MAY 2020

# MARITIME REPORTER AND ENGINEERING NEWS

marinelink.com

INTERVIEW
JOHN WATERHOUSE,
ELLIOTT BAY DESIGN GROUP

SHIPBUILDING
PHILLY SHIPYARD WINS BIG

OFFSHORE WIND
INSIDE THE ECONOMICS

## COVID-19 & MARITIME

ABS, CLASSNK, DNV GL, LR
CLASSIFICATION EVOLVES
TO MEET NEW CHALLENGES

STACKING YOUR SHIPS
BIOFOULING CONSIDERATIONS

TRAINING TIPS FOR SHIPS
TRAINING & COVID-19
A 'HOW TO' GUIDE

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Number 5 Volume 82

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**"Well said"**

"I think the **RMS QUEEN MARY** has to be my choice. Trans-Atlantic liners were among the most sophisticated pieces of technology of their time. Constructed during a global depression, the vessel served in wartime and in peace with distinction. Contrast the **glamour** of the first class passengers with the **hopes and fears** of the immigrant Third Class passengers, all held together by the **hard work of the ship's crew**, and you have the **story of humanity**."

**John Waterhouse, EBDG,** when asked to name & explain his favorite ship ever.

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## Features



## Departments

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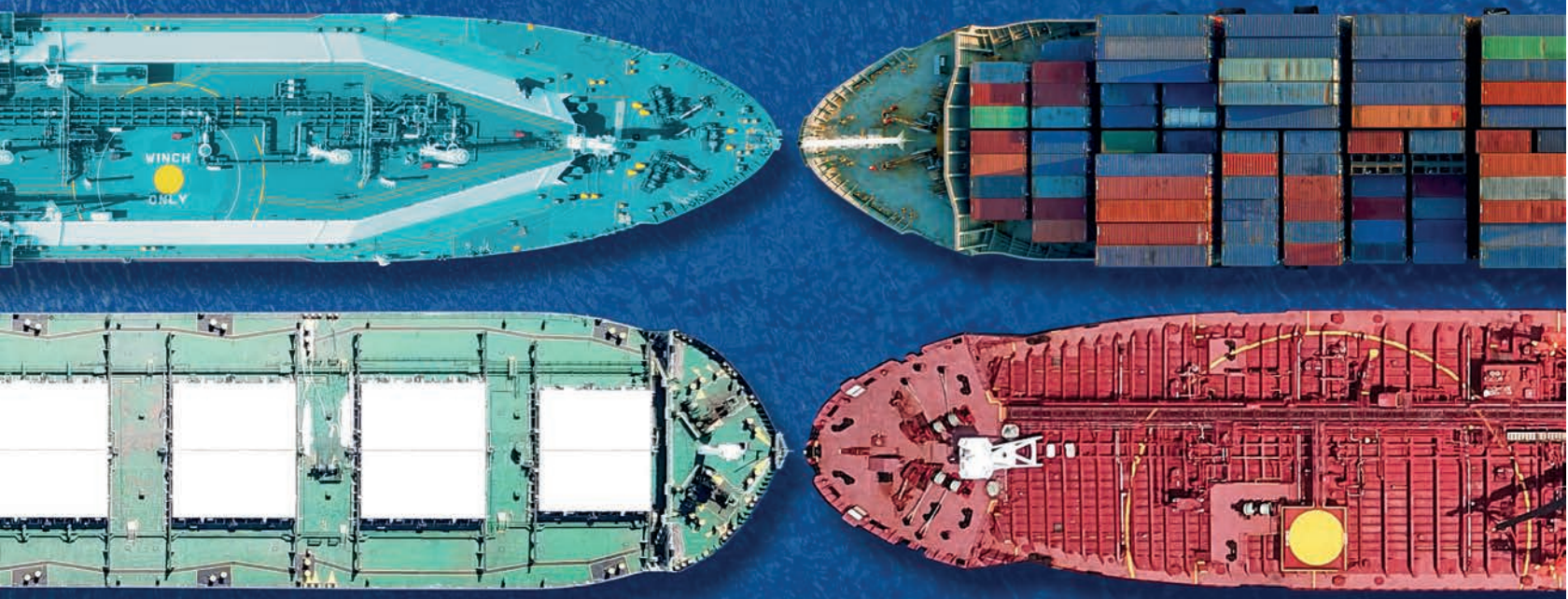


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# Authors


Bryant


Buckley


DiRenzo


Ewing


Goldberg


Kinsey


Mulligan


Parker


Swain


Siegel


Takle


van Hemmen

**Bryant**
Dennis Bryant is with Bryant's Maritime Consulting, and a regular contributor to Maritime Reporter & Engineering News.

**Buckley**
Bruce Buckley is a member of the Coast Guard Auxiliary. He has been the Auxiliary Point of Contact for the USCG Research and Development Center (RDC) currently.

**DiRenzo**
Dr. Joe DiRenzo III is the Director of Research Partner-ships at the RDC and a long time contributor to Marine News and Maritime Technology.

**Ewing**
Tom Ewing specializrd in energy and environmental topics.

**Goldberg**
Murray Goldberg is CEO of Marine Learning Systems, maker of MarineLMS. A researcher and developer of learning management systems, his software has been used by millions of people and companies worldwide.

**Kinsey**
Captain Andrew Kinsey is Senior Marine Risk Consultant, Allianz Global Corporate & Specialty.

**Mulligan**
Tom Mulligan graduated Trinity College Dublin in 1979 with a BA Hons Degree in Natural Sciences (Chemistry). Following a period as a production chemist in an electronic circuit board manufacturing company, he returned to the University of Limerick in 1986 where he obtained a Masters Degree in Industrial Chemistry in 1988. Today, based in Ireland, he serves as Maritime Reporter & Engineering News' science and technology writer.

**Parker**
Barry Parker, bdp1 Consulting Ltd provides strategic and tactical support, including analytics and communications, to businesses across the maritime spectrum.

**Stoichevski**
William Stoichevski began working for the Associated Press in Oslo. In 2003, he left the AP to oversee and write for a number of publications in the Norwegian capital. He has written thousands of offshore-focused reports from his North Sea vantage point. Hard-to-match access has granted him interviews with hundreds of industry captains and policy makers across the globe. William lives and works in Oslo. He started writing for Maritime Reporter in 2014.

**Swain**
Dr. Geoffrey Swain. Professor Ocean Engineering and Marine Science and Director Center for Corrosion and Biofouling Control, Florida Institute of Technology, Melbourne, Florida.

**Siegel**
Lowell Siegel is a member of the Coast Guard Auxiliary.

**Takle**
Vigleik Takle is Senior Vice President of Maritime Digital Solutions at Kongsberg Digital. Before joining Kongsberg Digital, he served as Chief Operating Officer in Cxense ASA, a high growth SaaS company listed on the Oslo Stock Exchange. Vigleik holds a Master of Science degree in industrial economics and technology management from the Norwegian University of Science and Technology (NTNU).

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


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Email: mrcirc@marinelink.com
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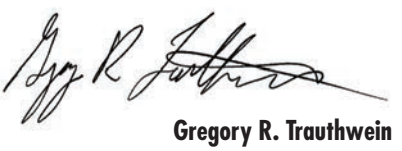
**I love symmetry, well planned or simply by dumb luck.** Back in mid-February 2020 when I interviewed **John Waterhouse** of Elliott Bay Design Group for this edition, the impact of COVID-19 was surely being felt, but it would be about another three weeks when the full effects were just starting to be realized. My interview was a continuation of our series profiling leaders in the naval architecture and marine engineering space, a follow-up to our recent coverage of the Staten Island Ferries fleet rebuild. Listening to our recorded interview, I even joked how COVID-19 would soon be pushed out of the news cycle by something bigger!

I won't spoil the feature on Waterhouse, which starts on page 34, but it is worth noting that when he entered this industry in the mid-1980s with Nickum and Spaulding, the industry and the company he worked for was vibrant and humming along at speed. Three years later, Nickum and Spaulding was out of business, as the bottom literally fell out of the offshore industry, commercial shipbuilding and, eventually, naval shipbuilding. But I like the story of EBDG even more today as we collectively … not simply as an industry but as a society … face the biggest challenge I've seen in my lifetime. The story on Waterhouse and EBDG is even more impactful for me now because, out of the ashes of Nickum and Spaulding, Elliott Bay Design Group was created by Waterhouse and two partners. He and his team at EBDG have been on a solid 30 year+ run, with the requisite numbers of peaks and valleys along the way.

Saying that this industry faces many hurdles ahead is obviously overly simplistic, but as has been proven time and again, maritime will prevail. It will look different for sure, and I'm certain that there will be many new names and faces along the way. But maritime remains the global engine for commerce, as proven with emphasis by today's seafarers which have kept ships running and critical supplies flowing, all the while being treated somewhat shamefully by the majority of the world's authorities that have left many stuck on ships for extended periods with little or no way to get home.

Brining the Waterhouse interview full circle, I went back to him just before press to get an updated insight on how COVID-19 was impacting his business, and to ask one signature question that I had forgotten to ask on the first go-round: *"What is your favorite ship of all time (not an EBDG design) and why?"* His answer is now one of my favorites of all time, as it provides symmetry to the situation we all live today:

*"I think the RMS QUEEN MARY has to be my choice. Trans-Atlantic liners were among the most sophisticated pieces of technology of their time. Constructed during a global depression, the vessel served in wartime and in peace with distinction. Contrast the glamour of the first class passengers with the hopes and fears of the immigrant Third Class passengers, all held together by the hard work of the ship's crew, and you have the story of humanity."*



**Gregory R. Trauthwein**
Editor & Associate Publisher
trauthwein@marinelink.com

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MARINELINK.COM

HQ
118 E. 25th St., 2nd Floor
New York, NY 10010 USA
T +1 212 477 6700; F +1 212 254 6271

FL Office
215 NW 3rd St
Boynton Beach, FL 33435-4009
T +1 561 732 4368; F +1 561 732 6984

Publisher
John C. O'Malley
jomalley@marinelink.com

Associate Publisher/Editorial Director
Greg Trauthwein
trauthwein@marinelink.com

Vice President, Sales
Rob Howard
howard@marinelink.com

Editorial Contributors
Tom Mulligan - UK
Claudio Paschoa - Brazil
William Stoichevski - Scandinavia

Production
Irina Vasilets
vasilets@marinelink.com

Nicole Ventimiglia
nicole@marinelink.com

Corporate Staff
Mark O'Malley, Marketing Manager
Esther Rothenberger, Accounting

Information Technology
Vladimir Bibik

Web Contributor
Michelle Howard; mhoward@marinelink.com

Subscriptions
Kathleen Hickey k.hickey@marinelink.com

Sales
Lucia Annunziata
annunziata@marinelink.com

Terry Breese
breese@marinelink.com; +1 561 732 1185

John Cagni
cagni@marinelink.com; +1 631-472-2715

Frank Covella
covella@marinelink.com; +1 561 732 1659

Mike Kozlowski
kozlowski@marinelink.com; +1 561 733 2477

International Sales
Scandinavia & Germany
Roland Persson
Orn Marketing AB, Box 184 , S-271 24
Ystad, Sweden
roland@orn.nu; +46 411-184 00

United Kingdom
Paul Barrett
Hallmark House, 25 Downham Road, Ramsden
Health, Essex CM11 1PU UK
ieaco@aol.com; +44 7778 357722

Classified Sales +1 212 477 6700

**Founder:**
John J. O'Malley [1905 - 1980]
Charles P. O'Malley [1928 - 2000]
John E. O'Malley [1930 - 2019]

Photo: Philly Shipyard

# The (potential) $1.5B Deal

**Philly Shipyard won a high-profile contract when TOTE Services awarded the deal to build up to five new ships, the National Security Multi-Mission Vessel (NSMV). We caught up with Steinar Nerbovik, President & CEO, Philly Shipyard for insights on the deal.**

While many companies globally fight to stay in business through the COVID-19 pandemic, Philly Shipyard received a huge deal late last month: the contract to build up to five NSMV ships, a contract that has been one of the most closely watched and hotly contested U.S. shipbuilding deals in recent memory. This shipbuilding contract extends beyond steel plate and machinery, with NSMV State-Class training ships designed and built to provide a state-of-the-art training vessel that will provide at-sea training for up to 600 cadet-midshipmen at a time from the six state maritime academies.

The initial award (two firm orders + three option ships) is valued at approximately $630 million, escalating to $1.5B if all five ships are ordered and built in series.

"First, we were honored to be selected by TOTE to build these vessels, and for the opportunity this provides to further diversify our business into government and commercial shipbuilding," said Nerbovik. "I believe our track record of on-time, on-budget deliveries, plus having delivered more than 50% of all large Jones Act ocean-going vessels in the last 20 years, have all opened the door for us to be a strong contender."

**Philly Shipyard Today**

Today Philly Shipyard has approximately 300 employees (a mix of its own and subcontractors), but with the new deal to build the State-Class series it expects to re-constitute its full workforce with up to 1,200 employees during 2021.

Since 2003, Philly Shipyard has delivered 30 commercial ships, including (3) CV 2600 Container vessels; (1) CV 2500 Container vessel; (14) MT-46 Product Tankers; (2) MT 115 Aframax Tankers; (8) MT 50 Product Tankers; and (2) 3600 Container Vessels. Aside from the contract to build the pair of NSMVs, it currently is work-

ing on a dry docking contract for the FSS Pollux.

In preparing to build the State-Class ships, Nerbovik said "the biggest investment we can make, and will make, is in our people. If we look back, in 2019, we leveraged the strong partnerships we have with our unions, and signed a new four-year collective bargaining agreement which is effective through January 2023. During that time, we also invested in maintaining a core staff of highly skilled technical employees from each department that have been able to swiftly move into action with the new NSMV contract."

While the COVID-19 pandemic has impacted nearly every industry, Nerbovik said production at the shipyard has been able to remain operational. "Like most others, the COVID-19 pandemic has influenced the way we are operating, and we have been diligently following the guidelines from the CDC, as well as from all Federal, State and local directives. Notwithstanding, operations are continuing and ongoing projects are moving forward."

**The Build Plan**

According to Nerbovik "design, purchasing and planning activities and have started and will continue," while production will commence on the first ship in 2021. Deliveries for both vessels are expected in 2023.

While Philly Shipyard is adept at the commercial shipbuidling process, this ship design differs substantailly in two key areas when compared against the ships it has traditionally built. "People and accommodation," said Nerbovik. "Most commercial vessels have 20-30 people on board. The NSMV will potentially have hundreds of people on board at any one time, and in addition to the accommodations, there is space for classrooms, dining areas, and all of the required spaces to actually operate the vessel. Add to that, the specific requirements related to a helicopter pad, RoRo and container storage, and hospital rooms, the result is a ship that requires much more "outfitting" and detail than most commercial builds."

# Seafarers & a brave new world

**In Shakespeare's famous shipwreck play "Tempest", the young isolated Miranda upon seeing the sailors who survived the storm says:**

> ***O, wonder!***
> ***How many goodly creatures are there here!***
> ***How beauteous mankind is! O brave new world,***
> ***That has such people in't!***

We are now well into the new world created by COVID-19. And we are rightly astonished at the number and variety of goodly creatures who have stepped forward to provide relief. Doctors, nurses, first responders, even grocery workers and truckers are rightfully acknowledged for their bravery and sacrifice for the greater good.

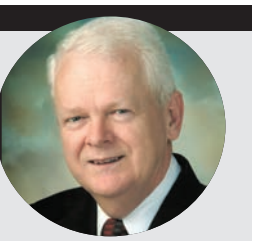
There is another large group who are also providing vitally needed service to relieve our stress and provide critical assistance. Seafarers, domestic and foreign, deliver our food, medical supplies, vehicles, fuel, and other products on which society relies so heavily. A large percentage of our products are imported by ship. Those ships are operated by foreign seafarers, mostly from lesser developed countries, who spend many months separated from their families. Domestic ships have U.S. seafarers, who also spend extensive periods away from their families. Foreign ships are guided in and out of port by marine pilots. Cargoes are loaded onto and unladen from ships by longshoremen. They and other harbor workers move outgoing cargoes from trucks and trains onto docks and incoming cargoes from the docks onto trucks and trains for further distribution, as well as those who work in shipyards to build and keep ships in operation.

Without this critical sector, the economy would quickly grind to a halt. If the economy grinds to halt, the hospitals go dark and close. The doctors and nurses can't do their important work. The ambulances stop. Law enforcement officers and fire fighters can't respond. There will be no groceries to stock the shelves.

This is the reason that the Department of Homeland Security (DHS) has designated the maritime community and other portions of the transportation industry as critical infrastructure.

So when you are giving thanks for the sacrifices of doctors, nurses, and so many others, remember the seafarers and other persons in the maritime community and the important work that they perform behind the scene. This is truly a brave new world!

**The Author**



**Bryant**

Dennis Bryant is with Bryant's Maritime Consulting, and a regular contributor to *Maritime Reporter & Engineering News.*

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**Tip #12**

# Training in COVID-19 Times: A "How to Guide"

COVID-19 is requiring all operators to reconsider how they train. In-person traditional training is essentially prohibited by this pandemic. So how do operators adapt quickly to maintain compliance and train for safe operations, yet do so in a COVID-safe way? Fortunately, it can be done, and it is not difficult. Furthermore, by taking the steps necessary to deliver training during the pandemic, you will be putting in place systems, tools and content to improve both the outcomes and cost-efficiency of your future training, pandemic or not.

In order to respond to the immediate need, we will focus here on the basics: getting effective training out to those who need it quickly, efficiently and safely. The time will come later for more extensive planning, refinement and measurement. For now – it is all about providing the needed training remotely, and making it available quickly.

Can We Train Remotely? Yes, remote learning has been happening for decades and there is a tremendous body of evidence to show that it is at least as effective, and often more effective than in-person classroom-based training. This applies to all forms of knowledge training – including basic knowledge (such as learning routines, deck layouts, company policies, sanitation basics, etc.) as well as foundational skill knowledge (such as such as where to aim a fire extinguisher, how to sanitize a surface, and the correct sequence for donning PPE). Thus, we can remotely deliver a broad range of knowledge training; even venturing into many areas we would normally think of as skills.

The Required Tools: At this moment, the goal is to deploy effective training quickly. The tools we require are a learning management system (LMS) to deliver on-line training and assessment, and a conferencing tool to allow for real-time interactions.

