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Volume 29 • Number 1

Marine News

JANUARY 2018

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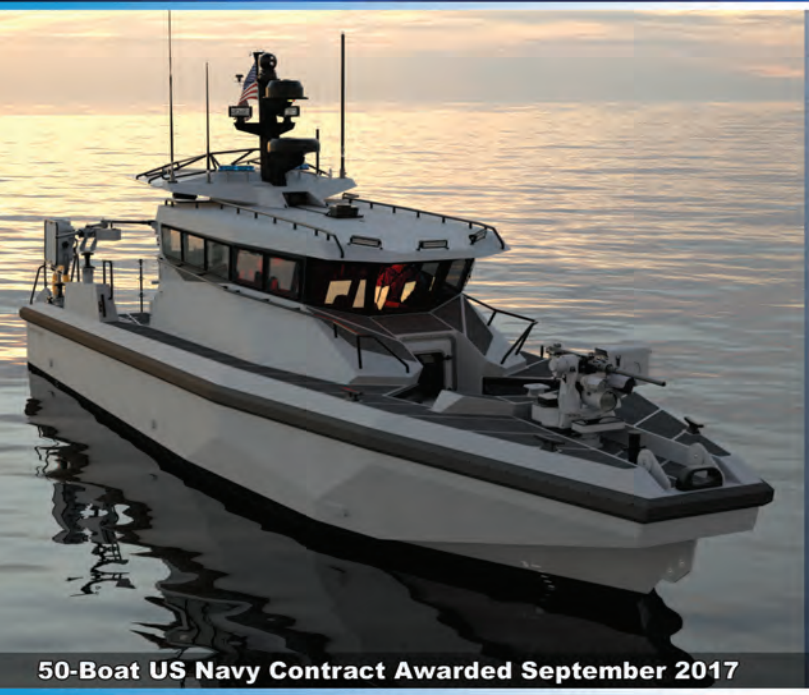

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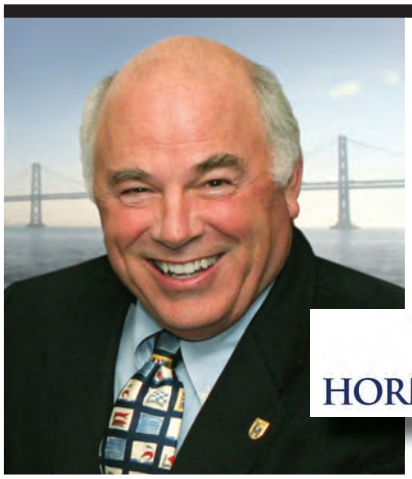

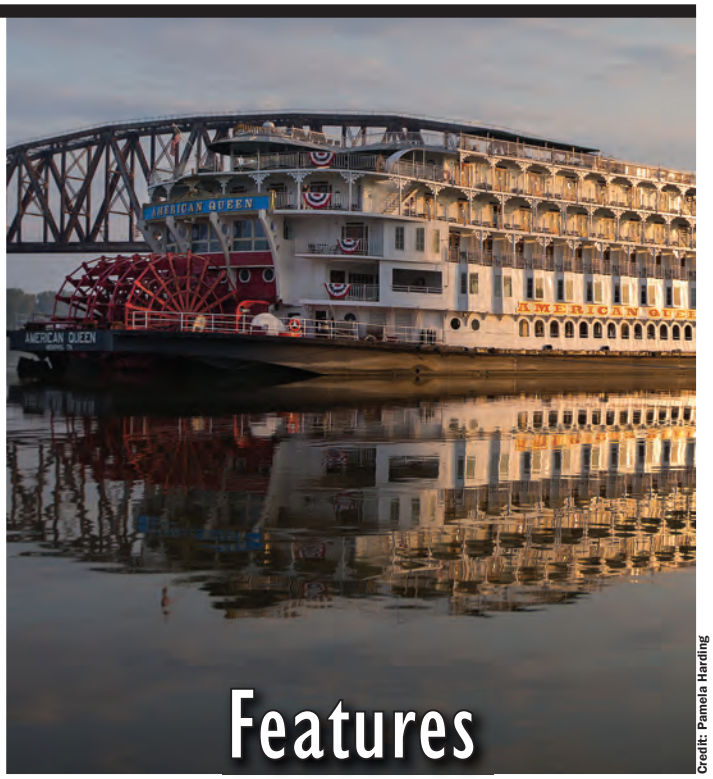

Credit: Pamela Harding

Features

ON THE COVER

This Teknicraft Design passenger vessel, now being built by All American Marine in Bellingham, Washington, is appropriately enough also a hybrid electric powered vessel. The Red & White Fleet will take delivery in the second quarter of 2018, when the innovative aluminum-hulled vessel will be put into service as an excursion and tour boat. The ferry building boom goes on.

Image credit: All American Marine

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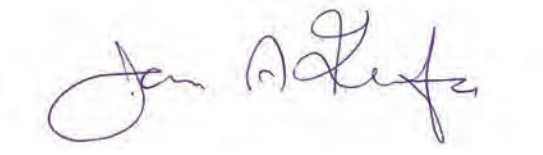
Red Hot. No, clearly I'm not talking about the worst deep freeze that the lower 48 has seen in three decades. But, if we're going to zero in on this month's primary editorial promise – and, that would be passenger vessels – then Red Hot is an entirely appropriate descriptor. It would not be a stretch to say that the ferry and passenger vessel building boom has buoyed if not saved many players in the so-called second tier shipyard ranks. And for those not involved in ferry markets? The backlogs in other yards have opened up still more opportunities for all.

For those readers yearning to stay plugged into the North American passenger vessel game, this issue of ***MarineNews*** should be your one-stop primer. To begin with, the recently released biennial National Census of Ferry Operators is a (somewhat flawed) treasure trove of data and industry INTEL. That's because a small number of operators declined to participate and still others cling tightly to passenger throughput numbers and other related items that they consider 'proprietary.' Our analysis of the report begins on page 10, but you can also read the full report by visiting the U.S. Department of Transportation's web site. Both efforts are time well spent.

Also in this edition, you'll hear from Hornblower CEO Terry MacRae, as well as the leadership from both the Passenger Vessel Association (PVA) and its global counterpart – Interferry. PVA, because they've got their finger on the regulatory pulse that impacts domestic operators, and Interferry because we can always learn something from our international partners from across the 'big pond' that separates us. From any one of these three perspectives, there is something for everyone and plenty to ponder as we launch into yet another New Year.

If the passenger vessel industry now propels the domestic waterfront, then the machinery that moves these new and innovative vessels is also changing. Propulsion selections for ferry operators dipping their toes into uncharted routes are looking for a greener footprint, an economical and compliant powerplant, and the assurance that they can rely upon their engines during that all important 'hour of power.' For these reasons, this month we bring three different entries that take the guess work out of what comes next. To that end, our case study on Scania's highly successful entry into the East Coast ferry market begins on page 46.

Finally, and since we should be looking ahead at what comes next, there should be plenty of upside to the current boom. As domestic river cruiseboats get fancier and more comfortable, new players are looking at entering the game. That's good news for passengers who can look forward to competitive pricing and stiffer competition; something that always brings out the best in service. The ultimate winner(s) will be the environment, as more cars and trucks are removed from the congested roadways, a smoother supply chain that has more options, and a boatbuilding industry that embraces the challenge of making it all possible. I call that ***Red Hot.***



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MarineNews
January 2018
Volume 29 Number 1


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Following senior positions in the energy industry, **Mike Corrigan** joined BC Ferries – one of the world's largest ferry operators – in 2003. He was president and CEO of the company from 2012 before leaving to take up the Interferry CEO role last April.

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Jeff Whitaker is the current PVA President and is the Vessel Operations Consultant for Hudson River Cruises and Events. The company provides sightseeing, dinner and charter cruises on its single 300 passenger vessel the Rip Van Winkle on the Hudson River. He has served on the PVA Safety and Security Committee since 2001 and served as its Chairman. Jeff has been a member of the FLAGSHIP work group since its inception. Jeff has been a member of the Board of Directors since 2011, served as PVA Secretary/Treasurer in 2015 and the PVA Vice-President in 2016.

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World Energy News	49,498

All stats from 01/02/2018

National Census of Ferry Operators Highlights

In November, the U.S. Department of Transportation's Bureau of Transportation Statistics (BTS) released the 2016 Highlights of Ferry Operations in the United States. The report highlights key findings from the 163 (out of 220 eligible) ferry operators (74%) that responded to the 2016 National Census of Ferry Operators (NCFO). The NCFO is a biennial census of all known ferry boat operations within the U.S. and its territories. The report's numbers, like most government sourced statistics, lag one calendar year. And, because a fair amount of operators did not respond, it can be assumed that a similar amount of data is missing. Hence, with fully 25% of operators not reporting, the numbers in this sector are staggering – **and they are growing**.

Data is just data, however, without context. Hence, we also researched past reports that carried similar data streams, to give perspective. BTS isn't necessarily thrilled with that idea because the number of respondents varies from survey to survey. Still, the numbers should be compared – especially since we are in the midst of one of the greatest ferry building booms in five decades. *By-the-Numbers, the last few reports looked something like this:*

U.S. Ferries: Through the Years …

Year / Census Year	1999 / 2000	2005 / 2006	2007 / 2008	2013 / 2014	2015 / 2016
Ferry Operators Responding	224	230	213	128	163
Ferries in Service	N/A	N/A	669	476	609
Vessels Not in Service	N/A	N/A	40	23	43
Total Fleet Size	677	690	709	499	652
Ferry Terminals (U.S.)	546	541	496	441	560
Total Ferry Route Segments	452	382	349	741	880
Passengers Carried	??	108 million	106 million	115 million	119 million
Oldest Ferry	??	??	94 years	101 years	102 years
Average Age (years)	??	25	26	28	27
Average Ferry Speed	??	14.0	14.1	15.0	14.0

Today's Ferry Fleet … at a glance …

Parameter (sample size)	Count	Percent
Carry passengers (652)	608	93.3
Carry vehicles (652)	279	42.8
Carry freight (652)	130	19.9
Passengers + Freight (652)	23	3.5
Passengers + Vehicles (652)	170	26.1
Self-propelled (596)	567	95.1
Other propulsion (596)	29	4.9
Diesel (641)	588	91.7
Gas (641)	22	3.4
CNG (641)	0	0.0
Electric (641)	4	0.6
Other (641)	27	4.2

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What are the 'take-aways' for this domestic ferry fleet? For starters, the fleet is growing, and participation in the BTS survey (this should be a no-brainer for all stakeholders) is rebounding. The numbers of ferries in service are growing, passenger count is expanding, the age of the fleet is decreasing slightly (***the boat building boom in this sector is arguably saving the small to mid-size shipyard industry***) and in just two years, the size of the fleet has exploded.

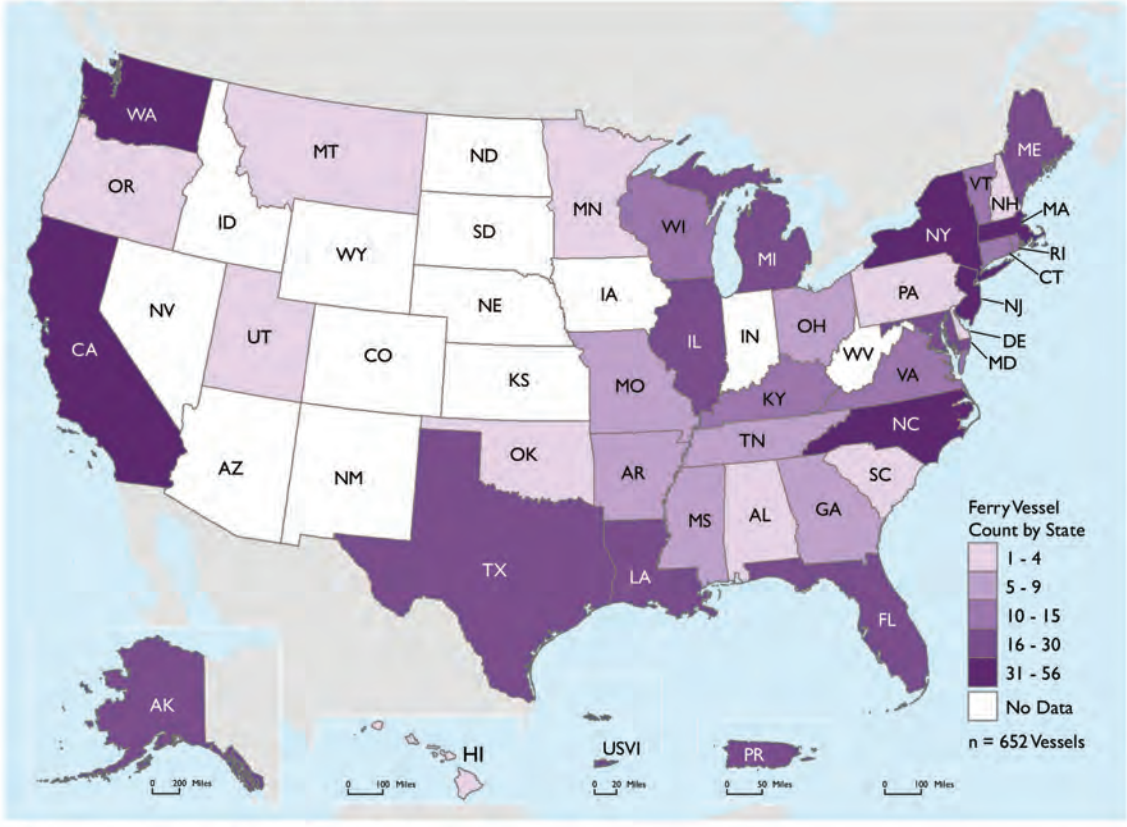
We can look to a number of reasons for this fleet rejuvenation. In urban regions – New York City and San Francisco in particular – there has been a resurgence in ferry use. Between 2017 and 2018, New York City plans to add 10 new ferry terminals and 19 new vessels that will facilitate 4.6 million annual trips across 6 routes and cover over 60 miles of waterway. From 2013 to 2015, the NCFO data showed that San Francisco's ferry ridership increased 25 percent. This resurgence in the bay area has prompted the construction of new ferry vessels, terminals, and route segments to create additional transportation options in an area where roadways and other public transportation options are overcrowded, or where there previously was no other accessible public transportation.

New York and Washington, the top 2 states for total passenger boardings, together reported transporting almost 70 million passengers in 2015 (43.6 and 26.1 million passengers, respectively). Washington and Texas, the top two states for total vehicle boardings, transported 11.1 and 2.3 million vehicles, respectively, in 2015. California, New York, and Washington had the largest numbers of total operators, each with 12.

Of the 652 reported vessels, 46.8 percent were privately owned and operated, while 37.3 percent were publicly owned and operated. A small number were publicly owned and privately operated (6%), while even fewer were privately owned and publicly operated (<1%).

The regions with the highest density of reported terminals were in the northeast and in the Upper Peninsula of Michigan, as well as on the west coast and in Alaska. New York had the highest number of reported terminals

Figure 4: Vessels by State (2015)



NOTE: Vessels are assigned to their operator state of origin.
SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, National Census of Ferry Operators 2016, Appendix A, Table 4, available at www.bts.gov as of October 2017.

in 2015 (60), while California (47), Alaska (41), Washington (40), Maine (32) and Michigan (31) also had a relatively high numbers of reported terminals.

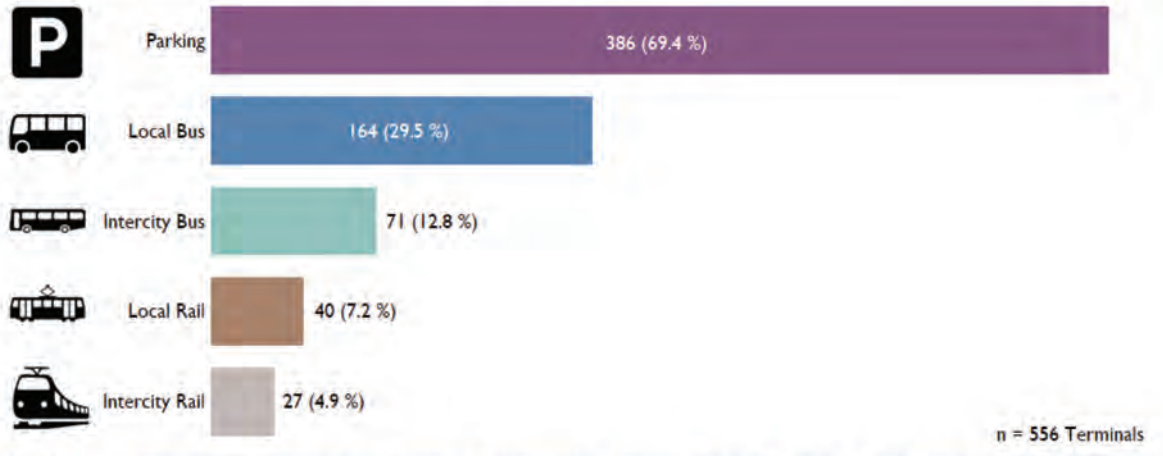
The highest number of reported route segments was concentrated in the northeast, the west coast, and in Alaska. The top five states with the largest number of reported terminals accounted for half of the total reported segments. Those top five states are Alaska, California, New York, Washington, and Michigan.

The 880 total reported route segments served a combined total of 20,042 nautical miles. By far (and not surprisingly) the highest total number of reported state route miles was in Alaska, where 12,493 nautical miles were served in calendar year 2015, over 62% of U.S. route miles. The majority of routes were less than 1 mile (26%). These ferry routes ranged from riverbank crossings to the longest reported route segment, which extends from Ketchikan, AK, to Bellingham, WA.

Not included within the scope of the ferry census were operations that were exclusively non-itinerant, such as excursion services (whale watches, casino boats, day cruises, dinner cruises, etc.). Also not included are passenger-only water taxi services not operating on a fixed route and LoLo (Lift-on/Lift-off) freight/auto carrier series. Efforts to enumerate ferry operations within the United States for the 2016 NCFO resulted in a frame of 259 active ferry operations for calendar year 2015.

