The Information Authority for the Workboat • Offshore • Inland • Coastal Marine Markets

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Marine News

DECEMBER 2017
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Features

ON THE COVER

Vigor recently launched The Harvest, the first complex liquefied ammonia transport barge built in the United States for Jones Act trade since 1982. Harvest is included in this month's Great Workboats features, which begins on page 44.

Image credit: Vigor

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MarineNews

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Florida: 215 NW 3rd St., Boynton Beach, FL 33435
tel: (561) 732-4368; fax: (561) 732-6984
New York: 118 E. 25th St., New York, NY 10010
tel: (212) 477-6700; fax: (212) 254-6271
www.marinelink.com

PUBLISHER
John C. O'Malley • *jomalley@marinelink.com*

Associate Publisher & Editorial Director
Greg Trauthwein • *trauthwein@marinelink.com*

Editor
Joseph Keefe • *keefe@marinelink.com*
Tel: 704-661-8475

Web Editor
Eric Haun • *haun@marinelink.com*

Contributing Writers
Susan Buchanan • Lawrence R. DeMarcay, III
Tom Ewing • Joe Hudspeth • Randy O'Neill

PRODUCTION
Production & Graphics Manager
Nicole Ventimiglia • *nicole@marinelink.com*

SALES
Vice President, Sales & Marketing
Rob Howard • *howard@marinelink.com*

Advertising Sales Managers
National Sales Manager
Terry Breese • ***breese@marinelink.com***
Tel: 561-732-1185 Fax: 561-732-8414

Lucia Annunziata • ***annunziata@marinelink.com***
Tel: 212-477-6700 **ext 6220** Fax: 212-254-6271
John Cagni • ***cagni@marinelink.com***
Tel: 631-472-2715 Fax: 561-732-8063
Frank Covella • ***covella@marinelink.com***
Tel: 561-732-1659 Fax: 561-732-8063
Mitch Engel • ***engel@marinelink.com***
Tel: 561-732-0312 Fax: 561-732-8063
Mike Kozlowski • ***kozlowski@marinelink.com***
Tel: 561-733-2477 Fax: 561-732-9670
Jean Vertucci • ***vertucci@marinelink.com***
Tel: 212-477-6700 **ext 6210** Fax: 212-254-6271

Managing Director, Intl. Sales
Paul Barrett • *ieaco@aol.com*
Tel: +44 1268 711560 Fax: +44 1268 711567
Uwe Riemeyer • *riemeyer@intermediapartners.de*
Tel: +49 202 27169 0 Fax: +49 202 27169 20

CORPORATE STAFF
Manager, Marketing
Mark O'Malley • *momalley@marinelink.com*
Accounting
Esther Rothenberger • *rothenberger@marinelink.com*
Tel: 212-477-6700 **ext 6810**
Manager, Info Tech Services
Vladimir Bibik • *bibik@marinelink.com*

CIRCULATION
Circulation Manager
Kathleen Hickey • *k.hickey@marinelink.com*
Tel: 212-477-6700 **ext 6320**

TO SUBSCRIBE:
Subscriptions to ***Marine News*** (12 issues per year) for one year are available for $60.00;
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Send your check payable to:
MarineNews, 118 E. 25th St., New York, NY 10010.
For more information email Kathleen Hickey at:
k.hickey@marinelink.com

Departments & Analysis

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For some publishers, the final edition of the year can be an afterthought; something that they've somehow got to push out the door (with a sigh of relief) just before the holidays; regardless of what it contains. Not so here at ***MarineNews***. On the contrary, the arrival of December edition prompts me to look back on the past 12 months and ask some basic questions. What did we get right; what could've gone better and what happened that we didn't expect? And, that's just inside of my shop. What happened in your world is more interesting – and far more important.

To say that 2017 was eventful would not provide full disclosure to a year which saw unprecedented attacks on the Jones Act, a ferry/passenger vessel building boom the likes of which hasn't been seen in a decade, and a lingering offshore energy downturn which has crippled the U.S. flag OSV sector. There was something for everyone: *laughter, tears, political wrangling and a regulatory environment that has been anything but kind to the domestic waterfront.* Through it all, you turned to ***MarineNews*** to sort it all out, and we delivered.

Without a doubt, one of my favorite exercises in any given year is composing the *DRAFT* entry for the top 10 stories of the year. That document is voluminous and typically contains as many as 25 bullets which I laboriously whittle down to a more compact ten. I craft that list to apply strictly to the brown water segment of the industry; from coast to coast, inland, offshore and everything in between. Now, it is time to see if your short list compares well to mine. The story begins on page 40.

With the inevitable challenges, setbacks and political drama also comes the milestones and victories. 2017 brought plenty of the latter. For example, the lineup of workboats that grace our annual look at the best of North America's brown water shipyard output is as impressive as I've seen in many years. Here, again, the buck stops at my desk. Before you turn to page 44 to see these impressive vessels, know in advance that my criteria included (first) the environmental footprint of a particular hull, the innovation that each entry represents and the competitive nature of U.S. yards that allows a particular hull to be exported to foreign markets.

Arguably, the big story for 2017 involves the regulatory pressures exerted onto the domestic waterfront and more specifically, the workboat sector. For inland stakeholders, particularly those who take shelter in a 'tier-beater' propulsion arrangement, that pressure comes primarily in the form of the subchapter M towboat rules. For everyone else, it means the advent of the 2020 emissions rules, Tier 4 enforcement and low sulphur distillates. Here to guide you on the way forward is longtime ***MarineNews*** stalwart Bob Kunkel and his associate and naval architect Chris Mandalakis. Everything you wanted to know but were afraid to ask as we quickly head into 2018? It's all here and more. See you in 2018.

Joseph Keefe, Editor, keefe@marinelink.com

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1800	375	19.3	280	219.1	2100	416	21.5	310	220.4
1600	371	18.3	277	209.4	1800	410	20.2	306	210.0
1400	319	15.7	238	209.2	1500	366	17.2	273	200.3
1200	225	11.3	168	213.3	1200	233	11.6	174	211.8
900	94	5.1	70	230.3	900	115	6.2	85	230.3
700	54	2.9	40	230.7	700	75	4.2	56	239.5

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C7.1

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2500	350	261	C
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Authors & Contributors

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Ewing


John


Johnson


Kunkel


Luthi


Mandalakis


Tiernan


Toohey


Wiggins

Susan Buchanan is a New Orleans-based business writer, specializing in energy, maritime matters, agriculture, the environment and construction. She holds a master's degree from Cornell University in agricultural economics and an undergraduate degree from the University of Pennsylvania.

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

Smarty Mathew John is ABS Manager of Industrial Systems, Subsea, Safety and Risk. Mathew John has held leadership roles in R&D, Operations and Consulting within ABS, including managing Risk-based Services, and Offshore & Subsea Risk & Reliability Applications. He has an MS in Industrial Engineering and a BS in Mechanical Engineering from Texas A&M, and a Subsea Engineering Certification from the University of Houston.

Gregory Johnson is a Senior Program Manager at Alion Science & Technology in the New London, CT office. His group provides research and engineering support primarily to the U.S. Coast Guard R&D Center. He has a BSEE from the Coast Guard Academy (1987), a MSEE from Northeastern University (1993), and a PhD in Electrical Engineering from the University of Rhode Island (2005).

Robert Kunkel, President of Alternative Marine Technologies, previously served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the Maritime Administration and the USDOT from 2003 until 2008. A past Vice President of the Connecticut Maritime Association, he is a contributing writer for MarineNews. A graduate of the Massachusetts Maritime Academy, Kunkel sailed as a licensed engineer and continued his career in ship construction at NASSCO and Hyundai Heavy Industries, among others. He is a senior member of the Special Committee on Ship Operation with ABS and an elected member of the NCB.

Randall Luthi is President of the National Ocean Industries Association (NOIA).

Chris Mandalakis has worked on a number of unique and groundbreaking projects including a series of hybrid electric research vessels as an employee of Derecktor Shipyard in Mamaroneck, NY and Alternative Marine Technologies. He has been involved in Amtech's newbuilding construction oversight and design review for 6 chemical and 4 product tankers at HMD in South Korea, and is currently working with Amtech as a naval architect and design integrator for the 2,200cbm LNG bunker barge currently under construction at Conrad Orange Shipyard in Orange, Texas. Chris has worked on numerous research projects and designs focused on alternative fuels, hybrid propulsion and fuel cells.

Daniel Tiernan is a Communications Specialist at Superior Industries.

Michael Toohey is President/CEO of the Waterways Council, Inc. / www.waterwayscouncil.org

Mark Wiggins is a Senior Systems Engineer with 32 years of experience including 20 years with the U.S. Coast Guard. He served on 4 cutters, a small boat station, R&D Center, US Coast Guard Academy and the Leadership and Development Center. He has since been a systems engineer for Alion Science & Technology for over 12 years, involved with design, evaluation, integration, testing and improvement of complex systems.

Freight Facts and Figures 2017

The annual edition of *Freight Facts and Figures*, issued the Bureau of Transportation Statistics provides a unique snapshot of the volume and value of freight flows in the United States; the extent, condition, and performance of the physical network over which freight moves; the economic conditions that generate freight movements; the industry that carries freight; and the safety, energy, and environmental implications of freight transportation. Although this lengthy, 12th edition version covers all modes, it also focuses on the marine component of the supply chain quite well.

BTS starts out by pointing to the U.S. economy, saying that although it was affected by an economic recession from December 2007 to June 2009, it has since returned to prerecession levels. That may well be true, but certain marine sectors are still hurting, albeit for other reasons. Freight volumes nevertheless continue to increase, in large part because the U.S. population grew by 14.5 percent between 2000 and 2016, climbing to 323 million in 2016. During that same period, the U.S. economy, measured by gross domestic product (GDP), increased by 32.7 percent. And, says BTS, foreign trade grew faster than the overall economy, reflecting unprecedented global interconnectivity. For North American workboat operators, that's also good news because that foreign freight has to get to the heartland somehow.

Expanded U.S. oil production and changes in where oil is produced increased the use of rail and barges to move oil from the wellhead to refineries and terminals for distribution to the final consumer. Although pipelines continue to be the predominant mode for moving oil, rail shipments have increased substantially in recent years. Regional oil shipments by rail increased, on average, from less than 1 percent in 2010 to 14.2 percent in 2016, after peaking at 26.7 percent for 2014. Oil production in the Bakken formation located in North Dakota has accounted for the majority of new rail shipments, while tankers and barges continued to move crude oil on U.S. inland waterways from port to port along the coast or on the Great Lakes. The use of tankers and barges for oil transport has decreased slightly, from an average of 2.6 percent in 2010 to 2.3 percent in 2016. For inland operators, that's disappointing. We need to expand, not contract those marine highways.

On the environmental side of the equation, vessel-related spills accounted for 79 percent of spills in 2016. But, the big picture is more encouraging: since 2000, significant reductions were seen in the number of oil-spill incidents and in the total gallons of oil spilled, 68 and 79 percent, respectively. That's due, in part, to the fact that the median age of both tank barges and deep draft tankers decreased significantly over that 15 year span. Every other category of domestic vessel is now, on average, significantly older than it was in 2000. That's nominally good news for boat builders looking for something to do as the offshore oil crisis drags on and the (OPA-90 mandated) double hull barge building boom ended in 2015.

Shallow draft vessels (barges/towboats) make up 93.8 percent of the domestic merchant fleet and operate domestically on intracoastal waterways and river systems. That's no secret, but the U.S. fleet also decreased by 1,272 vessels (3 percent) between 2000 and 2014, largely due to the retirement of dry bulk barges. Still, that shrinking of the inland fleet hasn't been enough to help freight rates rebound in the heartland. Separately, Campbell Transportation Company CEO Peter Stephaich probably says it best when he insists, *"We either need more tons to move or we need to shrink the barge fleet."* Unfortunately, that's not the only issue facing inland operators today.

Locks should make it easier for vessels to navigate the uneven water levels of U.S. Rivers. But, that's not always the case. Because of increasing traffic and aging locks, inland traffic is often delayed for hours while locks are shut down for maintenance and repair. The U.S. Army Corps of Engineers reports that the average age of all locks in 2015 was a whopping 60 years, with many locks exceeding that average. Between 2000 and 2015, average delay per lockage more than doubled from 64 to 143 minutes. This year alone, the Ohio River was closed to commercial navigation near Brookport after a hydraulic system at lock and dam 53 failed. By the 16th of October, a total of 58 vessels with 658 barges were waiting to transit this Lock and Dam, the backup covering roughly a 20-mile stretch of river.

Containerized cargo has grown rapidly from 17.9 million TEUs in 2000 to 32 million TEUs in 2015. In fact, container trade growth for the entire United States during that period expanded by 79 percent. In a few select areas, container-on-barge initiatives are starting to make some noise as shippers – sometimes with Marad's help – try to move some of those boxes off our congested highways. That becomes increasingly important as oceangoing vessel calls at U.S. ports swelled by 36.8 percent since 2005, led by the new post-Panamax class of boxships that are 28.8 percent bigger than their predecessors in terms of DWT capacity.

Table 3-17 Average Vessel Capacity Per Call at U.S. Ports: 2005, 2010, and 2013–2015

(deadweight tons)

Type	2005	(R) 2010	2013	2014	2015	Percent change, 2005–2015
Tanker	72,120	71,665	64,328	62,193	61,501	-14.7
Container	44,601	51,227	52,421	54,768	57,458	28.8
Dry Bulk	43,236	50,429	56,065	55,052	54,772	26.7
Roll on/Roll off	19,867	20,573	18,550	18,625	18,128	-8.8
Gas (LPG/LNG)	38,871	42,212	24,060	25,213	25,791	-33.7
General Cargo	25,217	23,603	16,189	16,393	17,441	-30.8
All types	**49,834**	**53,435**	**51,048**	**50,716**	**50,877**	**2.1**

KEY: R = revised.

NOTE: Deadweight tons (DWT) is a measurement of the capacity of a vessel. DWT is defined as the total weight (metric tons) of cargo, fuel, fresh water, stores and crew that a ship can carry when immersed to its load line.

SOURCE: U.S. Department of Transportation, Maritime Administration, *Vessel Calls in U.S. Ports* (Washington, DC: annual issues), available at www.marad.dot.gov/resources/data-statistics/ as of August 2016.

Table 6-16 Oil Spills In and Around U.S. Waterways: 2000 and 2013–2016

	2000		2013		2014		(R) 2015		2016	
Source	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled
Total, all spills	**8,354**	**1,431,370**	**3,223**	**497,710**	**3,077**	**668,363**	**2,873**	**361,482**	**2,663**	**301,723**
Vessel sources, total	**5,560**	**1,033,643**	**1,721**	**207,106**	**1,716**	**273,432**	**1,545**	**296,520**	**1,500**	**238,651**
Tankship	111	608,176	20	711	18	146	75	147,087	73	32,165
Tank barge	229	133,540	100	19,568	89	199,667	24	1,147	17	87,416
Other vessels[1]	5,220	291,927	1,601	186,827	1,609	73,619	1,446	148,286	1,410	119,070
Nonvessel sources, total	**1,645**	**373,761**	**1,048**	**284,513**	**963**	**386,350**	**931**	**63,027**	**943**	**59,318**
Offshore pipelines	4	17	35	6,028	41	5,267	26	474	22	9,139
Onshore pipelines	21	17,004	N	N	N	N	N	N	N	N
All other non-vessels[2]	1,620	356,740	1,013	278,485	922	381,083	905	62,553	921	50,179
Unknown	**1,149**	**23,966**	**454**	**6,091**	**398**	**8,581**	**397**	**1,935**	**220**	**3,754**

KEY: N = data do not exist; R = revised.

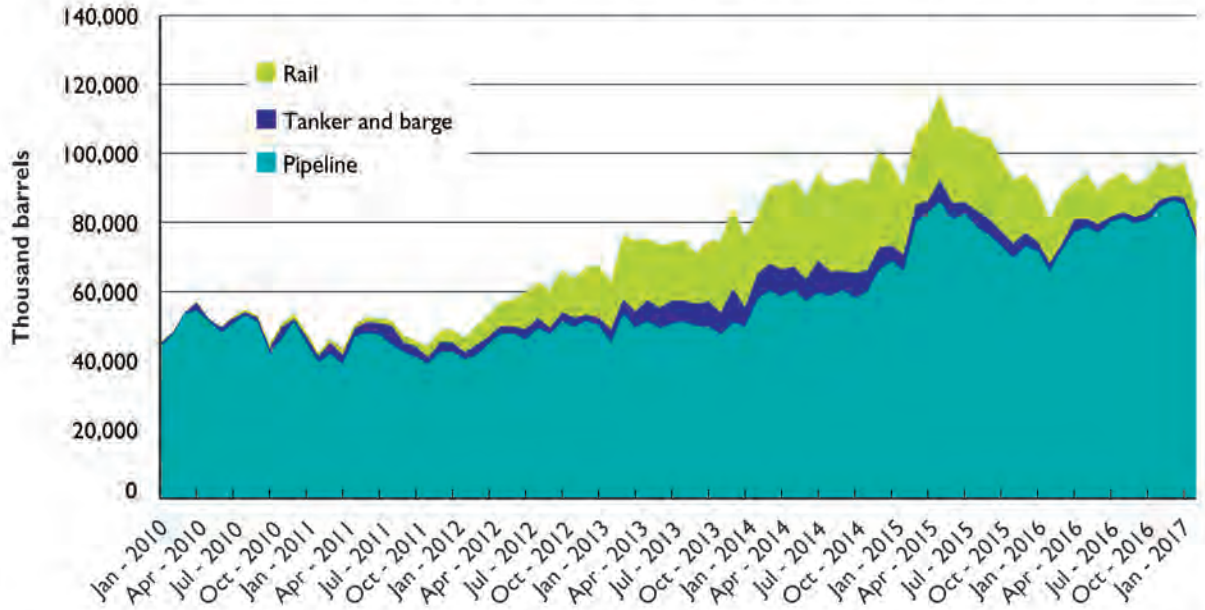
[1]Other vessels include commercial vessels, fishing boats, freight barges, freight ships, industrial vessels, oil recovery vessels, passenger vessels, unclassified public vessels, recreational boats, research vessels, school ships, tow and tug boats, mobile offshore drilling units, offshore supply vessels, publicly owned tank and freight ships, as well as vessels not fitting any particular class (unclassified).