If you have an LMS already available, great. If not, you will have to select one. While in normal times there would be many criteria to consider in this choice, I'll identify only two core requirements here that must be considered. First, ensure that your LMS allows you to easily deliver your own custom training content and assessments. For example, can you record a short video and quickly make it available to all your learners along with a quiz to test their knowledge? This is important as some LMSs make it difficult or impossible to deploy your own content, instead allowing only the LMS vendor's content and assessments. Second, it is important to decide whether you would like your crew to train while on-board. If the answer is yes, it will be important to choose an LMS which works on-board without connectivity. If the answer is no, then a larger variety of LMSs will do the job.

Second, for real-time interactions between your instructors and learners, a conferencing tool is required. In this case there are many to choose from. Three popular choices are Google Hangouts, Zoom, and Skype. All of these are inexpensive (and allow for a certain amount of free use), are easy to use, are reliable, and support video, audio, screen-sharing and chat functionality. Our customers have made extensive use of all of these without issue. Pick one.

Learning Principles: As above, given the luxury of time, we would look closely at needs and then design a program carefully tailored to address those needs. While that would be ideal, we can still achieve an excellent result by following a few basic principles.

First, can the lecture. Both for efficiency and for improved outcomes, avoid the temptation to simply move the classroom-based model onto a video-chat. Instead, record the lecture you would have given into a series of short videos, and make those available via the LMS. Then, once your learners have watched the recorded lecture videos, use the live conferencing tool to

hold a discussion, answer questions, work through problems, etc. Unlike a live lecture, recorded videos will allow learners to repeat material they find challenging or bypass items they already know. This will create a better learning experience and improved learning outcomes.

Next, assess frequently. Use your LMS to create short and simple exams to determine whether the learners know what you need them to know. For example, after they have watched one of the video lectures above, ask them to perform an online exam. This will not only tell you whether your video was effective (and help you improve it), but it is also an important way to convey your learning expectations to the learners. Furthermore, it will serve to stimulate questions for the upcoming live conferencing session. And finally, it will provide motivation to help ensure that the learners watched the video and absorbed as much as they could prior to the remote discussion.

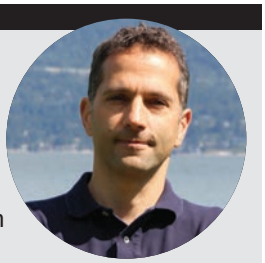
Third, keep your videos bite sized. Although in normal situations you might lecture for an hour or more in a classroom, it is better practice to record very short videos – each a maximum of 10 – 12 minutes. Each video should contain exactly one digestible topic and should be followed by an assessment as mentioned above. This will allow the learner to maintain focus, it will enable them to easily repeat the material they find difficult, and it will allow them to get very quick feedback (via the assessments) before they go too far down the road having missed a foundational piece of knowledge.

And finally – keep growing. Supplement your lessons with written FAQs – providing explanations and responding to the questions often asked by your learners. Expand and refine your video library. Add structure to your discussions. Soon you will have a continuously improving, highly effective learning program that can be deployed over and over.

Clearly there is much more that can be said on this topic. But these basic tools and principles will steer you in the right direction and get you up and going almost immediately.

Good luck, sail safely, and stay healthy!


**The Author**



**Goldberg**

Murray Goldberg is CEO of Marine Learning Systems which provides software and services to optimize knowledge, skills and behavior in maritime operators.

Contact Murray @ Murray@MarineLS.com

# Crew Training for a Future that Includes Autonomous Vessels

As we continue to contemplate a future with ships transitioning to automated and autonomous operations, the need for new and innovated crew training will only increase. Our current and future ship crews will need to straddle both new and existing vessel operation technology. This will present challenges, but ones that the industry can address in a proactive manner.

Traditionally, maritime skills have changed slowly and new technology was assimilated on the fly in many cases. The Merchant Marine was a place where you learned on the job. From entry-level positions to cadet shipping, the very rank structure of a ship was predicated on accruing knowledge and experience. We have already begun to see that fabric change with the reduction of crew sizes and the elimination of most all entry-level positions. We are now at the stage where we need to do a better job of preparing crews to perform their assigned tasks before they ever step foot onboard. The approaching landscape of automated vessel operations will only make foundational and continuing training of crews more critical. Vessel operators need to do a better job and new technology and training methods need to be utilized.

The development of more advanced and specialized ships utilizing machinery that incorporates technological advances will help make ships more efficient, but they will also demand a higher level of training and education of the crew who operate them. This is coming at a time when the industry is already facing a number of challenges in attracting and retaining qualified crews. This was a problem before the COVID-19 situation stressed the maritime labor pool to the breaking point. An important factor when we evaluate the risk profile of a vessel or fleet at Allianz is the manning component. Who supplies the crew and how are they trained are key questions when we look to develop a risk grading of an account.

It is critical that future maritime education and training be of high quality, but also that it be visible to the public. The

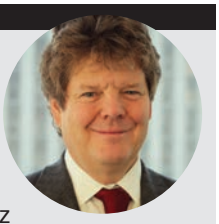
student we need to attract will have to possess the ability to learn and master skills that will be in high demand across numerous industries. However, we do not need to see that purely as a negative. Instead, we can look at the future skills needed in the maritime sector that will be useful elsewhere, as giving flexibility to individual career paths. We can attract people to sea by offering them a place to learn a skill that will help them transition to a job ashore. They will not have to sail for 30 years, offering an easier transition ashore may be able to help us get people to work at sea.

A key point, however, is the need to identify the skillsets and training needs required for the immediate, medium term and long-term future of the shipping industry. As an industry, we must drive this discussion and help steer innovations so that they help us operate safely and more efficiently. Keeping the status quo is not a viable option, nor is just looking to be "Grandfathered" in.

From the Marine Insurance Risk Management view of this situation, a key issue is the need to develop methods of assessment of automated and autonomous vessel transportation systems. In Marine Insurance, we look to the past to help predict the future. In some regards we have faced these challenges before when looking at the shipping industry. We have dealt with changes in propulsion from sail to steam and from steam to diesel. We have also dealt with the issue of unattended engine rooms and reduced manning levels. The key though is to learn from our past mistakes and make this coming transition be smoother and safer than our past efforts.

Key points to remember are that real-world vessel operations are complicated and there will still be human error. It is just where in the process that error will arise. In addition, the need for qualified mariners at sea will not disappear, it will grow. The next generation of mariner will need to not only possess the traditional skills of good seamanship, but also the new skills of the automated work place.


**The Author**



**Kinsey**

Captain Andrew Kinsey is the Senior Marine Risk Consultant at Allianz Global Corporate & Specialty.

# Profiles in Training
# Capt. Ted Morley
## COO & Academic Principal, Maritime Professional Training

Captain Ted Morley is a ubiquitous figure in maritime training circles, the COO and Academic Principal at MPT in Fort Lauderdales. MPT consistently enrolls more than 10,000 students annually, catering to the whole maritime market from super yachts to super tankers and everything in between. He shares his insights on how the current pandemic is changing maritime training, now and in the future.

**How have you altered your operations due to the pandemic?**
Even before COVID-19 we designed our main campus to fight viruses and improve air quality. We have UV sterilizers in our AC system and hospital grade hepa filtration, along with hydroxyl units and disinfectant fogging systems. We also pre-filter and pre-condition all the air coming into the building. Currently we are expanding our online portal to include virtual classrooms and more distance learning options.

**Had you previously offered distance learning alternatives?**
The USCG and other regulators have very strict guidelines on what courses be delivered online. STCW, by its very nature, requires hands on learning and assessments but we are all learning and adapting.

**How do you think this pandemic will impact the way in which maritime training and education is delivered in the future?**
Long term I see a blended approach to learning. It is difficult to self-study with many of the more technical courses and the hands-on portions will always require a "bricks and mortar" facility.

**Which technologies do you view as most promising to deliver maritime training more effectively and efficiently?**
Video conferencing and virtual simulations will play a larger role. Efficient yet safe classrooms are a must. The level of technology and infrastructure to effectively deliver and measure the students' knowledge, understanding, and competence levels will continue to rise. The blended approach will allow students to receive the classroom material early, review and develop a baseline, complete pre-entry familiarization, and then be ready to shift to a classroom setting to complete the learning process and the assessment criteria as established by the STCW Code and the various regulatory agencies.

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Photo: Stream Marine Training

# Profiles in Training

# Martyn Thomas,

## Chief of Staff, Stream Marine Training Ltd. (SMT)

Martyn Thomas is the Chief of Staff at Stream Marine Training Ltd (SMT Ltd.) following many years working for both global training providers and cruise companies. SMT is a maritime skills and technology business providing fire-fighting, sea survival, survival craft and HSE training to the global maritime, oil and gas, renewables and construction industries.

Thomas works out of SMT's head office in Glasgow where SMT trains the majority of its theoretical based courses, including Alternative Fuels, HELM, Security Awareness, and Security Duties, as well as its pool-based training courses like Personal Survival Techniques and custom-developed Water Safety courses. SMT also operates a fire-fighting training facility at Glasgow Airport where it trains all the STCW Fire Fighting courses, Enclosed Space Training, Rescue at Height and other offshore fire courses. In early 2020 SMT opened its new £500k boat training facility in Greenock moving from its previous site which was opened in 2015. This has allowed it to increase its boat training capacity for all STCW Boat courses with future expansion into other offshore training markets.

**Meet Martyn Thomas:**

Thomas began with a career in maritime, starting with his original apprenticeship as a Marine Electrical Engineer in the shipyard in Barrow-in-Furness before moving to A&P Appledore in Southampton. He was lured ashore for an electrical position, but "I was drawn back to the maritime industry where, until the late nineties, I was exposed to various maritime vessels from new builds to refurbishments."

His career hit a turning point while working for Hotpoint as a service engineer, receiving his first Management & Leadership training from GE as part of their Technical Sales Leadership Program. "This is where I first gained an appetite for teaching and training," said Thomas.

This appetite for teaching and training eventually led him to academia where he continued to work and completed his teaching degree, and as the Deputy Head of Faculty at Further Education College he would develop a number of qualifications, one of which was a course designed to help "would be" electrical engineers to become Electro Technical Officers for Carnival UK.

"I left the college and joined Carnival UK where I became their Cadet & Technical Training Manager," said Thomas. "As part of this role I developed and implemented the first edition of the competency framework for Deck, Engine & ETO Officers (3rd to 1st) within Carnival UK to enable them to demonstrate their professional and technical competence beyond the achievement of CoC's. While at Carnival I was also an ac-

tive member of the MNTB where I was the Vice Chair for the Ratings Trailblazer group where I helped develop several new maritime apprenticeships."

He eventually became the Head of Maritime & Safety Training and managed the development and implementation of the Marine LS LMS which enabled easier access to remote learning on board vessels. He also managed the creation and implementation of several e-learning courses which were launched, not only for Carnival UK vessels, but also to the wider Carnival Corporation.

In 2019, he joined the global training company RelyOnNutec to become its Global Head of Maritime Training. After supporting a number of its global centers to build its maritime divisions, the global business needed to re-focus on its offshore portfolio so his role there was cut short.

"While at Carnival UK I was introduced to Martin White, the owner of a new start-up maritime training business in Glasgow called Stream Marine Training Ltd (started in 2014)," said Thomas.

"This introduction was in 2015 and our aligned passion for training beyond compliance was part of the original reason for me working with him at a time when Carnival UK were seeking to utilize training providers who saw beyond compliance and helped train towards competence."

While not directly involved in maritime training, Thomas' role is to ensure the staff are focused and suitably trained to meet the needs of the modern seafarer and support our wide customer base in delivering standard and bespoke courses. "I am also responsible for enabling the staff to achieve this through their own professional development," said Thomas. "Our clients range from ferry operators, MOD, Offshore, tanker and bulk carrier operates and major cruise companies and meeting the ever-changing needs of these industry sectors requires us to find and use the best trainers."

### Meet SMT

"We are uniquely placed to offer three areas of expertise: Safety & Survival, Marine Technology and Careers," said Thomas. "The business in total has an annual turnover of £2.5M and we issue more than 8000 certificates annually across our full spectrum of courses."

Safety & Survival is the backbone of SMT's business and delivers every aspect of STCW, MNTB, maritime and shore-based safety and survival training. "Our instructors have a breadth of industry knowledge and help our clients build courses to meet their needs where required; this department operates over our three sites," said Thomas. In recent weeks we have been approved by both the Bahamas Maritime Authority and the MCA to deliver a number of STCW courses through the use of Webinars. This is allowing us to deliver classroom teaching around the world to seafarers requiring training during this period of restricted travel.

Following the launch of its Alternative Fuels (LNG) training in 2017, SMT decided to create a Marine Technology division to look at new areas of focus in the maritime industry, "and since then we have developed bespoke courses in Polar Survival, Maritime Evacuation Systems (MES), Crisis Management, Tanker Operations and Alternative fuels beyond LNG," said Thomas. "The M&T team are specialists in their fields and not only develop high level courses, they also teach across the course spectrum allowing them to be flexible assets which enables them to look into unique training methods and practices to keep SMT as an innovator in maritime training."

In addition to serving the qualified officers of the Merchant Navy SMT's Careers department is currently managing the training of more than 40 cadets, "which, as it was only started 18 months ago, is a fantastic achievement," said Thomas. "As a forward thinking, innovative business, we are constantly looking at the future and how we can support the training of crew both onshore and whilst at sea. While e-learning is the first evolutionary step to this, for SMT this will be a small stepping-stone to our future goals in our mission to support the training of seafarers, going beyond compliance and meeting the needs of both the seafarer and the shipping companies. (In addition) with the development of AR & VR and units becoming cheaper and more portable, the use of this equipment will support the future training of SMT and by ensuring that assessment is completed as an integrated piece of the training it means that seafarers can demonstrate competence alongside knowledge checks."

**SMT also operates a fire-fighting training facility at Glasgow Airport where it trains all the STCW Fire Fighting courses,**

Photo: Stream Marine Training

# A Titanium USS Enterprise (NCC-1701 that is)

*By Rik van Hemmen*

Dennis Bryant provided a link to a story about the USCG Cutter Bear in his March 18, 2020 newsletter. It is a great story about a great ship with a great Captain (Michael Healy) and a great crew. It shows that the right combination of ship and crew can perform miracles.

This one ship, its Captain (and his wife who often shipped with him), and its crew did so many things so well that it has become the stuff of legends. I will not further discuss these adventures; some can be found in the article and the rest can be easily Googled. Instead I want to draw attention to the lovely photo of the vessel in the article. I was awestruck by her beauty. Not the come hither style of beauty (even though in that category she is well endowed too). Rather I was struck by her functional beauty. This ship is the best looking Swiss army knife I have ever seen.

If somebody were to tell me that I would be sent "on a five-year mission: to explore strange new worlds. To seek out new life and new civilizations. To boldly go where no man has gone before!" this would be the vessel I would pick, even today.

OK, I may do a little technological upgrade, after all I am an engineer, but this would be the starting point and I would be loath to deviate too much.

Instead of steam, I would fit internal combustion engines, but probably work out a more complex hybrid diesel electric arrangement. I would not install a huge amount of power. (Her original propulsion power was only 300 IHP.) I would fit her with a sturdy CPP. With her electric drive she could be rigged for free running, sail charging or even some boost power to drive through ice. And she would be air-conditioned.

I would keep her brigantine rig, but rigged with more modern sails and maybe a Dynarig (Maltese Falcon) style square rigged foremast. My biggest dilemma would be to decide whether to keep her stack. There would be no need for that tall stack and I could rig more sail, but, my God, what a gorgeous stack! Then come the boats. I'd have a few RIBs (electric outboard powered), but undoubtedly also two much lower speed electric launches with simple galley and bunks and auxiliary sail on freestanding masts that can function as independent exploration/research vessels.

At one stage the Bear was fitted with a seaplane, but drones will perform that work today. A manned submarine would be sexy, but I think it would make more sense to use ROV's.

She would be fitted with excellent awnings, there is nothing better than shade when working on deck.

**The original Bear** was a steam barkentine.

Photo: U.S. Coast Guard

**Revenue Capt. Michael A. Healy,** commanding officer of cutters Chandler, Corwin, Bear, McCulloch and Thetis.

Photo: U.S. Coast Guard

Photo: U.S. Coast Guard

Altogether it would be the boat of Jacques Cousteau's (and my) dreams. There is actually only one big change that I would make and that relates to the history of the Bear herself and too many other great ships and boats.

Depending on how you count, the Bear had an active career that exceeded 70 years. She then saw reduced service and sank at nearly 90 years of age, while she was under tow to become a static exhibit vessel. Apparently she lost a mast when the tow line broke, and sank when her hull was punctured by the mast. I am sure her 70-year life was the result of both her Swiss army knife capabilities and her extremely heavy wooden construction to allow ice service. Nevertheless, almost certainly, she was removed from active service when her hull maintenance became too much of a burden. Many ships like this are then regarded as potential museum vessels, but museum vessel economics are extremely problematic and museum status is really only a sad testament to a vessel's loss of vitality.

Let's face it, the Bear did not die because she was obsolete, but rather because her hull structure was worn out. Remarkably, based on my wish list for a Bear replica outlined above, I could have modernized the original Bear for my mission if her hull had not worn out.

That indicates that if I were to build my Bear replica today, I should build her with an unlimited hull life. That would mean I would build her out of stainless steel, or even better; titanium.

Nobody uses those material for large vessel construction. So am I crazy? Or is the whole world wrong and am I right? I think I am right in this case and there may be other cases too.

I was first confronted with titanium as a hull material about 20 years ago. A friend of mine, Capt. Craig Tafoya, told me he had good connections with Russian titanium suppliers and

**Revenue Cutter Bear before WWI. "This ship is the best looking Swiss army knife I have ever seen."**

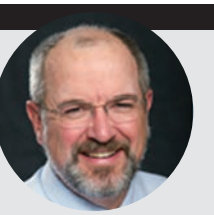
wondered if it may be cost effective to build floating drydocks out of titanium. His idea was very interesting and in some ways conforms to what I described above. Nobody throws drydocks away until they are rotten to the core, but the economics for drydocks are dicey, because drydocks are an upfront investment to make money over time. The less you spend at start up, the better your chance at cost recovery. Another friend of mine, the yacht designer Bruce Marek, with his partner Bruce Nelson, designed a titanium sailboat for a Japanese customer decades ago. This customer owned a titanium manufacturing business and built the boat himself. The boat was, and is, great, but since sailing yacht hull shape fashions still change so much over time, an old titanium sailing yacht hull does not compete against a new composite hull.

But here Bear comes back into the picture. Bear's hull was perfectly adequate for over 70 years and even almost 150 years later is perfectly adequate for her envisioned use (a research/long range patrol/training/discovery/remote community support vessel). Moreover, it is highly unlikely that 100 years into the future she cannot do what she did 150 years ago. And here the economics become interesting.