There were 18 (11%) operators that either did not provide passenger and/or vehicle boarding data or asked that the data they provided not be made public. Due to eligible operators who did not respond, as well as those choosing not to provide or make information public for select data items, the numbers in this report are almost certainly underestimated. These underestimates included the counts of vessels, terminals, segments, and route miles—and especially—total passenger and vehicle boardings in 2015. Bottom line? *The domestic ferry industry is alive and well, it is growing and it is helping to clean up the environment, clear out congested roads and get people, cars and freight from point A to point B much faster.*

Figure 12: Terminal Intermodal Connectors (2015)



SOURCE: U.S. Department of Transportation, Bureau of Transportation Statistics, National Census of Ferry Operators 2016, Appendix A, Table 6, available at www.bts.gov as of October 2017.

U.S. Department of Transportation
Bureau of Transportation Statistics

See the BTS report by clicking:
https://cms.bts.dot.gov/surveys/national-census-ferry-operators-ncfo/2016-highlights-ferry-operations-united-states

President & Chief Executive Officer, HMS Global Maritime

Terry MacRae founded Hornblower Yachts, LLC (doing business as Hornblower Cruises & Events) in 1980, and serves as Chief Executive Officer, the President and is also its owner. Mr. MacRae is the Co-founder of HMS Global Maritime and the American Queen Steamboat Company, and serves as Chief Executive Officer of Alcatraz Cruises, LLC, Statue Cruises, LLC, Hornblower Canada Co., Hornblower Cable Cars, Inc. and HNY Ferry, LLC (doing business as NYC Ferry). He leads one of the largest and fastest growing charter, dining cruise, and ferry operating companies in the nation.

Among other things, MacRae is an expert in the design, renovation, construction and operation of green/hybrid passenger vessels, and a highly regarded leader in the fine dining, entertainment, tourism, and ferry transportation development sectors. He leads the team that successfully won 10-year-long contracts, awarded by the National Park Service, to provide the exclusive transportation of visitors to Alcatraz Island, and the Statue of Liberty National Monument and Ellis Island Immigration Museum, the contract to provide boat tours to the Niagara Falls in Ontario, Canada, and most recently won the NYC Ferry (Citywide Ferry System) in New York, NY.

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He began his career as an environmental engineer with Industrial Clean Air, Inc. Quickly climbing the corporate ladder, MacRae served as Vice President and Vice President of Sales following the acquisition of Industrial Clean Air by Ecolaire Systems, Inc., where he looked for exciting and memorable venues for entertaining clients and soon began frequenting Hornblower Tours in Berkeley. By placing a great deal of importance on customer service, safety and teamwork, he grew the original two-boat acquisition to a +80 vessel, $260 million company with over 2,000 employees, who will serve an estimated 12,000,000 guests in 2017.

He has served as President of the Passenger Vessel Association (PVA) and helped to create the joint U.S. Coast Guard/PVA Partnership Action Team and is a past member of the Society of Naval Architects and Marine Engineers (SNAME). Notably, he was selected as California Travel Industry Association's Entrepreneur of the Year in 1999. Active in other roles as well, MacRae also served in the past as a board member for San Francisco Travel, the U.S. Travel Association and as a Commissioner and Vice Chairman for the California Travel & Tourism Commission, which promotes travel to and within the state. He is currently the Chairman of the National Parks Hospitality Association an organization of national park concessioners, and the Chairman of the National Parks Promotion Council, and organization that promotes visitation to our national parks. Mr. MacRae is a graduate of California State Polytechnic University at San Luis Obispo with a Bachelor of Science degree in Mechanical Engineering. Listen in this month as one of the most recognizable stakeholders in the nation's ferry and passenger ship industry shares his thoughts on the current state of the domestic passenger vessel industry and where it – as well as Hornblower itself – might be headed next.

Hornblower's footprint across the maritime sector certainly has changed and expanded over time – mostly under your leadership. It also has many divisions. Tell us about your firm as it exists today.

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the maritime industry. We provide commuter ferries, ferries to national parks, such as the Statue of Liberty through Statue Cruises and Alcatraz, overnight river cruises and corporate events, brunches and party cruises. The underlining theme across our various business units is to create an amazing experience for our guests.

Perhaps one of the most exciting stories of the year has to be the NYC Ferry system and the plethora of vessels being added to that system under your supervision. Give the readers a sense of how well that is going, how many passengers you are handling and any particular issues / problems that you've had to overcome while executing that contract.

Hornblower went to great lengths in order to design, build, finance and deliver a fleet in order to begin operations for NYC Ferry service on May 1st, 2017 with the launch of the Rockaway and East River routes to overwhelming success. A month later on June 1st, 2017, the South Brooklyn route launched followed by the fourth and final route of 2017, Astoria, on August 29th to complete the 2017 system milestones. With any project of this size, there are hurdles to overcome. We have what I believe to be the best team in the industry working day-in and day-out to make sure we have the safest, most reliable and efficient fleet. As things arise, we solve them and keep moving forward. In 2018, we will welcome an additional three 350-passenger vessels into the fleet and launch the Lower East Side and Soundview routes to fold the borough of the Bronx into one of the world's largest public passenger ferry systems. The entire system once completed in 2018, will operate 20 ferries and serve six routes spanning over 60 nautical miles of New York's waterways. Ridership for the entire system was anticipated at approximately 4.6 million riders. The widespread success of the ferry system is exceeding original projections. Demand for ferry transportation to specific summer-related destinations, such as Rockaway Beach, required proactive planning and unanticipated trips to service demand throughout the summer season. Even as we're heading into the winter, we're still seeing strong ridership from our core commuter base, which really shows us that we've built something that New Yorkers can rely on.

What's the next big thing scheduled to come out of your shop?

There are a lot of exciting things we are working on right now. In reflection on our work with the City of New York, I believe the turn-key solution we provided them is one that other municipalities can quickly adopt to get benefit of a public private ferry partnership, where Hornblower is the turn-key solution to design, build, finance and operate the system for the municipality for a fee. It's a simple and effective way for many municipalities to quickly expand their local transit options. I'm really proud of the work we've done with Hybrid technology. We built our Hybrid fleet to be flexible and to be able to plug-and-play with new power sources as they became available. We're seeing battery technology continue to improve as well as Hydrogen Fuel cells becoming more viable. There are some exciting things on the forefront and while I can't go into all the specifics, between expanded ferry opportunities, the propulsion systems we're working on, and additional overnight cruise opportunities - we're excited for the future.

Credit: Hornblower

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JANUARY

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SPECIAL REPORT: Inland Port Development

Inland Waterways Conference:
Mar 20 - 21, New Orleans, LA

MARCH

Ad Close: Feb 15

Pushboats, Tugboats & Assist Vessels

MARKET: Winches & Capstans
TECHNICAL: Naval Architects
PRODUCT: Workboat Engines
SPECIAL REPORT: Thrusters & Inland Propulsion

CMA Shipping:
Mar 12-14, Stamford, CT
Clean Waterways:
April 4-5, St. Louis, MO

APRIL

Ad Close: Mar 15

Boatbuilding, Construction & Repair

MARKET: Marine Cranes
TECHNICAL: Coatings/Corrosion Control
PRODUCT: CAD/CAM Software
SPECIAL REPORT: VGP Compliance
REGIONAL FOCUS: North American West Coast

NACE Corrosion: April 15-19, Phoenix, AZ
OTC: Apr 30 – May 3, Houston, TX

MAY

Ad Close: Apr 16

Inland Waterways

MARKET: Barge Building & Outfitting
TECHNICAL: Workboat Comms
PRODUCT: Cordage, Wire Rope & Rig
SPECIAL REPORT: Subchapter M Towboat Rules

IMX: May 21-23, St. Louis, MO
Electric & Hybrid Marine World Expo:
Jun 27-29, Amsterdam, NL

JUNE

Ad Close: May 15

Combat & Patrol Craft Annual

MARKET: Salvage & Spill Response
TECHNICAL: ATB's
PRODUCT: Pollution Prevention & Response equipment
SPECIAL REPORT: Shipyard Exports

Clean Pacific: Jun 19-21, Portland, OR
SeaWork: Jul 3-5, Southampton, UK

JULY

Ad Close: Jun 15

Propulsion Technology

MARKET: Lubricants, Fuels & Additives
TECHNICAL: Safety & Fire Prevention
PRODUCT: Shafts, Seals & Bearings
SPECIAL REPORT: Workboat Repair
REGIONAL FOCUS: Great Lakes

AUGUST

Ad Close: Jul 16

MN100 Market Leaders

MARKET: Boatbuilders
TECHNICAL: Marine Operators: Crew Training and Retention
PRODUCT: Hull and Deck Coatings

SEPTEMBER

Ad Close: Aug 15

Offshore Annual

MARKET: OSV & Offshore Trends
TECHNICAL: Dynamic Positioning Equipment & Training
PRODUCT: Pumps, Pipes & Valves
SPECIAL REPORT: Regulatory Outlook

OCTOBER

Ad Close: Sep 17

Autonomous Workboats

MARKET: Multi-Mission Workboats
TECHNICAL: Management & Operations Software
PRODUCT: Electronics & Navigation Equipment
SPECIAL REPORT: Simulation Tech & Trends

SHIPPINGInsight: Oct 9-11, Stamford, CT
Commercial Marine Expo:
Oct 17-18, Providence, RI
SNAME: Oct 23-27, Providence, RI

NOVEMBER

Ad Close: Oct 15

Workboat Annual

MARKET: Outfitting Today's Workboat
TECHNICAL: Marine Gears
PRODUCT: Deck Machinery-Winches and Cranes
SPECIAL REPORT: The Marine Fuel Debate
REGIONAL FOCUS: Gulf Coast

Clean Gulf:
Nov 13-15, Houston, TX
Workboat Show:
Nov 28-30, New Orleans, LA

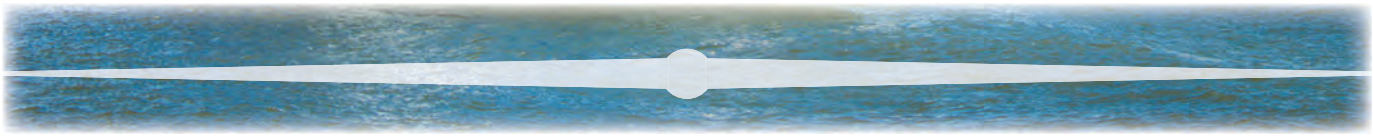
DECEMBER

Ad Close: Nov 15

Innovative Products & Boats

MARKET: Fire, Patrol & Escort Craft
TECHNICAL: Emissions Compliance and Monitoring
PRODUCT: Fire & Safety Equipment
SPECIAL REPORT: Top 10 Stories for 2018

"Hornblower operates our own ISO integrated Safety, Environmental & Quality Management System called Respect Our Planet, which covers many of the same topics as Flagship, but with much greater detail to our operations."



What is the latest trend in passenger / ferry services and why? How is Hornblower involved and where are you showing leadership?

Hornblower has always been a leader in our industry. However, as one of my Directors of Marine Operations reminded me once, the cutting edge is very close to the bleeding edge. Not many others are willing to be the first adopter. We have continued to demonstrate advancements in hull design, propulsion systems, passenger technology and passenger services. Passenger technologies, integrations with third party services and collaboration with others are going to be a trend we see coming. Download the latest NYC Ferry app and come for a ride on NYC Ferry to see just a few of the advancements I'm talking about.

PVA's safety management system called Flagship. Tell us about it. Who is using it (are you?) and what are some of its measurable benefits?

Flagship is the PVA's SMS. It was developed through the PVA Safety & Security Committee, PVA members and PVA resources. Hornblower operates our own ISO integrated Safety, Environmental & Quality Management System called Respect Our Planet, which covers many of the same topics as Flagship, but with much greater detail to our operations. The PVA members are currently introducing Flagship into their operations. Wendella Sightseeing in Chicago is one of the first PVA members utilizing Flagship.

Arguably, the most frustrating aspects of the Coast Guard's casualty investigation and reporting processes are its perceived inconsistent application, inappropriate restriction of operations and an outdated reporting form. Has there been any progress in the past 12 months on this front?

Recently, the USCG has introduced new 2692 incident reporting forms and instructions into the industry. The feedback from our team is that has helped with some of those previously mentioned concerns.

If you had to choose just one issue that is facing your firm and other PVA members that you deem the most important to address in the coming year, then what would that be, and why?

As our natural waterways have become cleaner and more inviting to the recreational passenger industry, two areas are of interest. (1) The shared waterways of human powered vessels (hpv) and finding a way to operate safely for all users of the waterways. (2) Illegal charters and those boats being used that are dangerous to the waterways, by not operating within the same inspection structure and regulatory requirements. Additionally, those charters are potential lost business to the passenger vessel industry.

In a post-9/11 world, security has to be an issue of enormous importance to all passenger vessel operators. PVA, for example, has worked to exempt vessels of less than 150 passengers from security plan and TWIC requirements. At the same time, what has been done to improve the security awareness footprint of this class of vessel?

PVA recently released its latest update to their Alternative Security Program/plan. This program update includes focuses on some of the newer security threats known to the industry such as cyber security and introducing controls

on that front. The beauty of the PVA security program or other programs is that they can be tailored to smaller classes of vessels, as operators deem best to serve their operation.

Are there any other regulatory changes looming for the industry that give you and your collective management team particular concern? If so, which ones and in what ways do the new rules impact operations?

At any point the Jones Act is discussed, it brings attention to our industry. The modern maritime industry is built from the Jones Act and our operations and business opportunities are tailored to working within its perimeters. If the Jones Act was to be repealed, it would drastically alter the way our industry and business environment is viewed and planned for now and the future.

PVA Green WATERS program was developed exclusively for members as a voluntary program aimed at reducing waste and operating in a cleaner, greener, and more sustainable environment. Has that program yielded fruit for a cleaner environment? Is it still being used?

Our team was part of the PVA Green Waters program development team. Hornblower has always been at the forefront of implementing smart and innovative environmental initiatives into the industry, either through introducing hybrid technology into our fleet to demonstrating local support to our parks and waterfronts. The PVA Green Waters program has helped PVA members and the environment, specifically to each of the PVA members' specific ports. One gleaming sign of its success can be attributed to the continued renaissance of the public's recreational use of our natural waterways.

PVA: State of the Industry

PVA President Jeff Whitaker in December weighed in on his year as head of the nation's passenger vessel advocacy group, where we are headed next, and what it will take to get there.

By Jeff Whitaker


Whitaker

The U.S. passenger vessel industry is looking forward to continued growth in the coming months. The past year was witness to solid economic conditions in the U.S., which added fuel to an already strong travel and tourism market, underpinning much of the U.S. passenger vessel industry. Ferry ridership continued to be strong with ferry systems in the Northeast, Pacific Northwest, and San Francisco Bay expanding operations with new ferry vessels either being delivered or under construction.

New vessel construction and acquisition also occurred in the U.S. flag overnight cruise market on the Nation's rivers as this industry continues to expand. Following on the success of 2017's strong passenger ridership, passenger vessel operators are optimistic for the future and are making strong capital investments in building new vessels in shipyards nationwide.

It has been my honor to serve as the 2017 President of the Passenger Vessel Association. While my term comes to an end this month, I am both proud of and optimistic for the future of the passenger vessel industry going forward. We are certainly experiencing sound economic conditions and we are also seeing exciting technological advancements in the passenger vessel industry. Hydrogen fuel sources are being studied, more efficient battery technologies are emerging, and new and more fuel-efficient vessel designs and materials are being adopted.

Over the past year, we have also worked successfully with Members of Congress and the federal regulatory agencies to represent our interests in Washington, DC, and to ensure a positive business environment for passenger vessel operators nationwide. With member input and through rigorous strategic planning, PVA is developing programs for member use while also promoting issues of importance to industry at the national level.

Illegal Charters

PVA and its members have long been committed to safety. One area of growing concern to us is that of illegal charters. Illegal charter operations are on the rise in virtually every port in our nation and these operators pose a growing threat to public safety. Illegal charter operators skirt essential Coast Guard regulatory and safety oversight, place the public in potentially dangerous situations and compete directly with legal passenger vessel operators.

We are also seeing a surge in websites that promote these illegal charter operations. These websites make it easy for recreational vessel owners to market illegal charters. In many cases, the vessels being offered for charter simply do not meet U.S. Coast Guard regulations.

As a result, PVA is strongly encouraging the Coast Guard to pursue increased enforcement nationwide and we are finding that they are beginning to respond to our requests. This summer, the Coast Guard in Chicago boarded 39 recreational vessels that were suspected of operating illegally. They issued 22 Notices of Violation and $50,000 worth of fines. We applaud this effort and hope to see additional enforcement activity in other U.S. ports.

Coast Guard RBDM & PVA's Flagship SMS

The implementation of Subchapter M is expected to place increasing pressure on the Coast Guard's already strained inspection resources. PVA, through lobbying efforts, is urging Congress to provide adequate funding for the Coast Guard's inspection mission. The Coast Guard and passenger vessel operators have closely worked together for many years to promote safe operations on our nation's

"PVA's Flagship Safety Management System (SMS) was recognized by Coast Guard in June 2017 as an accepted SMS that qualifies on this matrix for eligibility toward reduced scope of inspections. Utilizing tools like the RBDM may just provide relief for an undoubtedly stressed Coast Guard workforce, and more adequately spread inspection resources among the growing U.S. inspected vessel fleet."

waterways. While we have not always agreed with each other, we have developed a mutual respect which has fostered a stellar safety record for the U.S. flagged passenger vessel industry.

We are encouraged, however, by the Coast Guard's use of the Risk Based Decision Making (RBDM) Policy Letter and Matrix. Initiated this past year, this new inspection tool provides criteria for Coast Guard inspectors to evaluate and alter, or reduce, the scope of a vessel inspection based on risk. Many factors are used to make these decisions, but one key element is the use of a Safety Management System.