[2]All other non-vessels include aircraft, land vehicles, railroad equipment, bridges, factories, fleeting areas, industrial facilities, marinas, common carriers, sewer drainage, shipyard/repair facilities, and shorelines.

NOTES: Any spills inshore (pipeline or not) are now handled by the EPA and the associated state government agency. Spills involving interstate pipelines are the responsibility of the Department of Transportation, Pipeline and Hazardous Materials Safety Administration. Beginning in 2007, the U.S. Coast Guard no longer differentiated between offshore and onshore pipelines in data collection.

SOURCES: **2000**: U.S. Coast Guard, *Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium: 1969-2011* (Washington, DC: January 2013), tables *Number of Spills by Source, Volume of Spills by Source (Gallons) and Oil Spills In U.S. Waters Calendar Year*, available at http://homeport.uscg.mil/ as of July 2017. **2013-2016**: Incidents and gallons spilled are derived from Pollution Incident Investigation records from the Marine Information for Safety and Law Enforcement System (MISLE) as of July 2017.

Figure 2-3 Shipments of Crude Oil by Pipeline, Tanker and Barge, and Rail: January 2010–February 2017



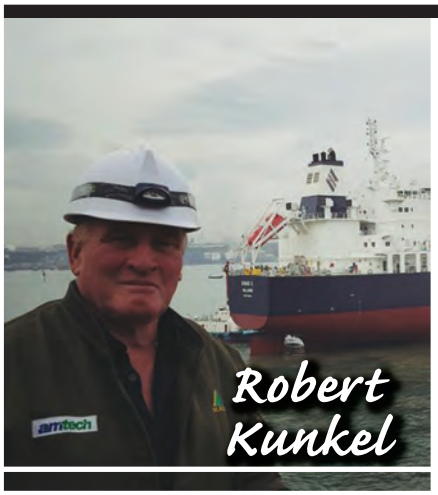
SOURCE: U.S. Energy Information Administration based on data from the Surface Transportation Board and other information, April 2017.

Table 3-10 Lock Characteristics and Delays in Rivers with 10,000 or More Lockages: 2000, 2010, and 2015

	Total lockages (2015)	Percent commercial lockages of all lockages (2015)	Average age of locks (2015)	Average delay in minutes			Percent of vessels delayed		
				2000	2010	2015	2000	2010	2015
All waterways	**595,089**	**77.9**	**60**	**64**	**80**	**143**	**35**	**36**	**48**
Ohio River	104,487	92.9	53	52	97	140	31	34	45
Mississippi River	99,339	72.1	74	90	81	109	20	19	42
Gulf Intracoastal Waterway	38,811	98.9	53	58	65	164	78	84	91
Illinois Waterway	24,941	94.1	81	127	53	143	41	29	65
Monongahela River	22,784	85.5	71	12	11	25	16	18	27
Tennessee River	22,370	69.3	69	209	122	432	24	24	51
Tennessee Tombigbee Waterway	19,403	72.1	33	9	3	19	38	10	16
Arkansas River	18,351	91.8	47	11	13	12	35	23	25
Chicago River	11,006	68.6	78	5	5	17	1	1	79

NOTES: A lockage is the movement through the lock by a vessel or other matter. Commercial vessels include all vessels operated for purposes of profit and include freight and passenger vessels.

SOURCE: United States Army Corps of Engineers, Navigation Data Center, *Lock Use, Performance, and Characteristics* (Alexandria, VA: annual issues), available at www.navigation-datacenter.us/ as of June 2017.



Alternative Marine Technologies, Inc.

Bob Kunkel needs no introduction to *MarineNews* readers. Kunkel, President of Alternative Marine Technologies, previously served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the Maritime Administration and Department of Transportation from 2003 until 2008. A past Vice President of the Connecticut Maritime Association, he is a contributing writer for ***Maritime Logistics Professional*** Magazine and of course, ***MarineNews***. A graduate of the Massachusetts Maritime Academy, Kunkel sailed as a licensed engineer and eventually continued his career in ship construction at myriad venues.

Appearing for the first time in our pages, Chris Mandalakis is a recent graduate with bachelors and masters degrees in Naval Architecture and Ocean Engineering from Stevens Institute of Technology. Mandalakis has worked on a number of groundbreaking projects including a series of hybrid electric research vessels as an employee of Derecktor Shipyard and Alternative Marine Technologies. He has been involved in Amtech's newbuilding construction oversight and design review for tankers at HMD in South Korea, and is currently working with Amtech as a naval architect and design integrator for the 2,200cbm LNG bunker barge currently under construction at Conrad Orange Shipyard. This month, as our featured **INSIGHTS** subject matter experts, Kunkel and Mandalakis weigh in together on emissions control and compliance, as perhaps no one else in industry can.

With EPA Tier 4 here, is there anything else that marine operators can do in terms of emissions reduction, beyond mere compliance? Is the regulatory machine considering still stricter rules? In other words, is this the best we can do?

Many of these questions are still unanswered simply because the regulations on a domestic or international platform are confusing. Yes EPA Tier 4 is here for the larger horsepower engines used for propulsion and with that arrival comes a very limited group of engines that meet the emission requirement. Simply put, no operator likes to be 'limited' in selecting machinery in a new construction project. The game changed on January 1, 2016 for engines rated between 130 and 600 Kw and not solely used for emergency purposes. Herein is the problem of regulatory requirements leading industry technology. Based upon our conversation with the EPA and latest construction experience, there are no smaller block engines that meet EPA Tier 4 or IMO Tier III. Keep in mind the IMO Tier III compliance for this engine size is based upon operation in an ECA and many owners are having difficulty receiving an EIAPP certificate because of that issue. The EMA – Truck & Engine Manufacturer's Association wrote to the EPA, USCG and Transport Canada on July 14, 2015 addressing this very issue.

Most if not all of the current problems the manufacturers are facing is the reduction of NOx and to receive an Engine International Air Pollution Prevention (EIAPP) Certificate the manufacturer must demonstrate the IMO Tier III NOx levels for the 'family' engine in service. Hence, the question is not what the Marine Operator can do achieve environmental compliance; it is what can the manufacturers do as many of the operators are not happy with the SCR solution to reduce NOx as it leads to additional operational costs and inefficiencies. The current Marpol Annex VI and EPA Tier 4 regulations are a huge step forward for environmental compliance. Monitoring and reporting stack emissions would be the next logical step and it will lead to new questions and problems. We are facing a generational change in the industry as the new owners and operators look to provide public benefits as part of their business model. All that said; if manufacturers cannot produce the product necessary to meet the

regulations, the Owner/Operators are faced with a very serious problem and that problem is just starting to raise its ugly head.

The IMO and U.S. EPA both have their own version of emission regulations. When it comes to the U.S. coastal workboat sector – U.S. EPA is really the only standard that they have to worry about, yes?

Unfortunately the answer is NO. A domestic newbuild operator accepting an engine that meets the EPA Tier 3 regulations in accordance with the January 1, 2016 keel laying date and does not comply with IMO Tier III Marpol Annex VI is limiting his vessel's trading or commercial operating routes. The IMO Tier III standards are a requirement in all of the current ECAs. The IMO NOx limits (depending on the engine speed), in Tier II range from 14.4 to 7.7 g/kWh while Tier III limits range from 3.4 to 1.96 g/kWh. In addition to the NOx limits, IMO adopted a HC emission standard of 2.0 g/kWh and a CO standard of 5.0 g/kWh from new Category 3 engines. No emission standard was adopted for PM, but manufacturers are required to measure and report PM emissions. Circling back to the first question, if your 'workboat' owner trades domestically he meets the EPA Tier 3 regulations. If however if he decides to work a job in let's say Mexico, Canada or South America and leaves that U.S. domestic ECA, he cannot return and work U.S. or Caribbean ECA coasts without first installing an engine or SCR to meet the IMO Tier III requirements. Simply put he loses his EPA Tier 3 Domestic pass and is treated like a foreign vessel entering the North American ECA. He must comply with IMO Tier III.

We have found EPA to be very cognizant of this problem and understanding of the fact that no engine in this power range exists to meet those emission requirements. For example, the regulations take into account new construction deliveries in the Great Lakes or repositioning repair voyages to, for example, Mexico, the Bahamas, Canada or South America. They have had extensive discussions in an effort to address the alignment of standards and enforcement for U.S. and Canadian vessels and provided several determinations addressing the issue. The provisions of 40 CFR 1043.10(a)(2) to exempt U.S. vessels from the NOx-related requirements of Annex VI do not apply for

vessels that travel even once to ports or waters subject to Canada's or Mexico's jurisdiction or for that matter any other country. Annex VI does not apply as a mandatory treaty obligation for the Great Lakes, so this determination does not apply for vessels traveling on the Great Lakes. The USCG as a port state authority is obligated to enforce Annex VI requirements for U.S Flag vessels operating outside of U.S. waters just as they would for vessels flying any other flag. This means that such vessels need to have EIAPP documentation showing that all installed engines above 130 kW comply with the appropriate tier of emission standards under Regulation 13 of Annex VI based on the vessel's keel-laying date.

Compliance with emissions regulations is one thing; reporting that compliance (and proving it) is yet another. When does it become mandatory, and what will operators have to do to comply? More importantly, what will it cost?

This is a very difficult question to answer. The submittal of Bunker samples and delivery confirmation is already a requirement. The IMO has a pending amendment 317 that addresses the data collection for fuel consumption. At this point, discussions take into account the current review and submittal of bunker deliveries, and looks at how that data can be placed into algorithms taking into the vessel's EEDI. The project has been described as a very difficult "techno-economic" solution. We have seen demonstrations of stack gas analyzers and would expect the installation of this equipment would be the next step. The next set of dates everyone is struggling with is 2020 to 2025 and the requirements being instituted for that period are already under discussion to delay the next set of emission regulations and fuel requirements. We would expect the mandatory reporting to follow once the actual emissions requirements are set in stone. Placing an arbitrary cost on these regulations is very difficult if you are not looking at a specific vessel design, primary solution (engine type) or aftermarket secondary solution.

LNG is gathering steam as an alternative fuel. Is it the future, and if so, will operators still need after treatment of one form or another to reach Tier 4 compliance?

No doubt we are seeing more and more interest in LNG propulsion system in the larger ship category and LNG is a future fuel consideration – but not so much in the smaller size engines or vessels. IMO has approved the propulsion gas code and ship design considerations are moving past 'LNG Ready.' There are space considerations and issues that need to be addressed with safety zones in the applications. Pending keel laying dates and the type of engines installed including dual fuel applications will need aftermarket treatment to meet those later 2020-2025 emission requirements. The most difficult issue is the understanding of the cryogenics and the bunkering application. Simple operations that have been with us for a long time that are now much more complicated taking into account cryogenic temperatures, vapor issues and the understanding that LNG is actually a safe fuel.

Is the key drag on more operators switching to LNG the lack of infrastructure? Or, "if they build it, will the operators come?"

The lack of bunkering infrastructure is a key issue [here] on a worldwide issue. Where gas has been employed in the northern European ferry markets, infrastructure was quickly built and provided where a niche or targeted itinerary or market was identified. With a larger number of operators, particularly in the Jones Act Trade committing to burning gas, commercial availability will help to solve the infrastructure problem. Construction of the JAX LNG terminal is well underway in Florida to support the Tote Marlin Class vessels and we have seen other projects in the non-contiguous trades taking on new discussions of gas availability. Future economics and the cost of fuel will be the next driver. Above all, the key to the slow uptake of LNG is the current lack of a cost benefit. At $50-$60 a barrel, the capital costs associated with burning LNG make it a tough sell. We need to see an economic benefit reaching beyond the regulatory issues.

You've been involved in countless newbuild assignments and repower refits. What's your favorite propulsion system today, why, and is it the panacea for all workboat operators?

Despite countless assignments, there are few of us that can claim unlimited experience dealing with the new EPA TIER 4 and IMO Tier III emission issues. Based on recent sea trials and FAT attendances we are very impressed with the GE L250 and V250 EGR environmental series. Look to this group to solve some of the other smaller engine issues. We have been working with Cummins on their new engine development and our hybrid projects and we see a lot of synergy with this manufacturer. By far, the growth potential in propulsion that we think will outpace all others will be hybrid applications.

"We see energy storage as the path forward as it is essential to introducing alternative energy sources; whether fuel cell, wind power or solar. You can't turn these energy sources on and off like a combustion engine."

Tier "beaters" – the practice of using multiple smaller engines to produce the desired power but staying under the HP of a higher tier engine has been described as good design. What are your thoughts on this practice?

In our opinion – taking into account specific design and project issues – it still is. Using the problems we are seeing in the 130 to 600 kW range – if we can install four 125 kW generators instead of three 145 kW units and circumvent compliance issues – why not? It is all based upon cost analysis and the Owner's environmental commitment. We are going to repeat our opinion that shipping and transportation are both going through a generational change. How important will those environmental and social benefits become when compared to profits?

SCR After Treatment: it's been proven to work, produce tier IV results, and it fits into a tight space (think workboats). A GE engine reaches Tier 4 without it, using EGR. Is one solution better than another for workboats?

As with most choices, there are tradeoffs and please understand 'proven' is a gray definition at this point in the installation process. The GE engines are able to comply through the extensive use of EGR or exhaust gas recirculation, and clever manipulation of timing to reduce combustion temperatures and comply with NOx emissions criteria. It is a 'Primary Solution.' This, as expected, comes at a cost, in this case, fuel efficiency. SCR or selective catalytic reduction also impacts efficiency, the level of which depends on the system and application. SCR as a 'Secondary solution' requires additional equipment to be installed in the exhaust stack – though this equipment has decreased drastically in size as regulation and the lack of a 'Primary solution' has driven more to look at the aftermarket systems. Both options have their merits and problems and there is a best choice for every application.

What's the most viable alternative fuel (beyond LNG)? Why and how likely is it to be adopted in the near term?

If we look at the transit and automotive sectors, there has been varying interest in fuel cells, probably caused by volatile and now historically low fuel prices. Hydrogen fuel cells, made more relevant by an increase in electric powertrain technology, are unique in that, when the hydrogen is generated using solar or other alternative energy source, they are truly emission free. Fuel cells have become smaller and more cost effective as they are produced in higher numbers for transit applications. The Maritime industry historically adopted energy reduction and conservation as a means to reduce emissions and meet environmental compliance. We see energy storage as the path forward as it is essential to introducing alternative energy sources; whether fuel cell, wind power or solar. You can't turn these energy sources on and off like a combustion engine. Bunkering and fuel handling are also issues – we will likely see a similar learning curve with hydrogen (compressed or liquid) as we are seeing with LNG as a fuel.

Methanol, or "liquid gas" is another option being discussed. As clean as natural gas, (though containing fewer BTU's), methanol does not contain sulfur and can be created from renewable and non-renewable feed stocks. Why hasn't it taken off faster?

Methanol is a widely traded chemical commodity, is liquid at room temperature, and is capable of meeting current and future Sulphur requirements. However, from an environmental standpoint, when we look at total emissions (fuel production to tailpipe if you will) there is no reduction in GHG production, as Methane must be processed to produce Methanol. Further, though methanol is essentially Sulphur free, NOx compliance is somewhat more difficult – current options include water emulsion in the fuel to decrease combustion temperature, or after treatment. Engine conversions for methanol are similar in complexity to gas burning dual fuel engines, so in many cases, the benefits might just simply not outweigh the costs of a methanol conversion.

Hybrid Energy and Batteries have come a long way for marine applications – in terms of weight, size (volumetric space taken upon by batteries and the power that they can generate). Do you foresee a time

when this will become common on workboat platforms and if so, which ones?

We believe Hybrid and EV technology will be a very significant path forward. Battery technology will continue to drive progress in a number of industries including automotive, aerospace, and certainly marine. We are already seeing hybrid projects ranging from research vessel and coastal shipping newbuilds in the United States and to 1,100 passenger RoPax ferry conversions in Scandinavia. Over 2.5 megawatts of battery power has been installed in single vessel installations. We need to ask a simple question: is the combustion engine dead? The technology had a fantastic run and we see that slow death occurring in the automotive industry as sales of electric vehicles rise. Britain in fact has just announced that all new cars must be zero emission by 2050. GM believes their entire product line could be EV or Hybrid within 5 years. Hybrids have a number of distinct advantages particularly well suited to vessels with diverse operating profiles. Vessels such as PSVs, OSVs, research vessels and others which operate with distinct transit and station keeping or standby periods can utilize energy stored in batteries to avoid idling and underutilized electric and propulsion plants. Such operation is quiet and virtually emission free. Maintenance and fuel costs are further reduced. Look to energy storage companies like Corvus Energy and Spears to lead the way on the battery level. BAE Hybrid has been in this market for years in the mass transit market and has been our selected system manufacturer on several marine projects on the coastal front. Our Harbor Harvest Federal Marine Highway project will employ BAE Hybridrive as our propulsion's system with Cummins and Corvus Energy.

Real-World Infrastructure Needs

By Mike Toohey, President/CEO of the Waterways Council, Inc.