Suppose the hull costs three times the cost of a steel hull (a not crazy assumption), that will still only increase her overall cost by, say 25%. That will be counterbalanced by massively reduced maintenance costs, and she will always be a very attractive candidate for continuous upgrade, ensuring her continued existence. In other words, build the Bear out of titanium, and we will never have to think about building a replica and never see a noble vessel like this die an ignominious death.

So for what other vessels should we think in terms of eternal hulls? Sail training vessels (like the USCG Eagle)? Aircraft carriers? Research vessels? Cruise vessels? Tugs? Staten Island ferries? The hull design (shape) would have to be mature, and its technology upgrade expected. Those hulls are out there. The Navy has looked at titanium construction for years, but are constrained in starting titanium construction due to an aversion by congress on infrastructure spending. Still, a few years ago, I heard a US Navy admiral say that the US Navy spends 20% of its maintenance budget on corrosion prevention. Let's run those numbers against the cost of titanium.

**The Author**



**van Hemmen**

Rik van Hemmen is the President of Martin & Ottaway, a marine consulting firm that specializes in the resolution of technical, operational and financial issues in maritime.

**MaiTai Nui w weld testing - Jody Culbert 50 ft Subchapter T Titanium Off the Beach Catamaran**

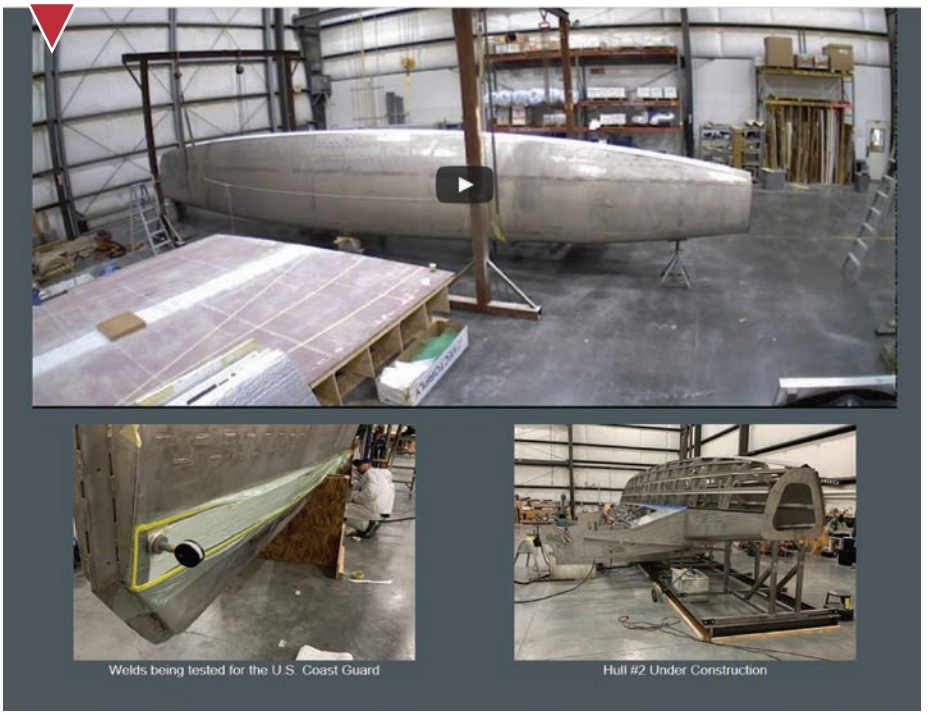



Photo: Jim Betts www.bettsboats.com

**50 ft Titanium Sailing Catamarn Demi-hull Mock up Note Trapezoidal shaped stringers at Bettsboats Anacortes WA**

Photo: Jim Betts www.bettsboats.com

# Maritime Software Landscape Mapping 2020

*By Vigleik Takle, SVP Maritime Digital Solutions, Kongsberg Digital*

Overall, 2019 was another turbulent year for most shipping markets, overshadowed by preparations for the IMO 2020 sulfur regulations, rising geopolitical tensions, the trade war between the USA and China, as well as natural disasters disrupting global supply chains. This article provides insight into the changes seen in the maritime software landscape under these turbulent conditions: On a high-level, the increase of software solutions reported in the recent years seems to have flattened out in 2019. This is partially caused by the fact that some solutions were being consolidated, but also fewer new vendors were entering the market. Venture capital investments were up from last year, but only due to one single major transaction. That said, we believe, now more than ever, it is important to be on the outlook for an increase in maritime digitalization efforts, since the "real world" use cases with healthy ROIs are finally starting to emerge in the market due to more mature and scalable solutions. 2020 will be the year to get started and the ones not willing to embrace the opportunities at hand, will lag behind the players that do. In the 2020 version of our software landscape report, we have mapped almost 500 software vendors across the maritime landscape, a number that is only slightly higher than in beginning of 2019. We have seen just a small increase in the number of new vendors entering the arena, which was partly offset by a number of consolidations across existing vendors such as for example BMT Smart being acquired by Greensteam, and ChartCo and Marine Press merging to form OneOcean. With only 20 new vendors mapped during 2019, the last year's increase in maritime software products is significantly lower than in the two previous years, despite 2019 being a record year of venture funding into maritime startups. In total $1.14 billion were invested; however, the lion's share of $1 billion was dedicated to one single company only: the digital freight forwarder Flexport. The remainder being invested into maritime startups was only $140 million, which is significantly less than the previous years' investments. The largest part of the 2019 investments went into the 4 startups Traxens (Container IoT), FreightHub (Digital Freight Forwarder), Rombit (Port Operation Efficiency) and Nautilus Labs (Fleet Management).

New vendors that joined our mapping were spread across a number of different areas, such as e.g. ship finance (Oceanis), crew management (MarCoPay, Marified, Arieh Solutions), port management (Marine Digital, PortXchange, eYard), market intelligence & analytics (Oceanbolt, NavD), Fleet Tracking (OrbitMi) and supply chain (OceanOps, Boxport). It seems that the market has finally reached a saturation in the area of fuel & energy monitoring solutions, where not many new entrants seem to be willing to challenge the well-established existing vendors. Also, we observed a continuing large growth in supply chain related vendors, as the interest of investors seems to have shifted from purely maritime startups in a narrow sense, to focus on intermodal supply chain related startups, which are often closely linked to the container shipping segments. Since these vendors are not exclusively focused on the maritime space, only the most relevant ones have been mapped out in our graphic.

## What are the technology trends?

At the core of maritime software solutions remains cloud technology, which is often paired with an edge computer that is installed onboard. While the cloud enables shoreside offices to access and monitor their data almost in real-time from anywhere in the world, the edge computers onboard facilitate data capture from OT systems, help bridge potential connectivity losses, process data already onboard in order to limit bandwidth requirements as much as possible, and of course to provide insight to the onboard crew on the performance of the vessel.

We also see a lot of talk on standardization of data, which is a prerequisite for collecting data from similar systems from different vendors. In the past, this has proven to be difficult, given that most installed systems were never intended to be part of something bigger than themselves. Consequently, there are often inconsistencies across different vessels even in systems from the same vendor. This is something that is addressed through solutions like Kongsberg's Vessel Insight and similar solutions from other vendors. We strongly believe that efforts like these will be the answer to the industry's challenge of getting access to standardized data across systems and fleets - and making it available for all types of services to build on top through well-defined and documented APIs.

Last but not least, the number of software vendors experimenting with blockchain technology is also increasing, especially in the area of document handling and document sharing, enabling e.g. a safe transfer of trusted documents, such as ship or crew certificates. So far none has taken a significant market share, but we are starting to see alliances form – which is an interesting development towards more commercially viable adopted solutions.

## What's coming in 2020?

Given the current global turmoil in the markets, it is obviously hard to say how it will affect the market for digital services. It is, however, our opinion that the adoption of new digital services will continue to increase in 2020 as the initial shock of the impact of the Coronavirus softens.

The digitalization of the maritime industry has been proceeding at an increasing pace, and, while in the beginning it was

mostly pursued by larger and shipping companies, we see that increasingly also smaller shipping companies are starting to explore maritime software solutions to optimize their businesses. The somewhat slow adoption in a broad scale can probably credited to several factors, but in our opinion the three main reasons are the lack of quality data, high entry costs and lack of "real world" use-cases with healthy ROIs. That is about to change. With large parts of the older inefficient tonnage being scrapped during the last years, ship operators are now inevitably left with the task to optimize the operations of their existing fleets, and digital tools will play a key role in this. Also, the number of newbuilds equipped with additional sensors is slowly but steadily increasing – also across the less "sophisticated" shipping segments. This is indicating that ship owners have come to acknowledge the fact that they need to get ready for the digital age ahead of them. In addition, we see that the solutions and services available to maritime players are getting more mature and it can be expected that the focus will broaden in the short term from fuel & energy management solutions - which have dominated maritime digitalization for a long time – towards other less well-established areas, such as document handling, repair & maintenance and port call optimizations.

We also expect 2020 to be a year when cyber security finally gets its deserved focus with the new IMO guidelines coming into effect on 1st of January 2021. Connecting vessels in order to get access to vessel data and sharing it with value added applications obviously also poses a risk, making it crucial to understand the exposure and take mitigating actions. The ones that will be successful will find the right balance between protecting their systems and opening them up in order to explore the business potential of digitalization.

Furthermore, we also see that "real world" use cases are starting to emerge as solutions are getting more mature and the cost of getting access to quality data is going down. Finally, some will say, as conferences and articles on maritime digitalization have tended to dive into topics and technologies already years ahead of the daily world of most ship owners in the industry. Combine that with a strengthened focus on more sustainable, efficient and greener operations, we feel confident that 2020 will be the year where the early adopters will start to reap the benefits of their investments. Are you one of them? if not, our advice to you is that it's the time to get off the fence and explore your options. Start small, focus on proven solutions and you will be on the right track for the future.

# COVID-19, Telemedicine & Seafarer's Health

**By Greg Trauthwein**

Seafarers are an essential workforce to the global economy with as many as 1.5 million working day and night, securing the safe and efficient transportation of more than 90% of the goods that move across the globe.

This fact has never been more apparent than during the recent COVID-19 pandemic, which has shuttered many industries and countries globally, leaving seafarers as the primary conduit to keep commerce flowing. "COVID-19 is absolutely incomparable and unprecedented in recent human history," said Natalya Butakova, AP Companies Global Solutions, an international medical assistance company, providing medical assistance services to seafarers and cruise lines.

While "maritime" is deemed essential by most every country with waterway access, in many cases the raw materials and finished products carried by ship are welcomed ashore, but the men and women who deliver them, in many cases, are not. The plight of the seafarer has been brought further into the spotlight during the COVID-19 pandemic. While the seafarer historically has been 'out of sight, out of mind' to the general public, when global supply chains are upended, the value of the world commercial fleet and the people who run them starts to crystalize. Yet this importance is not reflected in the treatment of this group, as many ports globally refuse to allow seafarers ashore for crew changes, fearing a possible injection of COVID-19.

The remote character of that working environment defines them as a 'hard-to-reach' population group. And, the vulnerability of these seafarers makes their health and wellbeing a concern and a priority in a public health point of view. Nevertheless, their collective wellbeing is an underserved aspect of the global supply chain and one which, if left unchecked, could place us all in peril.

## COVID-19 … It's not just a strain on the physical

While much of the focus today is on stopping the spread of COVID-19, some see the mental strain on seafarers as an equally serious situation. "As an ex-seafarer I have been saddened by the deterioration in the attitude towards, working conditions and treatment of seafarers. I honestly believe the situation has only worsened since I left the sea," said Frank Coles, CEO, Wallem Group, in a recent article written for MarineLink.com. **https://www.marinelink.com/news/opinion-getting-ahead-reality-477040**

"Studies suggest one-in-five seafarers have considered self-harm. About 85 seafarers die on the job every month. Of these, around five take their own lives. These are staggering statistics and ones we should be utterly ashamed of," Coles continued. "Our industry talks incessantly about safety, yet the figures suggest we are failing to deliver because a major part of achieving a safe ship is a crew who are happy, respected and feel supported."

"Probably the most serious and concerning matter on board in these challenging time is not even COVID-19, but mental health issues arising from the situation," AP Companies' Butakova concurs. "The seafarers feel isolated and struggle to get the news from home, therefore they are not sure if their loved ones are safe or were affected by the pandemic. On the other hand, they also have fear on what will happen if they get ill on board, during the time of pandemic, many ports have closed and do not accept COVID infected nonresidents. The majority of medical facilities have restricted capabilities. All these circumstances, of course, create additional anxiety, which adds to usual matters that cause mental health issues on board."

While the majority of focus and concern rightfully is on COVID-19, Dana Erskine-Pando of Flying Nurses International reminds us that normal health issues found onboard working ships continue. "Just because this pandemic is going on, does not stop the number of injuries and illnesses that are occurring that have nothing to do with COVID-19; these people still need to be able to get off the ships and get home," said Erskine-Pando. Flying Nurses International has for more than 20 years escorted patients via airplane to domestic and international destinations. With the majority of commercial flights shutdown, and with entire countries shut in, and she said the company has not flown anyone in about a month, and she has 10 patients waiting for transport home. "Depending on where they call home will determine if we can get them there."

## New Problems, New Solutions

Believing 'necessity is the mother of invention' companies engaged in supplying maritime medical services have been busy creating new solutions to assist seafarers and shipowners in a time of need. "We have recently introduced new product: Mental Health Solutions – psychological teleconsultations for the seafarers," said AP Companies' Butakova. "It is a psychological hotline, that can be used for different kind of short-term and long-term psychological treatments."

AP companies has also enhanced its capabilities for telemedicine and now we can offer it in 168 languages. "Essentially this is not just a regular telemedicine services," said Butakova. "AP Companies has brought online it's global network of the best medical providers around the globe to give seafarers, members of their families and all AP members access to the best medical providers, get access to routine medical care with the doctors they have been visiting all these years in their native language."

Future Care is an international medical management/cost containment and telemedical service provider exclusively to the maritime industry, serving shipowners and P&I Clubs in fulfilling the medical needs of seafarers, aboard ship and on land. Founded in 1996 by CEO and President Christina DeSimone, today about 50,000 seafarers have, through shipowners, access to Future Care services (a number which includes its joint venture partnership with MedSea).

Future Care offers its services primarily via four dedicated call centers – in Beijing, Manilla, Johannesburg and the U.S. – for commercial shipping, staffed with maritime trained doctors and nurses. According to DeSimone "we have, with Dr. Arthur Diskin, Future Care's Global Medical Director, devised alternative solutions for our shipowner customers, such as preboarding screening and onboard protocols for crew members that may have the COVID symptoms. Future Care developed these programs, which do not fall under our standard suite of services, in anticipation of our clients' needs. The response has been overwhelmingly positive."

Future Care developed these protocols, including the preboard screening questionnaire and review to assist the captain in mitigating the chances of infected crewmembers and others from boarding the ship. As noted by Dr. Diskin"… you can't take the risk to zero, but you can mitigate."

Future Care has also addressed onboard response to crewmembers presenting with Covid-19 symptoms for its clients through interactive telephone conferences and initiating quarantine protocols, among other recommended measures. While underway, some of the problems prevalent on land hold true at sea, namely the ability to quickly, accurately test someone with COVID-19 symptoms to determine if they do indeed have the disease, allowing for an accurate course of treatment and return to work. As on land, if a crewmember shows symptoms at sea it is incumbent first to isolate them, followed by identifying any recent, close contacts.

"I'm recommending that everyone wear a mask (on the ship); if you're wearing a mask, that will mitigate the risk of transmission," said Dr. Diskin. "We have learned more about this virus in just the last five months than any illness that's existed in the history of the planet over a similar time period, but there is still more to learn." Dr. Diskin recommends that common sense and planning play a big role in success if there is an ill or injured crewmember onboard. "You have to make important calculations based on where you are. For example, if you're in the Solomon Islands (and they have minimal ICU facilities), and your next stop is Sydney, you might want to keep them on the vessel and head to the better equipped stop."

The big questions today:

- When is it safe to go back to work on a ship
- How do we prevent transmission from people who are asymptomatic to people who are immune compromised?
- Do we let a captain go back who has pre-existing conditions such as diabetes and/or hypertension because he/she is at higher risk to become critically ill if infected? "There are still a lot of questions."

He said that there is a lot of strategy and logistics that is involved with this, but the unpredictability mandates that it is handled on a case-by-case basis; a problem with the maritime industry (like others) is that owners and operators want an algorithm to make treatment predictable. "But that's not the way it's working out. You wake up every day and it's a different algorithm, which is hard on any industry, particularly the shipping industry."

## Telemedicine on Ships '101'

As medical care onboard ships is a challenge during the best of times, we spoke with Dr. Arthur Diskin, MD, FACEP Global Medical Director, Future Care, Inc., for his insights on making the most of modern telemedicine now, arguably the worst of times. He said that telemedicine is a tremendous tool, particularly on a ship "where it's telemedicine or nothing." It is a tremendous tool in certain silos, he said, for example as a screening tool so you can more quickly screen out people that don't need a shoreside medical facility. It is also a useful tool to check in on people with chronic medical problems. In addition, he recommends:

1. **IDENTIFY:** First and foremost, it is critical to identify your medical officer onboard, and to distribute your medical officers widely throughout the fleet, so there's someone with some medical experience, ideally, onboard every ship.
2. **PLAN AHEAD:** Plan ahead for a potential COVID-19 (or other) medical emergency so you know your options in advance. For example, if you're sailing from Hawaii to Long Beach, know the point where it's better to proceed east or west. If you are more aware you can provide your telemedicine provider a clearer picture and receive better options.
3. **STOCK UP:** Owners should review their onboard medicine cabinets, and go "above and beyond the minimum level" to provide more treatment flexibility if needed.


# Uncharted Waters

## *Class, maritime & navigating* **COVID-19**

While the COVID-19 pandemic has effectively shuttered a sizeable portion of the world population and economy, the maritime industry plows forward, the vital cog in keeping commerce and critical supplies moving. As the pandemic and its aftermath promise to radically change many working norms across all industries, we check in this month with leaders from the top four ship classification societies for their opinions on how this will materially impact their business now and in the future.

***By Greg Trauthwein***

"At times like this when so much feels out of control, it is important to focus on what you can control and so our ongoing focus on minimizing and eliminating unnecessary costs will keep us in good shape while we keep driving forward new technologies and services. The long-term plan remains the same as it has since our inception."

**Christopher J. Wiernicki,**
CEO, American Bureau of Shipping


ABS

"This (COVID-19 pandemic) is above and beyond anything I've experienced during my 30 years in the maritime industry," said **Knut Ørbeck-Nilssen**, CEO Maritime, DNV GL. "It is truly global, hitting not only the maritime industry but the world economy, impacting world trade, job security and the health and well-being of families. Its breadth is making it that much more challenging for everyone."