PVA's Flagship Safety Management System (SMS) was recognized by Coast Guard in June 2017 as an accepted SMS that qualifies on this matrix for eligibility toward reduced scope of inspections. Utilizing tools like the RBDM may just provide relief for an undoubtedly stressed Coast Guard workforce, and more adequately spread inspection resources among the growing U.S. inspected vessel fleet.

Support for U.S. Shipyards

PVA's membership not only includes passenger vessel operators, but it also includes U.S. shipyards. As a result, our association includes shipyard-related programs in its advocacy war chest. This past year, PVA was pleased to see the government renew, and fully fund, the Small Shipyard Grant Program.

The Small Shipyard Grant Program, which is administered by the U.S. Maritime Administration, has been in existence for approximately a decade and has been renewed for another three years (through fiscal 2020). PVA has been a strong supporter of this program over the years, as it grows in importance to U.S. shipyards and passenger vessel operators who are building new vessels.

PVA/USCG Quality Partnerships

PVA meets with Coast Guard leadership several times each year to explore non-regulatory solutions to industry concerns through what is called the PVA/Coast Guard Quality Partnership. This year, industry and Coast Guard experts studied the most common types of accidents on passenger vessels: slips, trips, and falls. The group reported back vital data that will inform best practices to improve training and other risk mitigation strategies. The Partnership also produced policy clarifying guidance for testing requirements and procedures for engine automation controls at the request of many in our industry. In addition, we discussed illegal

charters, Coast Guard inspection resource needs, the need for consistent application of Coast Guard regulations and policy across all ports, passenger vessel safety statistics, security and a host of other topics of importance to industry.

The PVA Alternate Security Program (ASP)

Passenger vessel operators remain vigilant when it comes to security at their vessels and facilities. Many PVA members use the Coast Guard approved PVA Alternate Security Program (ASP) for their vessel and facility security requirements, as mandated by the Maritime Transportation Security Act (MTSA) regulations. This year PVA, with the Coast Guard, undertook a revision of the PVA ASP, in keeping with five-year regulatory renewal requirements. This fourth revision of the ASP was approved by Coast Guard in September and includes updates on new Coast Guard regulations and policy letters. In addition, the PVA ASP incorporates new cyber security tools and resources to assist members in developing cyber security risk management best practices for their operations. PVA also developed assessment worksheets to help PVA members better analyze their security needs.

PVA Annual Convention at MariTrends 2018, January 28-31, 2018, Savannah, GA

This month, PVA members will gather at the Savannah International Trade and Convention Center in Savannah, GA to continue the dialogue about the issues discussed above and many more important industry topics. Nearly 100 sessions, workshops, roundtables and social events are planned. More than 90 exhibitors will showcase products and services especially for passenger vessel operators on the MariTrends 2018 trade show floor.

Expanding membership ranks continue to contribute to

our association's diversity and along with that comes new issues, opportunities and challenges. We welcome these things and remain committed to serving the passenger vessel industry ever-changing needs in the New Year and beyond.

Jeff Whitaker is the current PVA President and is the Vessel Operations Consultant for Hudson River Cruises and Events. The company provides sightseeing, dinner and charter cruises on its single 300 passenger vessel the Rip Van Winkle on the Hudson River. He has served on the PVA Safety and Security Committee since 2001 and served as its Chairman. Jeff has been a member of the FLAGSHIP work group since its inception. Jeff has been a member of the Board of Directors since 2011, served as PVA Secretary/ Treasurer in 2015 and the PVA Vice-President in 2016.

A 'Ferry Tale' of Mutual Benefit

By Randy O'Neill


O'Neill

A generally sound assumption to make is that many recreational boaters operating power boats and sailing vessels are not very familiar with the maritime Rules of the Road that their professional mariner counterparts understand and adhere to. The unfortunate consequence is a wide array of marine casualties and incidents from collisions, allisions, capsizings, groundings, wake damage, many unreported and countless near misses.

Another safe assumption is that it's almost certain that when a professional mariner gets involved with a recreational boater, the authorities, most notably the U.S. Coast Guard (USCG) will generally be predisposed to find fault with the professional mariner who "… should have known better."

And, if the incident is serious enough, receives outsized public exposure or USCG investigators believe sanctions are appropriate for license holders involved in an incident, charges of negligence leading to Suspension & Revocation (S&R) proceedings are a distinct possibility.

While these 'David vs. Goliath' type incidents between private craft and larger commercial vessels are certainly not anything new, unfortunately, many impacted professional mariners are often placed in an uncomfortable 'guilty until proven innocent' posture when defending their actions.

An Un-Sound Decision

A short review of a not-so-unusual encounter between a commercial passenger ferry and a 30' powerboat demonstrates the significant difficulty a professional mariner and his/her maritime defense attorney face when things go sideways.

The master of a large ferry in the Pacific Northwest was heading east across calm sound waters under a clear, sunny sky with a full load of passengers and vehicles when off his starboard bow he first saw a smaller boat about 500 yards away on a perpendicular/crossing course directly in front of the ferry's fixed route. Inexplicably, the 30-footer began to slow considerably, but did not change course. The recreational boat's operator had now made what would have been close but manageable situation into a potentially dangerous collision.

Now closing rapidly on a likely collision course with the boat, the ferry's master reduced speed and turned abruptly to starboard to avoid what he deemed would either be a collision or, minimally, a swamping of the smaller vessel if he continued on his plotted track. The ferry's emergency maneuver, however, had the unintended consequence of taking the large vessel out of the dredged channel and its safe bottom clearance into shallower water resulting in a 'soft' grounding.

With many passengers documenting the slowly unfolding incident in photographs and video, the incident went 'live' and viral on a bevy of social media platforms and quickly became the subject of a 'breaking news' story on local television and radio broadcasts. That's when and how the USCG became aware of the incident, and its investigators were not pleased to be among the last to know.

Meanwhile out on the sound, the ferry's master was fully occupied trying to free his vessel from the sandbar when he saw a USCG cutter approaching his position. Knowing that he had not yet reported the grounding to the authorities and realizing USCG investigators would not look favorably on that omission, he promptly notified his dispatcher who, understanding the potential negative implications to the company and its captain, immediately contacted the license insurer (that the company had purchased license insurance from) to rapidly intervene and handle these exact types of incidents.

Within minutes, a local maritime defense attorney contacted the ferry captain on the cell phone number pro-

vided by the dispatcher and prepped him for the crucial impending marine casualty interview. Very soon thereafter, USCG investigators pulled alongside and boarded the still grounded ferry and conducted what witnesses reported was a rather "heated discussion" with the master and other bridge personnel before taking contact information from ferry passengers who offered their photos and videos of the encounter.

Two days later, the captain and his attorney attended a formal interview with USCG and heard nothing more until six weeks later when the captain received a "Warning in lieu of Suspension & Revocation" letter from USCG for a violation of Law or Regulation (46CFR 5.33) or "… while serving as operator of said vessel, you failed to adhere to Inland Navigation Rule 18 by failing to keep out of the way of a sailing vessel while underway."

Lesser of Two Evils

The captain's license defense attorney reviewed USCG's complaint and, after discussing the pros and cons of accepting the Letter of Warning (LOW) sanction, both the captain and his attorney decided to accept it rather than take the risk of losing an argument before an Administrative Law Judge (ALJ) over what constitutes "… prudent evasive maneuvers and safe operating speed in congested waters…" and receiving a more severe sanction, including a significant USCG license suspension. Such an outcome would have not only obvious negative consequences for the captain, but also for his company which would be losing and needing to quickly replace a valuable member of its team in whom it had invested significant time and training.

Clearly, the master's employer's full support and backing of his actions throughout the almost two month ordeal was a key factor in his decision to accept the LOW, knowing that his job security was not in jeopardy. The fact that ferry company management was well aware of the multitude of risks confronted by its bridge officers operating in often perilous vessel traffic conditions and prudently invested in license defense coverage for its officers, paid a significant dividend in this incident.

There is rarely a completely happy (or inexpensive) ending to cases like the one described above, just like there is no avoiding the competition for space with recreational boaters and their operators. The clear 'takeaway' is that when there are incidents between commercial vessels and pleasure craft – fairly or unfairly – the professional mariner will invariably be held to a higher standard … even if his or her actions ultimately prevented a more serious casualty.

Randy O'Neill *is Senior Vice President with Lancer Insurance Company and has been Manager of its MOPS Marine License Insurance division since 1984. Over the past 29 years, Mr. O'Neill has spoken and written on many occasions on the importance of USCG license protection. He is a regular contributor to* ***MarineNews*** *magazine. He can reached at:* ***roneill@lancerinsurance.com***

Cooperation is the Key to Ferry Industry's Future

Interferry CEO Mike Corrigan explains how the trade association's 'stronger together' mission is helping to shape outcomes on the pressing issues of safety, security and the environment.

By Mike Corrigan

Corrigan

Last April, I took the helm of Interferry after 14 years in leadership positions with Canada's BC Ferries – the last five as president and CEO. The past ten months in my new role have reinforced a core conviction forged during my previous experience in the industry. Both as an operator and long-time Interferry director, I saw that our members are stronger when we work together to embrace opportunities, overcome challenges and share our knowledge for the benefit of the entire ferry sector. This belief is now being reaffirmed as the association further builds on its mission as the industry's global voice.

A prime example came in October at our 42nd annual conference in Split, Croatia, with the introduction of our new Domestic Ferry Safety Committee. Formed to support developing nations, the committee's first task is to identify drivers for change and carry out a risk assessment. We will then draw up an action plan to reach out to potential collaborators and funding partners. The initiative has been prompted by statistics showing that 93% of fatalities occur on domestic routes and have totaled at least 60,000 deaths over the past 50 years – a toll that is almost certainly underestimated. Of the known fatalities, no less than two-thirds of these occurred in just seven countries, notably in the Philippines, Bangladesh and Indonesia. There could hardly be a stronger case for pulling together in the common cause of safety.

Meanwhile Interferry is working closely with the European Maritime Safety Agency (EMSA) to identify required, relevant and realistic changes to current fire protection regulations following a string of fire incidents on ro-ro and ro-pax ships in recent years. Our initial findings indicate that most of the fire risk relates to the cargo carried rather than the vessel itself. It's become particularly clear that electrical connections – such as those for reefer units – need special attention, but there are also valid concerns on the functionality and effectiveness of traditional detection and extinguishing systems. Several of our members are developing new internal practices, which will form the basis for a second round of Interferry fire safety best practice guidance during 2018.

Alongside this, Interferry has now launched a Security Committee, which will likewise develop a best practices guide over the long term. The committee is comprised of company security officers from a dozen operators and has been established with the primary function of facilitating experience-sharing among members. To an even greater degree than other major issues such as safety and environmental regulations, security measures will need to be more fully addressed on a risk basis, and in close cooperation with local and national authorities. We do not expect any universal new requirements from the international regulator, but we will position ourselves to help members better engage in discussions on voluntary measures and local requirements.

The environment is another area where strength in unity continues to be a guiding principle in protecting the ferry sector's interests while working to ensure the well-being of Planet Earth. I'm pleased to say that the International Maritime Organization (IMO) is making good progress on developing short, medium and long-term requirements on greenhouse gas emissions from international shipping – helped along the way with sector-specific interventions from Interferry thanks to our consultative status.

Some impatient countries, spearheaded in particular by the European Union (EU), are threatening to impose regional measures. In November, the European institutions

"… security measures will need to be more fully addressed on a risk basis, and in close cooperation with local and national authorities. We do not expect any universal new requirements from the international regulator, but we will position ourselves to help members better engage in discussions on voluntary measures and local requirements."

agreed to hold off making their own regulations while they wait to see what the IMO decides during 2018. The ferry sector is relatively well placed to meet future requirements, as our frequent port calls will facilitate the use of alternative fuels and will also enable the benefit of electric power from shore installations. Our main concern is the recent discussion on mandatory slow steaming, which may well be a solution for some deep-sea segments, but certainly not for the bustling ferry business.

The background to all this stems from some ten years ago, when the EU member states pushed other IMO members to agree to binding requirements on reducing CO2 emissions. This was to be linked to some form of market-based mechanism such as an Emission Trading System (ETS). At that time, the EU's forceful campaigning backfired quite dramatically with developing countries blocking any agreement on resolutions of this kind. Several years without constructive dialogue ensued, but since then we have nevertheless seen the successful introduction of technical energy efficiency requirements for new ships and operational monitoring of fuel consumption.

Supported by several other industrialized nations, the EU bloc is again pushing the IMO, albeit with the 'wait and see what happens in 2018' proviso. As such the EU side has drawn a line in the sand – either there are ambitious binding global requirements effective from 2023, or they will unilaterally impose requirements for all ships calling at EU ports. It should be noted, however, that the 2013 global revolt to their inclusion of international aviation in an EU-run ETS left a distinct impression on some of the European institutions and led to their November decision not to include shipping in an ETS – at least for now.

As I have indicated, from a ferry industry point of view, we are not overly concerned with the impact of future climate regulations. Our members have improved their efficiency dramatically over the past generation of ferries and huge strides are still being taken, such as the rapidly increasing electrification of ferries. Most would agree that, when the dust has settled, there will be a cost associated to CO2 emissions, but the general prediction is that such

"The ferry sector is relatively well placed to meet future requirements, as our frequent port calls will facilitate the use of alternative fuels and will also enable the benefit of electric power from shore installations."

costs will be in the order of magnitude of the normal fluctuations in fuel prices. Although that is not exactly welcome news for the bottom line, such costs are manageable.

The initial discussions on speed reductions for ships are more worrying. The main attraction of ferries as a mode of transport is that we can compete with highways and aviation. Slowing down has, on average, been proven as a good way to temporarily mitigate overcapacity in deep sea trades, but it would be very challenging to the ferry business model.

Furthermore, in a segment where operating speeds for conventional ferries range from 12 to 26 knots, it is hard to envisage an equitable way of mandating slower speeds in our particular sector. Interferry, with ample support from its members, has spent a lot of resources trying to make the existing requirements of the Energy Efficiency Design Index (EEDI) work as intended. If there is any

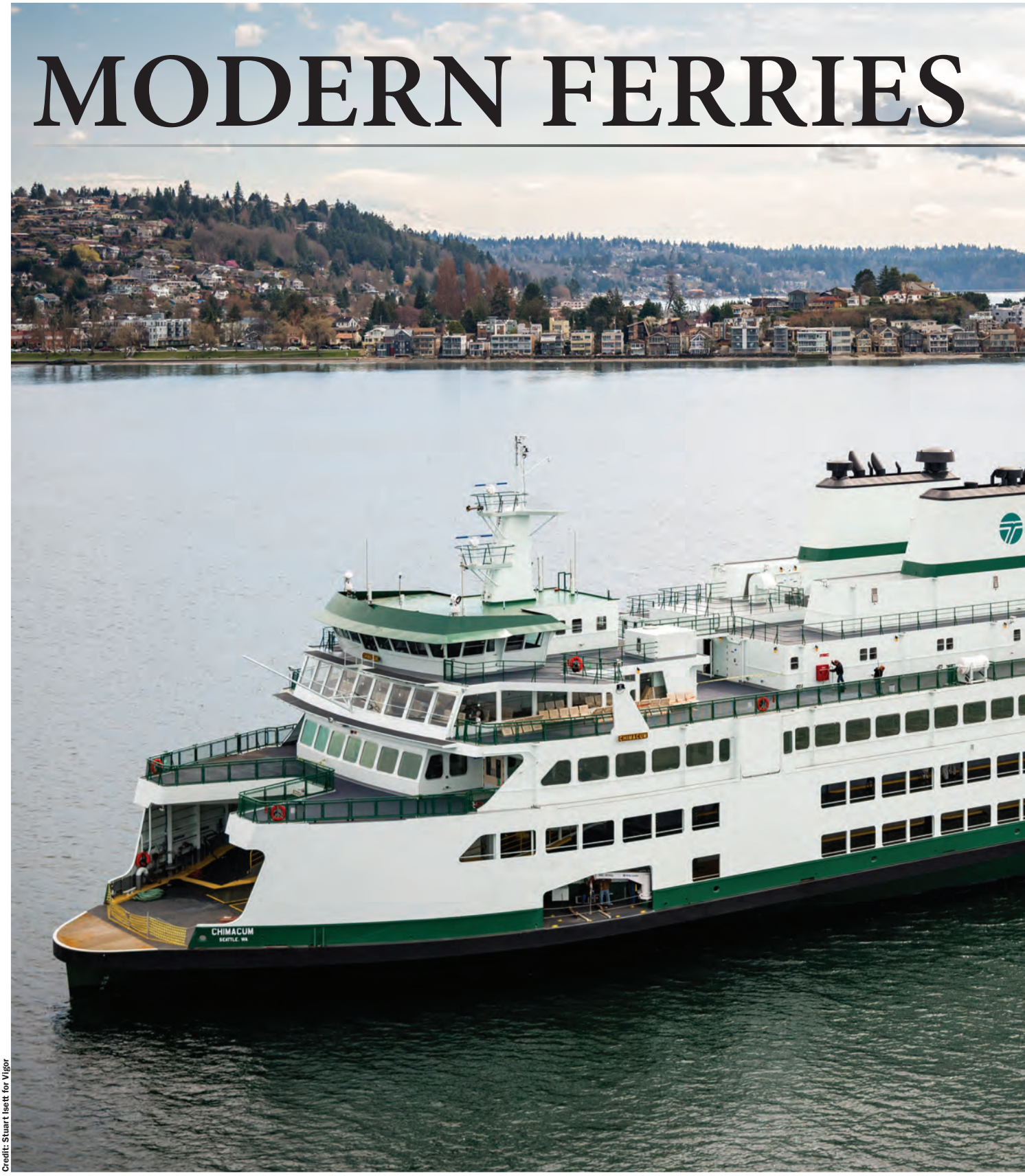
Credit: AdobeStock ©KANVAG

hard-earned lesson from that exercise, it is that – unlike tankers, containerships and bulkers – the ferry industry is far too diverse to be treated as a homogenous entity.

We will continue to engage with the IMO and the EU to help them pull the right levers for significant CO2 reductions over the coming decades … but by working together with our members and the authorities, we will make it very clear that one size does not fit all.