Toohey

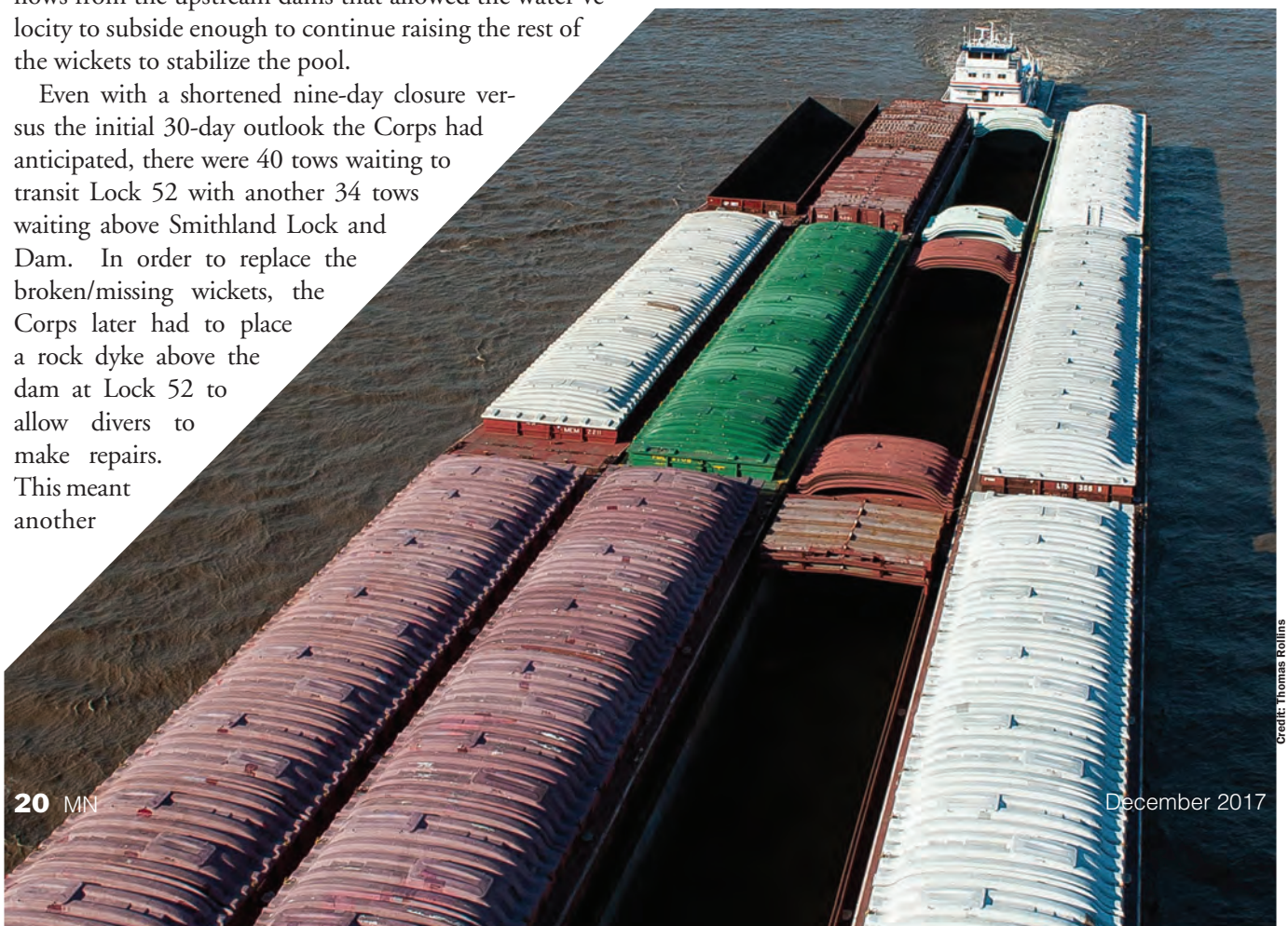
Over the last two months, the inland waterways system has been particularly stressed by both emergency and Mother Nature-inflicted outages at key locks and dams. Lock and Dam (L&D) 52 on the Ohio River was closed September 6-14 when the dam's low-lift wooden wickets could not be raised to hold a stable pool for navigation, halting shipping on the river. Given the river's conditions, the wicket gates had to be raised individually, by hand, to impound water to create the pool. While raising the wickets, the U.S. Army Corps of Engineers found that five consecutive wickets were missing or could not stand.

Due to swift river currents, approximately 320 feet of the dam was not raised, resulting in loss of pool (and loss of navigation) above the dam. The fast-moving water velocity coming from the up-stream Barkley, Kentucky, and Smithland Dams made it too dangerous for the Corps to repair the dam at that time. The Corps' was able to reduce flows from the upstream dams that allowed the water velocity to subside enough to continue raising the rest of the wickets to stabilize the pool.

Even with a shortened nine-day closure versus the initial 30-day outlook the Corps had anticipated, there were 40 tows waiting to transit Lock 52 with another 34 tows waiting above Smithland Lock and Dam. In order to replace the broken/missing wickets, the Corps later had to place a rock dyke above the dam at Lock 52 to allow divers to make repairs. This meant another 24- to 48-hour complete river closure.

A mere 72 hours after navigation resumed at L&D 52, the Corps had to raise the dam at Lock 53, delaying traffic for an additional 24 hours. Once the navigation pool was stabilized at Lock 53, the Corps found obstructions in the main chamber that did not allow the lower gates to close properly. This stalled navigation again for yet another 24 hours while the Corps removed the obstruction. Navigation had resumed, but only through the 1200-foot chamber at Lock 53 because the 600-foot chamber was inoperable.

The Corps eventually fixed these problems, but vessels shipping key commodities waited more than 80 hours per vessel in a queue that was, at one time, nearly 56 river-miles long. In addition to farmers shipping grain during the critical harvest season, power plants, manufacturing plants and municipalities that draw water from the Ohio River were advised by the Corps that the pools of water they depend upon could have also been lost in this outage. The outage at L&D 52 and 53 also triggered other back-ups up and down the Ohio River, including locks at Smithland, Cannelton, Meldahl and Dashields.



Credit: Thomas Rollins

In service since 1928, Locks and Dams 52 and 53 will be replaced by the Olmsted Lock and Dam which was authorized in 1988, but will not open until next year. Once Olmsted is finished, L&D 52-53 will be dismantled and removed.

The failure of this critical infrastructure came just three months after President Trump visited the Ohio River on June 7, proclaiming that "these critical corridors of commerce depend on a dilapidated system of locks and dams that are more than half a century old. And their condition, as you know better than anybody, is in bad shape. It continues to decay. Capital improvements of the system, which [are] so important, have been massively underfunded. And there's an $8.7 billion maintenance backlog that is only getting bigger and getting worse....citizens know firsthand that the rivers, like the beautiful Ohio River, carry the life blood of our heartland," he said.

During his June speech, the President also noted a similar outage on the river near Pittsburgh, saying, "Last December ... one lock built more than 50 years ago had to be shut down for five days due to hydraulic failure. And you know what that means? Five days means everything comes to a halt. We simply cannot tolerate a five-day shutdown on a major thoroughfare for American coal, American oil, and American steel, which is going to get more and bigger ... America must have the best, fastest and most reliable infrastructure anywhere in the world. We cannot accept these conditions any longer."

While few details have been revealed, the Trump Administration has said that it will undertake a $1 trillion infrastructure initiative to repair America's infrastructure, which WCI hopes will include the inland waterways' locks and dams among other areas being considered for modernization such as wastewater systems, bridges, roads, and rural broadband technology. WCI continues to advocate strongly for modernization of the inland waterways lock and dam infrastructure as part of this initiative.

"Together, we will fix it. We will create the first-class infrastructure our country and our people deserve," the President said on the Ohio River.

Let's hope that he – and Congress – will do just that and the inland waterways can continue to deliver America's goods to the world.

Editor's Note

We often talk about what could happen in the event of a major inland river infrastructure calamity. Now, we know.

What Hurricanes Teach Us About Energy Security

By Randall Luthi, President,
National Ocean Industries Association (NOIA)


Luthi

After a few years of relative calm, the 2017 hurricane season wreaked havoc in the Atlantic and the Gulf of Mexico, causing widespread damage and human suffering, and exposing the vulnerabilities and strengths of American energy security. As the flood waters from Hurricane Harvey receded and Gulf coast residents embarked on the arduous road to recovery, the offshore energy industry took stock and counted its losses and blessings.

Offshore energy facilities faired remarkably well compared to onshore energy facilities, many of which suffered catastrophic damage from flood waters. In fact, there were no reported deaths or injuries among offshore workers, no reported damage to offshore facilities and no reported spills from offshore facilities. The same held true after Tropical Storm Nate barreled through the Gulf several weeks later.

This is a testament to how well the offshore industry prepares for and responds to hurricanes. Even during the devastating 2005 storm season when Hurricanes Katrina and Rita ravaged the vital energy infrastructure of our Outer Continental Shelf (OCS), 97% of offshore facilities survived the record-breaking storms, every single offshore safety valve held, there were no significant spills from offshore facilities and there were no deaths or injuries among offshore workers.

In the aftermath of such devastating storms, offshore companies have a proud history of providing critical support during disaster recovery efforts onshore. Following Hurricane Harvey, offshore companies again stepped up, providing support services, emergency funds, housing and other assistance to their employees, and donating tens of millions of dollars to the Red Cross and similar organizations.

While we can be justifiably proud of our industry's safety, environmental and philanthropic record, natural disasters like Hurricane Harvey and Tropical Storm Nate also expose the vulnerability of America's offshore energy security. Coincidentally or not, we have placed the vast majority of our offshore energy eggs in one basket – the Gulf of Mexico.

Energy companies working in the Gulf of Mexico produce about 1.7 million barrels of crude oil and 3.2 million cubic feet of natural gas per day. The Bureau of Safety and Environmental Enforcement (BSEE) estimated that 24.5% of oil production and 26% of natural gas produc-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"… due to short-sighted federal policy decisions, only 6% of the OCS is currently accessible to the offshore oil and gas industry; nearly 94% is off limits to oil and gas exploration and production."

tion from the Gulf of Mexico was temporarily curtailed as a result of Harvey. Several weeks later, Tropical Storm Nate forced even more production to be shut-in, temporarily curtailing 92% of oil production and 77% of natural gas production from the Gulf of Mexico, according to BSEE.

In addition, because Harvey was such a slow-moving storm, the flooding that followed forced the closure of refineries along the Texas coast, taking offline 25% of the nation's crude oil refining capacity. Less than two weeks after Harvey, gasoline prices, including those from pumps thousands of miles away from the Gulf of Mexico, reached their highest level in two years.

Partly because hurricanes have the potential to strike the heart of the U.S. offshore energy industry and temporarily weaken our nation's energy security, the National Ocean Industries Association (NOIA) has long advocated for increased access to federal offshore areas outside of the Gulf of Mexico. However, due to short-sighted federal policy decisions, only 6% of the OCS is currently accessible to the offshore oil and gas industry; nearly 94% is off limits to oil and gas exploration and production.

The success of the offshore energy industry has made the U.S. the world's leader in the production of oil and natural gas. However, Harvey and Nate revealed just how precarious that position is. The lack of new sources of oil and natural gas outside of the Gulf of Mexico, and infrastructure that is centralized along the Gulf Coast led to temporary shut downs in the energy delivery system for major population areas of the U.S. and a rapid rise of gasoline prices at the pump.

Luckily, the wisdom of those before us provided a mechanism known as the Strategic Petroleum Reserve (SPR) to keep many refineries running, and President Trump released 500,000 barrels of oil from the reserve to ensure that there were no severe shortages – this time. Ironically, many who are adamantly opposed to oil and natural gas development, and who have championed the "keep it in the ground" movement, saw the wisdom of the SPR and joined the calls to bring oil out of the ground to avoid severe supply shocks to the gas pumps and consumers following Harvey and Nate.

Simply put, we dodged an energy security bullet during the 2017 hurricane season. By geographically concentrating our nation's offshore energy production, the U.S. is rolling the dice when it comes to natural disasters. The U.S. may not be as lucky next time if we don't ensure the continued development and production of our energy resources from both inside of and outside of the Gulf of Mexico. Not only would exploring and developing new areas off our coasts be a victory for American energy and economic security, it would give us peace of mind next time a catastrophic storm plows through the Gulf of Mexico.

Thankfully, the Trump administration re-opened the discussion about how we manage the energy sources off our coasts and is in the second stage of developing a new and more expansive National 5-Year OCS Oil and Leasing Program for 2019-2024 to replace Obama's 2017-2022 program, which took the entire Atlantic OCS and much of the Arctic OCS off the table. Decentralizing offshore energy sources will strengthen American energy and economic security by ensuring production of offshore oil and natural gas continues, even if hurricanes or other natural disasters cause temporary disruptions from onshore and offshore energy producing areas.

Now is the time for big "out of the box" thinking. Never has there been a better time for federal policy makers to craft long-term solutions to providing diverse energy sources (both traditional and non-traditional) and energy delivery systems to ensure energy consumers are protected. Five year leasing programs could become 20 year leasing programs, providing long-term certainty to both industry, regarding which areas can be leased, and conservation groups, regarding which areas cannot be leased. This should also include more pipelines and more refining capacity in more areas, increasing the areas open for offshore energy exploration and development and protecting the SPR by establishing a method of replacing reserves in times of plenty.

Today, oil and natural gas production from the U.S. Gulf of Mexico, the hub of our offshore energy industry, accounts for 19 percent of domestic oil production and 5 percent of domestic natural gas production, generates billions of dollars in revenue for state and local governments and the U.S. taxpayer, and supports hundreds of thousands of jobs. With the right government policies, particularly regarding access to offshore areas, industry has the potential to unlock additional sources of energy, create tens of thousands of new jobs and bring in billions of dollars in new government revenue. We have the know-how and technology to ensure weather-ready American energy dominance; we just need the political will.

AIS, AtoN, MTS – and you

USACE and USCG collaborate to make inland waterways Safer.

By Mark Wiggins and Greg Johnson

Johnson

Wiggins

The United States Army Corps of Engineers (USACE), supported by Alion Science and Technology (Alion), has put forth considerable effort during the last two years to further extend the capabilities of the existing Automatic Identification System (AIS) network to improve the safety and efficiency of navigation along the inland rivers.

Alphabet Soup: AIS, MTS, AtoN & VTS

The USACE works with the United States Coast Guard (USCG) and other agencies and stakeholders to operate and maintain the nation's Marine Transportation System (MTS). A primary tool to manage the MTS is the visual Aids to Navigation (AtoN) system. The USCG also oversees the Nationwide AIS (NAIS), an automated system for the exchange of navigational information between vessels and shore stations that is based on the AIS required for most commercial vessels by the International Maritime Organization (IMO).

AIS information may include vessel-specific information, location, and speed supplemented by other govern-

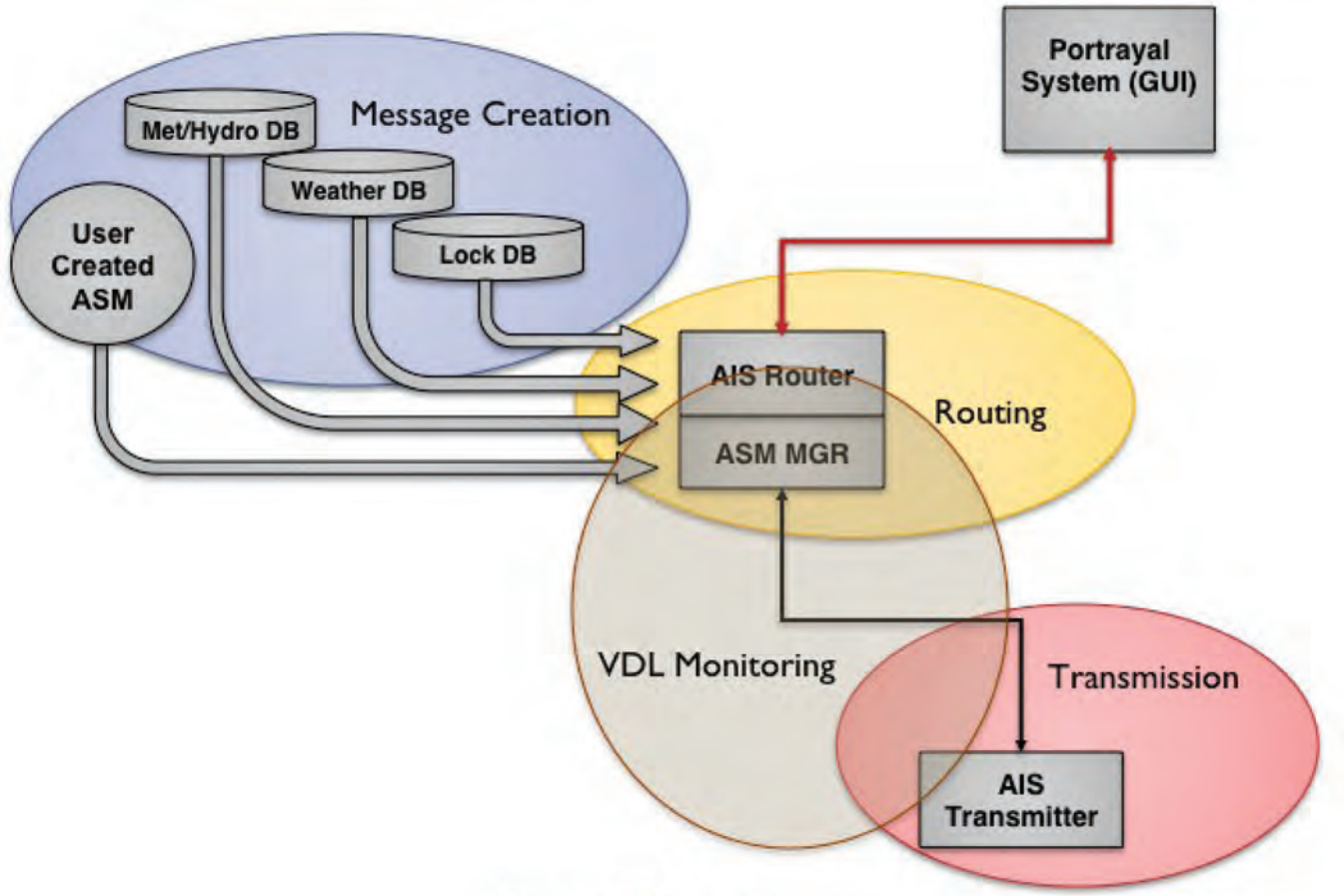


Figure 1. AIS Transmit Processes.

ment information and sensor data to support safe operation and domain awareness in U.S. waters. AIS may also be used to transmit information to support navigation, such as the locations of hazards. The transmission of electronic information to supplement visual AtoN is termed here as electronic AtoN (e-AtoN). It is one part of a more comprehensive and systematic integration presentation of electronic information to support navigation that is termed as e-Navigation (e-Nav).