While the level of impact varies by region, with China and the United States – the world's leading producer and consumer, respectively – at its epicenter, every stakeholder in the maritime industry is impacted, from shipowners, to shipyards, equipment manufacturers and crews on ship.

"COVID-19 is a threat, disrupter and catalyst that is essentially reshaping the industry's commercial, security and safety trends," said **Christopher J. Wiernicki**, CEO, American Bureau of Shipping. "It has put shipping in a 'Time Out' situation, as the industry is learning and adapting to this new reality on the fly, de-

Lloyd's Register

> On COVID-19 and the newbuild orderbook: "Clarkson's revised its forecast for 2020 from 71mGT in its October forecast to 39mGT in the latest March forecasts, a 45% reduction."
>
> **Nick Brown**, Marine and Offshore Director, Lloyd's Register

vising new methods of working virtually and remotely in real-time. Keeping pace with operational changes and clients' needs in the face of the COVID-19 pandemic is rewriting the rules for all of us. The pandemic is driving classification to deliver more condition-based versus calendar-based surveys, and it also is accelerating the modernization and upgrade of SOLAS."

But while most feel pain, some sectors have enjoyed gain, notably the tanker market which has benefitted by the plummeting price of oil and an oil production spat between Russia and Saudi Arabia which effectively took massive amounts of tankers out of trade routes for oil storage at sea.

"At the opposite end of the scale are cruise lines, which are banned from operating," said Ørbeck-Nilssen. "Over the last four or five years I've talked about tectonic shifts in markets, regulation and technology, and it's interesting to see now how true these tectonic shifts are affecting shipping. As 2019 drew to an end, we had no clue what was looming just a few weeks ahead; struggles that could potentially endure to 2021 and beyond."

While the current fleet of ships and crews face their own unique challenges, looking forward at the likely dramatic reduction of the newbuild orderbook and changing trade patterns themselves could impact the industry for the coming years.

"As the availability and access to drydocks and maintenance teams is impacted, LR is actively encouraging regulators and the other Recognized Organizations to establish a uniform approach on the postponement of ship surveys," said **Nick Brown,** Marine and Offshore Director, Lloyd's Register. "Clearly, COVID-19 has had an impact on new ship orders and construction schedules, with Clarkson's revising its forecast for 2020 from 71mGT in its October forecast to 39mGT in the latest March forecasts, a 45% reduction."

## Prepping for the 'Black Swan'

While many larger organization plan for business disruption and Black Swan events, the sheer size, scope and duration of COVID-19 took most by surprise. "I am doubtful that anybody can truly say they were prepared for this specific event," said Ørbeck-Nilssen. "Most professional organizations like DNV GL run a regular risk assessment of operations; we did not identify a pandemic, of this scope, as a risk."

But once it became clear that 'business as usual' was no more, the mechanism to operate differently was engaged almost immediately. "Once this pandemic hit, even though we weren't sure exactly what hit us, we quickly engaged our emergency protocol in various locations," said Ørbeck-Nilssen. "It's impressive to see how employees are working out of their homes and traveling to vessels; our employees are extremely flexible, motivated and dedicated to their work. This is something money cannot buy."

According to Wiernicki, ABS was prepared to weather the COVID-19 storm due to the strategic investments in people, processes and technologies. "During times like this, it is helpful to have a clearly defined purpose, and ABS certainly does," said Wiernicki. "We are doubling down on our commitment to innovating with technology and digital services to respond to the challenges our clients and members face, and on assisting the industry in the new normal we will all face once the mitigation measures are eased."

To that end, ABS has expanded its remote survey options, including the majority of annual class surveys. Simultaneously it launched guidance on sanitizing and decontaminating marine and offshore assets exposed to COVID-19, and developed a risk-based framework to help organizations put together a proactive plan to restart operations on the other side of the pandemic.

While most tout investments in ad-

"It's like navigating a ship: You know where you're going, but you're in dire straits so you need an extra watchman to help you maneuver every nautical mile. At the same time you need to maintain a long-term outlook."

**Knut Ørbeck-Nilssen,**
CEO Maritime, DNV GL

DNV GL

vanced product and systems, LR's Brown said that being prepared for any emergency comes down to a basic premise: "You need to communicate, communicate and communicate. You can't prepare for every emergency, but you need to ensure that people are empowered to act swiftly, effectively and safely when faced with crisis. You also need systems that will support you to continue to serve your customers in a flexible way."

## The Next 24 Hours

The world economy really started to hit the brakes in late February 2020 as the pandemic spread, notably hitting the U.S. hard and shutting large swathes of the world's largest economy. At press time more than 30 million Americans have joined the unemployment line in less than two months, a staggering speed culminating in an unemployment rate of nearly 15% versus less than 5% just two months earlier. As global recession looms, many in the maritime sector have adjusted their 'long-range' planning to the next 24 hours.

"I think it's true that all of us in the maritime industry, and DNV GL, have had to narrow our planning outlook to what's happening tomorrow, to what's happening next week," said Ørbeck-Nilssen. "There are many moving parts to any global operation, and we have increased the frequency of our management meetings to a weekly basis, and I'm in touch with my direct reports on a daily basis."

Ørbeck-Nilssen compares the planning challenge today to navigating a ship through a storm: "You know where you're going, but you're in dire straits so you need an extra watchman to help you maneuver every nautical mile. At the same time you need to maintain a long-term outlook; to know your end destination and which course you're charting."

At Japan's ClassNK there has been a notable increase of communications to its fleet as shipowners navigate a number of simultaneous perilous currents.

"The volume of correspondence related to due dates for inspections and survey procedures for ships in operation and newbuildings has increased drastically," said **Takeshi Okamoto**, Corporate Officer and General Manager of EOD, ClassNK. "We have temporarily shifted some human resources from on-site surveys, supporting clients by making greater use of remote surveys and taking other practical measures. As a matter of urgency, we have invested in the ICT to reinforce and enhance our remote operations capabilities, and also to support staff working from home."

Even as tumultuous markets demand shorter term planning, all concur on the need to maintain some long-term vision.

"In the short term, we are focusing on communication internally and connecting with clients digitally to ensure we stay responsive to their needs and find new ways of doing business that adapt to the circumstances we find ourselves in," said Wiernicki. "At times like this when so much feels out of control, it is important to focus on what you can control and so our ongoing focus on minimizing and eliminating unnecessary costs will keep us in good shape while we keep driving forward new technologies and services. The long-term plan remains the same as it has since our inception."

ClassNK's Okamoto, concurs. "While it is fair to say that day to day decision making is currently based on emergency procedures, ClassNK remains committed to its Mid-Term Plan, R&D Roadmap, and its recently announced ClassNK Digital Grand Design 2030 to better integrate data utilization and grow its activities based on opportunities presented by digital technologies."

## Class Future: Digital, Connected

While much of the vision of the future is fuzzy at best, one thing that is crystal clear is the need to fast-track the digitalization and connectivity activities throughout maritime.

In the five years leading up to 2020,




modernization of class and 'class of the future' was topical as a confluence of strong regulatory and technical currents – dramatic emission reduction, future fuels, digitalization and autonomous operations – simultaneously worked to transform the industry. With the pandemic and the need to quickly find new and innovative ways to work to keep ships sailing safely, and efficiently, many changes that were in the pipeline could potentially be put on the fast track, namely digitalization. "I'm grateful for the strategy we have followed for the last five years to digitalize and modernize classification at DNV GL. It comes to bear fruit at times like these where the daily, physical face-to-face meetings and handing over of certificates is being made difficult," said Ørbeck-Nilssen. "Our introduction of electronic certificates; our establishment of operational centers and the Direct Access to Technical Experts (DATE) service; and our ever-increasing remote survey capabilities make us continuously available to our customers. When we started our digitalization and class modernization journey, we didn't foresee a pandemic, but our ability to respond to it has really validated our efforts and investment."

Looking ahead, Ørbeck-Nilssen particularly sees an acceleration of digitalization initiatives due to the need for it today among 'social distancing' initiatives. "It will be like putting a turbo charger on its (digitalization's) development so I would say that this crisis will probably put us 2 to 5 years ahead of what would have been the 'normal' progression of digitalization in maritime industries."

LR's Brown envisions a more integrated digital and connected future for maritime. "The concept of e-interactions is on the rise and this situation will only become more and more acceptable as best practice to improve efficiency, increase safety and maximize the use of our employees," said Brown. "In our marine and offshore businesses, our remote services are underpinned by our LR Remote app. Using the app, crew members can share video and audio with an LR technical specialist and other relevant parties, such as a flag representative. The LR Remote app enables survey requests to be coordinated and channeled to our global surveyor network."

The need to offer the full menu of classification services using news tools and techniques is shared by all, as well as the need to connect all stakeholders in the maritime value chain. ClassNK's Okamoto said "we are providing appropriate services, including remote survey, which best suit individual cases. Ultimately, we take guidance from the Flag State concerned, but ClassNK is also a bridge connecting our clients and flag states, and promoting cooperation between them."

ClassNK also believes the pandemic may trigger or accelerate transition away from time-based, periodic surveys towards risk-based survey schemes.

"We have been able to provide our technical services to support our clients' operations by following our Business Continuity Plan," said Okamoto. "It is also fair to say that the use of digital technology - including the electronic certificates launched three years ago - has helped to ensure that the provision of our services has continued as normally as possible."

ClassNK recently launched its Digital Grand Design 2030 strategy, a strategy that could be implemented more rapidly due to the pandemic. "We are currently constructing survey systems that are in line with condition monitoring and evaluation technologies, where we have a great interest in expanding evaluation methodologies using digital technology to substitute the current physical evaluation methods," said Okamoto.

"Though the goal is set to 2030, once the feasibility of a given piece of technology is confirmed, it will be quickly deployed as part of our operation."

Though COVID-19 has upended many businesses and business models, ABS's Wiernicki said that "our focus on at-

"ClassNK believes that the current situation ... may trigger or accelerate transition away from time-based, periodic surveys towards risk-based survey schemes."

**Takeshi Okamoto,**
Corporate Officer and General Manager of EOD, ClassNK

ClassNK

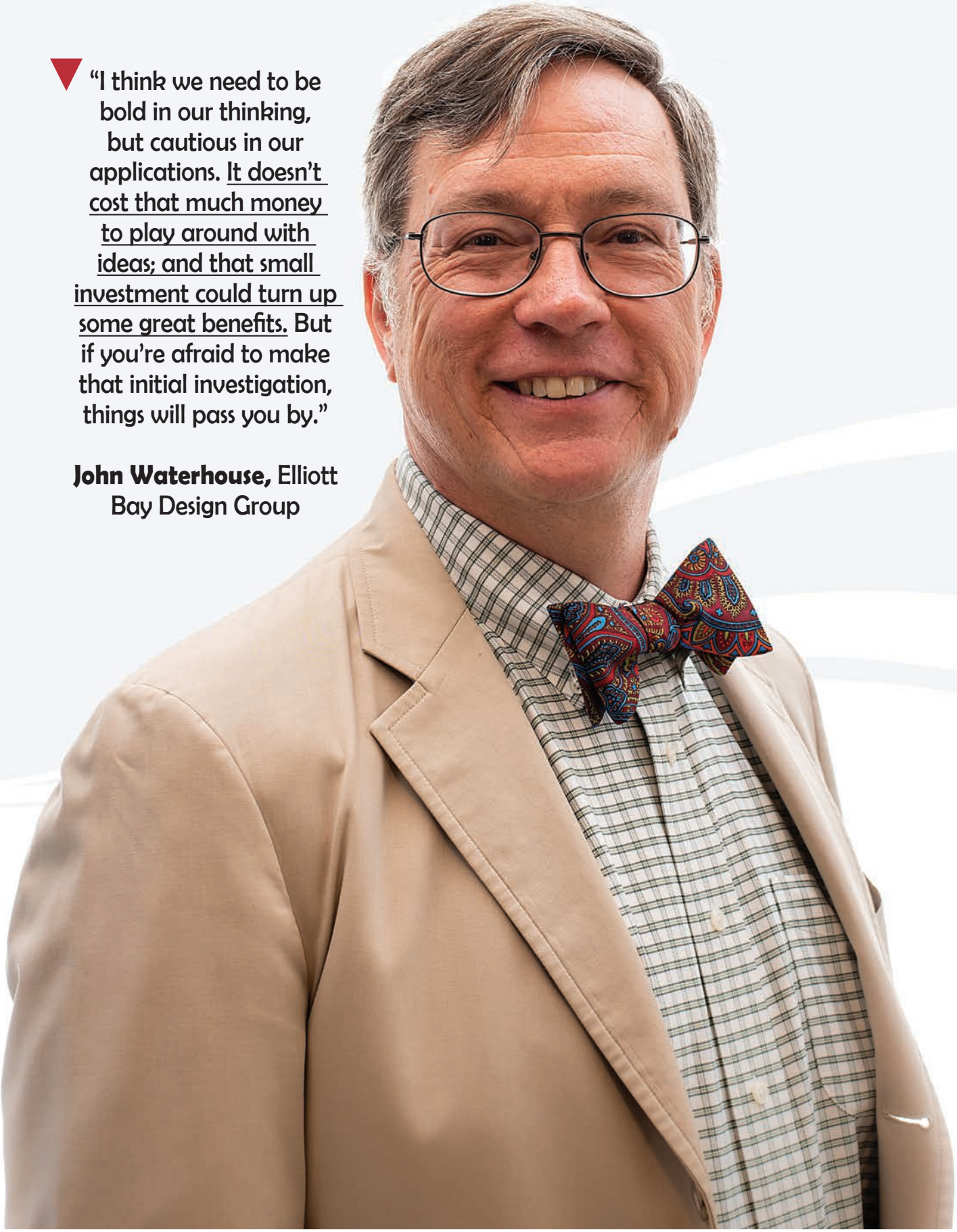
tracting and retaining great people, creating modern, highly efficient business processes and innovating with digital technologies to deliver powerful new services that drive safety and operational performance gains for the industry, provides a strong foundation. Nothing that has happened changes this approach."

While Wiernicki concurs that the digital path is clear, he offers a caveat. "What is clear is that while digital technologies have already permanently altered some of the fundamental realities of the marine and offshore industries, there is still a considerable way to go. Thanks to advances such as telemedicine, high-speed broadband communications and AI-based technical assistants, vessels and platforms far out at sea, though still off in the distance, are far less isolated than they used to be," said Wiernicki. "At the same time, however, digital technologies are also transforming the nature of risk. Their seemingly limitless potential to create positive change is accompanied by an equal and opposite potential to generate fresh hazards."

"This has given rise to a challenge unprecedented in maritime history — not only are digital sources of risk both intangible and invisible, but the consequences they can conjure range from costly to catastrophic. As a result, safety leadership in this changing world means ensuring technology's potency is tempered by human needs."

While Brown agrees on the further investment in and advancement of digital solutions, long-term he said the industry cannot take its gaze from decarbonization. "We will continue our investments in digitizing our services so that it becomes more the norm rather than the exception. This would lead to traditional physical attendance surveys becoming enhanced and supplemented by remote surveys and data, through the use of digital technology such as digital twins." In addition, LR maintains that the climate emergency is an event of the same magnitude, "just with a different time domain to COVID-19."

With hindsight being '20/20', Ørbeck-Nilssen perhaps best summarizes the future course of class and maritime by looking back a few hundred years. "It's almost like the Renaissance period between the 1400-1700s, with societies coming out of the middle ages, a time when everything was re-discovered and looked at with fresh eyes," said Ørbeck-Nilssen. "All was geared toward making a better life across art, culture … across everything … and I think this is very much going to be the impact on shipping and maritime. Everything will be looked at with new eyes, it's going to be a renaissance for the maritime world and I think we'll have a lot of innovation and new ideas; things that we've traditionally done for years simply will not hold up, it will be put to the test."



"I think we need to be bold in our thinking, but cautious in our applications. It doesn't cost that much money to play around with ideas; and that small investment could turn up some great benefits. But if you're afraid to make that initial investigation, things will pass you by."

**John Waterhouse,** Elliott Bay Design Group

# @ EBDG

## *"Be Bold in Thinking but Cautious in Application"*

**John Waterhouse** is a ubiquitous character in the U.S. maritime industry, a deep-thinker, a signature bow tie and more than three decades of naval architecture and marine engineering experience and success as co-owner of the Seattle-based Elliott Bay Design Group (EBDG).

***By Greg Trauthwein***

While growing up, John Waterhouse spent some time in Vancouver, BC, Canada, and it was as a young boy standing on the shores of English Bay, watching ships come in from around the world to load and unload their cargos, when he realized that a maritime career could be his future. "It was in high school when the light bulb went off when I realized that people get paid to design ships. That was it for me," he said.

Following his undergrad studies at UC Berkeley, Waterhouse took a year off on a sailboat journey around the Pacific before returning home and taking a position with Nickum and Spaulding Associates, a Seattle-based naval architecture and marine engineering firm. He eventually went on for his Master's Degree in Naval Architecture and Marine Engineering at MIT, returning to Nickum and Spaulding in 1984.

"There were about 100 people in the firm at the time, doing work for the U.S. Navy on the LSD 41 class," he said. But in the mid-1980s the bottom literally fell out of offshore energy, commercial shipbuilding and eventually naval shipbuilding in the U.S., and in a matter of three years Nickum & Spaulding went from a vibrant firm to closing its doors in 1987. "These were some very tough times when I started my career," Waterhouse remembers. "I was just an employee at the time, but I thought 'there's too much good stuff here' to simply walk away." So, Waterhouse and two partners, Ken Lane who is a principal now with The Glosten Associates and Annette Grimm, who has since moved on to other interests, bought most of the assets of Nickum and Spaulding, and in January 1988 the firm re-opened its doors as Elliott Bay Design Group.

### EBDG: A Fresh Start

"It was a challenging time to start my career, and a challenging time to start a new engineering firm," Waterhouse said. When the firm re-opened it had the support of the former owners to help retain some of its legacy clients, including Black Ball Ferry Line and its M.V. Coho, a ferry designed by Phil Spaulding which still runs today between Victoria and Port Angeles.

Today EBDG is 51 employees – including 27 professional engineers and seven project managers – up from six employees when the firm restarted in 1988. With four offices in Seattle, WA; Ketchikan, AK; Covington, LA; and Port Chester, NY, EBDG handles approximately 130 projects annually. "At the end of the day, our customers are looking for us to help them solve problems," is how Waterhouse simply defines the purpose of his firm. "Ferry boats have been a part of our heritage from the start, and it's been a really good run through a renewal

cycle for ferry vessels in the United States. We have continued to support several ferry projects , including, some of the largest ferry operators in the US - Staten Island, Texas DOT, N. Carolina DOT, Washington State DOT."

