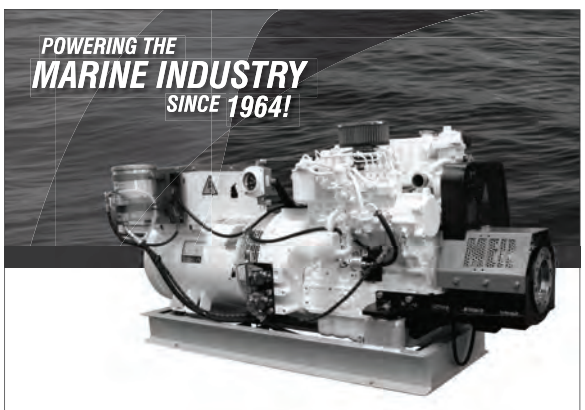






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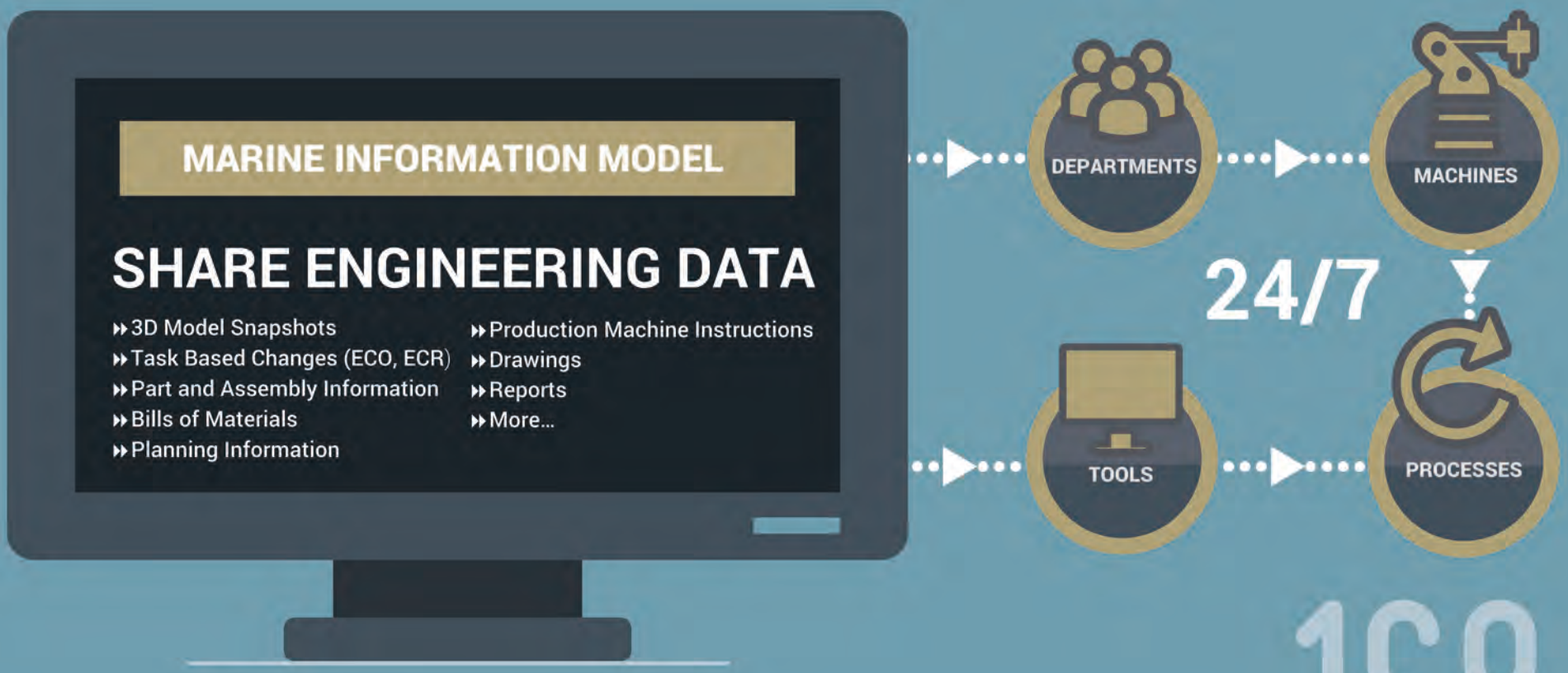


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