Traditionally, AIS has been used to broadcast vessel position, course, speed, and other vessel information to nearby vessels and shore authorities such as Vessel Traffic Services (VTS). This information is then plotted and displayed on an enabled radar display or electronic chart system (ECS). The goal of the USCG and USACE is to transmit additional safety- and navigation-related information such as weather, water depth, river current, Synthetic and Virtual AtoN, vessels in lock queue, lock status, and USACE Notices to Navigation Interests (NTNI) information. The new information helps improve maritime safety and domain awareness with the use of Synthetic and Virtual AtoN information. They serve to identify an existing physical AtoN (Synthetic) or one that is nonexistent (Virtual). These AtoNs may be displayed on the mariners' ECS/radar to allow easy identification of radar return of the AtoN or to augment physical AtoN in tough-to-maneuver areas.

e-Navigation on Inland Rivers

e-Nav capabilities have been installed and used on the lower Ohio River and adjacent Mississippi River for over two years. It began as a proof of concept test with the USCG. Alion, working under contract to the USCG and USACE, designed and implemented the test bed that has now transitioned to a permanent and expanding e-Nav infrastructure. It is managed predominantly by the USACE under Mr. Brian Tetreault.

The additional AIS information is currently being transmitted from the following USACE locks: Markland, McAlpine, Cannelton, Newburgh, J. T. Myers, Smithland, Lock 52, Kentucky Lock, Barkley, and the Olmsted Locks and Dam project. The USCG also transmits the messages from the Nationwide Distress System (NDS) site at Battletown, KY, as well as transmitters in Louisville, KY, and one in Owensboro, KY.

Figure 2. AIS transmitter locations on Ohio River and adjacent Mississippi River.

"e-Nav capabilities have been installed and used on the lower Ohio River and adjacent Mississippi River for over two years. It began as a proof of concept test with the USCG. Alion, working under contract to the USCG and USACE, designed and implemented the test bed that has now transitioned to a permanent and expanding e-Nav infrastructure."

More than just vessel and environmental data can be received. For example, Notice to Navigation information is often transmitted. These define temporary zones to be set for safety, security, or traffic management among other things. This information is displayed as an overlay on the ECS and allows the mariner to quickly see areas to avoid. Environmental information transmissions such as weather, river current, and water depth are collected from the National Oceanic and Atmospheric Administration, the Weather Service, the USACE, the USGS, and private weather stations. This information is also displayed on the ECS to aid in course planning and decision making along with Lock Status and Vessel Queue.

Crews will be able to view the current lock status and the

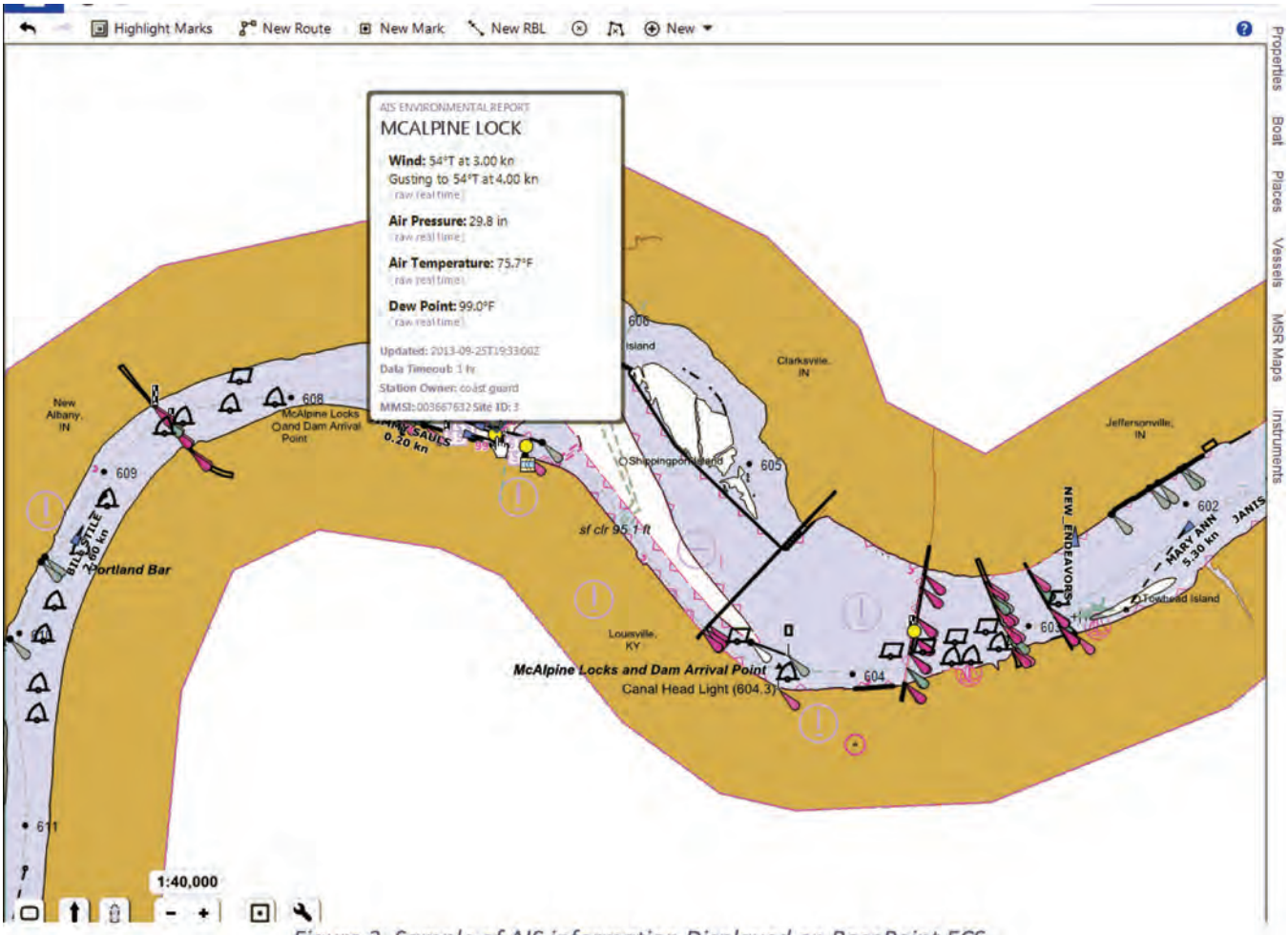


Figure 3. Sample of AIS information Displayed on RosePoint ECS.

vessels awaiting lockage as well as their schedule and direction of transit. Each lock transmitter relays information related to its traffic and status as well as its adjacent locks.

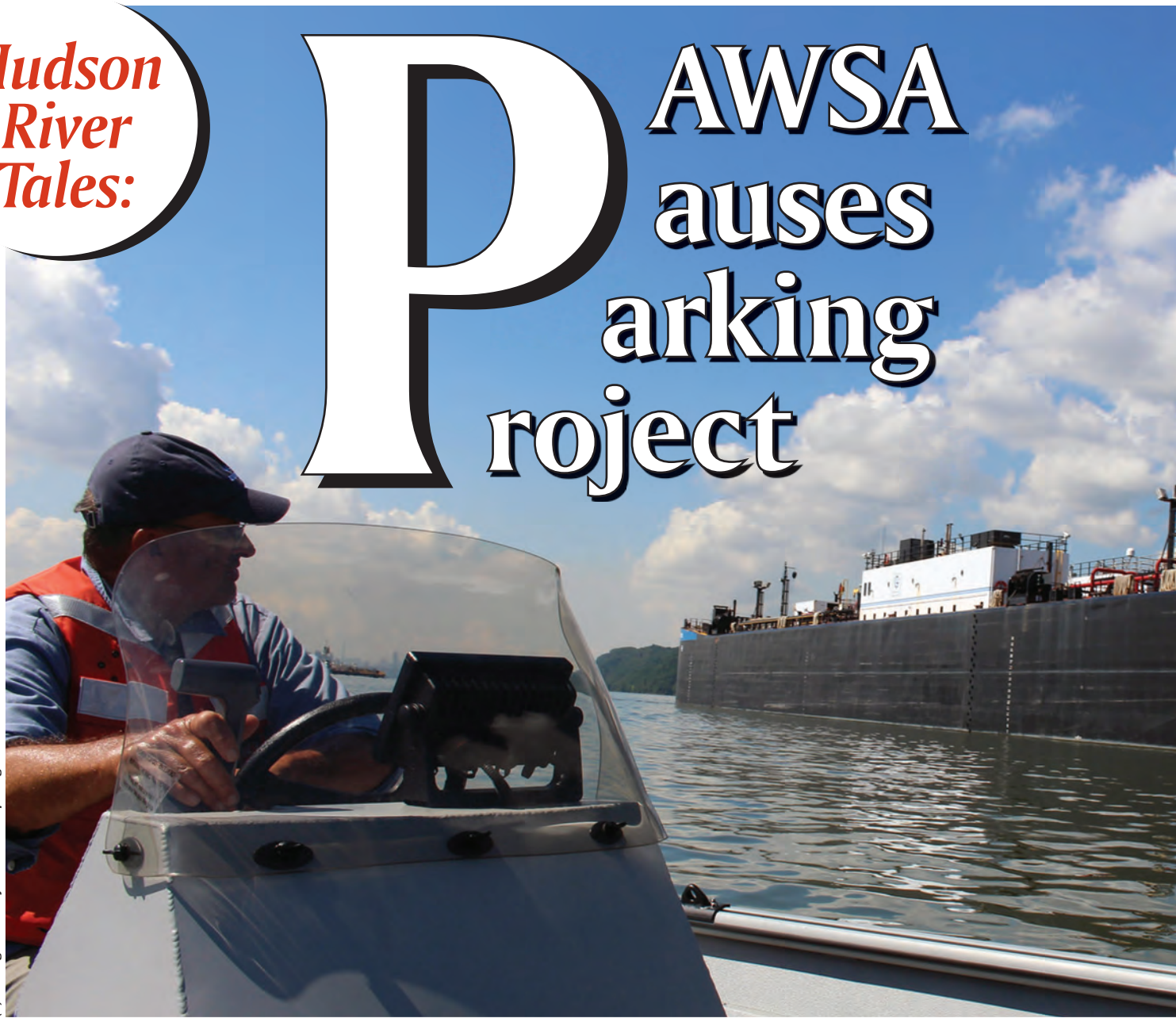
All of this information is available for display on vessels using their existing VHF AIS equipment and an ECS that is AIS message 21 and Application Specific Message (ASM) capable. RosePoint – a marine navigation system and software provider – has been a leader in implementing the AIS ASM standards, which allows the AIS data messages to be displayed in a user-configurable fashion. RosePoint currently supports these e-Nav messages, but it must be enabled in the settings first by enabling Experimental ASM in the Settings-Rose Point Labs menu.

As more ECS providers enable their software to properly interpret and display the AIS information (which is being received presently), the more readily all stakeholders can use the data. There are currently minimal standards for how the e-Nav information is displayed or portrayed on ECS; thus end users and manufacturers must work together to ensure that the data are displayed in a useful, but non-intrusive manner. As the manufacturers adopt more of the e-Nav standards, the more configurable and customized each ECS display can become.

Gregory Johnson *is a Senior Program Manager at Alion Science & Technology in the New London, CT office. His group provides research and engineering support primarily to the U.S. Coast Guard R&D Center. He has a BSEE from the Coast Guard Academy (1987), a MSEE from Northeastern University (1993), and a PhD in Electrical Engineering from the University of Rhode Island (2005).*

Mark Wiggins *is a Senior Systems Engineer with 32 years of experience including 20 years with the U.S. Coast Guard. He served on 4 cutters, a small boat station, R&D Center, US Coast Guard Academy and the Leadership and Development Center. He has since been a systems engineer for Alion Science & Technology for over 12 years, involved with design, evaluation, integration, testing and improvement of complex systems.*

Hudson River Tales: PAWSA auses arking roject



(*) all images courtesy www.riverkeeper.org

When marine safety collides with environmental advocacy and non-maritime business interests, the discussion can be contentious, confusing and cumbersome.

By Tom Ewing

In June 2016, the U.S. Coast Guard (USCG) opened a public comment period regarding new anchorage zones in the Hudson River; usually a rather low-key set of issues. This proved different. Opponents jumped on the proposal – initially suggested by three maritime organizations – as a backdoor way to facilitate a huge expansion in crude oil shipments on the Hudson.

One year later, this past June, the Coast Guard decided to advance this difficult mix of issues through its PAWSA process – a Ports and Waterways Safety Assessment. The USCG describes the PAWSA as "a disciplined approach to identify major waterway safety hazards, estimate risk lev-

els, and evaluate potential mitigation measures." The move was welcomed by maritime and environmental groups.

Edward J. Kelly, Executive Director of the Maritime Association of the Port of NY/NJ, said "we are in favor of any process or forum that will clearly establish the facts." For mariners, the anchorage zones are needed for safety, not facilitating commerce. Riverkeeper is a Hudson River environmental advocacy organization. It writes on its website that Riverkeeper is very much looking "forward to being part of this discussion, and we're grateful to the Coast Guard for including us." Scenic Hudson, another environmental group, expressed similar comments.

PAWSA Procedures

In September, the Coast Guard announced two PAWSA sessions, each covering two days: November 7 & 8, in Poughkeepsie, and November 15 & 16 in Albany. Participants would be chosen "based on their waterway expertise and to create a broad cross-section of Hudson River stakeholders." (This report is written between those meeting dates.) Three big areas of contention mark the anchorage zone controversy. For mariners, this involves the basic issue of safety. For environmental and citizens' groups, the tangle of issues presented by crude oil transport and environmental safety were of primary concern.

Separately, a proposal by Champlain Hudson Power Express (CHPE) to build a 320kV electric transmission cable from Quebec to New York City running, for part of its route, 88 miles length-wise under the Hudson was also in the mix. The cable would be mostly buried but held down by cement "blankets" in sections of impermeable bedrock.

It's important to recall that the anchorage zones at issue are not new, but have been used by mariners for decades. What is new is the proposal to formally designate the anchorage zones, rather than continuing their informal status as safe havens.

The move to formalize the sites followed a 2015 Coast Guard bulletin "reminding" captains that 'parking' was allowed only at designated sites. Therefore, to avoid enforcement issues, the Tug and Barge Committee of the Maritime Association of the Port of NY/NJ, the Hudson River Port Pilot's Association and the American Waterways Operators (AWO) asked the USCG to formally designate new sites.

Issues & Answers

The issue of safety presents as one area of common ground, although limited. John Lipscomb is Riverkeeper's vice president for advocacy. Lipscomb, who participated in the recent PAWSA, agrees with industry on safety. If captains need to anchor because of a problem, Lipscomb said, "people are just as eager as industry to be able to anchor rather than proceed at risk. We're dedicated to keeping it possible for vessels to anchor and where it's suitable to anchor when there's a safety issue."

Amity breaks down, though, regarding formal status. For Riverkeeper, this new standing is troublesome because it opens the possibility that vessels will deliberately use the sites for, say, logistics purposes, not just emergencies. Industry could play the river, so to speak, moving vessels in response to market and business conditions, taking advantage of parking on the shoulder of a public highway because it's newly convenient for berthing, access or con-

gestion. "They've had (these sites) for decades," Lipscomb said, "now they want something different."

Mariners, however, insists that there's no economy in leaving a barge idling on the river. But, Lipscomb counters that Riverkeeper members regularly send him pictures of vessels parked "day after day."

Oil looms in the background of the PAWSA discussions, and suspicions, about safety versus commerce. In the last two years, oil shipments have declined on the Hudson. Some analysts say that crude transport has shifted from barges to the railroads, where it will likely stay, because of competitive reasons.

Others say: not so fast. Two years is a blink of an eye for conclusions about risks with disastrous consequences. Oil markets swing wildly and renewed demand could make Hudson transit attractive again, particularly to supply new export markets. It would be shortsighted, advocates insist, to pull back now on environmental safeguards for a river clinging to a fragile recovery.

Riverkeeper proposes that any vessel moving to an anchorage must also call the Coast Guard advising of an emergency. This requirement would prevent non-emergent stops, Lipscomb says, while keeping open all current sites. "(Mariners) want official designation," he commented, "but the public is saying since we don't know why, we're saying 'No.' You can't park eight boats in Kingston just for the convenience of being near Albany."

Mariners look at designation differently. Lipscomb references the traditional anchorages with the expectation that they will always be there. But that's not the case. Designation is critical because without it the existing anchorage sites may be forced off limits by CHPE's 88-mile transmission cable. Designation would require CHPE to avoid official sites. The mariners originally proposed 10 anchorage sites providing space for up to 43 vessels, along about 100 miles of the river. Ed Kelly, however, expects a final decision would likely approve far fewer anchorages.

Critically though, with formal status, at least those fewer sites would be codified as permanent. If the more numerous sites remain as informal it's possible that many would be lost or inaccessible because of the cable. Mariners need a decision, sooner not later, and before the cable impacts and possibly excludes anchorage zones, which, after all, aren't just casual, easily replaced spaces.

Definitions Matter

Eric Johansson is chairman of the Maritime Association's Tug and Barge Committee, and another participant in the

"… people are just as eager as industry to be able to anchor rather than proceed at risk. We're dedicated to keeping it possible for vessels to anchor and where it's suitable to anchor when there's a safety issue."
– John Lipscomb, Riverkeeper's Vice President for advocacy

PAWSA's first session, in Poughkeepsie. Johansson was a tug pilot for 20 years. He said that when he started working, if he pulled over every time there was some fog on the Hudson, he would have been fired. Today, in contrast, he said safety is such a high priority that captains are ready to pull over at any time to avoid risks of collision or accident.