Much innovation in maritime (and beyond) is driven by emerging regulations, none more important today than the mandate to reduce carbon emissions from shipping. But innovative solutions in and of themselves are not the mission of EBDG. "It's not like our customers are sitting on piles of cash that they want to spend on interesting engineering projects," said Waterhouse. "They are looking hard at their margins to figure out how they can trim to stay in the business or make a return to their shareholders. Transportation is a tough industry; there's lots of competition and its historically been a drive to greater efficiencies, which often means that the margins get thinner and thinner." Like the maritime industry it serves, EBDG has had its fair share of ups and downs. "We have had our feast and famine days," said Waterhouse. "The famine side of the business is certainly no fun, because the people you work with are not simply numbers on a ledger, they are your friends, you know their families. Keeping business coming in the door has been a large part of my focus for 30 years."

**Above: Fisher Island Community Association –** passenger/vehicle ferry.

**Below: Governors Island** passenger only ferry delivered May 23, 2019.


Photo: EBDG

## Evolving Technology

From pencils, drawing boards and slide rules to 3D modeling and computing in the cloud, the tools used to design vessels have changed dramatically since 1988. While technology acceleration has assisted firms like EBDG to "develop things quicker, faster and better" Waterhouse warns that technology in and of itself is not an answer. "One of my biggest fears is an over-reliance on technology that is not backed up with experience and common sense," said Waterhouse. "Your people still need to have enough calibration and the ability to do a back of the envelope calculation using first principles to reassure themselves that what they're getting out of the computer is indeed reasonable."

EBDG, similar to others in the industry, battles with an aging workforce and the grooming of the next generation. "We

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# ASK John Waterhouse

**How does the current COVID-19 pandemic compare to other business disruptions that you have seen during the course of your career?**

The pandemic and concurrent price collapse in the oil and gas industries are once in a century events that will disrupt lives, damage businesses, change social behaviors, and impact the environment. Will our modern technologies prove more robust or more fragile than those at the time of the Spanish Flu pandemic in 1918? We have been able to transition most of our employees to working remotely from home. Some of our contracts have been cancelled but so far we have a decent book of business.

**Who do you count as the most influential mentor in helping to shape your career/management style?**

**Phil Spaulding** impressed me with his passion for design. **Ed Hagemann** showed me the importance of thinking about what the numbers are trying to tell you. **Russ McComb** showed me that good humor, respect, and open communication are what every employee hopes to get from management.

**What is your favorite book?**

The Lord of the Rings trilogy.

**You have an affinity for history: what is your favorite ship of all time (*not an EBDG design*) and why?**

Wow, this is a hard one. I think the **RMS QUEEN MARY** has to be my choice. Trans-Atlantic liners were among the most sophisticated pieces of technology of their time. Constructed during a global depression, the vessel served in wartime and in peace with distinction. Contrast the glamour of the first class passengers with the hopes and fears of the immigrant Third Class passengers, all held together by the hard work of the ship's crew, and you have the story of humanity.

Photo Courtesy Urban Commons

deliberately focus on knowledge transfer between our senior engineers and new generation of engineers through internal training and seminars, as well as getting them in the field together. For the maritime industry as a whole, the transfer of that tribal knowledge is a concern."

Melding traditional engineering skill with modern tools is sharply in focus today in maritime as "it is a fourth marine industrial revolution … from sail and wood to iron and steam to steel and internal combustion to … we are very much seeing that 'next turn of the wheel.'"

Determining 'what's next' is the struggle of many vessel owners and designer, as there is no clear front-running technology or fuel today.

"The basic technology of the diesel engine burning distillate has had a pretty good run as a technology … 100 years of success," said Waterhouse. "And there's no one dominate technology that's going to follow that, it's going to be fractured. Methanol might make sense for one operator while all-electric with batteries makes sense for another. There are even suggestions that nuclear power might make sense in certain applications." Add into that a variety of emerging and mature energy assistance technologies, from Flettner rotors to hull bubbles, undoubtedly, confusion is the norm.

**"Russ McComb showed me that good humor, respect, and open communication are what every employee hopes to get from management."**

"There are so many technologies out there that it's hard for people to make choices," said Waterhouse. "I see our role as a guide, helping to guide operators through the thicket of different technologies to reach a solution that is appropriate for their operation. There is not a standard or canned solution, it depends on the customer."

As new ship fuels and marine propulsion applications emerge, questions now turn the real cost to the environment of sourcing and using that fuel. "Hydrogen is great but the dirty secret is that it comes from breaking apart natural gas," said Waterhouse. "That's the primary source of commercial hydrogen in the U.S. right now. Can you produce hydrogen from renewable sources? Yes you can, but that infrastructure is not there today."

## Digital Revolution?

Any discussion on the evolution of maritime must include digitalization and autonomy, but according to Waterhouse, neither topic is particularly 'new.'

"Frankly, digitalization has been around for a long time, as we've been using computers to control engines, HVAC systems and provide navigation information," he said. "Today we have the ability (and the challenge) to combine the information from those various digital channels and determine how to use the resulting data so that it is most impactful to your operation."

Waterhouse contends that the real challenge moving forward will center on energy management onboard ships and boats; specifically using less of it via optimized hull forms and systems to recover, store, monitor and manage energy, citing innovations such as the "battery in a box on deck" solution for offshore oil, an energy storage solution that assists during dynamic positioning work when there is a need for brief energy pushes.

He said many clients are looking at autonomous opportunities, "but in reality we have had autonomy at different levels for some time … autopilot, the unmanned engine room are both forms of autonomy. He maintains that the technology is there, as evidenced by autonomous operations in the subsea sector, "but the practical side of me asks; what's going to happen when things start going wrong? The maritime industry is conservative with cause."

"I think we need to be bold in our thinking, but cautious in our applications," concludes Waterhouse. "Don't be afraid to consider. It doesn't cost that much money to play around with ideas; and that small investment could turn up some great benefits. But if you're afraid to make that initial investigation, things will pass you by."

# *Offshore Wind* OSV Report

***By Barry Parker***


Island Diligence installation work at Borkum Riff windfarm.

Source: Island Offshore

The role of offshore wind in generating power will continue to grow in importance as the word pivots away from fossil fuels. With new installations comes demand for vessels. Consultants Wood Mackenzie, specialists in offshore energy, opined in late March 2020 that, worldwide, total forecast wind additions for 2020 were now expected to be 73GW even after taking into account negative impacts from the Coronavirus pandemic. Another consultant, Rystad Energy, was taking a cautious look, suggesting that 2020 would see no growth in offshore additions (compared with the 71 gW commissioned in 2019), with a 10% softening in 2021.

In the United States, estimates of projects set to come online, principally along the mid- and north Atlantic coasts, range from 6 gW up to 10 gW, out into the 2020's; or 600 to 1000 turbines (with a notional 10 mW turbine). Service vessels supporting construction and maintenance of turbines and cable arrays will be an integral part of such projects.

How will these vessels be financed? Recent developments in a different part of the energy sphere, LNG fueling for vessels, may provide a template for financial structures that could emerge, with vessel ownership tied to a mix of project finance, infrastructure funds, and hedge fund investments with a "green" tinge.

A recent LNG deal highlights the role of the big players with financial heft. An investor group that included HighStar Capital (part of Oaktree Capital, the private equity and infrastructure funds provider) had joined forces with Clean Marine Energy, a smaller entity but with deep connections into the maritime business, to build Clean Jacksonville, a barge to deliver LNG to commercial shipping customers. It was delivered from Conrad Shipyard, in August, 2018. This is not a "one hit wonder" as Northstar Midstream (the Oaktree Capital affiliate) has now ordered a second LNG bunker barge, to be built at Bay Shipbuilding, for service along the U.S. East Coast. In both cases, the fuel comes from Jax LNG, a new facility, backed by Southern Company, a huge $120 billion (assets) utility serving the southeastern United States, underscoring the importance of anchoring finance to deep pockets and heft balance sheets.

Such arrangements will be a template for offshore wind finance, a province of big money; Oaktree, a participant in vessel finance, managed some $125 billion for pension funds and others, at end 2019 . A majority stake in Oaktree is held by the even larger ($540 billion assets) Canadian infrastructure giant Brookfield (the purchaser of Teekay Offshore). Vessels serving offshore wind energy could well be tied to larger funding packages. Examples of mega-projects abound; in the North Sea, consider the 465 mW Borkum Riffgrund 2 offshore wind farm project in the German North Sea. The $1 billion+ project, is backed by Global Infrastructure Partners (a well-known investor in ports) and by the Danish behemoth Ørsted. Another Ørsted project, Race Bank (570 mW, off Norfolk, UK) sees an investment from leading infrastructure financier Macquarie (also active in ports).

To date in U.S. waters, one 30 mW project- Block Island Wind, is actually online. The project's original developer, Deepwater Wind, acquired by Ørsted for $500 million in 2018, was backed by hedge fund investor D.E. Shaw, reported to have invested equity of $70 million. Block Island Wind's construction, with a non-Jones Act lifter performing the actual installation of turbines, was also funded with $290 million of debt from Societe Generale and KeyBank (active, through a different part of the bank, in commercial workboat vessel finance). For service vessels, there is a place for independent owners.

With the ramp up of offshore wind in U.S. waters, counts of needed service vessels flow from the estimated number of turbines to be installed and then serviced afterwards. Rough rules of thumb suggest that one service vessel might be required for 20 – 25 turbines; future U.S. demand could therefore encompass several dozen vessels. Some may be newbuilds, while others may be conversions of boats originally built to service dormant oil platforms and drilling rigs. To date, available lifting and installation vessels are non-Jones Act compliant.

On the finance side, there is a clear contrast between the smaller vessels, such as those used to transfer crews, and the larger vessels which transfer components from shore and, at the job site, engage in lifting and positioning. VesselsValue, a U.K. based information provider, puts values on existing one- to three-year-old international flag PSVs at $13.7 million, crew boats at $1.3 million; and for U.S. flagged vessels at nearly $24 million and $4 million, respectively.

These prices, bolstered to account for enhanced seakeeping (including at reduced speeds to protect whales) are within the purview of commercial banks with maritime specialties or groups catering to small businesses and high net worth individuals. Yet, risks, in the form of delayed projects, may push financing into the realm of deeper pocketed project developers and utilities.

## BIG PROJECTS REQUIRE BIG BALANCE SHEETS

On the more capital intensive lift boats, where newbuilds could easily cost $250 million, the financials of Bonheur ASA, the parent company of Fred Olsen Windcarriers (owners of the Brave Tern, which was used for constructing Block Island Wind) and Blue Tern, provide insight. Its 2018 financials reveal that it acquired 51% of the shareholding in the offshore transport and jack-up installation vessel Blue Tern (ex Sea Fox 5, built 2012 at Keppeland shown on the map working at Borkum Riffgrund 2 ) for the equivalent of $73.6 million, with the payment including assumption of $10.8 million of loans still outstanding. In 2019, a jack-up operation maintenance vessel, Jill, was added to the owned fleet (purchased from Falcon Offshore, after previously being chartered in), with $2.2 million in startup costs alone. For DEME (which will be deploying the LNG fueled service vessel ORION, with a 5,000 ton lift capacity) another metric, annual

turnover, was reported at $2.9B, for 2018.

With bigger ticket items comes more risk; utilization in Q4 2019 for the Shipping/Offshore wind segment vessels was 46% (compared to 79% in Q4 2018), as Fred Olsen was integrating an investment in Hamburg based United Wind Logistics- which transports offshore wind turbine components, such as blades, nacelles and towers from manufacturing sites to pre-assembly ports with chartered vessels (four owned vessels are under construction).

Traditional OSVs – whether purpose built or converted from the oil trades, have an important , albeit still growing role to play. In Europe, the trendsetter in offshore wind, offshore wind is part of a diversified portfolio approach for OSV owners. Eidesvik, the Norwegian listed owner, whose OSVs Viking Neptune, Viking Poseidon and Acergy Viking have been chartered into wind energy projects in the North Sea for deep pocketed developers such as Merkur Offshore and Siemens Gamesea. While precise revenues are not broken out, Eidesvik's 2019 Q4 financial results by segments reveal that revenues in its "other" category were 6.4 million Kroner (roughly US $0.7 million), dwarfed by traditional supply, subsea and seismic categories.

Early 2019 saw strong performance for Fred Olsen's fleet of seven "Bayard Class" CTV's, integrated the previous year into Northern Offshore Services business and sold in Q3, saw a utilization rate of 97% in Q2. Northern Offshore operates a fleet of nearly three dozen crew transfer and multi-purpose vessels. In early 2020, Northern Offshore entered into a Memorandum of Understanding (MOU) with NYK Line to study and presumably cooperate as the offshore wind market expands to Japan.

Another northern European outfit, Windea, a multi-company cooperation spearheaded by Bernhard Schulte Offshore, offers both service vessels and CTVs, serving windfarms throughout the North Sea. As European expertise spreads outward, Bernhard Schulte Offshore is looking at the U.S. market. Importantly, it entered into a partnership with the financial packager Mid-ocean Wind (tied to the Clean Marine group mentioned previously, involved with the structured finance underpinning the LNG barges).

Look to the structured finance behind the LNG bunkering deals, for an offshore wind template, with the caution that Coro-

**Van Oord's cable layer NEXUS at Gemini Windpark, offshore Netherlands.**


Source: Van Oord

navirus-caused financial disruptions may put private equity and other non-traditional funding sources under new pressures.

Synergies on the supply chain front (as well as with finance providers) are closely aligned with vessel employment. Windea's logistics expertise, where one of the partners is German logistician Buss Energy, contributed to its success in being awarded work by DEME in development at the Hornsea wind farm (a massive 1.4 gW array off the U.K. east coast coming online in 2022); such relationships create opportunities for the subsequent deployment of OSVs that must be fit for a particular installation. The synergy model provides another template for OSV operators in the states who might seek to employ their vessels on big projects. Northern Offshore Services, with offices in Scandinavia and northern Europe, provides a template here; they explain: "Together, Northern Offshore Services and Ørsted operate six specially constructed CTVs at the Anholt, Nysted and Horns Rev 2 offshore wind farms. These vessels have been especially constructed to optimize turbines' accessibility in different sea areas."

In the U.S., where the offshore wind is still in the planning stages, the small versus large dichotomy will be in evidence once newbuild construction enters the mix. With businesses facing a new paradigm with Covid 19, it's not clear how much financial markets disarray from the pandemic will set back the ambitious plans along the U.S. East Coast.

To date, vessel finance for the wind sector in the U.S. has been of the "small ticket" variety. Blount Boats built the first crew transfer vessel (CTV), Atlantic Pioneer, for the U.S. market, which delivered in 2015 to privately held Atlantic Wind Transfers (AWT, founded in 2015, and based in Quonset Point, R.I. on Narragansett Bay) to serve the Block Island Wind Project. In late 2019, AWT announced plans to build two similar vessels, also at the Blount yard. While finance details are private, Rhode Island Fast Ferries (RIFF), a company described as the parent company of Atlantic Wind Transfers, has been financed by BankAmerica. BankAmerica, in a website posting, said: "They're a growing business at the heart of the state's economic revival, and we work closely with them regarding financing needs for large capital projects, like new vessels, as well as other banking services for their business." This traditional financing model is already being superseded by structures linked to bigger balance sheets.

Finance for the sector goes beyond purely commercial lending to vessel owners, into the realm of business synergies; in the case of AWT, it benefits from existing dock facilities leased at Quonset Point by its parent company. Synergies also play a role at another CTV operator, Windserv Marine, a part of the privately held tug and barge specialist Reinauer Transportation Corporation (which in turn is the owner of Senesco Marine, with a yard located within earshot of the RIFF facility) describes itself as a full service provider "… in all stages of the windfarm lifecycle…" Windserv has joined forces with Ørsted to build two CTVs, one at a small yard in North Carolina, which will initially serve a small project offshore Virginia, and the second at Senesco, which will serve Revolution Wind, a 704 mW project ( 88 turbines @ 8 mW) being developed by Ørsted in conjunction with U.S. utility Eversource.

Beyond the vessels, governmental incentives are critical to supporting offshore wind supply chains. In Rhode Island, Quonset Development Corp (QDC) is a quasi-state agency developing and managing real estate in Quonset Business Park in North Kingstown, Rhode Island. Mr. Steven V. King, QDC' s Managing Director, said in a statement that: "Ongoing upgrades to the state's key infrastructure will be essential to moving Rhode Island closer to the governor's goal of 100% renewable energy by 2030. Governor Raimondo's proposed FY2021 budget includes a $20 million investment earmarked for upgrades at the Port of Davisville. This investment will finance the Port Master Plan, adding capacity for offshore wind logistics…This bond will position Davisville to accommodate offshore wind project cargo and logistics staging…."

Similarly, in Connecticut, the Connecticut Port Authority agreed on a $157 million dollar redevelopment plan, funded through a Public Private Partnership (PPP) to transform the State Pier, in New London, into a staging area for the offshore wind industry (with Ørsted and Eversource contributing half, and state entities funding the balance. In New York City, a potential hub for servicing windfarms expected to come online in the early 2020's, the Economic Development Corp (EDC) is looking at re-purposing its long-shuttered South Brooklyn Marine Terminal into a staging area; an eventual deal here (and elsewhere on the coast) would likely also follow the PPP template, which could open the door for infrastructure and "green energy" funds to participate. In such structures, service vessels may be part of the deal.

With the dearth of commercial bank finance, OSV owners building (or converting) vessels for the offshore wind trades should look at different sources. ESG (environment, social, governance) funds will invest in large projects, smaller vessels will need to be a subset of a bigger transaction. The energy giants have access to capital not available to small owners; consider Northern Offshore Services collaborating with deep-pocketed Ørsted: "…operat<ing> six specially constructed CTVs at the Anholt, Nysted and Horns Rev 2 offshore wind farms." Windea's financing also points to a template- Berhard Schulte turned to Chinese leasing company ICBC for funding two service vessels, Windea Leibniz and Windea La Cour working in the North Sea. Such financing is enabled by the deep pockets of Siemens, taking the vessels on lengthy charters.

Rosy growth forecasts of only a few months ago notwithstanding, the likely economic slowdown will impact OSVs in offshore wind (as well as in the battered oil sector). Wood Mackenzie wrote, in March, 2020, as the Coronavirus pandemic was raging "The potential impact on global installations remains most significant in China and the U.S., where wind-focused policy deadlines were expected to deliver record volumes."