Following senior positions in the energy industry, ***Mike Corrigan*** *joined BC Ferries – one of the world's largest ferry operators – in 2003. He was president and CEO of the company from 2012 before leaving to take up the Interferry CEO role last April.*

MODERN FERRIES



Credit: Stuart Isett for Vigor

EVOLVE

Automated now; autonomous looms large in the center porthole.

By Barry Parker

The word 'Autonomous' is probably the maritime industry's most frequently used term in the past year. The word, however, has a far different meaning than the similarly sounding "Automated" – which means that certain processes are handled by machines, rather than by humans. Throughout 2017, industry thought leaders have been mulling over the new digital paradigms that are emerging including the 'Internet of Things' and/or the linkage of processes and machines – the 'Fourth Industrial Revolution' – where devices talk to each other, and other emerging disrupters.

WHEN & WHERE

Dr. Roar Adland, Professor at the Norwegian School of Economics (NHH), and Chairman of the Shipping Department, parsed the relative economic value (focusing on reduced crewing costs) among shipping sectors. He wrote, in early 2017: "All told, unmanned vessels would likely have a role to play in coastal and shortsea shipping, where port-time and crew costs takes up a relatively large share, and where accommodation takes up a relatively larger part of the vessel."

These ideas are no longer just lofty concepts; tangible projects employing them have moved from the drawing board to reality. Even crewless vessels are no longer the stuff of futurists; on the west coast of Norway – an area where emissions are prohibited – in the "Fjord1" project, two battery powered passenger/car carrying ferries will shuttle the 1.5 mile stretch across the Nordfjord (about 100 miles north of Bergen), linking Anda and Lote. Human captains aboard the vessels, to be delivered in early 2018, will handle dockings only.

In a mid-November speech at the Annual General Meeting of the American Institute of Marine Underwriters (AIMU), Christopher Wiernicki, ABS Chairman, President and CEO, explained that: "An autonomous ship … is

"Our excellent performance is largely due to the experience of our fleet employees. Our vessels are crewed to USCG Subchapter H standards, and we have employees with over 45 years' experience in the fleet. While we have no interest or incentive to replace employees through automation, we have adopted automation to a limited extent in areas that can improve efficiency and safety of our system."

– Matthew von Ruden,
WSF's Director of Vessel Engineering and Maintenance

a marine vessel with sensors, automated navigation, propulsion and auxiliary systems, with the decision logic necessary to follow plans, sense the environment, adjust execution for the environment, and potentially operate without human intervention."

For the ferry sector, Rolls Royce's VP of Innovation, Oskar Levander explained, in his 2016 presentation to Interferry, *"Smart Ferries - The era of ship intelligence,"* the pathway towards autonomous ferry operation can be packaged into five steps:

- *Automatic crossings*
- *Situational awareness*
- *Automatic docking*
- *Remote watch*
- *Remote/ Automatic*

A Remote/Automatic ferry operation is, he says, likely to emerge in the 2020-2022 timeframe. When describing the Fjord1 effort, Mr. Levander made the explicit link between automation and sustainability, saying: "You do not want to waste too much time and energy with batteries, this is very important because the batteries need to be operated in the most efficient way."

In an observation that comports with Levander's view, Wiernicki observed in his address to the AIMU, "The journey from automated to autonomous is complicated but logical." Wiernicki's ABS colleague, Dr. Kirsi Tikka, speaking in December, amplified, saying, "If implemented correctly, evolutionary development will introduce significant benefits to shipping at each phase, before we reach autonomy on a larger scale."

Levander's presentation stressed the safety aspects of automated operation. There is also a powerful environmental driver fueling the automation trend, as evidenced by the Fjord1 project- where Rolls Royce 'AutoCrossing' control systems, guide 'Azipull' bow and stern thrusters aboard the vessel. Beyond this, the vessels are 'future-proofed' in that automated docking systems could be added later.

ACROSS THE BIG POND

Washington State Ferries (WSF), among the largest ferry operators in North America, is looking to the future. Matthew von Ruden, WSF's Director of Vessel Engineering and Maintenance, told ***MarineNews*** in December, "WSF operates 22 vessels and moves nearly 24 million passengers annually. Our top priority is passenger safety. We set the bar high for both service reliability and On-Time Performance and generally meet or exceed these goals in spite of tight budget restrictions."

With an average age of 30 years, the WSF fleet is being renewed. von Ruden, whose career includes service with the U.S. Coast Guard and in the shipbuilding side of the private sector, adds, "…we also have our new Olympic Class ferries – the fourth of which is scheduled for delivery in July 2018."

Also on the West Coast, Vancouver-based BC Ferries is also contemplating what comes next. Captain Jamie Marshall, the ferry giant's Vice President of Business Develop-

ment and Innovation, explained, "We continue to look at automation to improve safety and take advantage of new and developing technologies." And, as new technologies emerge, companies are collaborating, Marshall adds, "BC Ferries is working with other ferry operators in Canada as part of the Canadian Ferry Association to stay informed on the latest developments in automation and potential improvements to ferry operations."

As newer vessels enter ferry fleets, automation is being incorporated into operations in new ways. At BC Ferries, for example, fire monitors can be operated without putting the fire team near the fire, which keeps them away from the danger." Automation plays in important role in safety, says Marshall. "Automated Identification Systems (AIS) now allows our bridge teams to see around corners like in Active Pass and know exact positions of other marine traffic allowing the Captain and bridge teams to make the best decisions with respect to safe passing." WSDOT's von Ruden agrees. "The alarm and monitoring system is a PLC based system that employs logic in monitoring thousands of equipment and system parameters. We are investigating a cloud-based data analytics system for alerts, notifications, diagnostics and trending as well."

von Ruden went on to say, "In our new Olympic class vessels, we employ automation in our propulsion, electrical and alarm and monitoring systems. The propulsion plant for the double-ended ferry consists of two geared diesels, coupled through a high speed shaft, driving a controllable pitch propeller at each end. The propulsion control system includes automation for load sharing and shedding through variation in engine speed and propeller pitch. Our electrical switchgear includes electrical load sharing and load shedding functionality."

As automation moves further into WFS processes, there is still work to be done. For example, WFS is searching for an automation solution for counting of both 'walk on' passengers and passengers in vehicles "We recently piloted a passenger counting system at our busiest terminal, Seattle's Colman Dock. We were unable to achieve our target for accuracy, however, so we will keep looking for a solution, " von Ruden conceded. The customer side of the business also figures in BC Ferries' thinking. Captain Marshall provided a view from the perspective of ferry riders, saying: "Automation also helps improve the customer experience like giving our passengers choices such as using automated self-ticketing kiosks or interacting with one of our customer service agents."

BEYOND MONEY: CAPTURING EFFICIENCIES

Docking, a midterm target in Mr. Levander's taxonomy, also enters into the WSF thinking, with Mr. von Ruden telling *MarineNews*: "In the future, we are interested in a vessel restraint system, as we currently rely on ships propulsion to "push the dock" during vehicle and passenger loading. Also, we are interested in converting three of our ferries to hybrid electric propulsion. If that project is funded, we will need to employ automation to connect the medium voltage power from the terminal to the vessel to facilitate battery charging." Summing up, he said that: "WSF is interested in other automation solutions that can contribute to the safety or efficiency of our system."

BC Ferries' Captain Marshall also stressed the role of automation for the sake of improvement (not simply to save money on crew costs), insisting, "Human factors continue to be one of the largest contributors to marine incidents and accidents and as the automobile industry is incorporating automation to improve safety and reduce accidents, the ferry sector is looking to be in a position to benefit in a similar manner."

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Credit: Pamela Harding

Credit: Pamela Harding

Inland Waterways:

Riverboat Touring – Status quo or Ready to Grow?

By Tom Ewing

Credit: Benny Lendermon

Credit: Benny Lendermon

If you want to book a plush river cruise vacation in America's heartland – say on the Mississippi or Ohio Rivers – you can do it. The American Queen Steamboat Company's website offers as many as 13 river cruises in 2018. Certainly, the 'bourbon cruise,' aboard the lavish American Duchess sounds like fun. Or, maybe next year you can sign up for the nine-day 'Derby Cruise.' And, next year means 2019 because the 2018 cruise is sold out. Maybe the most fun is that passengers themselves will be part of a race: the Kentucky Derby Festival Great Steamboat Race – one of the most iconic events on the Ohio River. You likely can't do that as a passenger anywhere else in the world.

If you can't get to the Derby on the American Duchess you can contact American Cruise Lines – they offer an 11-day cruise from Memphis to Pittsburgh, with a stop at Churchill Downs for a VIP racetrack tour. And if you've got plenty of vacation time, perhaps the ACS 22-day Mississippi River excursion, travelling from New Orleans to St. Paul, MN, is more to your liking.

SITREP: RIVER CRUISING

There's plenty of life in the inland river luxury passenger cruising market, and not just on the Mississippi or Ohio. This is an active market in the Northwest, in Florida and certainly in Canada and along the New England coast. Nevertheless, and like an asterisk on a baseball stat, a follow up question always arises: yes, river cruising is alive, but is it alive and well? The sentiment persists that US inland river cruising remains a limited, rather staid product sector. There's always optimism: it's ready to break out, with favorable signs supporting industry growth. This will be the year, or maybe next.

This somewhat pessimistic view is based on a sense that US river cruising is still largely characterized by old-school, down-market products, aboard rough faux paddle-wheelers offering more of a sense of a Tom Sawyer adventure than a European style luxury vacation offering an afternoon excursion to the Louvre. Nevertheless, the AQS 2018 Derby Cruise is sold out and its itinerary includes an excursion to the Owensboro (KY) Museum of Fine Art. Different museums, but the cultural offering is an important indicator.

Separately, however, a third river-based cruise line, Louisiana-based French American Line offers the Louisiane, with 75 suites and staterooms for 150 passengers. But this year FAL won't be offering river tours. That's because the company got a better offer. A spokesperson explained that FAL was close to signing a contract to provide "humanitarian relief in the Caribbean."

Another unsettled development for cruise market-watchers revolves around decisions by Viking River Cruises. In 2015 Viking announced plans to build six new vessels, with the first two ready for service in 2017. Unfortunately, in 2016, that schedule was put on hold, bumping possible start up to 2018. Asked for an update, a spokesman replied, "We are actively working with our partners to launch on the Mississippi River, but at this point in time we do not have any details to share regarding product specifics or a launch timeline."

For 2018, the river cruise market presents a swirl of indicators. In all likelihood, consumer demand will continue. What's not clear is whether that demand will hopefully expand, finally strong enough to hasten big decisions about expensive new vessels; strong enough to forge new partnerships among operators and ports and possible host cities; strong enough to signal to operators that they need to ramp up their efforts regarding employment and training – from kitchen help to seasoned mariners.

BENCHMARKING THE BUSINESS

River tour stakeholders are optimistic about 2018. They see market conditions in alignment with larger vacation and travel interests. But, the cruise industry is cyclical, closely linked to how well the overall economy is doing and, of course, how well individual consumers judge their own economic position. One favorable sign that's hard to miss: the Dow edging closer to 25,000.

Cynthia Anderson, CTC, MC, is a partner and head of marketing with USA River Cruises, in business since 1996, based in Vancouver, WA. Her company specializes in small vessel cruises, mostly in the United States. A 30-year travel industry veteran, Anderson is bullish on 2018. Her company has seen strong annual growth since 2010. She expects that growth to continue; based on a number of favorable factors:

- *Overseas jitters, people want to stay home;*
- *River cruises draw repeat customers to smaller, personalized settings;*
- *People want a vacation, but with less air travel, not more;*
- *New vessels potentially coming on line, soon.*

Anderson says that at least one company will have four new European-style boats delivered in 2018-19. Beyond this, she stressed the importance of cruise-business networks. Success doesn't just happen. In Vancouver, it took five years to overcome local resistance to a port call by a Columbia River based vessel. Anderson said people just didn't see the extensive local impacts and city government

Captain Jeffrey Monroe
Director of Education and Standards, IAMPE

Cynthia Anderson
CTC, MC, Partner & Head of Marketing, USA River Cruises

Benny Lendermon
President, Memphis' Riverfront Development Corp

decisions about port modifications were delayed. Eventually a riverfront coalition evolved, one which successfully advocated for the ship's call, a development contributing to a series of port upgrades, including new housing and retail as well as regional benefits: Most of the ship's wine now comes from Northwest wineries.

Daniel Beals is advertising and marketing coordinator for St. Lawrence Cruise Lines. Like Anderson, he is optimistic about 2018. His boat carries 66 passengers; 60% from the US. Americans, he says, like to visit Canada because it's close, familiar and beautiful. "River cruising can still grow throughout North America," he told ***MarineNews***, adding, "If people feel confident with money and travel, particularly retirees, it will grow."

Another stakeholder, the International Association of Maritime and Port Executives (IAMPE) is a maritime trade group. Captain Jeffrey Monroe is IAMPE's Director of Education and Standards. Monroe said IAMPE's membership is interested in river cruising. "This is an emerging issue," Monroe said. "We include it in our inland waters training program; people are very interested in how this all works." Monroe said that US river cruising faces challenges about how to break out of a historically limited scope, as well as expanding territories and improving quantity and quality of products.

Monroe cites two basic factors for market expansion: First, new private-sector investments, eventually driven by bigger, well funded operators. He admits that there is a

Image: Memphis' Riverfront Development Corp.

chicken-and-egg factor that weighs on next steps and timing. He points to Viking as a likely entrant, offering that, "Viking knows how to put these pieces together."

REGIONAL COLLABORATION KEY

Monroe's second point mirrored Cynthia Anderson's comments. There needs to be regional partnerships among all entities involved in river cruises – or efforts to develop cruises, and keep them successful. Regional and market coalitions can make sure all the moving parts work – from tour buses to staging areas to local port officials who will place high value on visits from touring vessels – and work for required infrastructure upgrades.

As an example, Monroe cited work being done by Maine stakeholders, including the Maine Port Authority and the City of Portland. Patrick Arnold heads up that cooperative work through his company, Soli DG. Funding comes from the coalition members as well as some public money from state/regional tourist offices. Arnold said that cruise lines look for this regional work because they sell cruises based on a region, not a particular city or singular destination. To the extent the region is attractive, welcoming and can help with logistics, those attributes eventually support growth that brings new ships.

Memphis, TN, is one city expecting big growth in river cruising. At the heart of the action, American Queen Steamboat Company is headquartered there. The recent move by AQS was in no small part prompted by the city's expanded facilities for riverboat tours, including American Cruise Lines' operations, and, possibly, Viking, as well.

Memphis began reconstruction of its Beale Street Landing around the time that AQS was reevaluating its new business plan. "New" is important – and perhaps cautionary – because the company was reorganizing to restart its cruise operations. Original plans called for a Mississippi-based operation, but a Mississippi home port made New Orleans to Memphis cruises – the bread and butter of lower Mississippi River cruising – difficult.

AQS looked at this logistical problem while observing Memphis' investments in Beale Street, starting around 2013, a broad set of projects eventually costing $45 million. One project included new riverboat landing infrastructure, about the best welcome mat a city could put out. This effort signified commitment, requiring approvals from city officials, a loan from the city, new private investors, and even, at one point, Congressional action to resolve federal commitments made through Marad. But the deal got done. AQS moved to town.

Benny Lendermon is president of Memphis' Riverfront Development Corp. It's his assessment that AQS, ACS and Viking are all "incredibly bullish on the future, on the market being there." He predicts Viking will start construction of new boats in 2018. Separately, IAMPE's Jeff Monroe cites the Memphis–AQS project as an example of what it takes to advance river cruising. The infrastructure is important, he says, but insists it's not the whole story. Rather, it's the commitment that this city isn't just any port in a storm. It's the right port, solidifying what will likely be a very lucrative partnership. Riverboat tourists typically aren't business travelers hurrying to a meeting. They are in town for fun, with time and money.

"Memphis, TN, is one city expecting big growth in river cruising. At the heart of the action, American Queen Steamboat Company is headquartered there. The recent move by AQS was in no small part prompted by the city's expanded facilities for riverboat tours, including American Cruise Lines' operations, and, possibly, Viking, as well."

For any business expansion, hard assets and a deliberate business plan are central components. Memphis has invested in both. For the operators, there were sold out riverboat cruises in 2017. What does that indicate for 2018? It could be that the market is fully satisfied. Or maybe there are thousands of customers anxious to get in on the fun, if only there was room. The red-hot ferry building industry may have found another sector to help keep it 'moving on down the river.' Looking ahead, Memphis, multiple industry players, and the operators themselves are banking on it.

Tom Ewing *is a freelance writer specializing in energy and environmental issues.*

A 'Ferry' Good Year

New Routes, New Challenges and Plenty of Newbuilding as 2017 gives way to the New Year.

By Joe Hudspeth

A year ago, the maritime industry could be found clinging to the edge of their seats to see what the coming year had in store. 2017 was set to be a telling year and indeed it was. With the elections finalized, the political impact, if any, was sure to be seen. While fuel prices have remained low and continuing to hamper the offshore workboat market, consumer confidence has held high and new vessel construction is strong – particularly in the ferry segment.

The need and recent demand for new ferries goes beyond in-kind vessel replacement. That's because the trend is for expanded routes, more frequent service, larger vessels, and in some cases the establishment of a startup service with a new service provider. Coupled to each of these requirements is often an aggressive timeline and tight budget – both of which have been the case for the startup of the NYC Ferry service on the East River in Manhattan.

New Routes: Horses for Courses

The scope of the project was vast, but it appears that San Francisco based Hornblower Cruises and Events was indeed able to fill the role of 'Ferry Godfather' and pull off this Cinderella story at the eleventh hour. While the overall service has proven to be popular, the NYC Ferry has experienced some shoe-fitting challenges along the way – including the need for additional vessels. Like their fellow New Yorkers, Hornblower has remained resilient in charting a course for success for this new service.

Elsewhere, Potomac Riverboat Company in Alexandria, Virginia also took on a brand new ferry route, servicing the recently opened Washington, D.C. Wharf harborside development. In order to address the challenge of transiting low-clearance bridges along the route, the fleet of four 88' aluminum catamarans built by Metal Shark all feature folding rails on the upper passenger deck.