The meaning of "long term" anchorage is another unresolved issue. John Lipscomb says "long term" has never been defined within the context of officially designated anchorages. For Riverkeeper, and others, there is an implicit, and maybe deliberate, ambiguity here, that "long term" means a vessel could stay parked for a day or a week, again, stationary not because of safety, but seeking other advantage.

For mariners, "long term" references a permanent, not a temporary site, established just for a limited time, because of water conditions, for example, or seasonal wildlife or construction. Riverkeeper contends that the Coast Guard needs to clarify its authority over the Hudson. Lipscomb used the phrase "messy language" regarding authority. He added that New York State recently passed a bill giving new responsibilities to the NY's Department of Environmental Conservation regarding how petroleum products are shipped within the Hudson estuary. He wants the USCG PAWSA report to reflect this broad context of concern for the Hudson.

Beyond the Waterway

It's hard to assess how, or even whether, the transmission cable fits in the PAWSA process. No one from CHPE participated in the Poughkeepsie session, nor was there anyone among the official list of observers. One person at the Poughkeepsie meeting said the CHPE cable came up often in discussions. He estimated that of 40 people, however, maybe half didn't know of the issue, indicating that time had to be spent bringing about twenty people up to speed, a bit unusual among experts chosen for their "waterway expertise."

Mariners cite two major concerns: anchor-cable snags and electromagnetic interference with navigational compasses. CHPE has presented a Navigational Risk Assessment (NRA) report, including an "anchor snag manual," evaluating those potential hazards. It concludes negligible risks for compasses and anchors. Mariners want a closer look.

Brian Vahey is Senior Manager, Atlantic Region, for the American Waterways Operators. He is part of an industry-maritime group that closely reviewed CHPE's NRA.

His concerns include how the probability of anchor strikes was calculated, that AIS (automatic identification system) traffic information did not account for tugboat-barge footprints and inaccurately presents the probability of an anchor strike. Furthermore, CHPE's probability calculations, Vahey said, depend in large part on anchoring practices in waterways in Europe and on the North American west coast, "which are not indicative of the unique operating conditions on the Hudson."

"Considering what's at stake," Vahey said, "we believe that developers should do as much as humanly possible to drive down risk, and we don't believe the CHPE cable project has gotten there." Vahey's group suggests, for example, that the cable should be buried at 15 feet, not seven.

After the second PAWSA meeting, the Coast Guard will take the information to prepare a final report. This will take a few months. For Coast Guard report writers, it's not an easy assignment.

__Tom Ewing__ is a freelance writer specializing in energy and environmental issues.

Commercial Workboat Philanthropy on Display on PT-305

Image: National World War II Museum

WWII Museum's PT-305 sails again after a far reaching donor-funded restoration.

By Susan Buchanan

In March, the National WWII Museum in New Orleans launched its reconstructed PT-305, built locally by Higgins Industries in 1943. The museum acquired the boat known as the USS Sudden Jerk in 2007, restoration began in 2009, and it now sails Lake Pontchartrain as an interactive exhibit. PT-305, with a fifteen-man crew, belonged to a twelve-ship squadron operating in the Mediterranean from 1944 until the war ended in 1945.

"Our administrators estimate we've put $3.5 million into the restoration, not counting the value of volunteer time," Tom Czekanski, the National WWII Museum's senior curator and restoration manager, said last month. "The vessel, now operating, is valued at $7 million for replacement purposes. The number of hours donated by volunteers has reached 120,000."

The project's more than 200 volunteers include WWII vets, naval and electrical engineers, retired Coast Guard and military members, machinists, parts collectors, historians and students. A variety of donors gave money, parts and services. And, the local waterfront, workboat industry stakeholders and their employees were an undeniably big part of that effort.

Recent improvements to the PT-305, which was used for tours and oystering on the U.S. East Coast for over half a decade, include the addition of 13 feet in hull length that was lost postwar; over 12,000 feet of cabling and wiring; three miles worth of caulking; 13,000 board feet of woodwork and 300 gallons of paint.

Four, war-time combat PT boats exist in the United States today, but the Sudden Jerk is the only one that's fully restored. Last month, we spoke with just a few of the dozens of project donors, benefactors and volunteers.

VT Halter Marine provided labor and equipment

"VT Halter Marine's involvement in the restoration project began soon after the PT-305 was returned to New Orleans in 2007," Meredith Foster, business development manager and technology control officer at VT Halter Marine, Inc. in Pascagoula, Ms., said last month. "VTHM has contributed over 700 hours of labor, along with material and equipment, to the project." The company built the rudders and fuel tanks for the PT-305, Rob Mullins, VTHM's vice president of business development, said. "We also donated some electrical fixtures."

PT-305 is transported on the Mississippi River in New Orleans to begin sea trials at SeaBrook Harbor & Marine.

Foster said Harold Halter, the founder of Halter Marine, and Higgins Industry were united through the history of their shipyards. Higgins operated yards in the New Orleans area and employed over 20,000 people at its peak until WWII, she said. The shipyards were mostly closed by 1963. "But the main yard became Equitable Shipyards in 1967 and part of the Halter Marine Inc. group of shipbuilding companies," Foster said. That's one reason that VTHM has been active in the PT-305's restoration.

SeaBrook Harbor & Marine

SeaBrook Harbor & Marine is the largest, dry-stack facility in Louisiana, with deep-water access, an 85-ton Travelift and a large-capacity, indoor paint booth. After Katrina struck in 2005, SeaBrook retooled its entire yard and brought 300 storm-damaged boats back into service. The company offers storm-protected storage for 200 boats, from 20 to 40 feet long.

"We contributed volunteers and machinery to the project," Jeffrey Montz, CEO of SeaBrook Harbor & Marine in New Orleans, said last month. "Our major contribution has been picking up and moving the boat to our yard on France Road to do repairs." The PT-305 underwent sea trials in January at SeaBrook, located on the Intracoastal Waterway.

"This project is living history, and that's a big reason why we've participated," Montz said. "A personal reason is that my grandfather during WWII put engines in these PT boats. It's cool to be included in something he was involved in, and it is wonderful work to be a part of."

Newmar Power

"We supplied battery chargers to the PT-305 through our distributor Donovan Marine in Harahan" in Jefferson Parish, Brian Giannini, marine sales manager at Newmar in Huntington Beach, California, said. "At Donovan, they were very passionate, marshaling the troops to pull together resources to help out this project."

Newmar donated a package of four Phase Three-series battery chargers for the vessel's port and starboard 24V battery banks and its 12V generator start bank. To protect the boat's 1943 design and outward appearance, the chargers and related modern systems were mounted out of sight in the boat's ammunition locker. The chargers were installed by volunteers and electricians at the PT-305 restoration site, Giannini said.

The company's chargers were added to meet U.S. Coast Guard requirements that passenger-carrying vessels have communications, alarms, pumps and safety equipment, he said. Newmar's PT-series units have smart circuitry to do three-stage charging for fast recovery and conditioning. These ABS-approved chargers can also be used as a power supply for DC or direct current loads. For its part, Newmar has made electronic-power products and accessories for over 45 years in on-site facilities that do its major production work, allowing quality control.

Moore Industries

"We contributed products to the restoration and are very proud to have been included in this historic project," Tom Watson, corporate marketing manager at Moore Industries-International, Inc. in North Hills, California, said, "Because the boat's master monitoring and control electronics panel couldn't be restored, a modern Programmable Logic Controller was installed." That's where Moore Industries' THZ3 Dual Input Smart HART temperature transmitters came into play.

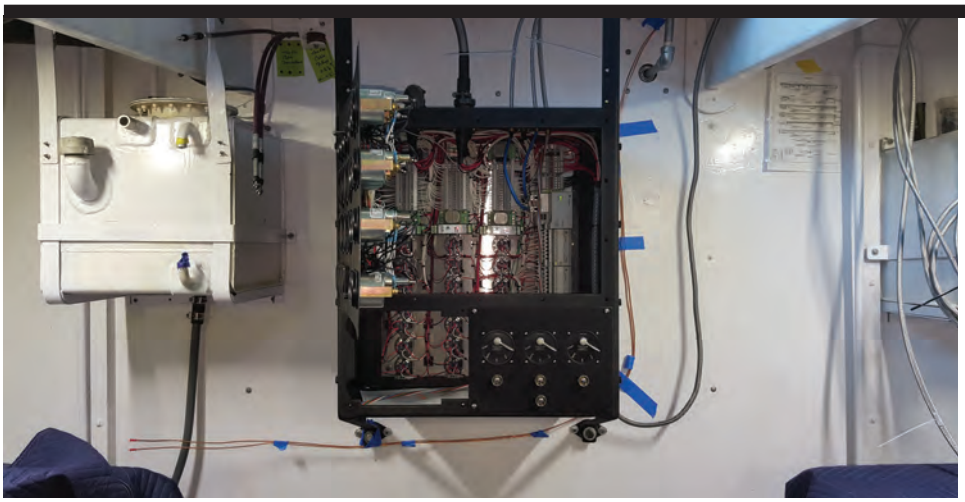
"Many sensors monitoring the boat's engine and other parameters, such as strain gauges, thermometers and torque sensors, use older analog circuits and instruments that provide non-linear resistance (ohms) outputs," Watson said. "Since our THZ3 can build up to a 128-point custom input curve, these resistance signals can be linearized and converted to linear 4-20mA signals and sent to the PLC."

Because of the THZ3 HPP's small size and encapsulated electronics, it could be integrated into panels on the Sudden Jerk. "One particular monitoring unit is near the PT-305's

PT-305 Fast Facts

Vessel: Motor Torpedo Boat	Length: 78'-00"	Hull material: wood
Hull type: hard-chine planing	Beam: 20'-08"	Top Speed: 41 KT
Fuel Capacity: 3000 gallons (AvGas)	Draft: 6'-00"	Cruise Speed: ~25 KT
Propulsion: 3 x 1,500 HP engines	Range: >500nm @ 25 KT (250 nm @ 41 KT)	Loaded Displacement: 49 LT

(*) Data: Courtesy Mark Masor, naval architect at Gibbs & Cox, Inc. and museum volunteer.



The THZ3 HPP model's small size and protected, encapsulated electronics make this model ideal for integrating into panels like that used for the PT-305.

engine room that housed one of the three Packard 1500 horsepower, 2500 cubic inch engines," Watson said. "Since these engines run on aviation fuel, it's possible that under some circumstances fumes could be present. The THZ3's Class I Division 2 hazardous-area approval and small hockey puck are other features that led to its use on the PT-305."

Crescent River Port Pilots' Foundation

Patrick Duvernay of the Crescent River Port Pilots' Foundation in Belle Chasse, La., said, "when the museum was getting ready to move the PT-305 to Lake Pontchartrain, they needed assistance for transportation. Our foundation has strong military and naval contacts and a number of veterans. We asked the museum about their requirements, and we raised $10,000." The association has 110 pilots.

"The PT-305 played an important part in our nation's history and it, along with the museum, fills an educational niche," Duvernay said. He added that South Louisiana's maritime presence make it an appropriate place for the *Sudden Jerk*.

The association's pilots navigate ocean cargo ships along a treacherous stretch of the Mississippi River from Head of Passes to New Orleans. River pilots formed their foundation in 2005 to support causes in Jefferson, Orleans, Plaquemines, St. Bernard and St. Tammany Parishes, where they work and live.

Pritzker Military Museum & Library gave big

In early March, the Pritzker Military Museum & Library, along with the TAWANI Foundation, both located in Chicago, donated $100,000 to the PT-305 project. That included a $10,000 pledge to the museum's "Launch PT-305" Kickstarter campaign.

Opened in 2003, the Pritzker Military Museum & Library was founded by retired Colonel Jennifer Pritzker, IL ARNG to raise awareness about military history and veterans. The TAWANI Foundation is a grant-making group funded by Colonel Pritzker, who collected books and materials focused on American soldiers. The Pritzker Museum & Library encourages discussion, and in the last decade has held hundreds of events led by historians and authors.

PT-305 returns to Louisiana

"Andrew Higgins is the man who won the war for us," Dwight D. Eisenhower said in 1964, three years after his second presidential term. Higgins Industries churned out 20,000 boats between 1940 and1945. At one time, the company ran seven plants, including one at Michoud in

PT-305 Restoration Contributors … at a glance (*)

Bender	Dometic Marine	Lemoine Marine Refrigeration	Quality Metal Works
Berard Transportation	Gibbs & Cox	Marquette Transportation	Rockwell Automation
Boysie Bollinger	Gulf Coast Shipyard	Moore Industries	Rolls-Royce
Canal Barge	Ingalls Shipbuilding	NewMar	Stewart and Stevenson Services
Crescent River Pilots	International Paint	Petit Paint	Seabrook Harbor & Marine
Cummins Mid-South	Karl Senner	Pritzker Military Museum	VT Halter Marine

(*) this list not all-inclusive.

New Orleans East, the site of today's Michoud Assembly Facility. With high wartime demand for labor, Higgins' staff was the first diversified workforce of men and women – as well as white and African Americans – in New Orleans.

In 1944, PT-305 participated in the invasion of Elba in Italy and in operation Dragoon in southern France. That year in Italy, the *Sudden Jerk* sank a German Flak-lighter off of Palamaria Island and drowned a German Flack-lighter at Point Del Mesco. In 1945, PT-305 sank an Italian fast-torpedo-armed vessel off Cape dell'Arma. For their part, German submarines attacked ships near the mouth of the Mississippi River for over a year, starting in the spring of 1942.

When the *Sudden Jerk* returned to the States, it spent the post-war decades as a tour, scalloping and fishing boat on the East Coast, and then seeded oyster beds in Chesapeake Bay. In 2001, the Defenders of America Naval Museum in Galveston, Texas bought PT-305. That institute eventually contacted the WWII Museum, where the vessel arrived in April 2007 for a complete overhaul. The PT-305 was rebuilt in the New Orleans warehouse district at the Kushner Restoration Pavilion.

Its current condition and location wouldn't have been possible without the help of countless volunteers, corporate and private donors, marine OEM outfits and many other sources. Throughout the entire project – then and now, in good times and bad – the commercial waterfront and workboat stakeholders have been key contributors.

Visit: **www.nationalww2museum.org/events-programs/events/123078-pt-305-ride-lifetime**

Susan Buchanan *is a New Orleans-based business writer, specializing in energy, maritime matters, agriculture, the environment and construction. She holds a master's degree from Cornell University in agricultural economics and an undergraduate degree from the University of Pennsylvania.*

Technology Qualification on the Route to Autonomy

ABS weighs in on the way forward for marine autonomous systems and navigation technology.

By Smarty Mathew John

The era of digitization and hyper-connectivity is taking the maritime industry on a journey as it transitions from 'smart' to remotely operated and then, to autonomous vessels. The OSV sector – and offshore workboats in general – may well be leading that transition, with some projections for remote-controlled vessels as soon as next year.

Many new technologies (sensors, navigational systems, instrumentation and artificial intelligence, etc.) are rapidly being introduced, with industry codes and regulations struggling to keep pace. Some new technologies and their intended applications have little precedent, raising concerns about their readiness, maturity and safety implications.

While industry has gained experience in the past two years through autonomous surface vessels supporting simple missions – such as surveys in restricted waters – more complex missions are being envisioned (e.g., oil spill recovery, firefighting, safety standby rescue). These missions will require more advanced control algorithms and intelligence to navigate in open waters, and to work with other manned or unmanned vessels, in human supervised or fully autonomous modes.

More complex systems integration and system-system/human-system interaction will be required to accomplish mission objectives. The security of these cyber-enabled systems will also become a critical issue. While the benefits of autonomous vessels are clear in terms of reductions in human error, reduced exposure of offshore workers to hazards, reduced operating cost and greater design and operational efficiency, there are risks introduced by autonomy itself.

To support early adoption of an autonomous ship concept, owners and regulators will need to build confidence that these new technologies will perform as intended. The potential risks associated with their implementation will need to be systematically reviewed and managed. Following a new technology qualification (NTQ) process can help accomplish this for each step on the route to autonomous Vessels.

Qualifying New Technology

ABS recently introduced the NTQ service to help qualify new technologies by confirming their ability to function in accordance with defined performance requirements. It is based on the qualification approach outlined in the *ABS Guidance Notes on Qualifying New Technologies* as shown in **Figure 1**.

Based on the principles of systems engineering, the process encourages a systematic and consistent evaluation of new technologies as they mature from concept through to intended operations. It follows a five-stage process that aligns with the typical product-development phases of a

new technology:

1. *Feasibility*
2. *Concept verification*
3. *Prototype validation*
4. *System integration*
5. *Operational verification/validation*

The qualification activities within each stage employ risk assessments and engineering evaluations that build upon each other to determine if the new technology provides acceptable levels of safety in line with current offshore and marine industry practices. The qualification efforts – by all stakeholders, including the vendor, system integrator and end-user – at each stage are detailed in an NTQ plan.

Completion of the qualification activities produces a "statement of maturity," which attests to the technology's maturity level and helps to demonstrate progress and readiness to investors, partners or customers. It also helps regulatory agencies to gain confidence that the foreseeable hazards have been systematically reviewed.

When the 'prototype-validation stage' is completed, the technology then can be Type Approved to reduce repeated evaluation of identical designs.

Applying NTQ

A new technology is broadly defined as 'any design (material, component, equipment or system), process or procedure that does not have prior in-service experience, and/or any classification rules, statutory regulations or industry standards that are directly applicable'. The type of 'novelty' of a new technology is categorized as follows:

- *C1. Design/process/procedures challenging the boundaries of current offshore or marine applications*
- *C2. Design/process/procedures in new or novel applications*
- *C3. New or novel design/process/procedures in existing applications*
- *C4. New or novel design/process/procedures in new or novel applications*

The level of effort involved in qualifying new technology increases from C1 through C4. An asset is a novel concept if incorporating new technologies appreciably alters its service scope, functional capability, and/or risk profile because it introduces applications that have not been proven in the marine and offshore industry. A novel concept also can be a system of systems (SoS) that results from integration of independent systems to form a larger system with unique capabilities.