# Facilitating Maritime Comm

*As COVID-19 continues to impact every corner of maritime, we check in with the leaders of the world's top two ship registeries – International Registries Inc. and Panama Ship Registry – for insights on the challenges ahead.*

***By Greg Trauthwein***

"Many routine practices have become increasingly complicated: docking for repairs, accidents on board, crew changes, all represent a challenge."

**Rafel Cigarruista,** Director, Panama Ship Registery

Panama Ship Registry

**How has COVID-19 impacted the market and your organization?**

**Cigarruista, Panama** COVID-19 has impacted the maritime sector from every perspective, from design, construction, marine insurance, cargo movement, maritime administration, ship operators and managers, port operators; in short, the whole industry. Each and every one of us has suffered a blow that has shaken us to the core.

**Gallagher, IRI** The most significant disruption has been with crew changes, specifically the restrictions placed on getting crew both on and off the vessels safely as well as their onward home travel. Crew members are worried about their families and want to go home at the end of their contracts, but that requires a lot of coordination between governments and the industry. Early on the RMI put its support behind the IMO and the global movement to have countries identify seafarers as key transport workers to help facilitate crew changes. Unfortunately, there is still some way to go. Travel restrictions have not only impacted crew, but also the many people who need to board vessels to support safe vessel operations. In fact, this is the second major difficulty we are facing, since restrictions also apply to the nautical inspectors who are critical to ensuring compliance with national and international regulations. The RMI recognizes that it is vital to maintain a robust inspection regime; for without inspections, the ships, their crews, and the wider environment are put at risk. Therefore, the RMI Registry issued Marine Safety Advisory 17-20, which allows for temporary alternative inspection arrangements when an in-person inspection is not possible.

**How has this pandemic impacted your short- and long-range planning.**

**Cigarruista, Panama** When COVID-19 started and was contained in China, the analysis was that it only affected ships under construction and operating in that country, or perhaps depending on the extent of the virus, it could affect ships that had to go to China. When the virus began to spread throughout Asia, we reconsidered the initial measures and took measures based on the daily development of the situation. The most important thing for us is not being an obstacle for our shipowners, but make them feel that we are there to help them in these difficult moments. Every 24 hours we live, we gain experience by testing or disapproving the actions we implement. This experience tells us what we must improve, maintain and/or change.

**Gallagher, IRI** This is a dynamic and rapidly changing situation, but that does not mean we cannot plan for the future. Our team has been focused on keeping our fleet moving as efficiently as possible both in the short- and long-term. Teams that have moved to remote work have focused on short-term projects that will enhance customer service during and after the pandemic, such as IT improvements, and internal operations and processes. Much of what our teams are doing is business as usual in a new environment. In the short-term we are focused at the management level on contingency planning and ensuring offices have the support they need to move tasks around and assign duties differently. For example, we have largely shifted production of our seafarer books and licenses to our Hong Kong and Piraeus offices. For the long-term, we do not have a crystal ball to tell us when restrictions will be lifted or what

# mmerce During a Pandemic

the world will look like after COVID-19, but we do know that in the aftermath of this our owners and operators will need our support more than ever.

**How do you see today's situation impacting ship registry?**

**Gallagher, IRI** The situation has made all of us think outside of the box and innovate. We are implementing new ways of doing business and working with clients. For example, we have worked with banks, owners, and other industry stakeholders to complete mortgage recordings and legal transactions during this time. We have implemented procedures for virtual inspections, which look different for every vessel.

**Cigarruista, Panama** The most complicated thing to date is dealing with the entire fleet and its different needs. Many routine practices and process have become increasingly complicated. For example, docking for repairs and maintenance, accidents on board, crew changes, inspections, certification and follow-up audits, all those processes represent now a challenge.

Since we took over the administration in July 2019 with the change of government, at the General Directorate of Merchant Marine (which is the Ship Registry) we have been re-engineering processes and gradually modernizing the registry and thanks to that, we have been able to implement and react quickly to this situation. Our latest innovation is proof of that. We have introduced the certificates of registration of ships and radio licenses electronically. There are many measures to ensure document protection: a paperless initiative – eco-friendly, self-protected documents from unauthorized editions, a unique sequential number assigned and controlled only by the Panama Maritime Authority's Directorate of Merchant Marine (the Registry of Ships), QR code, which leads to an application that displays the document information in real time, proving its authenticity.

In the first quarter of 2020, the Ship Registry has shown a sustainable growth in ships and tonnage; we are exceeding what we had planned and contributing positively in terms of figures in the fleet of 8,289 ships.

**How was your organization best prepared for this 'Black Swan' event?**

**Gallagher, IRI** Having 28 worldwide offices with technical experts and knowledgeable staff spread out across the world has really been a key asset during this crisis because it allowed us to move operations around to stay at full capacity for our clients. Prior to COVID-19, each office was empowered to make decisions for clients in their own market – so the local leadership was confident and comfortable addressing challenges and problem solving. Having key resources spread around the globe, and such a strong global network, has prevented a lot of the communication problems or delays for technical, marine safety, and radio issues. Also, RMI was one of the first registries that had already developed an online platform and database 20 years ago. Additionally, we have initiated an online system for our owners/operators and manning agents to apply for seafarers' documentation online. We are also able to issue vessel certificates electronically.

**When the smoke clears and there is a return to normalcy, what areas will you strengthen to prepare for the next event of this magnitude?**

**Cigarruista, Panama** Innovation and technology; the least possible red tape; and even more simplicity of the processes.

**Gallagher, IRI** Industry wide we need to collaborate to strengthen digitization efforts. In the next five years we should set a goal to have no more paper – the signing process and document exchange of the past will not exist in the future. We should as an industry ensure that everyone is fully functional outside the office. I believe it is important for IMO and other international bodies to fully support digitalization from universal acceptance of electronic records to digitization of reports and transactions.

"In the next five years we should set a goal to have no more paper – the signing process and document exchange of the past will not exist in the future."

**Bill Gallagher,**
President, International Registries Inc.

International Registries Inc.

# COVID 19 & BioFouling: Advice for Laying Up Your Ships

*By Dr. Geoffrey Swain*

Biofouling control measures for ships are usually selected to match their operational profiles, and so what happens when constant service ships become idle for prolonged periods or operate at slower service speeds? Will they become vulnerable to fouling, and what measures can be taken to reduce the risk? These questions can best be answered by understanding the biology of the waters in which the vessels are located, the ecology of the different immersed parts of the ship, the biofouling control methods that have been applied or in use, the methods available to remove fouling, and the long term costs and implications associated with biofouling.

Biofouling occurs due to the presence of the mobile propagating stages of marine organisms that would normally colonize rocky shores or other hard substrates. At certain times of the year they will populate the waters at levels where any free space will be colonized, and all immersed surfaces of a ship become potential habitats. The world's oceans may be divided into polar, subpolar, temperate, subtropical and tropical regions **(Figure 1)**. Biofouling is typically more aggressive in warmer waters and with today's satellite observations we are able to monitor historic and real time ocean productivity and we can identify the times of year when

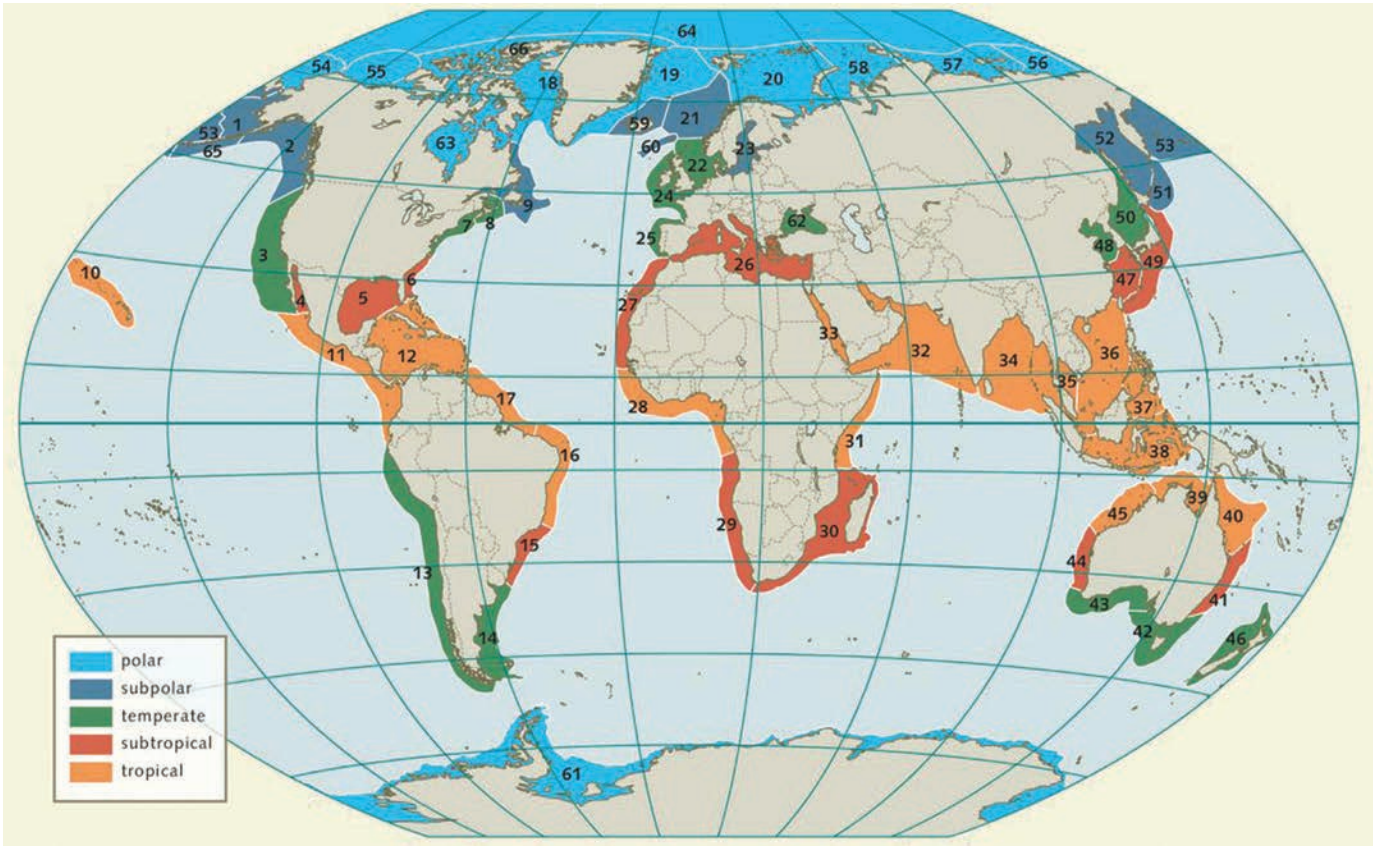



**Figure 1.** The nearcoastal areas of the world's oceans have been classed into 66 large, transnational marine ecosystems, known as the large marine ecosystems (LMEs). Taken from World Ocean Review Living with the Oceans. 5 Coasts – 2017

certain areas are biologically active.

Although our knowledge about coastal ecologies is extensive, little has been done since the 1950s to translate that knowledge to a format that can be used to manage the fouling of ships and structures. In Marine Fouling and Its Prevention (1952), the differences in fouling sequence were reported for 20 different locations from around the world. Differences in barnacle settlement at locations along the east coast of the US between Lamoine, Maine (44.490N) and Miami (25.760N) **(Figure 2)** clearly show that the duration of barnacle settlement increases as one moves south to warmer waters.

Fouling forecasting, however, requires more detailed knowledge of local conditions and the organisms that are present. An example of the fouling conditions as measured by the organisms that were recruited to 25 x 30 cm epoxy coated static immersion panels during a one-month period at our test site in Port Canaveral, Florida is shown in **Figure 3**. The data shows a diversity of different fouling types and the summer months have more active fouling than in the winter.

John de Palma (1972) promoted the idea of fearless fouling forecasting and used data collected from Fort Lauderdale and other areas to create a fouling rate zone chart. He proposed that in warm water coastal areas, fouling is greatest closest to the coast and decreases as one moves seaward to deeper waters **(Figure 4)**.

Ships and structures develop their own ecology due to the location, geometry, activity and the fouling control measure that is applied. These may be divided into the general hull and niche areas. The bulbous bow and sides of the hull typically develop biofilms and weed fouling, whilst the flats often have barnacles. The niche areas offer sites that are sheltered from water flow and these are ideal sites for barnacles, tubeworms and mollusks. The International Maritime Organization Resolution MEPC.207(62) contains guidelines that recommend every ship have a Biofouling Management Plan and a Biofouling Record Book onboard. These recommendations are now re-

**Figure 2.** Barnacle settlement on test panels located at different locations along the east coast of the United State. Adapted from Redfield and Deevy, The Seasonal Sequence. Marine Fouling and Its Prevention 1952

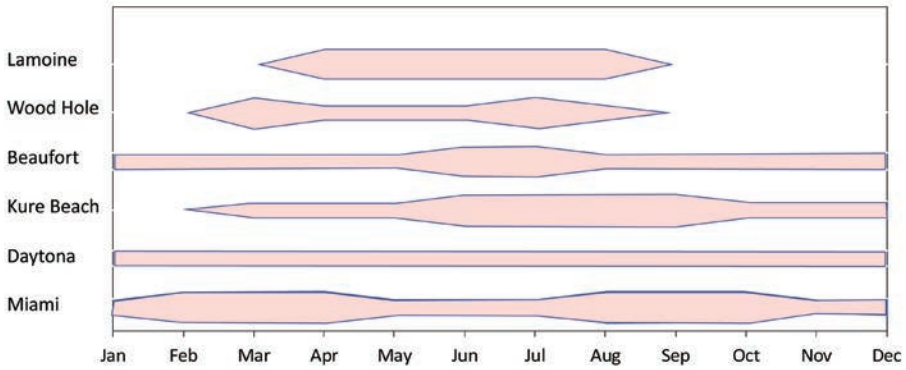



**Figure 3.** The seasonal sequence of fouling on 25x30cm epoxy coated panels immersed for one month at Port Canaveral, FL.

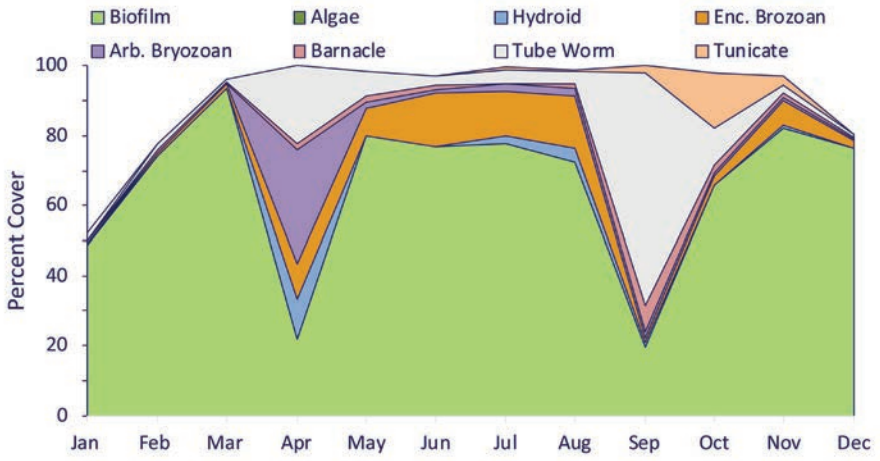



**Figure 4.** Warm water coastal fouling rate zone chart. Taken from a model developed by John DePalma, Fearless Fouling Forecasting 1972

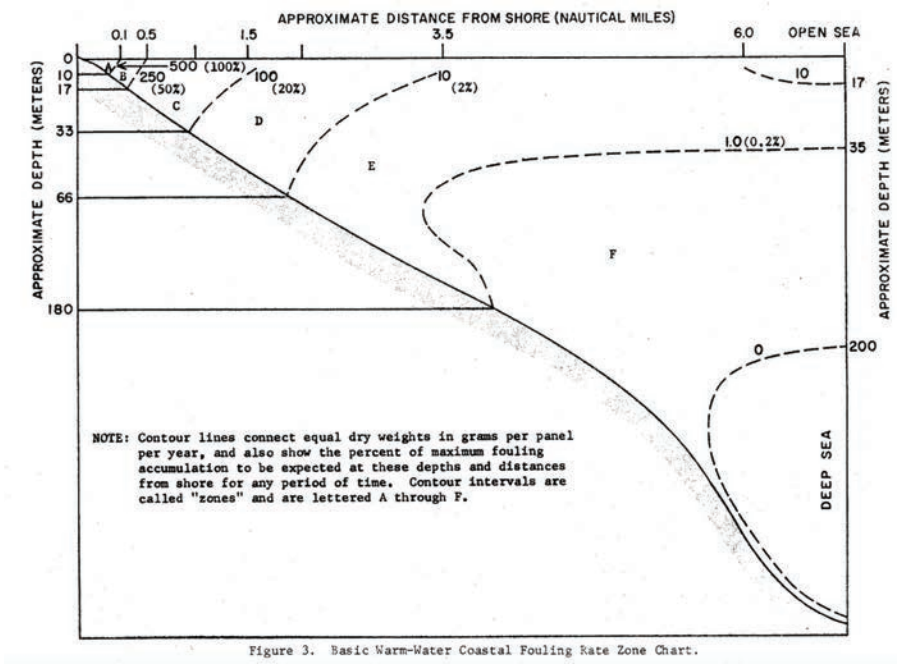


**Figure 5.** The general hull and niche areas of a ship.

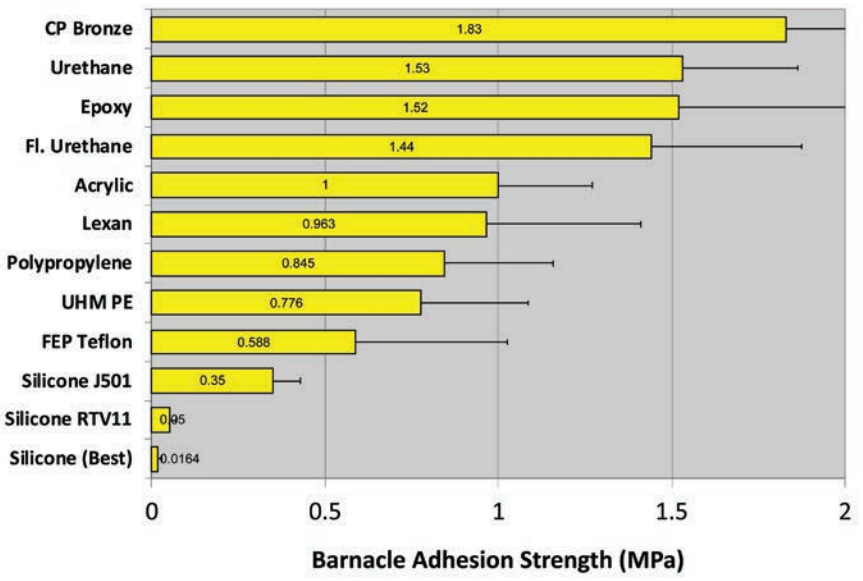

quired for ships visiting Australia, New Zealand and California and will provide excellent guidance in making decisions with respect to biofouling control.