Kitsap Transit in Washington's Puget Sound also kicked off a new ferry service from Bremerton to Seattle last year and is in the midst of constructing and procuring six new vessels to grow their fleet and incorporate two additional routes. Kitsap Transit's new ferry fleet is shaping up to be one of the most diverse. Their construction program includes two ultra-low-wake ferries for their wake sensitive Rich Passage run, a diesel-electric hybrid ferry for the short commutes to Port Orchard and Annapolis, and three new Tier IV-powered high speed 250-passenger subchapter K ferries for voyages from Southworth and Kingston to downtown Seattle.

Separately, the National Park Service is also in the hunt for a new ferry operator to run their new ferry service from Pensacola to Fort Pickens and Pensacola Beach. Early in 2017, All American Marine delivered two new 72' aluminum catamaran 149-passenger ferries that are currently in dry storage while NPS selects a concessionaire to operate the service and the necessary shore side infrastructure is put into place.

A Course through Choppy Waters

2017 has been a year of development and growth, but it was not smooth sailing for all on the ferry front as various vessels experienced a few rocky runs. Nevertheless, members of the Passenger Vessel Association (PVA) can claim one of the best track records for maritime and transportation related casualties.

Human factors are most often to blame which raises some eyebrows as to whether a safer vessel can be built and additional training can be garnered to help avert potential incidents. Organizations such as PVA, Interferry, and the Worldwide Ferry Safety Association (WFSA) are all centered on the premise of safe ferry operations. Industry conferences bring vessel operators, government regulators, and supply chain stakeholders together to present new ideas and vet lessons learned – moving the industry forward. This year will be no different.

During last year's Ferry Safety and Technology Conference, organized by WFSA, several presentations advance the goal of safer navigation and landings. Dr. Martha Grabowski of Le Moyne College, for example, gave an in-

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sightful presentation on the use of wearable, immersive, augmented reality devices for marine navigation. Through smart glass technology, there is potential for operators to physically see their operating environment with superimposed real-time digital navigation aids.

Still under development, the technology could someday give the master an overlay of a navigation chart plot, forward looking radar images for debris detection, or even water depth data without having to divert focus. This technology also shows potential to reduce distracted driver issues by ensuring that the master stays visually focused on the appropriate targets to avoid triggering alarms. Separately, 'Geofencing' can be employed to define safe courses, helping keep vessels from straying from charted channels. Furthermore, every safe voyage must conclude with a safe pier landing.

Shea Thorvaldsen of McLaren Engineering group presented several developments in shoreside infrastructure that promote softer landings through impact-dampening fendering and provision for safer access for passengers with height adjustable ramps and stability-enhanced floating platforms. This may eventually yield proximity sensors and auto pilot controls specifically developed to aid in automated docking or collision avoidance.

The New Year promises continued growth in the construction of ferries, expansion of routes, and the addition of new operators joining the fleet. When embarking on a new voyage, the safest course is a charted course and there are plenty of aids to assist owners and operators along the way.

Consider attending PVA's annual conference at Maritrends in Savannah, GA in January; the Ferry Safety and Technology conference in Manhattan in March; or the 2018 Interferry Conference to be hosted in Cancun in October. Investing in new vessel construction can be daunting and can at times toss a few heavy seas or rogue waves your way, but partnering with an experienced shipyard with a reliable track record for delivering U.S. Coast Guard inspected ferries will certainly help calm the storm. Partnerships will be key to setting sail on a safe and successful 2018.

***Joe Hudspeth** is VP of Business Development at All American Marine. He currently serves as a regional co-chairman for the Passenger Vessel Association and participates on several PVA committees. Reach him at jhudspeth@allamericanmarine.com*

Domestic Maritime Training: In Extremis

Image: CreativeCommons-Glenn Fitzpatrick

The Built-for-Purpose National Security Multi-Mission Vessel (NSMV) Training Ship comes to life.

By Joseph Keefe

Anybody who has spent four years at a State Maritime Academy has also spent time at sea on a Marad-owned training vessel. Today, these platforms are long in the tooth, equipped with outdated equipment and not necessarily conducive to the task of training cadets for a future career at sea. For a long time, though, they've gotten the job done.

It is also true that some of these hulls are one equipment casualty away from the bone yard, despite that best efforts of the schools tasked with their upkeep. That's got state maritime academy (SMA) officials worried. The Massachusetts Maritime Academy's Academic Dean Brad Lima knows what is at stake. "Kennedy is 50 years old and sound mechanically. We are installing an ultra low sulfur fuel system to be environmentally compliant. We hope that T/S Kennedy has many good years of sailing left in her."

That's good news, if true. The vessels are owned by Marad and as such, serve myriad other functions. Over time, they've been called up and activated during national emergencies – notably in the aftermath of hurricanes Sandy and Katrina and this year's particularly robust hurricane season. Leveraging that reality, state maritime academy stakeholders are making their most logical pitch ever: a built-for-purpose class of training ships. In a perfect world, they're hoping for as many as five, which could come at a series-build price of $1 billion. Attempted before, and with predictable results, the stars may finally be aligned to get something done. Before that can happen, the coalition has to convince legislators that the price tag will yield good value to federal taxpayers.

In December, Massachusetts Maritime Academy President Fran McDonald weighed in with ***MarineNews***. "While the training of cadets is the primary mission of these 'on-loan' training ships, these well-maintained vessels serve an important corollary role in support of national disaster response or military need. This role was clearly displayed this past fall as three of the six ships were activated in support of Hurricanes Harvey and Maria and a fourth was notified of a possible activation in support of the California wild fires."

These kinds of testimonials are expected, coming from schools that desperately need ships. Separately, however, FEMA Emergency Management specialist Dan Kelleher had a birds-eye view as the recent post-hurricane crisis in Puerto Rico unfolded. "The T/S Kennedy was on site in San Juan with FEMA personnel and commodities, before SJU [airport] was reopened to commercial air-traffic. The ship took on cargo and FEMA staff in Ingleside, TX and departed for Puerto Rico. When we arrived in San Juan, the only other ship in the bay was a U.S. Coast Guard cutter. We were the tip of the spear," he said, adding quickly, "These ships provided thousands of responders a safe and secure place to live and sleep; hot meals and showers and most importantly clean drinking water. The academy ships

are a phenomenal asset to the federal government."

At the California Maritime Academy, CMA President Tom Cropper gave a similarly ominous account. He told ***MarineNews***, "The CMA ship hasn't been used in five years but Marad did call to see if FEMA could use it for dorms for firefighters in the recent SoCal fires. It turns out that it wasn't needed." That kind of scenario, he says, makes the training vessels that much more important. "West Coast fires – unlike East Coast hurricanes – aren't predictable. That makes a ship like the NSMV all the more valuable."

A Plan Emerges

Herbert Engineering (HEC) was contracted to prepare the NSMV design, and in 2015 a concept level design was prepared, with the Phase 3 design completed in early 2017. That package is expected to be sufficient for shipyards to prepare bids to build NSMV's. The goal is to deliver new vessels to all five SMA's. These hulls need to be useful assets for government response to humanitarian and disaster crises in coastal and port areas. This ability to merge two primary missions – training and disaster response – into one vessel is a critical design feature that must be incorporated into the new training ships.

Key design features include safety (compliant to SOLAS, USCG and ABS class rules), a capacity of 760 persons, and an operating draft of no more than 25 feet. This will allow access to less developed ports in support of future relief missions.

A hull lines optimization was effective in reducing required propulsion power by about 10% between the concept design and the optimized hull design. Two separate engine rooms were built into the design for reasons of redundancy in an emergency and to allow training to take place in one engine room while the second is used for propulsion.

In Extremis: all options on the table

CMA's President Cropper grimly summed up the looming crisis. "We're in extremis now. People want to know, 'what's plan B?' We're in 'plan B' now. Maine's ship needs a serious engine overhaul. Texas has no ship and Mass and New York's ships are quite old. People say it will cost a lot of money. Well, it will require ***that*** kind of investment."

As the academies and Marad battle for the funds to build the NSMV, other options have emerged. One solution involves having more than one academy leverage one hull for training purposes. It has been done before, but in practice greatly accelerates the wear and tear on these aging vessels. This option merely moves the timeline forward as to when the real crisis will occur.

Still another option is being tossed around. Sales of second-hand ships reached a 10-year high in 2017 on optimism that one of the shipping industry's deepest recessions was nearing an end.' More than 1,600 ships worth $19 billion were sold, the highest number since 2007. Fueled by growing confidence, shippers are taking advantage of low prices.

The right commercial hull of recent vintage, repurposed for Marad's training needs, might just be the ticket. That's because the average price of a five-year old 180,000 DWT bulker is now just $33 million, up from the $24 million low of 2016, but much less than the steep estimated price of $250 million for just one NSMV.

SUNY President Dr. Michael Alfutis disagrees. The most cost effective option – the NSMV – will support U.S. shipbuilding, provide domestic mariners with the necessary credentials to support U.S. military sealift, and at the same time, increase the nation's ability to respond to national disasters. "In fact, it is the only option that meets all three," he said.

Newly sworn-in Marad Chief Mark Buzby, for his part, says, "We can't use the model that we've used in the past. We have to approach this in a much different way. Building the purpose-built ship would be the ultimate way to do it if we were really serious. But thus far, we have not done that. So the fall back – if we don't build a purpose-built ship – is to go on the market, and it's going to have to be a foreign-built, existing used ship because, because there aren't any in the US inventory that could fulfill that. Buying a foreign ship and modifying it in a domestic yard – we're doing that homework now. We have to look at it."

Standardization: Better Training, and Economy, too

There is also a lot to be said for a standardized training platform, especially if congress approves the series-build option. Both training and maintenance can be standardized across hulls, something that would create ultimately reduce

Image: Herbert Engineering & Marad

costs and additionally allow the SMA's to develop a standardized, logical curriculum that's not necessarily possible today. A fit-for-purpose/series-built vessel comes at a higher upfront cost than a used hull, but yields a much lower 'total ownership cost.' That's because standardized, off-the-shelf fittings across the fleet can be acquired more cheaply.

CMA's Cropper agrees. "CMA has one of the younger vessels at about 28 years old – it is a diesel ship, but the almost 30 year old hull houses 40 year old equipment and technology." Hence, the NSMV would also bring relevant training back to the academies. "Relevant training from day one prepares mariners for real life. You can't do that on a tired 40 year old hull," insists Cropper.

Manning Crisis Looming

The U.S. Maritime Administration has officially sounded the alarm. Buzby points to the coming manning crisis as the rallying cry for the NSMV. Buzby says that would be a mistake. And, the first place to address those worries is at the six SMA's. Buzby, a Kings Point graduate, says that we need all of them to thrive.

"We absolutely do. We [also] need them coming out of Kings Point and we need them coming out of the other six schools," he said, adding quickly, "This adds a level of concern and crisis to the whole school ship issue, because if we lose the school ship, that's a big chunk of people that I lose. It's all connected."

Asked if he thought that the newly designed National Security Maritime Vessel (NSMV) class could get funded and built, he pointed to financing options that might work if traditional funding did not. "If we're looking to get regular construction money out of the Navy or out of Congress to the tune of 320 million dollars, we may have to get that incrementally, or we may not be able to get that at all, in which case we may have to look at maybe a build-lease kind of option. We've done that before. We built the first pre-positioning ships that way."

In one of the first definitive statements about the issue to date, Buzby all but promised that he would get the ships. "We're looking at multiple options of how to make this work, but the key to it is we know we have to replace school ships. Absolutely, we have to."

Mass. Maritime's Fran McDonald perhaps says it best when he offers, "The partnership between the Maritime Administration, the State Maritime Academies and the cadets who pay tuition to attend the state academies is the consummate federal/state/citizen partnership. In order for our nation to maintain a robust strategic sea-lift capability and recognizing the critical role that civilian mariners play in support of that sealift effort, the shared responsibility between these three parties stands as a best practice that, arguably, should be modeled elsewhere in government."

Indeed, and in the administration building of the Massachusetts Maritime Academy, there is a plaque that commemorates the words of the nation's first Maritime Administrator, Joseph P. Kennedy. First year MMA cadets are required to memorize it. It reads simply, "You can have a Merchant Marine with first class men even if they sail second class ships, but second class men can't be trusted with the finest ships afloat." Without a working plan to replace the current fleet of SMA training ships, we very soon won't have the men, women or the ships to make Joe Kennedy's thesis matter.

The Proposed NSMV at a glance …

LOA: 159.85 m (524.5 ft.)	Propulsion engines: 4 x Diesel Generators	Total Power: 15,680 kW
Beam: 27 m (88.6 ft.)	Fuel Consumption: 26 tpd at 12 knots	Fuel: MGO) <0.1% Sulfur
Draft: 6.5 m (21.4 ft.)	Propellers: 1 propeller, fixed pitch	Thrusters: Bow & Stern
Service Speed: 18 knots	Crane: 1 x Jib Boom w/35 MT SWL	Endurance: ~ 11,000 nm
Cruising Speed: 12 knots	RoRo ramp: 20 ft. wide/40 ton capacity	RoRo deck: 10,700 sq. ft.
Propulsion: Diesel Electric	Capacity: 10 x 40 ft trailers with 26 autos	TEU Capacity: ~ 64 TEU

Assessing Skills in the Maritime Industry

Never easy, but always a critically important task.

By Murray Goldberg

It is critically important that we assess the ability of our mariners to perform the skills required to safely and efficiently do their jobs. It happens to also be very difficult to do so objectively and at the level of detail necessary to ensure safe operations and continuous improvement. This is especially true in dynamic, team-based scenarios such as drills and complicated safety-critical activities. This article covers a novel initiative by one of the world's largest cruise lines and its partners to provide a solution to this problem.

Skill Assessor – Report

Introduction

There is no arguing that the maritime industry is a highly skills-based environment. Not only must our mariners possess all the necessary knowledge to be able to perform efficiently and safely, but in addition they must be able to demonstrate the critical skills required of their position in a wide variety of conditions. As a result, a robust maritime training program will always consist of deep attention paid to the teaching and assessment of both knowledge and skills. But the question is, how effective are our current tools and best practice techniques at teaching and assessing knowledge and skills? The answer is "very effective" in some cases, and "not at all" in others. The "not at all" part is a problem.

We have said above that we need to teach and assess knowledge and stills. Let's break this down. On the knowledge side, we are in good shape. There is a tremendous body of excellent research built over the decades on how to best impart and assess knowledge. As a computer science faculty member for 10 years at a large research university, this, in fact was my research area. The latest research on this has unequivocally shown that knowledge is best taught using the technique of blended learning; that which combines online learning and face-to-face training. Blended learning provides significantly better training and assessment outcomes than traditional face to face training, if done properly. As a result, the implementation of blended learning programs by vessel operators is accelerating.

But what about skills? There has been much less research on how to most effectively teach and assess skills. On the teaching side, the maritime industry has led in many ways, and has also followed the example of other industries by employing comprehensive hands-on training and repeated practice in both real and simulated environments. When this kind of skills training is preceded by on-line learning of the knowledge that underlies those skills, the outcome can be excellent. But how do we know for sure? How can we deeply and comprehensively assess the skills we teach?

It is actually quite difficult. In fact the assessment of skills is easily the weakest link in the safety chain comprised of effective knowledge and skills training and assessment.

Current Practice in Skills Assessment

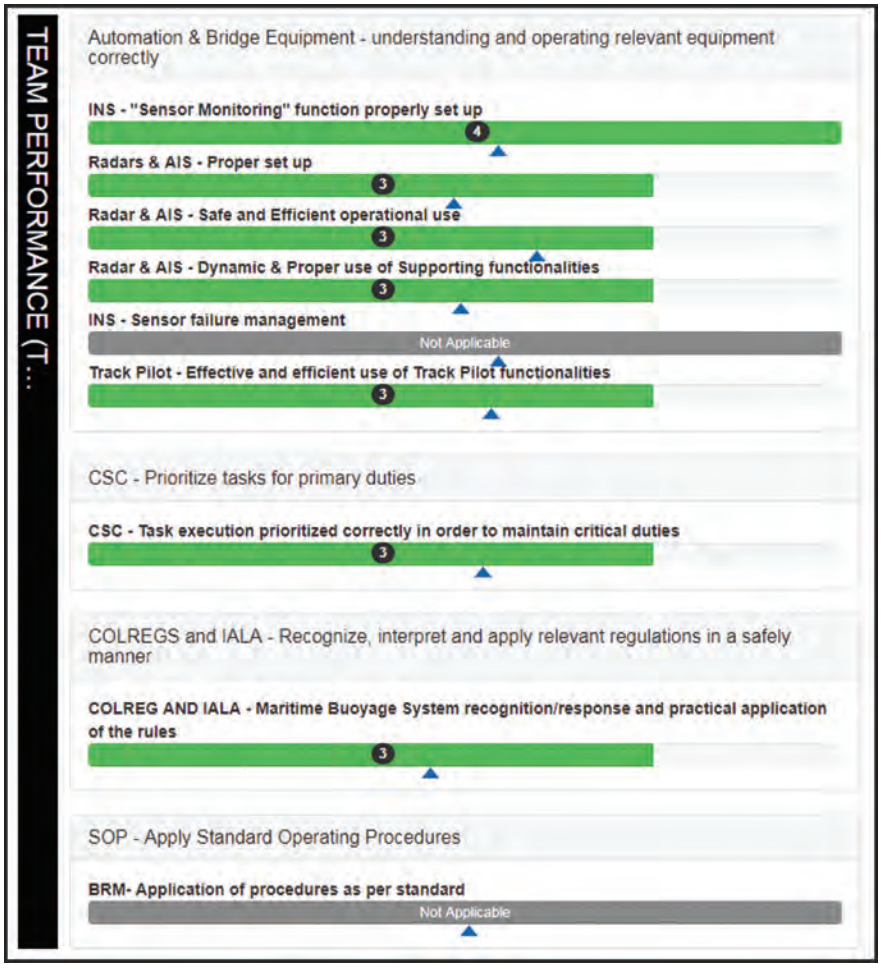
Most operators do assess skills to some degree. But while it is easy to be compliant using a weak approach to skills assessment, it is more difficult to know whether your officers and crew are competent. Although current practice does include some very good examples at well-run simulation and training centers, structured and standardized tools to assess skills at a fine-grained level are almost non-existent.