Novel concepts are typically presented to ABS for a review and class approval in accordance with the *ABS Guidance Notes on Review and Approval of Novel Concepts.* That process and its linkage to the NTQ process are shown in **Figure 2**.

Gathering Requirements & Technology Decomposition

This step helps to develop a 'system requirements and description document' (SRDD) for the novel concept, which defines and sets the baseline requirements for qualification of the SoS and all subsystems or components; the document is intended to be a design-review package rather than a single, consolidated document.

As the design matures through development and more knowledge is gained through qualification, the initial requirements may be subject to change. The SRDD will need to be updated accordingly to include more detailed documents, which, for example, offer functional descriptions and specifications of software designs and requirements. Those requirements can be gathered and defined by following a systems-engineering approach, focusing on:

- *Defining goals for the novel concept, or SoS, based on the mission;*
- *Identifying the functional requirements to meet the goals – including human element considerations;*
- *Identifying the performance requirements for each functional requirement;*
- *This process is followed by a top-down system decomposition, wherein the system is divided into subsystems, which are further broken down into components. The typical system hierarchy and decomposition iterations are shown in* Figure 3.

This decomposition process achieves the following:

- *Mapping the functional requirements of the system to item(s) (e.g., subsystems or components) to identify their ownership;*
- *Mapping functional requirements to specific performance requirements;*
- *Confirmation that all defined functional requirements can be addressed by configurable items.*

For example, a goal for the autonomous navigation system could be that it is 'capable of executing its mission in a safe and reliable manner under all foreseeable conditions.' A functional requirement associated with this goal could be that 'the system is able to navigate on its own by detecting objects in its path and maneuvering to avoid collisions.'

The key system that contributes to this functional require-

ment could be the autonomous navigation system; the associated subsystem could be collision avoidance system; with relevant components being the sensors/sensor fusion for situational awareness, such as cameras, RADAR and LIDAR.

Performance requirements are defined at the subsystem or component level. Examples include:

- *detection and classification (by type and size) of objects within a certain time frame and distance required to give sufficient time to react;*
- *execution of collision regulations based on type of object;*
- *resolution requirement for cameras;*
- *fault tolerance, failed and degraded state requirements.*

Reference can also be made to the approaches used in

FIGURE 1

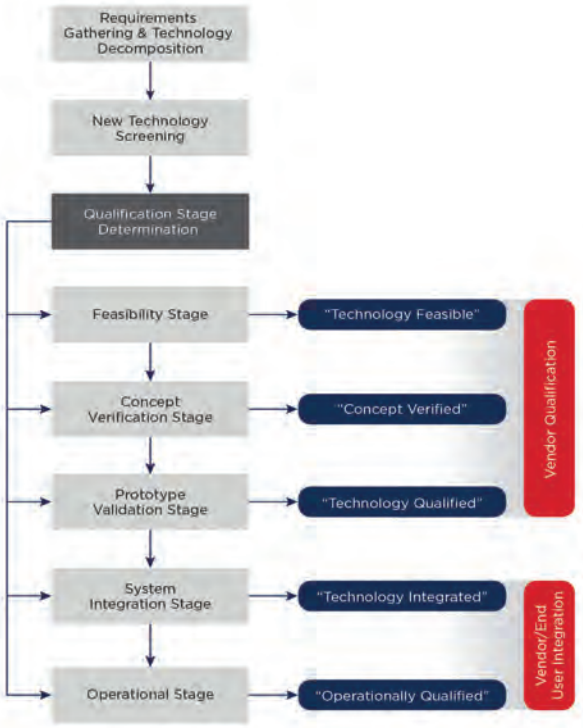


FIGURE 3

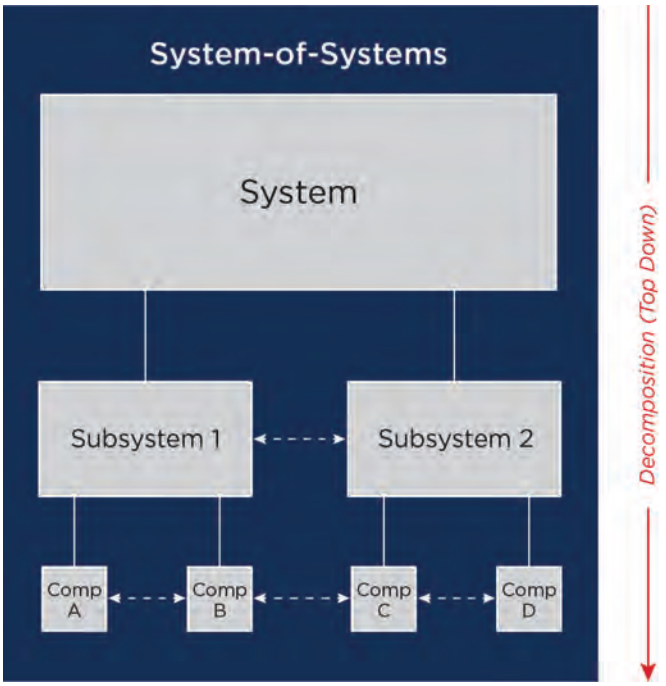


FIGURE 2

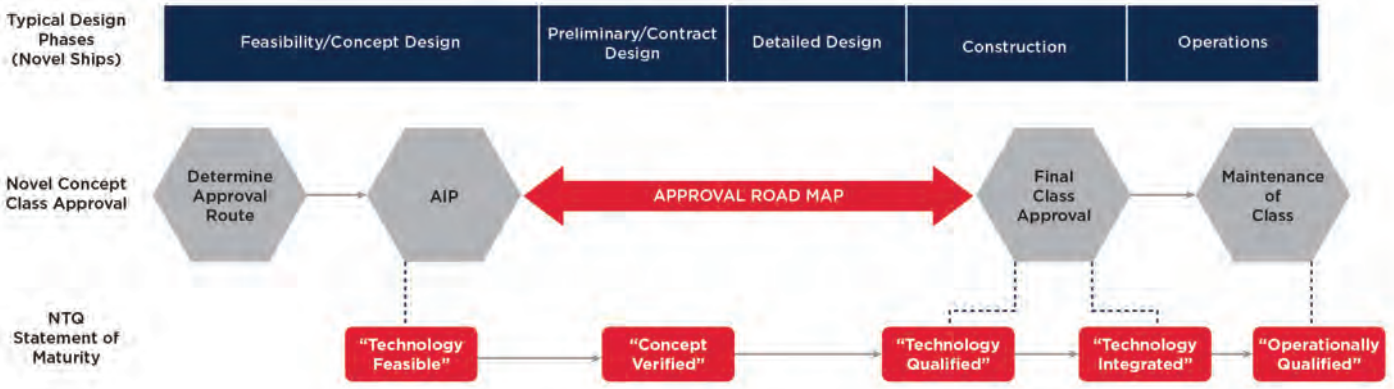
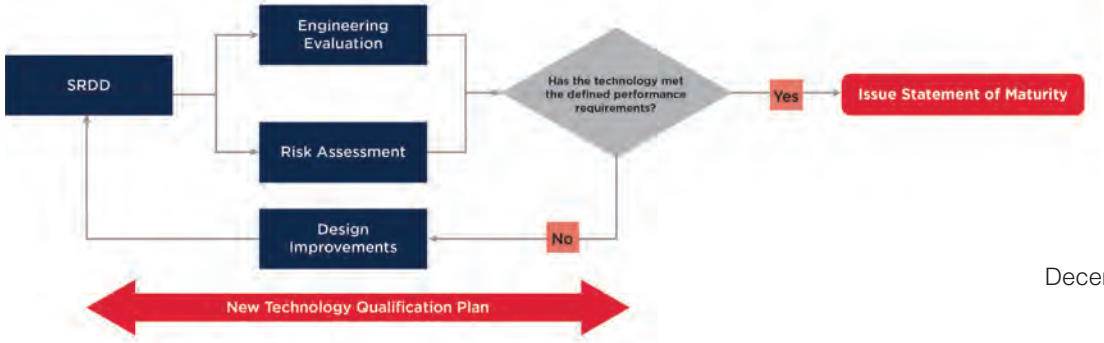


FIGURE 4



the IMO's goal-based standards or the Naval Ship Code.

New Technology Screening

The next step is to identify new technology items and determine where to focus qualification efforts. The previous NTQ novelty categories can be used to estimate the rigor required to qualify each new technology. The assignment of integrity levels will determine the criticality of each item in the system hierarchy based on the potential consequences of a functional or systemic failure.

When the functional requirements and subsystems are reviewed, many of the individual technologies (e.g., sensors, instrumentation, etc.) may have some maturity, but may be being used in a novel application.

The new technologies that will require the most attention are autonomous control systems that use machine learning or artificial intelligence-based algorithms to assess conditions and events, make decisions, or command interfacing systems used for safe operations.

New Technology Stage Determination

The maturity level of the new technology can be determined by the systematic screening process and review of the SRDD, helping to identify the stage at which qualification activities should be initiated.

Qualification Activities

The objective of qualification activities is to verify and validate that the new technology can satisfy performance requirements. Qualification within each stage is comprised of a set of iterative activities that include engineering evaluation and risk assessments as shown in **Figure 4**. The activities for progressing through each qualification stage are in the NTQ plan.

Risk assessments are the key to identifying the technical risks associated with new technologies. They should target hazards associated with the overall SoS based on the specified mission and new technology at each qualification stage.

Typical activities for engineering evaluation include a review of the engineering design requirements, design verification (through analyses and simulation), validation testing, interface analyses, verification of operability, ability to be inspected and maintained, and a review of the quality-assurance program. The key engineering-evaluation activities for an autonomous-control system include:

- *verification of software systems;*
- *verification and validation of data integrity;*
- *review and certification of the software provider.*

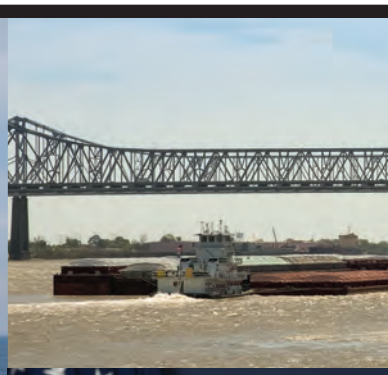
The Path to Classification

The ABS NTQ process is embedded within the class review and approval for novel concepts, helping to make the transition seamless. When all enabling new technologies have obtained a 'technology feasible' Statement of Maturity, an Approval In Principle can be issued. The AIP is a key milestone in the class approval process; it attests that the novel concept in this technology complies with the intent of the ABS Rules and Guides. It demonstrates the feasibility of a project with respect to the SoS goals and the concept's eligibility to be classed.

The future for autonomous shipping is promising despite some significant obstacles in the way, such as the creation of regulatory frameworks and building industry confidence in safety and their mission-ability of the technologies. The NTQ program was developed to support marine and offshore industries during a time of rapid technological change.

***Smarty Mathew John** is ABS Manager of Industrial Systems, Subsea, Safety and Risk. Matthew John has held leadership roles in R&D, Operations and Consulting within ABS, including managing Risk-based Services, and Offshore & Subsea Risk & Reliability Applications. He has an MS in Industrial Engineering and a BS in Mechanical Engineering from Texas A&M, and a Subsea Engineering Certification from the University of Houston.*

The Top 10 Stories for 2017



Plucked from the headlines, the top stories of 2017 were compelling, and each provided impact to the domestic waterfront and in particular – the workboat sector. Follow along as ***MarineNews*** recaps the highlights, drama and significant events that shaped the past 12 months.

By Joseph Keefe

DOT & Marad: Chao & Buzby both Confirmed

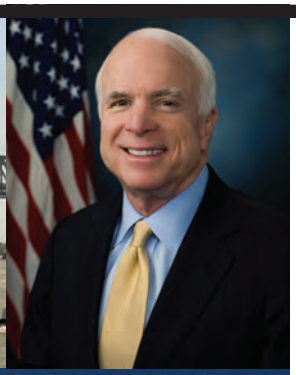
When Elaine Chao was sworn in to be the U.S. Secretary of Transportation, the Washington veteran brought a welcome burst of competence to the position. Her wide-ranging experience across the maritime sector and prior service at the U.S. Department of Transportation, Maritime Administration, and the Federal Maritime Commission uniquely positions her to understand the critical role that the waterfront plays in the intermodal equation. Soon after taking her chair, she was joined by another familiar face at Marad.

Rear Adm. Mark H. Buzby, USN, Ret. was next sworn in as the Administrator of the U.S. Maritime Administration. A career naval officer with over 34 years of service, Buzby also served as the Commander of the Military Sealift Command (MSC). A 1979 graduate of the U.S. Merchant Marine Academy, Buzby earned his Bachelor of Science in Nautical Science and U.S. Coast Guard Third Mate License.

On paper, he is arguably the most qualified person confirmed for the position in recent memory. Together with DOT Secretary Chao, the duo forms the basis of the best one-two punch that the domestic waterfront has seen in some time inside the beltway.

Infrastructure: Closures at Locks 52, 53

The late year infrastructure failure(s) at Lock 52 near Brookport, Illinois was unquestionably one of the biggest stories of the year for the domestic waterfront. Arguably, no other issue is more important to inland commerce than the



poor condition of inland infrastructure, locks and dams. At one point in the crisis, average delays of 65+ hours were being experienced by a queue 58 vessels and 658 barges waiting their turn. Originally, Hurricane Nate created rising river levels and its closure, but Lock and Dam 52 was also closed for almost nine days in September due to an unscheduled maintenance issue.

The unscheduled closure created a massive headache for farmers and shippers alike, as they tried to move newly harvested soybeans from Midwest farms to export terminals along the Gulf Coast. The Mississippi River and its tributaries are the lynchpin for transporting grain to export markets with as much as 60 percent of all U.S. agriculture exports departing the nation's heartland via Gulf Coast gateways. A robust crop of corn and soybeans increased export commitments, and as barges and towboats waited to pass, there was nowhere to store the grain and even less choices on the river.

The closures bring to the full spotlight the critical, but aging, lock and dam infrastructure on the inland waterways system. And, while it is tempting to characterize this event as an isolated, one-time anomaly, the truth of the matter is that the entire inland lock and dam system – the vast majority of it in any event – is more than 50 years old.

You can bet that farmers in Brazil and Argentina are watching with interest what plays out on U.S. Rivers. But, don't worry: if we have a catastrophic, long lasting casualty on one or more of our major river arteries, the rest of the world won't go hungry. Argentina and Brazil will gladly feed them. We often talk about what could happen if we don't take care of these river assets. Now, we know.

CAAP in California

It turns out that the maritime industry – the one which moves 95% of what you use on a daily basis? – is bad for the environment. In response, the ports of Los Angeles and Long Beach (prodded by the politically driven, so-called California Clean Air Action Plan), above and beyond the remarkable progress they have already made to date, now seek to achieve and accelerate to 100% zero-emissions cargo handling equipment by 2030.

Separately, an industry study, commissioned by the Pacific Merchant Shipping Association (PMSA), puts the cost of achieving this lofty goal at about $16 billion locally, not including infrastructure costs outside the marine terminal gates. Like safety, you can't put a price on saving the environment.

One lesson or 'take-away' is that environmental efforts are hard. Sometimes they are expensive and sometimes, people don't look at the big picture as they push an agenda that a captive audience can scarcely afford, with long term benefits – and impacts – that are at best, uncertain. This was one of those times.

Operators, ports and terminals everywhere all hope that 'green' produces another kind of 'green.' That doesn't always happen. What will be the impact of the West Coast Clean Air Action Plan (CAAP)? What if other regional ports don't follow suit?

In their well-intentioned haste to clean up the environment, CAAP proponents concentrate chiefly on the ports when far greater gains can be had by improving highways, rail intermodal connections, inland locks and dams. Hence, laying the lion's share of cost on the maritime sector – ports and vessels alike – to clean up something that has already been improved by leaps and bounds is not only unfair; it's also foolish. Someday, it might just take down the supply chain along the way.

Horizon Pushes the 'Pause' Button

Horizon Shipbuilding in September announced that it

would reorganize amid revenues insufficient for maintaining normal operations. The yard had, up until that point and by all outward appearance, been sailing along, incredibly busy and engaged in more than one series-build contract. In September, that all came crashing down in an announcement that few saw coming in advance.

Lance Lemcool, Horizon Shipbuilding Vice President announced the news with a prepared statement that said, in part, "Last year, Travis R. Short, President of Horizon Shipbuilding saw an opportunity to repeat a great construction performance from 2012 ... Hornblower (HNY Ferries) offered just this type of opportunity through its NYC Ferry project and Horizon has achieved what most believed couldn't be done. Through the unparalleled commitment of Horizon's boat builders, subcontractors and suppliers, all of the 2017 ferries have been delivered. However, project revenues were not sufficient for Horizon to continue normal day to day operations."

Horizon now looks to an uncertain future. The announcement comes closely on the heels of what was a largely well-perceived execution of an aggressive building contract for Hornblower, as well as several other recent deliveries. Beyond this, the yard was also lauded for the development of its proprietary, in-house software program that was specifically designed to create efficiencies and economy-of-scale for shipbuilders and other manufacturers. All of that, apparently, wasn't enough to ward off September's announcement.

Energy Exports

According to Reuters reporting of EIA numbers, the United States will account for a whopping 80 percent of the world's output growth over the next 10 years. Closer to home, U.S. oil production hit a record 9.65 million bpd in November. This is a 'good news, bad news' story for U.S. offshore maritime assets. That's because whenever the price of crude oil rebounds sufficiently to give the ailing OSV sector a glimmer of hope, land-based shale producers simply open the tap. On the other hand, not all of that oil can come from the hinterland, and if EIA projections are correct, the U.S. outer continental shelf will soon play an enhanced role.