Fouling control coatings provide the most commonly used method of protection to immersed surfaces. These may be divided into those that function by the release of a biocide and those that reduce biological adhesion to the surface. For biocide-based coatings, the active ingredients are held within a paint matrix that is designed to control the release at the minimum rate required to prevent fouling. The formulations are typically tailored to specific operational profiles and changes to the ship routine may alter the release of active ingredients and performance. For copper, the optimum release rate is generally considered to be between 10-20 µg/cm2/day, however, under static conditions the lack of water flow and the buildup of silts and slimes will reduce copper output to a level at which macrofouling may develop. There are also certain organisms that exhibit copper tolerance. This was first observed by Weis from research he did in Biscayne Bay, Florida in the 1940s. He identified the barnacle Balanus amphitrite and the encrusting bryozoan Watersipora cucullate as copper tolerant species, and these are typical of the early colonizers of copper-based coatings.

The silicone-based fouling release coatings are designed to reduce the adhesion of organisms to the surface. Typical barnacle adhesion strengths to these coatings are between 0.02 to 0.06 MPa compared to values greater than 1 MPa for other coatings **(Figure 6)**. This means the force required to remove a 10mm diameter barnacle from a fouling release coating may be as low as 1.5 Newtons (0.3lbs) compared to in excess of 80 Newtons (18lbs) for non-release coatings and surfaces. When the adhesion strength is greater than the strength of the barnacle shell, then hull cleaning typically leaves the barnacle base plate which roughens the surface and acts as a future site for settlement. For constant service ships, the shear stress developed by water movement across the surface of fouling release coatings is sufficient to remove juvenile macrofouling. Under prolonged static conditions, however, the fouling organisms can get a sufficient hold to make removal difficult and barnacles have a tendency to undercut the coating which increases adhesion strength and damages the surface.

Ships that remain stationary for long

**Figure 6.** Barnacle adhesion strength to different materials. (taken from Swain, Redefining Antifouling Coatings. Journal of Protective Coatings and Linings September 1999).



periods of time are therefore likely to become fouled. As the organisms grow, so will the forces required to remove them increase, and it is why proactive removal of the marine growth is critical if one wishes to avoid damage to the coating. The exact nature and timing of the growth are difficult to predict due to the large number of variables that will determine the event **(Figure 7)**. Forecasting the development of fouling requires knowledge of the ship operation and schedule, the local conditions, and the age and condition of the fouling control coating. This knowledge should then be communicated with the coating supplier for their advice.

The ship owner has only limited choices as to how to manage fouling. Selecting a location with low fouling pressure is important. This may be achieved by voyage planning that places the vessel in an advantageous location, but if this is not feasible, then local knowledge may be used to identify the locations with reduced fouling. The ship should then be monitored for biofouling recruitment. This may be done using an ROV to visually inspect surfaces. Another option is to hang sentinel epoxy coated panels over the side to ascertain what fouling organisms are present. If biofouling is active then a decision must be made whether to engage in proactive maintenance of the coating or reactively let it foul and clean the vessel once it resumes service. Proactive measures include running the vessel up to a certain speed for a predetermined time at a frequency that maintains the activity of the paint or removes the incipient organisms. Another choice is to light clean or groom the vessel at a frequency that removes the fouling before it becomes established. Our experience in the summer high fouling season at Port Canaveral, Florida is that the fouling control coatings require a light cleaning (grooming) on a weekly basis to ensure that they remain free of fouling (Tribou 2015 and Hearin 2015). Ship hull grooming is ideally done using remotely operated vehicles but at present, the decision to rely on in water husbandry will require the services of a diving company with the method to match the fouling and the coating. Hull cleaning is also becoming highly regulated. There are an increasing number of areas in the world that do not permit hull cleaning or have regulations that limit the amount of discharge that is created by the process (Scianni 2019).

Finally, there are the costs associated with biofouling and these include both monetary and environmental penalties. Failure to prevent fouling will reduce ship performance, increased greenhouse gas emissions and the danger of transporting invasive species. If the fouling is allowed to become well developed, then the subsequent hull cleaning is likely to damage the coating which will cause excessive discharges of the paint into the water, reduce or eliminate the effectiveness of the coating and require dry docking. All are undesirable outcomes. It would therefore seem prudent to proactively manage the coating by selecting an anchorage that minimizes the problem and apply proactive methods to maintain the coating in a clean and active condition.

**Acknowledgements:**

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**Figure 7.** Factors that influence the development of biofouling.

| | |
|---|---|
| Biogeographic | Realm, Province, Ecoregion |
| Aquatic Setting | Ocean, Coastal, Estuarine, Freshwater |
| Water Column | Salinity, Temperature, Currents, Tides, Wave Action, Nutrients |
| Biotic Component | Composition of benthic communities |
| Season | Spring, Summer, Autumn, Winter |
| Structure | Hull, Propeller, Sea Chest, Ballast, Other |
| Material | Steel, Coatings: *Inert, Biocide, Fouling Release* |

# Coast Guard Auxiliary Supports Research Efforts

*By Lowell Siegel, Bruce Buckley and Dr. Joe DiRenzo*

Unique among the nation's armed services, the Coast Guard's missions include national defense, law enforcement, natural disaster incident management, recreational boating safety and environmental protection. This diversity of mission scope presents opportunities for the Coast Guard at the strategic, operational and tactical levels as the service works to make their efforts as effective and efficient as possible.

Contributing to the service's overall execution effort is the Coast Guard Research and Development Center (RDC), based in New London, Connecticut. This 80-person command is the center of gravity of ongoing applied research, development, testing and implementation of new technologies that enable the Coast Guard to address the nation's increasingly complex maritime challenges. RDC opened in 1972, and has served as the tip of the technological spear, engaging in a wide range of projects which the Coast Guard and other agencies in the Department of Homeland Security (DHS) have identified as mission critical.

As part of a continuous effort to improve capability and enhance engagement, the RDC has developed partnerships with other organizations and research entities. The partnership with the Coast Guard Auxiliary, established two years ago, has been a true force multiplier in all aspects of research.

The Auxiliary is an all-volunteer force of more than 22,000 that was established in June of 1939, while the active-duty reserve components were mobilized for deployment overseas. Today, Auxiliary members nationwide support seven of the 11 Coast Guards missions. Auxiliary members volunteered over 3.5 million hours to the Coast Guard in 2018.

Auxiliary support for the RDC reached 1,200 volunteer hours in 2019, and continues to grow. Each week a new request appears. The coordination effort occurs on a daily basis and has been dubbed a successful "work-in-progress" by Capt. Bruce Buckley, the Auxiliary liaison to the RDC, because he expects the partnership to continue to expand in scope and impact.

Auxiliary research support is made up of a wide range of activities. Auxiliary members have been identified as subject matter experts for current and future projects as the RDC's research leads build their project plans. In addition to providing technical expertise, Auxiliarists participate in field experimentation -- supplying boats and boat crews for events from Long Island Sound to Alaska. Additionally, a cadre of Auxiliary members serve as a virtual public affairs staff for the RDC. They have developed feature articles, captured video which has been developed into short documentaries, and shot photos in remote regions of the country during field experimentation. These Auxiliary members bring exceptional backgrounds … such as former members of The New York Times editorial board, experience with media relations companies, former TV news producers and videographers. The extraordinary thing … all are supporting the RDC as volunteers. Here are a few examples of Auxiliary-supported Coast Guard research and development projects:

## MARITIME OBJECT TRACKING TECHNOLOGY

Maritime Object Tracking Technology (MOTT) was developed as part of the Coast Guard's on-going effort to thwart drug smuggling. Devices were designed to drift with contraband jettisoned by fleeing drug smugglers, using integrated software technology for tracking and recovery. The Concept of Operations: Assets (surface or air) drop the devices among the jettisoned cargo during a pursuit, returning later to retrieve the evi-


dence. A series of tests was conducted to validate survivability and functionality for both surface and air assets.

One test was conducted in New London, Connecticut; to simulate dropping the unit from a helicopter, they were dropped from the Gold Star Memorial Bridge. The Auxiliary supported this test evolution with two boats and crews. They provided critical standoff/security zone management and recovery of the devices in the water. In addition, photography support was provided for all of the testing operations for public affairs releases and test documentation.

The lessons learned in this early MOTT testing have been incorporated into a technology solicitation released by the DHS Science and Technology Silicon Valley Innovation Program on behalf of the Coast Guard.

**READY FOR RESCUE TECHNOLOGY CHALLENGE**

The goal of this public prize competition was to research affordable and effective enhancements to basic personal floatation devices. Unique ideas for improving the conspicuity of a person in the water were solicited. Concepts, ideas, prototypes and commercially-off-the-shelf (COTS) products were all considered. RDC provided guidance and technical contributions to the inventors to successfully improve the prototypes. This prize competition, sponsored by DHS Science and Technology, awarded over $250,000 in prize funding directly to the inventors.

Coast Guard Auxiliary support was wide-ranging, from judging the concepts to test planning and on-water evaluations. Two experienced Auxiliary boat crew members were part of the on-the-water test planning team. They advised on commercial vessel traffic during test area selection and provided a safety plan for RDC personnel functioning as test observers and statisticians. Underway support included four boats and 12 boat crew members during the eight-hour field event which assessed final prototypes in open water day/night test events. The manpower and expertise provided by the Auxiliary teams contributed to the success of the testing and armed industry participants with knowledge to improve their innovations.

**USCG CUBESAT GROUND STATION**

Another project with exceptional Auxiliary support involved CubeSat research. CubeSats are a type of miniaturized satellite for space research and typically have a mass of no more than three pounds per unit.

They are commonly put in orbit by private deployment companies as secondary payloads on a launch vehicle. More than 1,200 CubeSats have been launched as of January 2020. As part of the DHS Science & Technology Polar Scout CubeSat project, the RDC constructed a satellite ground station in Fairbanks, Alaska. This labor-intensive effort required the construction of an 18-foot radome structure. The successful completion on this ground station provided a valuable resource for the Coast Guard and DHS while testing CubeSat technology in support of Arctic search and rescue.

The Auxiliary support consisted of five members from the local Fairbanks area with construction experience. They were quickly mobilized and worked for three days assisting the on-site RDC team and providing skilled labor.

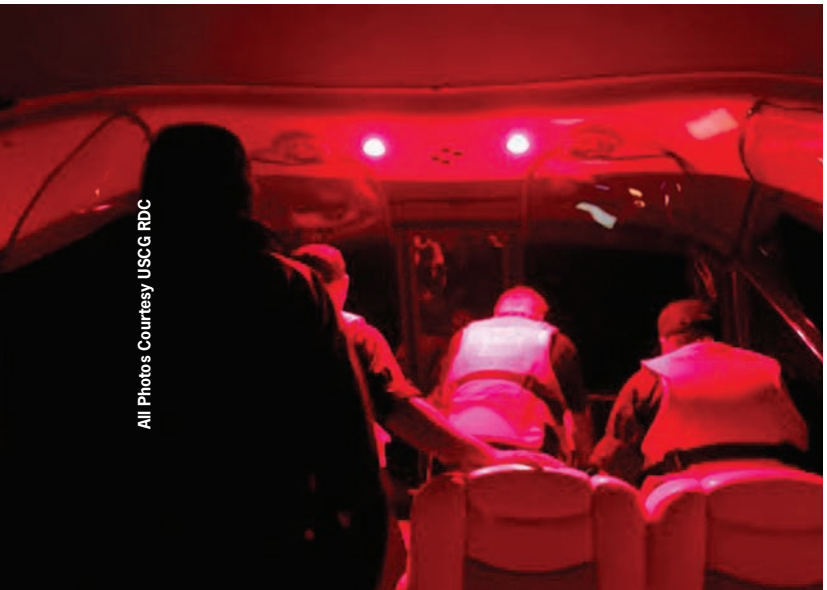
**IN-SITU BURN (ISB) RESEARCH**

This past summer, the RDC conducted testing on Little Sand Island in Mobile Bay, Alabama, to provide critical new information for dealing with difficult oil spills. Testing occurred in a large tank to evaluate in-situ burning (ISB) as a countermeasure to spills in fresh water, such as the Great Lakes.

This testing protocol included two full-scale ISB tests of flowing crude oil in fresh water, with and without marshland vegetation, which occurred over five days and had been preceded by weeks of preparation. The testing captured important data for researchers to use to best inform methods available to federal on-scene commanders.

Auxiliary members recorded the event, creating a documentary-style video for the research team similar to a report one would find on 60 Minutes or Dateline. The final 15-minute video with narration documented two major burns for the project team and included interviews with onsite technical experts.

These four examples capture a very small number of all the research events that Coast Guard Auxiliary members have been a part of at the RDC in the past two years. Eighty researchers combined with the bench strength of skills and resources of 22,000 Auxiliary members is a powerful win for Coast Guard research!



All Photos Courtesy USCG RDC


BMT

# Pentamaran: Next-gen Hull for Autonomous Ops

BMT released details of its 'Pentamaran' platform for autonomous applications, vessels that can be custom configured for military, patrol, intelligence surveillance and reconnaissance (ISR), anti-submarine warfare (ASW) and hydrographic survey work. The current designs go from 40 to 80m, but it can be scaled up or down to suit particular requirements. "As for the hull construction, we have used aluminium to keep the weight down," said **Martin Bissuel**, Business Sector Lead for Specialized Ship Design at BMT. "For the smaller units, composites could also be considered." The design features a narrow central hull and two smaller hulls on each side, for a total of five hulls. The two small hulls, or sponsons, are set one behind the other. BMT tests have reportedly established that the Pentamaran design reduces drag in comparison to monohulls, catamarans and trimarans.

"In calm conditions, the forward small hulls or sponsons on each side are not submerged in the water, and therefore do not generate any drag. These forward sponsons serve to supply roll stability when waves develop," said Bissuel. "As a result, the Pentamaran has less hull volume permanently immersed in the sea than a trimaran would have, resulting in reduced resistance through the water. Also, the positioning of the outer hulls, length-wise, is absolutely key to obtaining the best results. Through extensive tank testing we have been able to optimize the overall arrangement of the hulls for the best possible results."

A key consideration when a vessel is operating autonomously for long periods is the reliability of the propulsion setup. "When looking at autonomous operations, removing the human operator requirements into the design fundamentally changes the design philosophy that impacts not just the configuration of the power systems but also the entire below decks arrangement," said Bissuel. "The propulsion design could therefore move away from conventional setups. Multiple diesel-electric generators provide power for electric propulsors. The generators are positioned in different locations or compartments, increasing survivability and resilience because if one of the generators has an issue, power can still be provided by the other units. Maintenance is made easier because of the smaller generators, but more importantly, operationally it provides what we describe as graceful degradation of performance if units should fail, but providing high confidence that the unit can be returned."

With variables in propulsion system, speedand fuel, it's not possible to pinpoint duration, but Bissuel said that "When it comes to endurance the Pentamaran has been designed to push the boundaries. The profile varies depending on the customer requirements. We have run models when the 40m vessel will be able to do 40 days deployments, while 60 days can be achieved with the 62m version."

# Putting Pentamaran to Work

According to **Martin Bissuel**, Business Sector Lead for Specialized Ship Design at BMT, there is a wide range of missions the Pentamaran could be used for because of the different types of payloads, sensors, and effectors it can carry. Alongside applications such as patrol and hydrographic missions, it is designed for the latest military applications. Long endurance, deep water, intelligence, surveillance, and reconnaissance (ISR) and enduring communications node are both well suited to this platform which can remain on station, be discreet and have a low human cost if lost. It can also provide the ability to facilitate distributed physical effectors networks. Here are some potential applications:

- Support continuous at sea deterrent
- Deployable early warning systems
- Coastal defense
- Advanced force protection
- Support sea-lane clearance by using offboard vehicles
- Transfer of equipment from ship to land/land to ship
- Collect and process passive/active EM spectrum ISTAR data
- Launch/recover unmanned air vehicles.

The Pentamaran is designed to be a modular platform so that it can carry a range of payloads. The aft deck is very wide and provides a large amount of space. It can be a landing platform for unmanned air vehicles, a launch and recovery area for unmanned surface and underwater vehicles, but also carry containerized payloads for sensor systems. The mast is substantial enough so that multiple sensors can be fitted, not only for the vessel's own autonomous navigation needs, but also C4ISR payloads.

"We have a proven track record of achieving complex systems integration," said Bissuel.

"The Seafighter vessel we designed for the Office of Naval Research in the USA is a good example for that, as it features a novel platform concept as well as a range of innovative systems."

# Tech Files

Product & System Innovations

## EMI: Automating Ballast Ops When Installing BWMS

Installing ballast water treatment systems to comply with new regulations will require owners to automate ballast operations on board their vessels or barges. Retrofitting ballast water treatment systems generally requires modifications to the existing ballast systems. Many older vessels have remote operated valves, but no automation of the ballast system. EMI has been working with parent company W&O to provide blue water barges with innovative solutions to add automation functionality to their fleet.

When ballast water treatment systems are added to vessels, it requires piping modifications and additional valves to isolate, bypass, and engage ballast water treatment systems. Many of the legacy remote operated valve control systems on board do not have the capability to automate operations, and in many cases, are not expandable to control the newly added valves. Working closely with customers, EMI has designed solutions to replace legacy systems with custom new hardware and software that can automate a variety of modes of operation. Using visually intuitive graphics and onscreen prompts, EMI can provide single touch control to initiate a predefined sequence of turning on/off pumps and opening or closing valves for modes such as Warm up, Ballasting, De-ballasting, Can Flushing and Bypass operations. The sequences are custom tailored to the client's needs, based on the piping configuration, ballast treatment type and customer procedures on board.

Manufacturers of ballast water treatment systems are often unwilling to relinquish control of the valves in their systems, and unable to take control of valves and pumps outside of their equipment scope of supply due to regulatory constraints, leaving a gap in controls between the legacy valve control system

Photo: EMI/W&O

**Phoenix Lighting Floodlights**
When USNS Comfort was deployed to New York to provide COVID-19 relief, the Navy required an LED upgrade of hull perimeter and waterline security lighting. The Navy looked to Phoenix Lighting to deliver ModCom 2 LED floodlights,

**Valmet Automation**
Valmet will supply Valmet DNA automation and information systems for two 113 x 20.2 m, 157-pax. luxury expedition vessels being built by Helsinki Shipyard Oy for Russia's largest river cruise company Vodohod Ltd.