Current best practice typically involves having a trained assessor observe the performance of skills in a simulator or at a training center, and then make an assessment based on what he or she observes. To be effective, this requires a highly trained and experienced skills assessor using a standardized approach in controlled conditions. This approach is therefore rarely available to most operators, and even when it is, it is variable in quality and often somewhat subjective.

More commonly, skills assessment typically involves little more than an assessor recording who participated in an exercise and then perhaps adding a few high level comments as to how it went. This is common practice in skill demonstrations such as on-board drills (fire drills, life-boat drills, etc). This wastes a tremendous opportunity to assess competency and leaves operators exposed to a significant risk created by having very little knowledge as to the details of team and individual skill performance. If we don't have deep insight as to how our individuals and teams are able to perform their skills in a variety of conditions, how can we hope to improve? How can we know we are operating safely and efficiently?

A Solution

It was this nagging question, above, that inspired the training experts at one of the world's largest cruise lines to find a solution. Working together with Marine Learning Systems as their training technology partner, they developed and are realizing their vision of making comprehensive, objective and highly detailed skills assessments a reality. The vision and the technology to support it have evolved over time and involve input and significant expertise from a broad range of experts in safety training, human factors, simulation and maritime operations. Together these partners are joining the effort to finally create an accessible approach and electronic toolset for skills assessment.



The Skills Assessor App

The fundamental goal is to turn any demonstration of skill by teams or individuals into an opportunity for assessment. This can include on-board drills, simulation exercises and even real performance of dangerous duties like confined space entry and others. All of these are demonstrations of skills which can be assessed. All that is needed is a toolset to facilitate objective and comprehensive real-time assessment. That is the goal of the "Skills Assessor."

The skills assessor is an app that runs on a tablet and is linked into the Marine Learning System's LMS (learning management system). The app presents a simple structured assessment framework or "form" that corresponds to the skills being assessed. The form essentially lists a set of possible actions that are appropriate for the skill being demonstrated. As the mariners perform their duties or demonstrate their skills, the assessor will indicate which of the actions were actually observed for

each participant as they are observed.

For example, let's say we are assessing a team practicing a collision scenario in a simulator. The form in the skills assessor app will display a set of actions consistent with the activity for each participant. The role of the assessor is to mark each action when (and if) it is observed. For example, initial actions in a collision exercise might include calling out the event, adjusting propulsion, notifying the master, creating an incident log, and so on. The form can also indicate other performance requirements such as speaking in a loud and clear voice, etc.

As the scenario unfolds, the assessor will indicate with a single click each action (or "performance indicator") that was observed and who performed it. The performance indicators are intentionally simple so as to remove any subjectivity on the part of the assessor, and to allow rapid assessment in a fast-paced, fluid situation. At the end of the scenario, a report will be generated which provides remarkable detail on how the team performed as a whole, and how each individual contributed to that performance.

Actionable Data

Despite the fact that the performance indicators being recorded are intentionally very simple discrete actions, the depth of insight that can be derived is substantial. At the most basic level, the report will indicate whether the scenario was concluded successfully. It will show whether any critical actions were missed by the team or by an individual. It can reveal the timing of team member actions against scenario events in order to provide insight about individual and team reaction time and efficiency. Data from the skill assessor could be used to determine who among the team tended to lead and who tended to follow, those who contributed more, and those who contributed less.

Attributes such as assertiveness, leadership, hesitancy, and others can be derived. The difference between failure, success and mastery can be accurately determined, broken down by individual skill. A wealth of useful and actionable data is derived, telling us what we are doing well, and where the gaps are. And deeper analysis of the data will even reveal how factors like team composition, training history, and other influences can affect and be optimized to improve performance. The full utility of the data can only be imagined at this point.

Using the skills assessor, the cruise line will have the ability to gather skill performance information at any time from a huge variety of daily activities, creating an increasingly valuable database to be mined for insights. It can be used to assess current readiness, track the development of individual skills and employee attributes over time, compare performance across teams and vessels, and act as a rich source of data to inform a continuous improvement program. It will finally shine a light on one of the most important black holes in determining officer and crew core competence – skill proficiency.

Next Steps

The skill assessor has been used in prototype form at a large maritime simulation training center for over a year, and the first release of the full version is due in January of 2018. Even though this development has been largely based on the insights and expertise of those at the cruise line and their partners, the skills assessor will be available to the industry at large in the hope that the safety of all can benefit.

Murray Goldberg *is CEO of Marine Learning Systems (www.MarineLS.com). An eLearning researcher and developer, his software has been used by 14 million people worldwide.*

Propelling the Passenger Vessel Market

Scania advances into 2018 on the strength of prior year successes and new visibility in one of the North American marine industry's hottest sectors.

By Joseph Keefe

In the fourth quarter of 2017, the first two passenger vessels built by Louisiana-based shipbuilder Metal Shark for Entertainment Cruises' Potomac Riverboat Company division were delivered to Washington, D.C. Both are now in service. The two 88', 149-passenger high speed aluminum catamaran vessels – the Potomac Taxi I and Potomac Taxi II – departed Metal Shark's Franklin, Louisiana shipyard and eventually proceeded northward up the Atlantic Coast to Washington. How they got there is less important than what powered the delivery.

Powered by twin Scania DI13 081M diesel engines delivering 500 HP at 1800 RPM, the USCG Subchapter T vessels were designed by BMT Designers and Planners and BMT Nigel Gee, and feature an environmentally friendly low wake / low wash hull design. The new vessels provide commuters in the metro region with service between Old Town Alexandria; National Harbor, Maryland; and Georgetown and The Wharf in Washington DC.

NEW MARKETS, BIG BUSINESS

When Scania announced the deal to deliver eight, EPA Tier 3, 500 HP DI13-liter engines in 2017 to power those high-speed, low-wake water taxis, it marked the beginning of what turned out to be a very good year for the San Antonio-based engine manufacturer. That's because the deal not only represented a significant number of individual engines, but more importantly for Scania, it cemented the firm's toehold in the red hot domestic ferry sector.

As much as 40 percent of Scania's North American marine engine sales are made into the fisheries market. But, ferry business is rapidly catching up. Al Alcala, Sales Manager (Marine) for Scania USA Alcala explained, "We've had good success with our distributors and setting up dealers." As it turns out, that's exactly what tipped the scales for Scania on their latest sale.

In this case NRE Power Systems of Houma, LA was Scania's distributor to Metal Shark. Alcala explained, "Mack Boring and Parts in Somerset, NJ really convinced Entertainment Cruises and BMT Nigel Designers and Planners that Scania was the best option. It was a great team effort between two of our largest distributors and Scania USA."

WHY SCANIA

Scania's marine engine platform today includes a complete range of 9-, 13- and 16-liter benchmark engines for both propulsion and auxiliary applications. Scania engines are available in EPA tier 3 ratings up to 900 hp, and the firm has also launched a range of IMO tier 3 engines for Canada. That reliability stems from a simple design philosophy, one which employs a modular block design that employs as much as 30% in parts commonality. Because so many parts are common to each engine, that means Scania rarely is out of stock on any part.

The modular commonality also comes into play in other ways. Alcala sums up the Scania advantage nicely when he says, "Our 9L, 13L and 16L all share the same head, piston, and fuel system designs. The only difference is the number of cylinders. As such we have unmatched availability of

parts if needed because of the commonality. Our modular heads only weigh 40 lbs, allowing for the one-man service concept. If a technician knows how to work on one Scania, he/she knows how to work on any of them."

Saving weight is the obvious way to reduce fuel consumption and increase performance of any planing vessel. All Scania Marine 13L and 16L engines use Compacted Graphite-Iron (CGI) for their blocks. CGI has twice the tensile strength of gray iron used in competitor engines, but at the same time, is considerably lighter.

Thanks to the superior power-to-weight ratio and compact dimensions of the Scania marine engines, designers have opportunities to optimize efficiency and profitability. Alcala adds, "When I describe the power-to-weight ratio, it is specific to the 800 hp node but still holds true if we compare to other 13 Liter engines or larger at 500hp. I don't mean to split hairs, but at 800hp there were no other commercial engines smaller than 13L and since we are the lightest, we have the highest power-to-weight. At 500hp, there are smaller engines available, so technically, they could be considered having better power-to-weight ratio. But if you compare apples to apples and rating to rating we are still the leader."

For operators, this advantage – several hundred pounds – translates into more passengers and/or cargo per voyage and/or the ability to carry a larger fuel load which in turn allows for greater endurance. In the passenger vessel sector, and taking into account the Coast Guard's new, heftier passenger weight assumptions, this metric is especially important.

In the end, it was Entertainment Cruises' Bob Lawler who made the decision to go with Scania. "Scania is able to meet our size, horsepower and weight requirements in a very fuel efficient and affordable package, which combined with Scania's outstanding customer service we feel we have the perfect partner for this project."

Josh Stickles, Metal Shark's Vice President of Marketing, agreed. He told ***MarineNews*** in December, "Scania offered the right size, power and weight for this application, the company has a great reputation, and an established service network. Also, they were competitively priced." He continued, "Performance and fuel economy were outstanding right out of the box. Also, the engines are quiet, vibration is minimal, and the hull design is highly effective at reducing wake and wash for minimal environmental impact, which was a key consideration of the client."

LOOKING AHEAD

Scania today manufactures a wide range of truck, bus, marine and industrial engines. A true propulsion pioneer, the company employs approximately 42,000 employees with an annual turnover of $11 billion. In 2016, it celebrated its 125th year in the business. The best may be yet to come.

For Scania, the 2016 marine engine sales increase, worldwide, over 2015 was 27%. As it came to a close, 2017 sales volume (those numbers not ready as ***MarineNews*** went to press) was on-track to be 25% higher than 2016 – indeed a record year for the engine division at Scania.

Scania has worked with Metal Shark previously, but Alcala insists that this deal was special. "I believe it's the professionalism; everyone from Chris Allard, President and Carl Wegner, VP Sales, to their designers, and purchasing people that has really made the project seamless." That's good news for all involved, since with two boats already in the water and two more planned for a total of four, this is one newbuild project that has legs into 2018. As Entertainment Cruises found its new niche by providing much needed water transportation for some of the nation's most congested roads, Scania provided the power to make it happen. Other operators, municipalities and the US DOT's Maritime Administration will be watching closely to see how it all plays out.

Image: Metal Shark

The Electric Mobility Revolution Arrives on the Waterfront

Demand for electric mobility is sweeping across the globe, and it's rapidly gaining traction in the marine industry.

The electric mobility revolution is largely being driven by the land transportation sector. Industry statistics predict that electric vehicle sales will surpass combustion engine vehicles within the next 20 years. Many countries in Europe and Asia have already adopted aggressive deadlines to phase out sales of combustion-powered vehicles, and some cities such as London are planning to banish them from their roads entirely. The same rules will likely also be extended to their waterways.

Some of the world's largest auto manufacturers have announced plans to convert their entire production from combustion to electric or hybrid drives within the next couple of years. Recharging infrastructure will quickly spread to meet the demand, in the same way that filling stations became ubiquitous in the early days of motor vehicles. On the other hand, recharging will be less of a problem in the marine industry, since most docks and terminals already have shore power hookups.

At the recent International Work Boat Show, *MarineNews* caught up with Torqeedo, a German company that is at the forefront of bringing electric and hybrid technologies into the light commercial marine marketplace.

Early Adopters

Torqeedo has been in business for 13 years, initially selling small lightweight electric outboards for RIBs, dinghies, kayaks, canoes and pontoon boats. Over time, the company has increased its horsepower range and the complexity of its integrated systems. It is now equipping larger leisure yachts and commercial workboats with electric outboards and inboard systems with shaft or pod drives, in either all-electric or hybrid configurations. Torqeedo claims to have more than 70,000 electric motors in service. The product range runs from 1 to 80hp.

The primary limiting factor in electric mobility, according to Torqeedo, is not the electric motor but energy storage technology. Happily, batteries are getting better every day, again driven by automotive scale R&D. The company projects that energy density in batteries will improve by 70 percent over the next two years, while the cost in terms of dollars per kilowatt hours will fall by one-half over the same time frame. It's noteworthy that Torqeedo has signed an agreement with BMW to integrate marinized i3 automotive lithium batteries with its Deep Blue systems.

The Case for Electric

There's a compelling argument for electric propulsion – for specific types of boats with specific usage patterns. Torqeedo itself concedes that a pure electric drive system is not currently suitable for vessels that travel at high speeds for long periods of time. On the other hand, electric provides unique advantages over gas or diesel systems for slower vessels with shorter run times. And hybrid solutions – although more costly in terms of capital expense – can push larger boats at higher speeds for longer times. Solar panel recharging can also extend the range considerably.

The higher CapEx of electric or hybrid propulsion versus a comparable engine running on fossil fuels is offset by lower OpEx; in terms of fuel savings, reduced maintenance costs and increased uptime. Moreover, electric prices are more stable than fuel prices, giving more predictable costs. Torqeedo calculates that if a boat's annual fuel costs exceed $6,000, electric propulsion will yield a return on investment in just a few years. After that, the savings really start to kick in. Torqeedo offers a long-term battery capacity warranty of up to nine years after commissioning, guaranteeing that the batteries will retain at least 80 percent of their original capacity, even if they're being used every day. There are also intangible benefits, such as the health of crew and passengers, by reducing their exposure to noise, exhaust, vibration and fumes.

Sustainable Waterways

Municipal authorities around the world are actively searching for ways to clean up their air and environment and improve quality of life for their communities. One way to do this is to shift people-moving traffic from congested roadways to waterways by creating fleets of electric ferries and water taxis. For these applications, electric propulsion can be an attractive alternative to meet clean-air goals. It's been calculated that one single 80 horsepower four-stroke outboard motor puts out as much NOx and hydrocarbon emissions as 350 automobiles, so electrifying workboat fleets will make a

Image: Torqeedo

significant contribution to reducing air pollution.

To meet this growing demand, Torqeedo is focusing on water taxis, excursion boats and passenger ferries. The company points to a number of successful deployments over the last 12-18 months.

The city of San Antonio, for example, has just put into service a fleet of 43 electric passenger boats for its iconic River Walk downtown canal system. The 27-ft vessels, designed by Metalab and built by Lake Assault Boats, are each driven by a Torqeedo electric propulsion system that consists of a 20hp electric outboard, 16 lithium batteries, with a built in shore power connection for fast recharging. The barges seat up to 40 passengers and can be configured for multiple roles for tours, dining, water taxis, entertaining and water parades. They cruise at about four knots and can normally operate up to 12 hours without recharging, according to the vessel operators.

The largest 100 percent electric passenger boat in Canada, the Queen Elizabeth Dr., has been operating on Ottawa's scenic Rideau Canal since 2016. The 75-ft excursion boat is powered by two Torqeedo Deep Blue 80hp outboards – one at either end, since the boat is too long to turn around in the narrow waterway. The vessel makes up to eight 90-minute tours at 4.5 knots per day. The operator reports a rapid ROI. The electric power system was about $90,000 more than comparable gas-powered outboards, but the higher original cost is offset by $26,000 per year in reduced operating expenses, giving a break-even point in 3.5 years.

Separately, Watertaxi Rotterdam added the first hybrid vessel in its fleet in 2016. The boat is powered by a Torqeedo Deep Blue 80hp electric motor, with an integrated energy management system. Two 20kW generators keep the batteries charged when operating at speeds up to 13.5 knots on the River Meuse in the center of the city. The operator claims that the new boat is 70 percent more fuel efficient than the other 15 water taxis in the fleet.

Also in the Netherlands, the first purpose-built solar/electric passenger ferry commenced operations at the Port of Harlingen in late 2017. The boat has a unique integrated propulsion system with two independently controlled Torqeedo 8hp counter-steering pod drives fore and aft, providing an extraordinary level of maneuverability. The boat can be driven in a 90 degree angle to port or starboard, and perform a 360 circle in either direction within its own 28-ft length. The 48V lithium batteries are automatically charged from the 12 rooftop thin-film solar panels, and the boat can plug into shore power during stopovers for an additional recharging boost.

Heavy Metal

Torqeedo insists that vessel size and weight are not a challenge for electric propulsion. That's because electric motors have an extremely flat torque curve when compared to combustion engines. The high-torque motor provides the power to drive a much larger propeller capable of pushing very heavy loads. A case in point is a company operating dredging barges in inland gravel pits in Germany. The quarry owner, Kaspar Weiss GmbH, specified the zero-emission electric system for its dredges to provide a highly efficient green solution to protect the local groundwater and keep the air clean. The 44-meter barges, which haul loads up to 120 metric tons, are powered by a Torqeedo Deep Blue high-voltage system. The vessel typically moves about 500-600 meters at a speed of about 3 knots, opens its trap doors, then drives back and plugs in the chargers – about one to ten times per day. This owner has also installed Torqeedo outboards on pusher boats used in waste byproduct removal.

Propelling Hybrid Electric Solutions

Growing interest in hybrid-electric power systems is expanding the search for new propulsion and energy-storage systems in the workboat sector, where compliance with emerging environmental regulations and a relentless pursuit of operational efficiency are driving change.

By Domenic Carlucci

To meet demands for cleaner more efficient power, owners are examining the potential for less conventional methods of energy generation and storage – such as fuel cells, lithium-ion batteries, super-capacitors, flywheels, wind and solar – to propel their vessels. In the workboat sector, where quick energy delivery is commonly required during peak-loading conditions by everything from tugs to offshore support vessels, the combination of lithium ion batteries and super-capacitors is gaining market traction. In fact, the hybrid partnership is becoming big news.

Electric-hybrid propulsion systems are not new to shipping; the passenger ship sector has been applying diesel-electric propulsion for decades. But recent advances in hybrid-electric power and energy storage technologies are bringing additional benefits. In examining those benefits, it is first important to differentiate between hybrid propulsion and a hybrid power system – two concepts that are often confused.