The decision to open up U.S. crude oil for export has had a dramatic impact on the U.S. trade deficit, and the new normal has shaken up traditional supply and demand models. Today, domestic output has risen by as much as 15 percent since its mid-2016 low. Beyond this, global energy markets have been shored up by bullish hedge funds that have increased their long positions based on a perceived future tightening of worldwide supplies.

Both OPEC and non-OPEC exporters agreed one year ago to cut crude output substantially to bolster prices. That's been a partial success and as yearend approaches, that same coalition is signaling that they are likely to continue that policy. Both inland and offshore energy transportation and support operators hope that this will signal a rebound in fortunes for both sectors.

Renewed Attacks on Jones Act

In January, the Customs and Border Patrol (CPB) proposed changes to reverse then-current practices that allow non-US based vessels to transport cargo between US ports. The proposal ignited a fierce lobbying effort on both sides of the equation, one which was (for the time being) won by foreign flag interests. That's because, in May, CPB backpedaled; writing that based on "substantive comments" received "we conclude that the Agency's notice of proposed modification and revocation of the various ruling letters relating to the Jones Act should be reconsidered." That's where the matter stands today.

It would be an understatement to say that, during 2017, attacks on all aspects of the Jones Act – most recently from U.S. Senator John McCain, who plumbed new lows in leveraging a humanitarian crisis in Puerto Rico – have become more numerous and robust in their application. The latest assault comes in the choppy wake of Hurricane Maria, a powerful storm that walloped the island commonwealth earlier this year.

Jones Act opponents insist that the Jones Act is solely responsible for the slow and painful recovery now underway there and for the general state of Puerto Rico's insolvent economy in the first place. These folks 'never let a good crisis go to waste.' As this edition went to press, there were no less than four different legislative efforts being thrown around on the Hill to roll back some or all parts of the Jones Act. Suffice it to say that this year was one of the most active in recent history when it comes to protecting U.S. cabotage laws.

Hurricanes, Training Ships, Marad and U.S. Mariners

In 2017, the most active hurricane season in recent memory wreaked considerable havoc in this hemisphere. Puerto Rico, Texas and Florida all took substantial hits and if anyone previously doubted the value of being able to call

up Marad controlled training vessels to support recovery efforts, then what happened in Houston and Puerto Rico should have changed their minds. But, those state maritime academy (SMA) training ships are getting long in the tooth and there are, for the first time ever, no reserve assets left to replace them.

Two crises loom large in the porthole. First, as these aging vessels – some approaching 50 years in service – fail, the immediate problem to be faced is how and on what platforms the mariners of the future will be trained. Second – and no less important – these vessels perform myriad (critical national security) functions beyond their most visible training missions.

As Marad wrestles with what to do next, all options are on the table. A fit-for-purpose, series build replacement fleet of training vessels is being designed and contemplated, but that cost could exceed $1 billion for five vessels at a time when a single desperately needed icebreaker hasn't yet been funded. Without ships, most SMA kids can't get the sea time necessary to earn a license. The purchase of existing asset(s) at a time of market over-capacity is also being tossed around.

The Lingering Offshore Downturn

In the U.S. Gulf, the specter of Chapter 11 filings and the sobering reality of vessel after vessel rolling off the shipyard ways and directly into cold iron layup, tells a grim story. Earlier this year, VesselsValue (VV) shed some light on the real numbers. For example, and when comparing the 50 offshore vessels ordered in H1 2015 against the absence of any offshore orders placed during H1 2017, the situation in the offshore oil patch becomes only too obvious. Indeed, VesselsValue reported that about 28% of this global fleet is currently in layup. PSVs – or Petroleum Supply Vessels – top the list with 36% of their fleet currently laid up.

The VesselsValue offshore database includes Offshore Support Vessels (PSV, AHTS, AHT, FSV, Ocean Going Tugs and ERRVs), Offshore Construction Vessels (Pipe layer, Cable Layer, Well Intervention, Dive Support Vessels, MPSV, Floatel, Accommodation Ship, Crane, Lift Boats, SOV, and Utility Vessels) and Mobile Offshore Drilling Units (Drillship, Semi submersible, Jack Ups).

It is the massive lay-up and not so much the price of oil that could spell further misery for this sector. That's because rates will likely remain depressed for an extended period of time due to vessel reactivation. As rates recover, more vessels will be reactivated, which will, in turn force rates back down due to oversupply.

Finally, we broke out the U.S. flag offshore fleet from the pack. According to VesselsValue, as many as 450 (40%) U.S. offshore support vessels were laid up in September. Hence, this story is probably the most important, albeit unhappy story, of the past 12 months.

Hornblower and the Domestic Ferry Boom

A Hornblower contract won by two Gulf Coast yards to produce as many as 19 aluminum ferries for New York City's Economic Development Corporation was one of the biggest shipyard deals of the year, but it also highlighted the boom in domestic ferry newbuilds across the continent.

For its part, Metal Shark was contracted to build four 88' 150-passenger vessels for the Potomac Riverboat Company division of Entertainment Cruises. The first two are in production now at Franklin. Also in January, Metal Shark was hired to build two 105' 150-passenger ferries for the New Orleans Regional Transit Authority for delivery next year. And, they've since won other ferry contracts, as well. Myriad U.S. yards have won and performed similar work. Put simply, the ferry and passenger vessel segment provided a much needed bright spot for domestic builders during 2017.

Subchapter M Towboat Rules

Sub-M is the shorthand phrase referencing Subchapter M of the Code of Federal Regulations (CFR) dealing with towing vessels; more specifically, inspection, standards, and safety management. The final rule was issued in July of 2016. The impact of that edict is now hitting home for most of the 5,000+ vessels in this sector that were, until now, uninspected vessels.

Existing vessels need to meet most requirements by July, 2018. New vessels (keel laid/major conversion after July 20, 2017) must meet all requirements and obtain a certificate of inspection before entering service. Sub M stems from legislation passed in 2004.

The maritime community was active during regulatory development and most operators are moving towards compliance. For some – in particular those involved with the AWO's Responsible Carrier Program (AWO) – the new rule won't be a problem. However, concerns remain about actually implementing Sub M's demands, especially for the smaller, so-called Mom-and-Pop operators. Smaller operators could struggle, cutting corners or, worse, going out of business.

GREAT WORKBOATS
the Best of 2017

MarineNews showcases the best of North America's 2017 workboat deliveries. There is something for everyone.

Notwithstanding the lingering offshore energy downturn, there were plenty of bright spots for North American shipyards in 2017. If a hull was delivered in 2017, we took a look at it, with several areas as a focus for inclusion into this edition. For starters, it is always exciting when a domestic yard delivers a vessel – or multiple vessels, for that matter – to foreign buyers. We can compete in a foreign arena; on price, quality and on-time delivery. This year was no different. No less important is the environmental footprint of a vessel, and there was plenty to report on from that angle in the past 12 months. The domestic waterfront is indeed getting greener and cleaner. Finally, innovation wasn't in short supply, either.

In the end, technology, the environment and replacement tonnage requirements were seen as the main drivers of shipyard output. Inland operations, Arctic requirements, LNG propulsion, dredging, government requirements, offshore wind, inland operations, harbor assist, shortsea shipping and a host of other needs were addressed and met in 2017 by North American builders. The best of those designs and deliveries are chronicled below:

HORNBLOWER'S CITYWIDE FERRIES

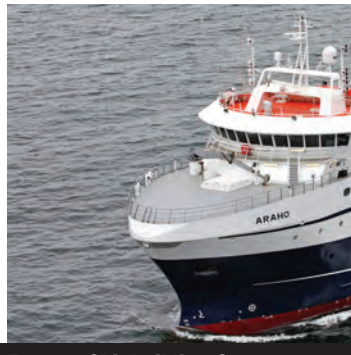
The first six passenger vessels built by Louisiana-based shipbuilder Metal Shark for New York's new NYC Ferry were delivered in New York. Vessels 1 through 6 were all delivered on-time between April and June of 2017. The Incat Crowther-designed, 149-passenger, USCG Subchapter T passenger ferries were handed off to crews from HNY Ferry Fleet LLC (a Hornblower company), operator of the new passenger vessel service. Hornblower Co. is the parent company of Hornblower Cruises & Events, Alcatraz Cruises, Statue Cruises, Hornblower Niagara Cruises, Liberty Landing Ferry and HMS Global Maritime. Hornblower's newest operation, NYC Ferry by Hornblower is the newest way for New Yorkers and visitors to "Work Live and Play." Expected to service over 4.6 million passenger trips annually, NYC Ferry now provides critical transportation links for areas currently underserved by transit and connect them to job centers, tech hubs and schools in New York City. Designed by Incat Crowther, the option ferries are of the "River" class design and have an overall length of 85'-4" with a 26'-3" beam. The all-aluminum vessels achieve speeds of 25 knots.

VIGOR DELIVERS HARVEST ATB TANK BARGE

Vigor recently launched The Harvest, the first complex liquefied ammonia transport barge built in the United States for Jones Act trade since 1982. The vessel was constructed to support the operations of The Mosaic Compa-

Hornblower

Vigor



Eastern Shipbuilding Group

ny. The Harvest will be operated by a subsidiary of Savage Companies as part of an articulated tug and barge (ATB) unit. Leveraging one million labor hours at Vigor facilities in Oregon and Washington and subcontractors throughout the region, teams used 9,000 tons of American rolled steel to complete the 508' x 96' ATB tank barge. Careful integration of various complex systems was required to support the Harvest's state-of-the-art, onboard re-liquefaction plant that keeps cargo cooled to -27 degrees Fahrenheit. Built to the highest ABS and U.S. Coast Guard safety standards, the first-in-class Harvest was completed on an aggressive timeline.

ESG DELIVERS FREEZER PROCESSOR FACTORY TRAWLER

Eastern Shipbuilding Group delivered a DNV-Classed Factory Processor Fishing Trawler, the Araho, to the O'Hara Corporation of Rockland, Maine. Notably the first US Flag Freezer Processor Factory Trawler constructed in over 25 years, the ARAHO is now in service in the waters of Alaska. This is the sixth fishing vessel Eastern has built for the O'Hara family over the last 20 years. This factory processor fishing trawler is far more sophisticated than the prior five vessels. The F/T ARAHO is a ST-115 design furnished by Skipsteknisk, AS of Aalesund, Norway. The main processing equipment, in the enclosed factory will consist of various types of fish heading machines and factory systems, consisting of transport systems, fish grader, storage tanks, weighing graders, weighing system, packing tables, packing machine, automatic horizontal freezer system H1, block elevators, etc. The design intention of the process deck lay-out and selected equipment for transport and handling is to obtain a system with the largest amount of automation, assisting the employees working in the processing area. This arrangement is designed to achieve very high throughput with minimum fish damage, improve employee efficiency all in a clean and safe work area. O'Hara Corporation operates three catcher-processor vessels in the Bering Sea, Aleutian Islands and Gulf of Alaska.

HARVEY GULF'S LARGE CAPACITY JONES ACT COMPLIANT MPSV

Harvey Gulf International Marine this year took delivery of two, large capacity Multi Purpose Support Vessels (MPSV), significantly enhancing the domestic Jones Act Fleet. Built by the Eastern Shipbuilding Group, the M/V HARVEY SUB-SEA, and BLUE-SEA are "best in class" Jones Act-qualified vessel that has the technical capabilities to efficiently, effectively and safely perform high quality field development activities that are currently being performed by a foreign fleet. Contrary to claims from foreign operators that U.S. vessels lack the capability to perform foreign-flag vessels for subsea construction, inspection and maintenance activities, the delivery of the M/V HARVEY SUB-SEA clearly demonstrates the capacity and capability of Jones Act qualified vessels to immediately perform the necessary work.

FIRST US-BUILT ROTORTUG ENTERS SERVICE

The first U.S.-built Rotortug, ART Trident, has undergone trials and is now in service. Designed by Robert Allan Ltd., and designated as an ART 80-98US, she was built by Master Boat Builders in Bayou La Batre, Ala., and is the first in a series of three being constructed for Seabulk Towing of Ft. Lauderdale, Fla. The ART (Advanced Rotortug) designation applies to Robert Allan Ltd. designed tugs featuring the triple Z-drive configuration, originally conceived and developed by Rotortug (KST) B.V. of the Netherlands. Offering exceptional omni-directional maneuverability and control, with a redundant propulsion machinery configuration, the ART series offers enhanced performance for ship-handling, terminal support and escort towing. The vessel has been arranged and outfitted to a high standard with six crew berths in total. The Master's and Chief Engineer's cabins are located in the deckhouse with two double crew cabins located on the lower accommodation deck. A fully appointed mess/lounge and a modern, fully equipped galley are also located in the deckhouse.

Harvey Gulf

Robert Allan Ltd.

SEASPAN CELEBRATES TWO NEW LNG FUELED VESSELS

Seaspan Ferries Corporation (SFC) welcomed two new, state-of-the-art dual-fuelled/hybrid (liquefied natural gas, diesel and battery) vessels to its fleet this year during a double commissioning ceremony held at SFC's Tilbury Terminal. The Seaspan Swift and Seaspan Reliant, the first eco-ferries of their kind in North America, were built at Sedef Shipyard in Istanbul, Turkey. The 148.9 meter ferries, which can accommodate up to 59, 53-foot trailers, mark the first new vessels added to SFC's fleet since 2002.

GREAT LAKES SHIPYARD BUILDS NATION'S FIRST SUBM COMPLIANT, ABS TUG

Great Lakes Shipyard has built the first of ten (10) Damen Stan Tugs 1907 ICE. Delivered in March, this milestone marks the beginning of a new construction program to introduce two (2) new harbor tugs per year for the next five (5) years at the Shipyard's facility in Cleveland, Ohio. Built to ABS Class, GLS Hull Numbers 6501–6510 are the first tugs built to meet the new USCG Subchapter M Regulations. The Great Lakes Towing Company & Great Lakes Shipyard entered into a partnership with Damen, who provided engineering for its proven designs and Great Lakes Shipyard will receive full construction, design and engineering support from Damen.

ESG DELIVERS FOUR ABS CLASS INLAND RIVER TOWBOATS

Eastern Shipbuilding Group recently delivered four (4) ABS Class Inland River Towboats IWL River. This series of CT Marine designed 134 foot ABS Classed Inland River Service Towboats are Triple Screw with Retractable Pilothouses. All four towboats were constructed, outfitted and delivered at Eastern's Allanton Facility. IWL River is one of Eastern's newest clients. These towboats will service the inland waterways of Latin America for Impala Terminals. Impala owns and operates a network of terminals that facilitate global trade flows, specializing in warehousing, multi-modal logistics and related port services for essential commodities worldwide.

LELAND, MICHIGAN TAKES DREDGING INTO OWN HANDS

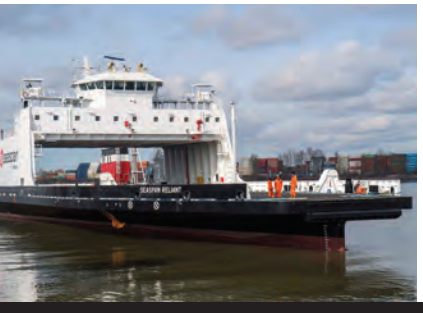
Leland, Michigan, on the shores of Lake Michigan, is one of the jewel communities of the state's Northern Lower Peninsula. For many decades, the harbor contracted dredging services to keep the marina clear at permitted depths, often with funding from the U.S. Army Corps of Engineers (ACOE). In fact, Leland Harbor has had to dredge its harbor mouth and channel 49 times in the last 53 years. With federal funding for the job drying up, the community took matters into their own hands and purchased a new 10-inch Wolverine Class cutter suction hydraulic dredge, manufactured at DSC Dredge's Greenbush, Michigan, facility. Taking delivery of its Wolverine Dredge in mid-April 2017, a crew of Leland township employees received full training over the next week, so that they can now rely upon their own resources – at a minimal annual cost – to keep the harbor cleared.

RESEARCH VESSEL, W.T. HOGARTH LAUNCHED

The R/V W.T. Hogarth — designed and engineered by Boksa Marine Design — was christened and launched on May 23, 2017. The 78' coastal class research vessel is the newest addition to the Florida Institute of Oceanography (FIO) fleet and will help continue the efforts of scientific education and discovery of FIO and its member institutions. The $6 million dollar vessel was a necessary upgrade and replaces the nearly 50-year-old R/V Bellows which had served as a floating laboratory for 35 years. The new vessel will be both longer and wider than its predecessor. It will offer more working space, including separated wet and dry labs, a larger work deck, separate galley and more comfortable arrangements for berthing. Anticipated missions for the new vessel will include a variety of over-the-side operations including study of marine life, affects of pollution, water sampling, bioacoustics, sediment coring, fisheries research and more.

FIRST TIER IV TUG ON US EAST COAST ARRIVES IN NYC

McAllister Towing this year announced the arrival in NY of the tug CAPT. Brian A. McAllister, the first in a series



Seaspan Ferries Corporation

Great Lakes Shipyard

Eastern Shipbuilding Group

DSC Dredge

of new builds that will enhance shipdocking on the East Coast for years to come. The vessel, built by Horizon Shipbuilding, is notably the first EPA Tier IV tug on the U.S. East Coast. She is powered by 3516E Tier IV Caterpillar engines with twin Schottel SRP4000FP units. Packed into her 100' x 40' hull is 6,770 horsepower and over 80 metric tons of bollard pull. Combining that power with a Markey class III escort winch on the bow and a Markey 2 1/4" wire winch on the stern puts the tug in a class of her own. State of the art remote controlled fire monitors and deluge systems (ABS FiFi certified) complete the package, making the tug a total Escort /Shipdocking/Rescue vessel unique to any East Coast port, let alone New York Harbor. The tug is named after the company's Chairman. She is the 31st and most powerful tractor tug in McAllister's fleet.