**Schottel Propulsion**
Jan De Nul ordered a heavy lift crane vessel capable of lifting 5,000mt from the CMHI Haimen China. It will sport Schottel propulsion package, including 4 rudderpropellers, 2 retractable rudderpropellers and 2 transverse thrusters.

**MAN ES Propulsion Package**
MAN Energy Solutions won the order to supply six MAN B&W 9S50ME-C9.6 Tier II-compliant main engines for three 238-m RoRo vessels for Finnlines PLC. MAN ES licensee Hyundai Heavy Industries Co. will build the engines in Korea,

and the new ballast water treatment system.

EMI and W&O work collaboratively with the client, and the BWT equipment manufacturer to determine what valves and piping are needed to install the BWT system, and to develop protocols to provide a 'handshake' between the ballast control valve automation system and ballast water treatment. This handshake ensures the two systems are communicating, and that the valves and pumps are correctly configured prior to starting/stopping ballast treatment operations.

The system consists of a Touchscreen and Ballast Control Panel. The touch screen provides the operator an interface using virtual pushbuttons and gauge displays for real-time control and indication of device states throughout the barge. The Valve Control Panel is the core of the system. Power is supplied to the panel from the vessel's main 115VAC switchboard.

The panel includes a PLC with associated I/O module to receive input signals from the HMI in the control room. The PLC processes the input signals, generates appropriate output signals, sends those signals to the valves, and communicates valve status to the HMI over an Ethernet network. EMI can provide systems with a variety of communication protocols to match vessel and BWT equipment requirements, including Modbus, PROFIBUS, PROFINET, AS-i, and DeviceNet. The panel includes a 24VDC power supply, UPS, and battery to provide power to the system in case of loss of main power.

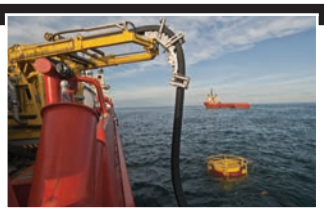
A set of relays drive remote and local audible outputs in the case of a system fault.

# $2M Grant for Floating Wind Tech

Aker Solutions

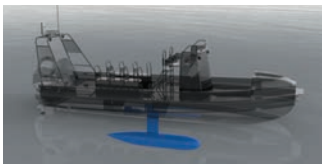
The California Energy Commission awarded Aker Solutions and Cognite a $2 million grant for a project called NextWind Real-Time Condition Monitoring, which is focused on next-gen solutions in wind through digitalization and aims to develop a holistic digital solution that will enable monitoring the condition of an offshore floating wind farm and its impact on the environment via live data streaming. According to Aker Solutions, a digital twin model of physical offshore wind assets will be developed to assess conditions and integrity management, real-time information that will allow access and analysis of data. "We believe applying new digital technologies is key to accelerating the green transition and increasing adoption of sustainable solutions in offshore wind by making them more cost-effective and efficient," said Dr. John Markus Lervik, CEO and co-founder of Cognite.

In April 2018, the Redwood Coast Energy Authority selected a consortium which includes Aker Solutions, Principle Power and EDPR Offshore to enter into a public-private partnership to pursue the development of the proposed Redwood Coast Offshore Wind Project. The 100-150 MW floating offshore wind farm is planned to be located more than 30 km off the coast and is expected online in the mid 2020's.



**Framo Oil Skimmer**
Framo introduced a customizable oil skimmer based on its TransRec platform. The new solution allows customers to specify a range of options to tailor their systems to fit their operational requirements.

**MAN ES for Type 31**
MAN ES won a contract to supply MAN Alpha VBS Mk 5 CP propeller systems for 5 frigates to be constructed by Babcock International Group. Each 138.7-m twin screw vessel, rated at more than 16,000 kW per shaftline.

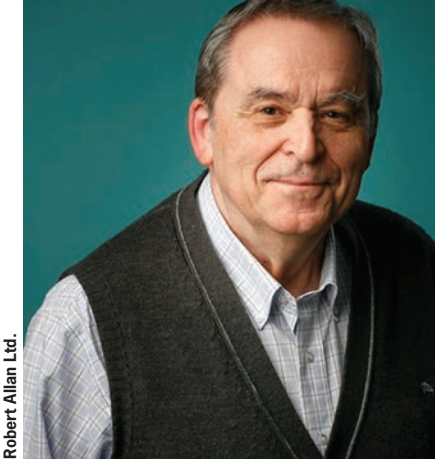


**Novel Workboat Stabilizer**
DACOMA and Tuco Marine have joined forces to test the Airkeel technology on Tuco's ProZero workboat range. The Airkeel is a novel stabilizer for work- and crewboats for the offshore industries developed and built by DACOMA.

**Record-breaking LNG Bunker**
Heerema's Sleipnir received the largest LNG bunkering ever completed. Titan LNG performed the bunkering, using the Coral Fraseri, Anthony Veder's LNG carrier in the Port of Rotterdam. Almost 3,300 mt of LNG was delivered.

**Akihiro Mori, NYK's First Internally Trained Captain**


NYK



Robert Allan Ltd.

**SNAME Fellow Muhlert**

GTT

**Dehouck Joins GTT as Deputy CEO**

### Akihiro Mori, NYK's First Internally Trained Captain

In the storied 135-year history of NYK, **Akihiro Mori** now holds a distinguished place in the company, as effective April 1, 2020, Mori becomes the first internally trained seafarer promoted to captain. In fiscal 2006, NYK became the first shipping company in Japan to hire graduates from ordinary four-year universities to undergo extensive in-house training for positions on board vessels.

### Muhlert Awarded SNAME Fellow Status

The Society of Naval Architects and Marine Engineers (SNAME) announced the awarding of the status of Fellow to **Hans Muhlert** of Robert Allan Ltd. Hans Muhlert has been a faithful and highly dedicated senior staff member of Robert Allan Ltd. for 50 years.

### Dehouck Joins GTT as Deputy CEO

GTT has appointed **Eric Dehouck** as deputy CEO, to assist Chairman and CEO **Philippe Berterottière**.

### Carson named Vard Marine CEO

Vard Marine Inc. said that **Dave McMillan**, the firm's President and CEO, will retire on May 31, 2020. **Wade Carson** was named the new President and CEO of the company upon McMillan's retirement.

### Norstar Hires Grünitz as MD

Singapore-based manager Norstar Ship Management (NSM) has appointed Lars Grünitz as its new Managing Director, replacing Christopher Kirton.
Grünitz was most recently Head of Vessel Management and Process improvement for Berge Bulk.

Norstar

**Norstar Hires Grünitz as MD**

### Stiefel Joins BV as Regional Chief Exec

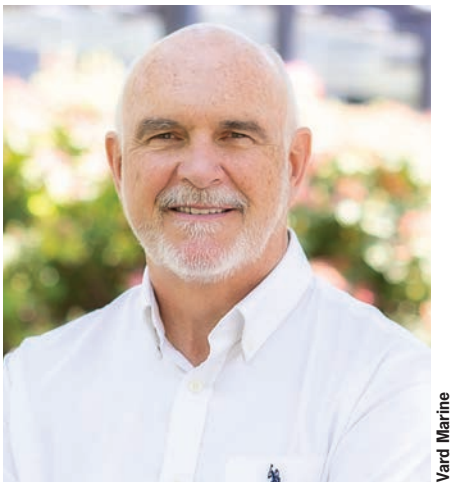
Bureau Veritas appointed **Rolf Stiefel** as its new Regional Chief Executive based in Hamburg, responsible for Central Europe - Germany, Austria, Switzerland and Russia. He will be based in the BV regional office in Hamburg and his ap-

BV

**Stiefel Joins BV as Regional Chief Exec**

Vard Marine

**Carson named CEO Vard Marine**



Vard Marine

**McMillan retires from Vard Marine**

Hamburg Süd

**Hamburg Süd CFO Henningsen**

pointment is effective May 1, 2020. He succeeds **Dr. Hans Gaetjens** who is retiring in July following a two month hand-over period.

**Henningsen New CFO at Hamburg Süd**

**Lasse Carøe Henningsen**, 46, will become the new Chief Financial Officer (CFO) at Hamburg Süd, succeeding **Jakob Wegge-Larsen**, who has held this position since December 2017 and will be returning to Maersk in Copenhagen at the end of June.

**de Lange Named MD at AEGIR-Marine**

**Jaap de Lange** was appointed Managing Director of AEGIR-Marine, a stern seal and propulsion services company. He started his career in the Royal Dutch Navy. Since 2009 he worked for Damen Shipyards in several senior leadership positions.

**Kline joins Martin & Ottaway**

**James "Jim" Kline**, USCG (Ret)., has joined Martin, Ottaway, van Hemmen & Dolan, Inc. as an engineering and surveying consultant.

**Mund Joins Ship Architects, Inc.**

Ship Architects, Inc. hired Andrew Mund, P.E., in the role of VP Engineering & Business Development. Mund will be broadly involved in all SAi projects, but his primary focus will be on those vessel design services corresponding to the pre-construction contract stage.

Ship Architects

**Mund Joins Ship Architects, Inc.**

# COVID-19 & the treatment of Seafarers

**Frank Coles, CEO, Wallem Group**, is known to "call 'em like he sees 'em". We caught up with Coles via video conference from Hong Kong last month to discuss the impact of COVID-19 on maritime, the future of digitalization and autonomy, and the shameful treatment of seafarers. **By Greg Trauthwein**

"The only shock to my system that was at the same level was 9/11, because of its impact on the world," is how Frank Coles puts the current COVID-19 pandemic in perspective. "That was a one-time thing on one-day, with implications that we still live with today."

Coles is regarded for being a visionary of sorts, someone that is adept and willing to distill a variety of complex topics and trends into a clear long-range picture. And unlike many in the maritime sector, he freely shares his opinions 'on the record' in both traditional and social media. That makes his contention that his current 'long range' planning is the next 24 hours all the more jarring. "Every day I wake up and think OK, 'what has changed, and how is this going to impact how we operate in the next 24 hours?,' because right now you can only think about the next 24 hours," said Coles.

**An Impetus for 'Real Change'**

In his previous job as the CEO of Transas, Coles spoke often about the real change needed within the maritime sector to bring its operations and technology up to speed with other transport logistics sectors. He sees the current COVID-19 situation as a potential inflection point for real change moving forward. "It might be the kind of Black Swan event that we need to trigger real change in the shipping industry, in particular its approach to digitalization of vessel operation," Coles recently wrote. But real change takes real investment, and as of mid-April many industries and corporations were focused on simply staying afloat, let alone investing in new technology.

"It depends how long this goes on," said Coles, when asked to identify likely first movers in vessel and operational modernization. "If this continues another two or three months, and trade continues to decline, there are shipping companies that are not going to come out the other end."

Despite a "compression" of the market, maritime stands strong as the primary heavy hauler of raw materials and goods, and today's broken economy will present "opportunity for companies to work in a completely different way when they come out the other side. I don't know how they can go back to business as usual, because everything around them will be different … cargo availability, banks, charterers, the way that countries deal with ships coming in and out … there will be a need to be more efficient."

According to Coles, despite generous helpings of hype from the media and a few large tech giants, he said that "the technology currently found onboard ships, in the operation centers run by shipmanagers and in owners' head-offices is improvised, disconnected and fragmented."

"We're right at the very beginning still (of this technology revolution)" said Coles. "You can read an article on an autonomous tug … so what! I'm not knocking it, but it's like having a remote driven car driving around a track in Disney Land. It's not like autonomous cars driving down the highway. We have a long way to go in the maritime industry."

While the technology has arrived to enable autonomy on short, local routes, Coles believes that there is a level of complexity, standardization and control that is missing, key ingredients to seamlessly fit together systems between ship and shore. Even some shorter local routes are not slam dunks for autonomy. "Do you think you'll see a fully autonomous Staten Island ferry? I don't think so."

Part of the problem in moving these technologies forward faster in maritime is simply the size of the industry itself. "It's definitely a matter a scale, because at the end of the day the total universe of ships is pretty minimal in the grand scheme of things."

Scale is one thing; proving the ROI to shipowners is another. "No one has produced the financial model that convinces any owner that if he invests in a total solution … the engine and navigation system is designed and connected together that it will make him efficient enough to make them money," said Coles. With charter rates historically fluctuating so wildly, he contends that "you can put the technology in, but until there is a certainty of revenue that comes along with it," it won't gain steam.

**The Future of Green Shipping**

When it comes to the laundry list of environmental regulations that have swept through the marine industry in recent years, Coles said "There's the absurdity of ships carrying millions of

tons of coal, oil or products extracted from the ground using large amounts of fossil fuels, running on low sulfur fuel and pumping corrosive effluents into the ocean in the name of, checks notes, 'protecting our environment'."

He said particular caution should be paid to the 'green' fuels debate, as it has a fundamental impact on not only vessel design but ship life.

Once the smoke of COVID-19 has cleared, the world and traditional trading patterns could be radically changed. "I'm not an economist, but I firmly believe that the over-reliance on manufacturing countries by the developed countries is going to change. The U.S. will have to do some sort of de-risking of the situation," said Coles. "I'm convinced we will evolve to a much more regional model, which is not necessarily a bad thing when you look at the future of 'green ships' because distance has always been a limiting factor (for certain 'green' fuels)," he said. "There's an opportunity for a new kind of ship. A ship that only has to go 1000-2000 miles looks completely different than a ship that sails 10,000 miles."

**The Seafarer**

Seafarers have been put in the spotlight by COVID-19 as never before. Courtesy of their profession which entails long distances traveled and months away from home, seafarers have never entered public consciousness, despite the fact that in good times and bad, they are a central player in keeping the global economy flowing.

The plight of the seafarer during this pandemic has been shameful by most accounts, as the men and women serving on commercial ships have been denied crew changes in many countries, and in cases where they could disembark, it is oftentimes difficult to impossible to get them home as many countries … lead by India … have effectively closed their borders.

"Someone just asked me the other day; will people even want to go to sea after the way that they've been treated?,'" said Coles. "One thing that I don't think will change is that there will be people that will go to sea anyway no matter what conditions we put them in; and I think that's a sad reflection on the industry." As an organization with more than 7,000 seafarers, Wallem is doing the best it can to help its seafarers. "We are carrying out crew changes as much as possible, and conducting a risk assessment each time to assess the risk of them getting stuck; the risk of infection," said Coles, an ex-seafarer himself. "My real concern is the mental well-being of the crew, and the impact of being unable to make crew changes."

The real challenge could come in a few months when Coles estimates that about 400,000 seafarers will be overdue and out of contract. "That's a huge number. So if we wake up on June 1 and find all of these restrictions are gone, we're going to then have a mad dash to replace crews."

Pending what the economic and shipping landscape looks like by the summer, Coles sees an even darker sky looming ahead. "The problem is that the hangover is going to be far worse than the actual problem, and that's my fear regarding the crews … we just don't know how bad it's going to be afterwards."

Real change in the treatment of seafarers is likely to come from a change at the top levels of political leadership. "I think that it's time for the big boys in maritime to step up and truly use their influence. I'm sure that many of them have access to the right people, and they need to do their bit," said Coles. "If you truly want world commerce to go on, you need to take care of the workers. If the workers stop, world commerce will stop. Take care of the people and commerce will take care of itself."

# 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

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

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### INERTIAL SENSING SYSTEMS

Silicon Sensing Systems Ltd, Clittaford Road Southway, Plymouth, Devon PL6 6DE United Kingdom , UK , tel:+44 (0) 1752 723330, sales@siliconsensing.com

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### MEMS MOTION SENSING

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### METEOROLOGICAL INSTRUMENTS

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### NAVAL ARCHITECTS, MARINE ENGINEERS

All American Marine, 1010 Hilton Ave. Bellingham, WA 98225 U.S.A. , tel:(360) 647-7602, marketing@allamericanmarine.com

Bristol Harbor Group, Inc., 103 Poppasquash Rd., Bristol, RI 02809, USA , tel:401-253-4318, fax:401-253-2329, design@bristolharborgroup.com contact: Greg Beers, P.E. - President, www.bristolharborgroup.com

The Shearer Group, Inc., 99 Poppasquash Road, Unit H, Bristol, RI , USA , tel:(401) 253-4318, fax:(401) 253-2329, gbeers@bristolharborgroup.com

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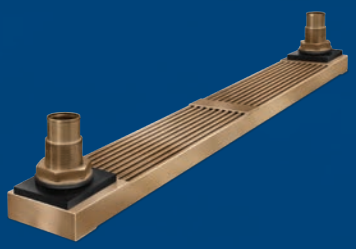
# We take the heat, so you don't have to.

## Cool. Because you need it.

We deliver cool based on your reality. So no matter where you operate, hot days and heavy loads will never slow you down.

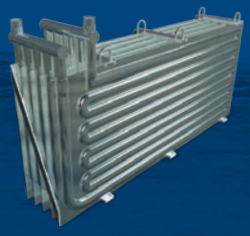


### GRIDCOOLER® Keel Cooler

- **One Piece Head Design** maintains greater structural integrity.
- **Higher Silver Content Braze Joints** resist fatigue and maintain the strength of surrounding material.
- **Better Penetration at Braze Joints** places more braze material with less heat, making joints stronger.
- **2-Year Warranty on Copper Nickel GRIDCOOLER Keel Coolers:** Industry-leading design, craftsmanship and materials create industry-leading products.
- **70 Years of Experience with Fully Assembled Packaged Keel Coolers**: Our focus is and always has been heat exchangers.

### WEKA Boxcooler®

- **Over 20 Years of Experience with Copper Nickel Boxcoolers** offering longer product life cycle than standard coated tube units.
- **Manufactured in the USA and The Netherlands:** provides the greatest product availability.
- **Weka Guard and Protector** eliminate the need for bulky and costly copper sacrificial anodes.



### Tranter® Heat Exchangers

- **Tranter Heat Exchangers** product offerings make Fernstrum your single source for multiple stage cooling systems.
- **Tranter Superchanger** plate and frame heat exchanger provides a range of options in pattern, size and material for a wide variety of applications.
- **Tranter Platecoil** provides an efficient and cost effective alternative to traditional pipe coil heating for bulk cargo, ballast and other applications.

FERNSTRUM®
R.W. Fernstrum & Company

fernstrum.com | 1.906.863.5553 | sales@fernstrum.com | ISO 9001:2015