Defining Principles

Hybrid propulsion usually utilizes internal combustion engines and electric generators to supply power to the propulsion shaft and thrusters, as referenced in the passenger-ship sector. Hybrid power denotes at least two different types of electricity generating equipment (i.e., diesel generators) or storage (lithium batteries) to provide power for propulsion and hotel loads (which includes onboard climate control, communication, entertainment, lighting, refrigeration, etc.) demands.

Hybrid propulsion systems are already widely used in the marine industry, such as onboard offshore support vessel and harbor tugs. To date, the North Sea area has been the focal point of this activity, driven by government-led environmental mandates and restrictions. Many OSVs serving this area have been retrofitted or built with hybrid systems. Hybrid power, on the other hand, is starting to impact vessel-system designs, and the technologies for the associated energy-storage and management systems are fast evolving. Hence, industry standards for these novel technologies have yet to be established.

Realizing Potential Benefits

Many of the potential benefits of hybrid power remain theoretical as the technology is still young in the workboat arena, but the new distribution systems could improve on the advantages that hybrid power has over conventional power systems, including better energy efficiency, reduced emissions, dynamic performance and noise elimination.

For example, when an OSV is in normal operations, a hybrid power system could reduce the minimum number of diesel generators that are required to run constantly. This is possible because the energy storage systems ([ESS], i.e., lithium batteries or super-capacitors) can provide the added power for the occasional peak demand caused by shifting currents or waves.

When they operate in harsher environments or more demanding operational routines, multiple generators could run at a constant speed and the ESS supports the electrical distribution system with extra power to relieve the stress of added load demands, such as with dynamic positioning. Engine maintenance, fuel consumption and carbon-related emissions could be greatly reduced. The fast-reacting ESS acts as an energy buffer for the comparably slow-starting generators to improve electrical power response time and to help improve the safety and reliability of the vessel.

As the technology behind hybrid power is new to the industry, ABS recently published several documents to expand industry understanding about the associated safety practices, as well as the benefits and risks of adoption. These include:

- *An Advisory on Hybrid Electric Power Systems*
- *A Guide for Use of Lithium Batteries in the Marine in Offshore Industries*
- *A Guide for Use of Supercapacitors in the Marine and Offshore Industries*

The Supercapacitor Guide, the most recently published, is helping to establish safety guidelines for any owners, operators, shipyards, designers and manufacturers involved in the production or use of these new technologies. The

ABS has granted Approval in Principle to Wärtsilä for a hybrid-powered, tug design. The new design will form the foundation for Wärtsilä's new portfolio of tug designs, known as the Wärtsilä HYTug Series.

maritime industry is increasingly interested in using supercapacitors as an energy-storage solution when quick delivery of energy is required during a peak loading conditions, such as when OSVs use power thrusters for dynamic positioning while station-keeping.

Other diverse examples of how they and other energy storage systems could enhance operations include:

- *When used for load leveling or peak-shaving, supercapacitors act as an energy buffer to supply or absorb power, allowing generators to be operated at a near constant load. Their ability to optimize power loading and reduce running hours can reduce maintenance requirements. With optimal loading, a higher average load can be maintained, resulting in a more stable and efficient operation of the prime movers.*
- *The supercapacitor-battery partnership could be used as additional power sources when generators shut down. In some instances, they can be used for blackout prevention, fault ride-through and assist in blackout recovery. They may be also used as part of an emergency power source for essential and emergency services.*
- *Dynamic Positioning Vessels. Supercapacitors could be used to supply thrusters and act as a spinning reserve in dynamic-positioning mode and/or as standby power for fault ride-through on DPS-2 or -3 vessels operating in closed bus.*
- *Heave Compensation. On Mobile Offshore Drilling Units or OSVs supercapacitors could be used as a buffer for heave compensation equipment and to harvest regenerative power from cranes.*
- *Renewable Energy Storage. Supercapacitors may be used as an energy-storage device on vessels or offshore installations with cyclic renewable energy sources to stabilize the fluctuating power flow connected to the shipboard electrical distribution system.*

They can also be installed in combination with batteries to potentially protect the batteries from extreme peak loads, extending battery life and achieving both high-power and high-energy density.

Low Temperature Environment Usage. Supercapacitors can be used in the low temperature environments that significantly constrain battery performance.

Clearly, supercapacitors have great versatility and potential to enhance operations. They also have the low internal resistance that makes higher currents possible, compared to the capabilities of battery applications. Charging and discharging a battery involves a temperature-dependent electro-chemical reaction between the electrodes and the electrolyte. An Electric Double Layer Capacitor distinguishes itself from a battery – in that the charging and discharging process does not involve a chemical reaction and is largely independent of temperature.

Looking Ahead

While the early interest and application of hybrid power systems has come from OSV and tug owners, technically, there is no limit to the size of vessel that could be powered by a combined supercapacitor-battery ESS. River, inland and portside operations have similar opportunities for hybrid development.

For example, both lithium ion batteries and supercapacitors are scalable, allowing the owner to expand from cell, to module, to pack, iteratively increasing the storage capacity as required. Numerous side-by-side batteries could be run by a power-management system, which has sub-sets for capacitor management and battery management.

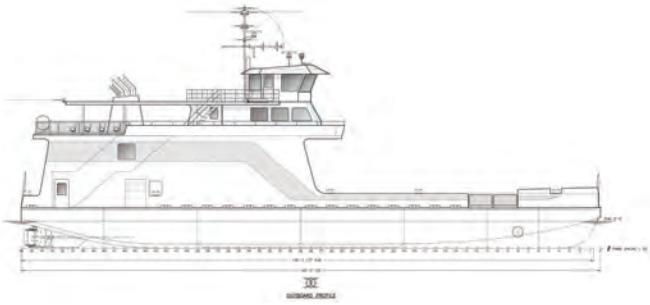
Any supercapacitor or battery will have its own management system for safety requirements, which would run in accordance with its design. This would interact with the vessel's power-management systems. The scalability of the systems could make them appropriate for a drillship, a small ferry, and many other applications. It all depends on what size ESS the owner wants to put onboard.

Because ABS sees the potential for energy-storage systems to improve the electric and propulsion systems for a range of vessels, we have been helping industry to engage with the hybrid technology by participating in a variety of workshops and conferences. Beyond the development of a series of hybrid propulsion and power guides and advisories, ABS has also completed several technology-focused, Approval-In-Principle projects and our type-approval program has included several marine battery suppliers.

At present, most of the hybrid work ABS is seeing is related to retrofitting, activities undertaken to improve the operating efficiency of existing ships. But when the industry starts designing and building new ships and systems with energy storage, instead of retrofitting out inefficiency, it may be possible to discover that a ship needs fewer installed generators. Then, lower capital expenses could be coupled with opportunities for lower operating expenses.

***Domenic Carlucci** is currently the ABS Manager for Machinery, Electrical and Controls Technology. Since joining ABS in 2008 Carlucci has held several senior roles in asset integrity management, life cycle risk and reliability, design and plan review, and product and service development. He served in the U.S. Navy as a Nuclear trained Surface Warfare Officer. He received his Bachelors of Science in Mechanical Engineering from Duke University and a Master's in Business Administration from the University of Houston.*

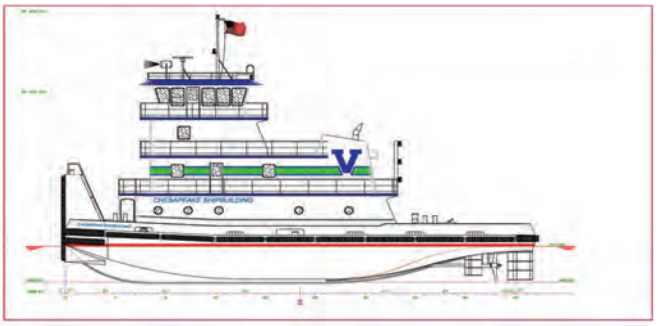
Miller Boat Line Taps EBDG for Passenger/Vehicle Ferry Design



Miller Boat Line of Put-in-Bay, Ohio has awarded Elliott Bay Design Group with a design contract for a new passenger/vehicle ferry to supplement their current operation servicing the Lake Erie Islands. The ferry will be roughly 140' in length with a carrying capacity of 26 standard vehicles and up to 600 passengers. The vessel will be ADA accessible and will feature Tier 3 propulsion technology. Special attention was given to design a vessel that enhances onboard passenger comfort and improve the loading and discharge times of both vehicles and passengers. Miller Boat Line, Inc. operates passenger/vehicle ferries from Catawba Point, Ohio to Put-in-Bay (South Bass Island) and Middle Bass Island in Lake Erie's Western Basin. Miller ferries transport hundreds of thousands of passengers and vehicles each year, and are the lifeline to the resort islands. The company was established in 1905, and is family owned and operated.

Chesapeake Shipbuilding Inks Newbuild Deal with Vane Brothers

Chesapeake Shipbuilding has signed another new agreement with Vane Brothers of Baltimore, MD to design and build four new Sub-Chapter, M-Compliant, Push Tugs, yet to be named. This new order will bring the total number of tugs to 20 that have been built by Chesapeake Shipbuilding for Vane Brothers since 2007. The new 3000 horsepower tugs will be equipped with twin Caterpillar 3512 main engines, conventional shafts, rudders and flanking rudders. They will accommodate up to 7 crew members and will have large, modern private and semi-private quarters. The Chesapeake designed tugs will be 94' LOA, with a 34' molded beam and a 10' 6" molded depth.



Cenac Marine Donates Barge to SLCC for Training

Cenac Marine Services has donated a fully refurbished barge to South Louisiana Community College's Workforce Development Training program. In a ceremony held at Cenac Marine Services Headquarters, the fully restored barge was presented to SLCC administration and staff. The barge, measuring 158 feet by 40 feet, replicates a standard Cenac Marine Services tank barge and will be used for the school's training of the next generation of maritime industry leaders. The barge will be located in Munson Slip in Houma. SLCC tankerman training will take place there when utilized.

IMTRA Adds Talent to Support Team


Cunningham


Ladue


Owens


Simmons


Taylor

IMTRA announced that it has added to its support team. Staffing changes include the hiring of **Steve Owens**, **Myles Cunningham** and **Tom Ladue**, as well as the promotion of **Jamie Simmons** and **Conrad Taylor**. Owens, an industry veteran, has taken on the role of product technical support specialist. Simmons has been promoted to Zipwake product manager. Taylor is taking on a new role at IMTRA as e-commerce sales manager. Most recently, Owens worked with ABT-TRAC's service team.

Simmons started with IMTRA in 2014 as a member of the customer service team. Taylor started with IMTRA in 2016, also as a member of the customer service team. Replacing Simmons and Taylor on the customer service team are Myles Cunningham and Tom Ladue. Cunningham has been in the marine industry for his entire adult life. Ladue came to IMTRA from Marine Warehouse in Miami, Florida.


Doyle


Crowley Leadership
Grune Smith Busch


Chao

William P. Doyle Appointed as DCA Executive Director and CEO

The Dredging Contactors of America's (DCA) announced that it has selected the Honorable **William P. Doyle** as its new Executive Director and Chief Executive Officer (CEO). William Doyle currently serves as a Commissioner with the U.S. Federal Maritime Commission. Doyle served over a decade as an officer in the U.S. Merchant Marine as an engineer aboard numerous classes of vessels. He is a licensed attorney and marine engineer. A graduate of the Massachusetts Maritime Academy, he also earned his J.D. from the Widener University School of Law.

Crowley Restructures Business Units

Crowley Maritime Corporation announced today that it has restructured its business units. Crowley will transition its non-liner and logistics business units into three main service lines – Crowley Shipping, Crowley Fuels and Crowley Solutions. **Rob Grune**, senior vice president and general manager, will oversee Crowley Shipping. Under **Rocky Smith**, senior vice president, Crowley Fuels will include Crowley's LNG sales, distribution and engineering unit, and the company's fuel sales and distribution business in Alaska. **Todd Busch**, senior vice president and general manager, will lead Crowley Solutions, which includes engineering and project management services; naval architecture and engineering through subsidiary Jensen Maritime.

Sabrina Chao Named 2018 CMA Commodore

Sabrina S. M. Chao, Executive Chairman of Wah Kwong Maritime Transport Holdings Ltd. has been named as the Connecticut Maritime Association (CMA) Commodore for the year 2018. Chao follows a long succession of maritime industry leaders as Commodore. The 2018 Commodore Award will be presented on March 14, 2018 at the Gala Dinner marking the conclusion of the annual CMA conference. The Award is given each year to a person in the international maritime industry who has contributed to the growth and development of the industry.

Propeller Club Names RADM Whitehead as President

The International Propeller Club of the United States last month elected and installed its leaders for the coming year and beyond. The Club's more than 75 chapters from around the world elected RADM **Joel Whitehead**, USCG (retired) to a two-year term as International President. **Niels Aalund**, a member of the Club's Port of Houston and Senior VP of Maritime Affairs, of the West Gulf Maritime Association, was elected First Vice President. **Maryanne Richards** of the Massachusetts Maritime Academy was elected Vice President for Student Ports.

Crowley Names Anderson as Vice President

Crowley Maritime Corporation announced today that **Ketra Anderson**


Whitehead


Aalund


Anderson


Malen-Habib


Fireman


Rees


McNamara

has been named vice president of safety, security, quality and environmental stewardship (SSQE). Anderson began her career with Crowley in 1985 working as an accounting supervisor and then as a dry cargo freight traffic manager. She has a degree in organizational development from Alaska Pacific University and is internationally certified as an ISO 9001, ISO 14000, a Lead Auditor and Skills Assessor. In 2010, she was awarded the Thomas Crowley Award – the company's highest honor.

Resolve Marine Strengthens Client Services Team

Resolve Marine Group has strengthened its senior team with the appointments of **Lindsay Malen-Habib** as Manager of Client Services. Ms. Malen-Habib has extensive experience in emergency response contingency planning, salvage and wreck removal having previously served as Director of Business Development for one of the world's largest salvors. She is active on numerous industry associations including the American Salvage Association and the Women in International Shipping and Trading Association (WISTA).

ABS Announces Senior Management Appointments

ABS announced three key senior management appointments as part of the organization's digital class strategy. **Howard Fireman**, previously the organization's chief technology officer, will take on the role of ABS Chief Digital Officer (CDO). **Joseph Gollapalli** joins ABS as Vice President, Digital Technology. He brings to ABS more than 20 years of experience to leverage software, data and analytics to develop and deploy innovative digital services. Joining ABS as VP, Strategic Development is **Ryan Moody**. He brings nearly 20 years of engineering management in the oil and gas industry holds a Bachelor of Science degree in Mechanical Engineering from Texas A&M University and an MBA from the University of Houston.

Galveston Appoints New Port Director

Rodger Rees has been appointed port director for the Port of Galveston. Rees has more than 25 years of executive management experience and currently serves as the deputy executive director and CFO for Port Canaveral, the world's second busiest cruise port. He is a certified public accountant and has completed the Certified Port Executive Program.

McNamara to Receive Honorary Doctorate at SUNY Maritime

Capt. **James McNamara** will receive an honorary doctorate of humane letters at SUNY Maritime College's commencement January 26 in recognition of his professional accomplishments, commitment to his alma mater, and his devotion to issues involving maritime safety, education and training. After graduating with a BS in Marine Transportation from SUNY Maritime, McNamara went to sea and rose through the ranks and became a ship's master. In 1970, he started an on-shore career at National Cargo Bureau and was named president of the organization in 1993.

Massport Hires Gleason as Deputy Port Director

The Massachusetts Port Authority (Massport) has welcomed **Lauren Gleason** as the Authority's Deputy Port Director of Business Development. Lauren started her career in supply chain and transportation at Hanjin Shipping. She is a graduate of the University of Rhode Island, receiving dual degrees in Global Business Management and Spanish Language.

Allianz Announces Leadership Changes in North America

Allianz Global Corporate & Specialty (AGCS) announced that effective December 31, **Henning Haagen** will take over as North American Regional Head of Specialty Lines, and **Rich Soja** will become the North American Regional Head of Marine. Both Haagen and Soja will continue in their current roles as Northeast Zone Executive in the U.S. and Global Head of Inland Marine, respectively. Haagan is a graduate of University of Cologne with a degree in Economics and concentration in marketing and insurance. Soja joined Allianz in 2017 from Tokio Marine Management, where he served as Senior VP, Marine. Soja graduated from Wake Forest University with a degree in Business Administration.


Gleason


Haagen


Soja


Keehan


Bowles


Palestrant


Stout

Keehan Promoted to President, APC

Advanced Polymer Coatings has promoted **David Keehan** to President. Previously, Keehan was APC VP of Sales and Marketing. Keehan has a Bachelor of Business Management degree from LeTourneau University. He has achieved Level 3 Certified Coating Inspector status from NACE International, the professional organization for the corrosion control industry.

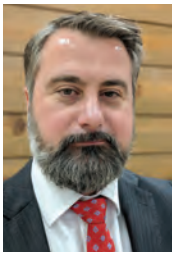
Bowles Appointed Director of Donald L. Blount & Associates

Gibbs & Cox announced the appointment of **Jeffrey Bowles** as Director of its Chesapeake, VA division. Bowles joined DLBA in 2001 as a Webb Institute Naval Architect and earned a master's degree in Marine Engineering from the University of Newcastle Upon Tyne. He was promoted to DLBA Technical Director in 2011. Bowles is a licensed Professional Engineer in the states of Virginia, Florida, and New York, and is a certified Project Management Professional.

SMART Center Adds Principal Investigator, Director

The National Science Foundation (NSF) Southeast Maritime and Transportation (SMART) Center has named **Thomas Stout** as the Center's new Principal Investigator and **Jennifer Palestrant** as the Center's new Director. The SMART Center is focused on developing effective career pathways and programs in the maritime and transportation industries.


Ross


Kelly


Parrilla


Protheroe


2016 Thomas Crowley Awards

Thomas is the Dean for Science, Technology, Engineering and Mathematics on the Chesapeake Campus of TCC. He earned his BS degree from Old Dominion University and his MS in Electronics Engineering from Norfolk State University. Palestrant joined TCC in 2016, serving as Interim Associate Vice President for Corporate Solutions and Manager of the College's Coast Guard Maritime Training program. She earned an MBA from the College of William and Mary and a BA from the College of Wooster.

Chevron President Appointed as OCIMF Chairman

The Oil Companies International Marine Forum (OCIMF) has voted to support the Executive Committee's appointment of Chevron Shipping Company President **Mark Ross** as the new OCIMF Chairman. Shell's Dr. **Grahaeme Henderson** stepped down as OCIMF Chairman in Singapore in November.

Fidelis Group Holdings Hires Kelly as Senior Claims Director

Christian Kelly comes to FCS with a 15 year career in the insurance industry, specializing in marine, energy, property, space, cyber and other non-marine claims. He most recently served as Executive Director, Global Head of Claims of London, UK with Thomas Miller Specialty. Kelly graduated from Merton College, earned his law degree from Anglia Ruskin University and received his Master's in EU law from the University of Essex.

Greensea Appoints New Robotics Engineer

Greensea announced the appointment of **Matthew Parrilla** as Robotics Engineer. Prior to joining Greensea, Matthew earned a BS in Physics from the University of Maryland, worked as a data visualization artist, and co-founded a startup. Matt will be working in the Emerging Technologies group at Greensea, focusing on next generation autonomy and navigation technologies.

Protheroe Joins Greystoke Team in Vancouver

Tim Protheroe has joined Greystoke Marine Management, headquartered in Vancouver. Tim is a Master Mariner who came ashore with Lloyds Register in 1992 and worked in several senior positions before being appointed President, Lloyds Register America's Inc. in 2014. Greystoke Marine Management was founded in January 2016 as a boutique management consultancy business offering marine expertise in myriad disciplines.

Crowley Awards Scholarships to USMMA Cadets

Crowley Maritime Corporation awarded four U.S. Merchant Marine Academy (USMMA) cadets with 2017 Thomas B. Crowley Memorial Scholarships during this year's Containerization and Intermodal Institute's Connie Awards luncheon. Crowley presented the scholarships to Midshipmen (MIDN) **Joshua Cann**, **Vincent Policastro**, **Rebecca Snyder** and **Benjamin Starr** while also formally recognizing 2016 recipient **Chandler Chiappe**, all of whom were chosen based on their academic performance, financial need and interest in pursuing a career at sea after graduation. Since 1984, Crowley has provided more than $3 million dollars in scholarship funding for more than 1,000 students.

Goss, Martus Receive 2016 Thomas Crowley Awards

Crowley Maritime Corporation's **Zoe Goss**, director, marine recruiting and development, and **Ray Martus**, vice president, vessel construction management, have been honored with 2016 Thomas Crowley Awards, the company's highest honor for its employees. Goss, a commander in the U.S. Navy Reserve, has a bachelor's degree in marine transportation from Massachusetts Maritime Academy, where she earned an unlimited Third Mate's license. She has a master's degree in national security and strategic studies from the U.S. Naval War College in Newport, RI. Martus joined Crowley in 2008 as director of new construction, and has since worked on numerous vessel construction projects, most recently the new ConRo vessels for Puerto Rico. Martus has a bachelor's degree in marine engineering from the U.S. Merchant Marine Academy and a master's degree in business administration from the University of Florida. He sailed for 12 years with various companies, including Crowley, ultimately obtaining his Chief Engineer unlimited license.


Bjørkeli


Catoe


Warren


Scalise & Allegretti


Ziegler


Zukunft

Corvus Energy announces a new CEO

Corvus Energy is pleased to announce the appointment of **Geir Bjørkeli** as its new Chief Executive Officer (CEO). Bjørkeli was previously Director of Norway for the Dutch company Huisman, and established the company's Norwegian presence for offshore construction equipment solutions. Bjørkeli is a mechanical engineer and holds an MBA in Shipping, Offshore and Finance at BI Norwegian School of Management and Nanyang Technical University, Singapore.

Glomex Opens U.S. Office, Appoints Catoe as Sales Director

Glomex SRL has established a North American office and warehouse in Brooklyn, New York and Dayton, Ohio, respectively. Glomex Marine Antennas USA Corp is led by **Chris Catoe**, who has been appointed sales director. Most recently, Catoe was a sales manager and sales engineer for Shakespeare Electronic Products Group.

Oregon Board of Maritime Pilots Names Executive Director

The Oregon Board of Maritime Pilots (OBMP) has announced the appointment of **Marc Warren** as the new Executive Director. Warren previously served as a regulatory specialist for the Oregon Liquor Control Commission and possesses 25 years of maritime leadership experience with the United States Coast Guard, serving as a Commanding Officer and most recently, Enforcement Division Chief.

AMP Names Scalise 'Champion of Maritime'

The American Maritime Partnership (AMP) recognized U.S. Congressman **Steve Scalise** (R-LA) last month with the 2017 'Champion of Maritime' Award, which honored Rep. Scalise for his support and dedication to the American maritime industry. AMP annually presents the 'Champion of Maritime' Award to a Member of Congress who has demonstrated exceptional support for the hardworking men and women of the American maritime industry. Rep. Scalise is a long-standing champion of the Jones Act. AMP's **Tom Allegretti** presented the award.

New Managing Director for GAC North America

Patrik Ziegler has been appointed Managing Director of GAC North America – Logistics (GNAL). He brings to the role more than 30 years' experience in logistics and oil & gas. In his new role, Patrik is tasked with overseeing the continuing expansion of GAC's integrated logistics services throughout North America.

USCG Releases El Faro Final Action Memo

The U.S. Coast Guard in December released the Commandant's Final Action Memo regarding the loss of El Faro with 33 persons on board. The Commandant found that the primary cause of the casualty was the decision to navigate the ship too close to the path of Hurricane Joaquin. The investigation also revealed that the Coast Guard has not sustained the proficiency and policy framework of the Alternate Compliance Program (ACP) in general. "The loss of the El Faro and its crewmembers was tragic and preventable. The Coast Guard will take appropriate action on all that we have learned from this investigation," said U.S. Coast Guard Commandant ADM **Paul Zukunft**. "I thank the members of the Marine Board of Investigation for their exhaustive work and independent recommendations. El Faro's heartbreaking story points to the need for all maritime stakeholders to zealously recommit to both the safety of our mariners and to professionalism of the maritime industry."

BTS Releases National Census of Ferry Operators Highlights

The U.S. Department of Transportation's Bureau of Transportation Statistics (BTS) today released the 2016 Highlights of Ferry Operations in the United States. Key findings from the 163 ferry operators that responded to the 2016 National Census of Ferry Operators (NCFO) indicated that 118.7 million passengers were carried on ferries in the U.S. and its territories in 2015. The reporting ferry operators provided service through 560 terminals on 880 unique route segments in 39 states, 2 U.S. territories, and 2 non-U.S. locations, using a fleet of almost 609 active vessels. This report and data from previous censuses can be found on the NCFO home page. The NCFO is a biennial census of all known ferry boat operations within the U.S. and its territories.

Victaulic Simplifies Maritime Gasket Specification

Victaulic's new DNV GL Type Approved Grade T "Type A" Nitrile gasket, designed for use with Victaulic couplings and flange adapters, simplifies gasket specification and offers superior fire-resistant performance. Applications include open-ended piping containing flammable liquids heated above flash point, open-ended liquefied gas, flammable liquids below flash point, sea water, fresh water, sanitary/drains/scuppers, sounding/vent, air and other systems.

www.victaulic.com/news

John Deere's New Marine Engines

John Deere Power Systems' new marine engines are specifically designed for radiator-cooled marine genset and auxiliary applications. The ABS Type approved PowerTech 6090HFM85 and 6135HFM85 engines are well-suited for genset, constant speed and variable speed auxiliary applications, particularly when wet manifolds and marine society classification certificates are desired or required. The ratings of both engines meet U.S. EPA Marine Tier 3 emissions regulations.

www.JohnDeere.com

Fairbanks Morse Engines for U.S. Navy's LCS 27

Fairbanks Morse has been selected to build and deliver the Main Propulsion Diesel Engines (MPDE's) that will power the U.S. Navy's newest Freedom class Littoral Combat Ship - the LCS 27. The two 16-cylinder Colt-Pielstick PA6B STC diesel engines will deliver over 12 MW of propulsion power and are among the largest medium speed diesel engines manufactured in the United States.

www.fairbanksmorse.com

ACT2 Technologies' Piranha WRS-10 MSD Unit

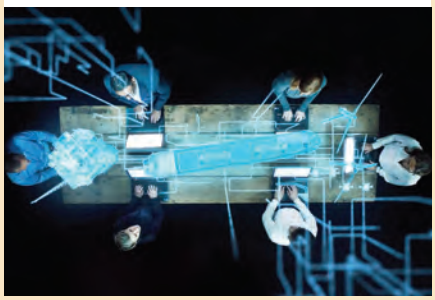
ACT2 Piranha units are designed to have a zero fecal bacteria and virus discharge and produce reusable quality water. The Piranha WRS systems comply with and go beyond 227(64) regulations to produce a discharge that should never go out of compliance regardless of any new rulings. Older Piranha 159(55) compliant systems will still meet the new 227(64) regulations with zero equipment changes.

www.ACT2Tech.org

Jotun turns to DNV GL's Veracity Platform

Jotun is using DNV GL's Veracity platform to combine external and proprietary data to optimize the delivery of its maritime coatings at port. Veracity creates an ecosystem where users can safely share data and link it to other quality assured datasets to extract value. Jotun uses the ETA dataset to ensure it has the right amount of product in the right place.

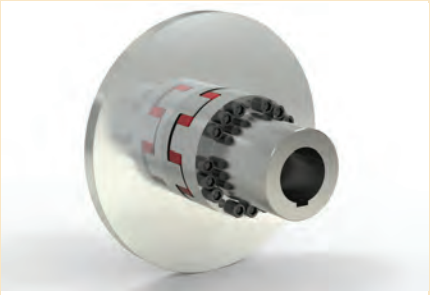
www.dnvgl.com / www.jotun.com/HPS



KOTUG Employs Drones for Safer Tug Ops

KOTUG has applied for a patent to use drone technology in its tug operations, in its ambition to achieve safer and more efficient working conditions. This pioneering invention – using a drone to connect the towline to an assisted vessel – will drastically improve the safety margin of tug operations as this will avoid the need for maneuvering in the so-called danger zone.

www.kotug.com



Guardian Couplings' K45 Series Curved Jaw Flange Couplings

Guardian Couplings has launched the new curved jaw flange (JF) K45 Series shaft-to-shaft coupling with a bolt-on disc for use with brake calipers. The new torsionally flexible coupling is designed for industrial applications including cranes and hoists, winches, and draglines. Five models are available and the coupling's brake disc and flexible spider element can be easily replaced during assembly.

www.guardiancouplings.com

Marine Repair Kit for Equipment, Structural Repairs

A new marine repair kit includes a variety of Stronghold Coatings products which allow users to effect repairs, keeping workboats productive at sea. The kit includes Plastic-Metal for the repair of all types of metal, RepaCoat for repair and sealing of metal, wood, stone, and elastic surfaces, and StopSand which allows sure footing on all surfaces, as well as items to clean surfaces, mix and apply the materials.

www.StrongholdOne.com

Hanseaticsoft Simplifies Purchasing With Mobile app

Hanseaticsoft, a leading provider of maritime software, has launched a new cloud-based mobile app to make purchasing processes simpler for shipping companies. The new Purchase Mobile app is tailor-made for purchasing executives who are often in meetings or out of the office and enables them to stay on top of all purchasing processes and handle important tasks while on the go.

www.Hanseaticsoft.com

ABB Ability Marine Pilot Vision for Ship Automation

ABB has unveiled a new situational awareness solution that will make vessel operations safer and more efficient. The solution can be used anywhere onboard and marks the next step towards remotely controlled and ultimately autonomous ships. ABB Ability Marine Pilot Vision takes advantage of the latest advances in sensor technology and computer vision to offer multiple real-time visualizations of a vessel's surroundings.

www.abb.com

Durable Anchor Pole Lights Built to Last

With their finicky filament bulbs and lightweight construction, traditional anchor pole lights seldom last more than a few seasons before needing to be replaced. NaviLED 360 Anchor Pole Mount Lamps from Hella marine are built with heavy-duty components for years of dependable, energy-efficient service. A new 8" fold-down model further rounds out the available lighting options. These are internationally-approved to a range of 2 nm.

www.hellamarine.com

USCG OPC to be Manufactured Using FORAN

SENER engineering and technology group has announced that Eastern Shipbuilding Group (ESG) will manufacture the new US Coast Guard Offshore Patrol Cutter using its FORAN shipbuilding CAD/CAM/CAE system. The option to conduct detail design of the OPC was awarded to ESG in September 2016. ESG has decided to conduct this project using the FORAN System, a CAD/CAM/CAE marine design system developed by SENER.

www.foran.es

FIRST RADIO ELECTRONICS TECHNICIAN

Military Sealift Command
Salary: $54,647 Per annum,
Full Time, Mid Career
Category: Shipboard Officer / Personnel / Crew
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Email: civmar@marinersupport.com
Work Phone: 866-562-7672
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 USA
Description:
Announcement #: 18-212-01EXOC Title, Series, Grade (Code) First Radio Electronics Technician WM 9997-12(212) Base Salary: $54,647 Per annum Type of Appointment: Excepted Service Career-Conditional Opening Date: October 20, 2017 Closing Date: Open continuously with periodic cut-offs Location: Military Sealift Command (MSC) Vessels Worldwide

CHIEF RADIO ELECTRONICS TECHNICIAN

Military Sealift Command
Salary: $61,703 Per annum,
Full Time, Mid Career
Category: Shipboard Officer / Personnel / Crew
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Email: civmar@marinersupport.com
Work Phone : 866-562-7672
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 USA
Description:
Announcement #: 18-210-01EXOC Title, Series, Grade (Code) Chief Radio Electronics Technician WM-9995-10 (210) Base Salary: $61,703 Per annum Type of Appointment: Excepted Service Career-Conditional Opening Date: October 20, 2017 Closing Date Open continuously with periodic cut-offs Location: Military Sealift Command (MSC) Vessels Worldwide.

CHIEF RADIO ELECTRONICS TECHNICIAN (IAT)

Military Sealift Command
Salary: $ $66,441 Per annum,
Full Time, Mid Career
Category: Shipboard Officer / Personnel / Crew
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Email: civmar@marinersupport.com
Work Phone : 866-562-7672
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 USA
Description:
Announcement #: 18-211-01EXOC Title, Series, Grade (Code) Chief Radio Electronics Technician (IAT) WM-9995-10 (211) Base Salary: $66,441 Per annum Type of Appointment: Excepted Service Career-Conditional Opening Date: October 20, 2017 Closing Date Open continuously with periodic cut-offs Location: Military Sealift Command (MSC) Vessels Worldwide

SHIP COMMUNICATIONS OFFICER

Military Sealift Command
Salary: $ $71,153 Per Annum,
Full Time, Mid Career
Category: Shipboard Officer / Personnel / Crew
Job Location: 6353 Center Drive building 8, Suite 202 Norfolk, VA, 23502 USA
Contact
Email: civmar@marinersupport.com
Work Phone : 866-562-7672
6353 Center Drive, Building #8, Suite 202 Norfolk, VA, 23502 USA
Description:
Announcement # 18-201-01EXOC Title, Series, Grade, (Code): Ship Communications Officer WM 9908-28 (201) Base Salary: $71,153 Per Annum Opening Date: October 20, 2017 Closing Date: Open continuously with periodic cut-offs Location: Military Sealift Command (MSC) Vessels Worldwide
Who May Apply: All United States citizens and current Military Sealift Command Civil Service Mariner (CIVMAR) eligible to apply under the Veterans Employment Opportunities Act (VEOA). Active Duty Service Members (ADSMs) must submit a certification (i.e., statement of service) at the time of application which certifies that the service member is expected to be discharged or released from active duty service under honorable conditions not later than 120 days after the date the certification is submitted.

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C3	CMA Shipping 2018	www.cmashipping2018.com	(203) 406-0109
11	Eastern Shipbuilding Group	www.easternshipbuilding.com	(850) 763-1900
23	Ebac Systems	www.ebacusa.com	(757) 873-6800
29	Gladding Hearn	www.gladding-hearn.com	(508) 676-8596
1	Glosten	www.glosten.com	(206) 624-7850
21	GP Link	www.gplink.com	(252) 504-5113
45	Great Lakes Maritime Academy	nmc.edu/maritime	(877) 824-7447
25	Incat Crowther	www.incatcrowther.com	61 2 9450 0447
39	Massachusetts Maritime Academy	www.maritime.edu	(508) 830-5000 ext.5094
55	McDonough Marine Services	www.mcdonoughmarine.com	(504) 780-8100
C2	Metal Shark Aluminum Boats, LLC	www.metalsharkboats.com	(337) 364-0777
23	MOPS Maritime License Insurance	www.mopslicenseins.com	(800) 782-8902 ext 3305
C4	R.W. Fernstrum & Company	www.fernstrum.com	(906) 863-5553
27	The Springfield Marine Company	www.springfieldgrp.com	(417) 616-6707
7	Tidewater Marine	www.tdw.com	(504) 568-1010
29	TPG Mount Vernon Marine LLC	www.tpgmarine.com	(812) 838-4889
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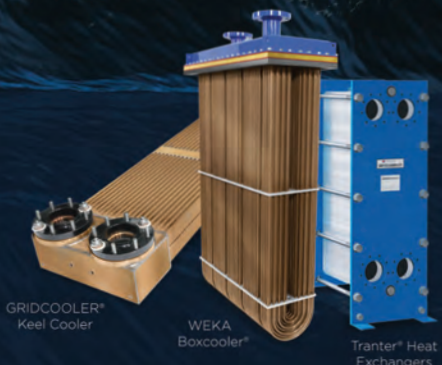

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