HARLEY MARINE'S FIRST U.S. EPA TIER 4 TRACTOR TUG

Harley Marine Services this accepted delivery of its newest tractor tug, Earl W Redd. The first-of-its-kind, the Earl W Redd is equipped with Caterpillar's Tier 4 emissions technology and enters the fleet as one of the most efficient and environmentally conscious vessels in the world. The Earl W Redd will not only meet but exceed the toughest marine EPA standards. The vessel is a true testament to Harley Marine's commitment to a cleaner tomorrow. Harley Marine Services is an environmentally conscious leader within the maritime industry and consistently raises the bar in an effort to practice ever stronger "green" business practices. Built at Diversified Marine of Portland, Oregon, the Earl W Redd measures 120 feet by 35 feet, with a loaded draft of 19 feet 3 inches. The tug features twin Cat 3516 Tier 4 Final main engines that will each produce 2,675 horsepower at 1,600 rpm. Each of the engines is paired with a selective catalytic reduction (SCR) after treatment system. SCR uses a urea-based solution to reduce NOx contained in diesel exhaust down to nitrogen and water vapor. The main engines will be paired with Rolls Royce US 255-P30-FP azimuth thrusters delivering an expected bollard pull capability of 75 tons.

MBTA'S GLADDING-HEARN BUILT FAST FERRIES

The Massachusetts Bay Transportation Authority (MBTA) has received the first of two new 150-passenger, high-speed catamarans from Gladding-Hearn Shipbuilding, Duclos Corporation. Funded by a grant from the Federal Transit Administration (FTA), the vessels will operate year-round commuter service in Boston Harbor. Designed by Incat Crowther, the all-aluminum ferry is 90 feet LOA, 28.8 feet abeam, and draws approximately four feet loaded. The vessel is powered by twin Caterpillar C-32, 12-cylinder, EPA-rated Tier 3 diesel engines, each delivering 1450 Bhp at 2100 rpm. The engines turn a pair of Hamilton HM 571 water-jets through ZF 3050 gearboxes. The ferry's top speed is 29 knots with a fully-loaded deadweight of more than 19 tonnes. The two engine rooms each house an RA Mitchell 47kW generator. Compliant with the United States Access Board's accessibility guidelines for passenger vessels (PVAG), the boat is designed for boarding passengers from the bow at integrated MBTA facilities.

METAL SHARK EXPANDS INTERNATIONAL REACH WITH LATIN AMERICAN, CARIBBEAN DELIVERIES

Louisiana-based boatbuilder Metal Shark announced several new contracts with Latin American and Caribbean operators, further expanding the company's presence in the region. At a recent ceremony in San Juan, the Puerto Rico Police Department (PRPD) officially commissioned its first three Metal Shark 36-foot Fearless-class center console patrol boats. The welded-aluminum offshore center console vessels have been designed to operate at speed in the large ocean swells prevalent off the Puerto Rican coastline. Featuring high performance ventilated stepped-bottom running surfaces and powered by triple 300-horsepower Mercury Verado engines, the PRPD's new patrol boats achieve speeds up to 55 knots. Additional vessels for the PRPD are currently in production at Metal Shark's Jeanerette, Louisiana production facility. Metal Shark has also announced the Colombian National Police (CNP) as a new customer. After working closely with the agency through an exten-

Boksa Marine Design

McAllister Towing

Harley Marine Services

sive standardization process earlier this year, Metal Shark recently delivered the CNP its first new 33-foot Relentless-class patrol boat. Special features of this welded aluminum center console vessel include a urethane-sheathed closed-cell foam Wing collar, Shockwave S2-Corbin high-backed shock-mitigating seating for five, and additional fold-away crew seating in the bow. The highly maneuverable patrol craft is powered by twin 300-horsepower Evinrude E-TEC G2 engines, which propel it to speeds in excess of 50 knots. In addition, Metal Shark announced that it has been awarded a contract to produce twelve 38-foot Defiant-class pilothouse patrol boats for the Dutch Caribbean Coast Guard. The production of these vessels will begin in early 2017, with deliveries commencing later in the year.

GLADDING-HEARN DELIVERS FOR MICHIGAN PILOTS

The Lake Pilots Association in Port Huron, MI, this year accepted delivery of a new Chesapeake Class pilot boat from Gladding-Hearn Shipbuilding, Duclos Corporation. The all-aluminum pilot boat features the C. Raymond Hunt-designed Deep V hull. It is powered by twin Cummins QSM11 diesel engines, each delivering 602 Bhp at 2300 rpm and a top speed of 25 knots. A Humphree interceptor, with automatic trim optimization, is installed at the transom. Diesel capacity is 690 gallons, which, shipyard officials say, will provide a range of at least 350 miles at an economical speed of about 20 knots. The wheelhouse, flush-mounted to the deck amidships and with forward-leaning front windows, is outfitted with Llebroc seats and a settee and is heated by two Heatercraft 40,000 Btu units. The forecastle also includes a 40,000 Btu heater, along with a settee, portable head, and built-in storage cabinets. Outside of the wheelhouse, the handrails and foredeck are heated by a 120,000 Btu diesel-fired heater. There are boarding platforms on the roof and port and starboard on the foredeck. At the transom are throttle and steering controls, and a winch-operated, rotating davit over a recessed platform for rescue operations.

Foss

DOUBLE HULL ASPHALT BARGE DELIVERED TO VANE BROTHERS

Bristol Harbor Group (BHGI) announced in 2017 that the Vane Brothers Company had taken delivery of a BHGI designed 361' x 62' x 24.5', 55,000 barrel double hull asphalt barge. BHGI was contracted by Conrad Industries to develop the design based on a previous proven hull design that BHGI had completed for Conrad in 2014. The construction of the barge took place at Conrad Deepwater South in Amelia, Louisiana and is certified by the American Bureau of Shipping (ABS) and the United States Coast Guard (USCG) for oceans-fully manned trade. The barge's primary purpose is to transport asphalt and other heavy oils. It is equipped with a complete loading and discharging system in 10 tank compartments and includes a cargo thermal heating system with over 8 miles of heating coil pipe. A thermal stress analysis, in accordance with ABS requirements, was developed to ensure hull structural stresses were acceptable.

GLADDING-HEARN DELIVERS FIFTH VESSEL TO CIRCLE LINE

Gladding-Hearn Shipbuilding, Duclos Corporation, has delivered the second of three new sightseeing vessels for Circle Line Sightseeing Cruises, Inc., in New York City. This follows the shipyard's delivery of three sister ships to the company in 2009. Like the earlier vessels, the new 599-passenger all-steel vessel, designed by DeJong and Lebet, N.A., in Jacksonville, Fla., measures 165 feet in length and features a 34-foot beam. With a top speed of 14 knots, the vessel is powered by twin Cummins QSK-38M1 diesel engines, delivering a total of 2600 hp and connected to ZF W3355 gear boxes, spinning 60-inch, 5-bladed bronze propellers. For dockside maneuvering, the vessel is equipped with a 125 hp Wesmar bow thruster, powered by an electric motor. Two 140 kW generators supply the ship's service power. The vessel carries 8,200 gallons of fuel and 4,000 gallons of potable water. Heating and air-conditioning are supplied by a 278,000 Btu diesel-fired boiler and four 15-ton water-cooled chillers.

RIBCRAFT'S 41' 12.5 MODEL

RIBCRAFT recently introduced the all new 41' RIBCRAFT 12.5 with the recent delivery of a specialized USCG

MBTA - Gladding-Hearn

Metal Shark

Gladding-Hearn

Sub Chapter T Certified tour boat to a customer in New England. At 41', the RIBCRAFT 12.5 is the newest and largest model in the RIBCRAFT model line. The ultimate offshore platform for tour operators, security and patrol operations, military applications, and discerning recreational boaters, the 12.5 combines RIBCRAFT's signature deep V hull and bow sheer with an extended waterline and generous beam. Designed for offshore passages and operations requiring large crew and payload capacities, this flagship model offers incredible flexibility to meet the specialized needs of every customer. The most recent 12.5, configured for passenger-for-hire operations, was built to United States Coast Guard Sub Chapter T standards for passenger vessels. Delivered to a tour company in New England, the boat will run whale watching expeditions, sightseeing tours and thrill rides. The new 41' USCG certified vessel can accommodate up to 34 guests through the combination of 29 jockey-style pod seats and a large aft bench. Outfitted for adventure tours, this RIBCRAFT 12.5 features an eye catching heavy duty yellow Hypalon tube, extended canopy top with an integrated swim ladder, bow thruster, and a marine head. Powered by triple 350HP Mercury Verado outboards, the RIBCRAFT 12.5 reaches speeds in excess of 50 mph while still providing responsive and agile handling that customers expect. The 12.5 is also available with twin inboard diesel I/O or water jets. With an optional thruster, the 12.5 delivers tight quarter maneuverability. The all new RIBCRAFT 12.5 is available in multiple configurations to suit both commercial and recreational customers. Whether as a USCG Inspected vessel with passenger seating, an open center console layout for commercial diving and sailing support, or a fully enclosed cabin for all weather protection and overnight accommodations, the all new RIBCRAFT 12.5 performs well in any role. In other words – the ideal multi-missioned workboat.

FINAL OF THREE FOSS ICE CLASS OCEAN TUGS CHRISTENED

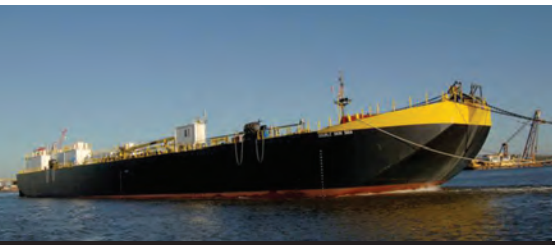
The final of three state-of-the-art Arctic Class tugs, the Nicole Foss, was christened earlier this summer at the Foss Waterway Seaport in Tacoma, WA. Built at the Foss Rainier, OR. Shipyard, the Nicole is designed to operate in the extreme conditions of the far north. The Nicole Foss is ice class D0, meaning the hulls are designed specifically for polar waters and are reinforced to maneuver in ice. The first of the three Arctic tugs, the Michele Foss debut in 2015, and in her first year of operation lead the way in safely pioneering a new route across the North Slope, while operating in extreme conditions of first year ice a meter thick. The Denise also returned to the far north this summer. The Nicole Foss complies with the requirements in the ABS Guide for Building and Classing Vessels Intended to Operate in Polar Waters, including ABS A1 standards, SOLAS and Green Passport. She includes two environmentally responsible Caterpillar C280-8 main engines; a Nautican nozzle and rudder system to provide superior bollard pull and maneuverability; and Reintjes reduction gears. Markey Machinery supplied the tow winch. The tug has a bollard pull of 221,000 pounds. The vessel incorporates several environmentally focused designs and structural and technological upgrades, including:

- *Elimination of ballast tanks, so there is no chance of transporting invasive species*
- *Holding tanks for black and gray water to permit operations in no-discharge zones*
- *Hydraulic oil systems compatible with biodegradable oil*
- *Energy efficient LED lighting*
- *High-energy absorption Schuyler fendering*

WETA 400 PASSENGER FERRIES

Hydrus & Cetus are two of four first-in-class 400 passenger catamarans that Vigor has built for the Water Emergency Transportation Authority (WETA). They are the cleanest 27 knot 400 passenger ferries operating in the U.S., setting the standard for low emissions and environmental responsibility. They operate with Tier III diesel engines with selective catalytic reduction (SCR) after treatment systems that achieve Tier 4 standards without using diesel particulate filters. The ferries also provide a very quiet, comfortable ride for passengers thanks to the innovative floating house design. The superstructure has 180 isolation mounts which provide a vibration free ride.

WETA



Bristol Harbor Group

Gladding-Hearn

RIBCRAFT

Superior Industries' Bulk Barge Cargo Transfer Systems Solution

Pontchartrain Materials Company Finds Innovative Solution for Barge Unloading Applications.

By Dan Tiernan

Located in New Orleans, Louisiana, Pontchartrain Materials Corporation, LLC provides aggregates to general contractors as well as asphalt and ready-mix companies. In addition to their chief product, limestone, the family-owned company sells recycled concrete and recycled asphalt. Pontchartrain sources the material from quarries in northern states, transferring it down the Mississippi River by barge to one of three company aggregate yards or directly to customers in the New Orleans and surrounding area.

Aggregate suppliers save time and money by transporting materials via barge, but the solution comes with a number of its own challenges. Specifically, unloading material onto the shore can be difficult to accomplish in a safe, efficient manner. Crane rigs offer a versatile option for stockpiling material on river banks or loading trucks, but don't allow operators to perform the task quickly. Truck ramp rigs grant an operation more speed, but their inflexible structure fails to afford crew members flexibility in material placement and prohibits unloading directly onto the bank.

Custom Design

A number of years ago, Perry Watkins, Vice President at Pontchartrain, started looking for a better barge unloading solution. "We saw a need for a dependable barge stacker to unload with. The conveyor unloaders in use at the time appeared to be under-engineered, limited, and not as safe as we wanted," he explained. In his search for a quality, long-term solution, Watkins got in contact with Walter Shook of

Superior Industries who facilitated communication between Watkins and Superior engineers to address this unique situation. Watkins described the needs of his application to Superior engineers who started working on new designs.

Superior engineers faced the design obstacle of configuring a heavy-duty, telescopic conveyor on a Pontchartrain barge, which would be between 35 and 45 feet wide. The axle length on a standard 130-foot Superior Telestacker Conveyor is over 50 feet. The size constraint required a custom approach from Superior engineers. For example, to mount a Telestacker Conveyor onto a 35-foot barge, the length of the axle would need to be about 28 feet. The standard stacker design incorporated a steel support structure underneath the conveyor called the undercarriage, which raised and lowered the conveyor, providing stability for the axle. The shortened length of Pontchartrain's custom conveyor required sharper angles in the support system design, a constraint that demanded a steeper undercarriage. However, a steeper undercarriage couldn't work because it wouldn't allow for any clearance underneath the unit.

In order to rectify this problem, Travis Thooft, Superior's chief engineer of portables systems, explains that Superior engineers switched the support system, "from being an undercarriage to what we've been calling an 'overcarriage' – a support system that rides above the conveyor." Thooft continued, "By going to an overcarriage we're able take advantage of increasing those angles which provides a lower force going through the support system." Part of the challenge with the new design was figuring out how to distribute the weight within the unit. Pontchartrain's conveyor weighed the same as a standard unit, but the axle weight was increased considerably in order to compensate for the adjustments made to the angles and distances of the support carriage.

"It was a fit for Superior where engineering through problems seemed to be their mission in life," says Watkins. "Reducing the footprint of a Telestacker Conveyor to fit onto a barge deck while maintaining the conveyor reach is not easy," he adds.

After the new design proved viable operating in-application, Pontchartrain Materials felt that the custom machine was worth the investment. They purchased the unit in August of 2015. To mount the conveyor onto one of the unloader barges, Pontchartrain's crew set the conveyor axle on the barge platform and assembled it onto the bearing along with the conveyor tail. They then put up side supports and pinned the actual conveyor portion, including the main and stinger, onto the tail. Simultaneously, the installation crew pinned the overcarriage to the tail. Finally, they attached the head of the conveyor portion along with the cylinder system.

Notably, the Telestacker Conveyor's fixed radial axle allows operators to move the conveyor over 90 degrees radially, which, combined with the telescopic capability, provides immense flexibility during operation.

Flexible Operation

During the design process, Pontchartrain requested their Telestacker Conveyor to be fitted with a custom hopper on the tail end to meter material onto the conveyor. The hopper has a hydraulically controlled gate that operators can open or close to change the material flow. Before owning a barge-mounted conveyor, Pontchartrain used a crane mounted clam bucket to unload material from its barges directly to a truck or hopper. Thooft describes the difficulty involved with such a maneuver saying, "If you've ever looked at a big clam bucket, the control of those is pretty difficult, especially for the operator that is sitting in the crane multiple feet away from where the discharge is. You have this huge load of material that is fairly difficult to control." The custom hopper on the barge-mounted conveyor gives crane operators an easier target to hit. "The distance that the crane operator moves for each load is significantly less," says Thooft. In addition to speeding up the process, Superior's design provides operators with more flexibility in positioning the flow of material and ensures a consistent flow rate.

"It's a very versatile machine, allowing us to unload to stockpiles and hoppers or onto trucks," says Watkins. He mentions that one of the best features of the Telestacker Conveyor is the wireless remote control operation, which allows the controller to run the operation from a safe position while always maintaining a clear visual of the operation. "It's a very safe machine, very steady," he says.

Watkins vision for a fully engineered, quality barge-mounted stacker provided the catalyst for Superior engineers to pursue greater innovation and a better product for material transfer companies. Custom conveying solutions provide an alternative to slow, stationary operations and equip river businesses with flexibility, efficiency, and speed.

***Daniel Tiernan** is a Communications Specialist at Superior Industries.*


D'Isernia & Papp


Rose


Getgen


Wiernicki


Bon Fleur


German

NMHS Honors ESG's D'Isernia at Annual Awards Gala

Brian D'Isernia, Founder and Owner of Eastern Shipbuilding Group, has received this year's National Maritime Historical Society (NMHS) Distinguished Service Award. With a career that spans 50 years, D'Isernia progressed from commercial fishing into vessel construction, opening the Eastern Shipbuilding Group of Panama City, Florida, in 1976. Today, Eastern's history includes a portfolio of over 350 vessels. The 24th Commandant of the US Coast Guard, Admiral **Robert J. Papp Jr.**, presented the award.

New Director of Business Development Joins the Global Team

Eric Rose has joined Global Diving & Salvage as Director of Business Development. Prior to joining Global, Rose spent many years with NC Machinery for Caterpillar, most recently as Washington Equipment Sales and Rental Manager. Before joining the Global team, Rose most recently served as the Northwest Territory Sales Manager for Weiler Products.

Getgen to Lead Marketing for Fairbanks Morse

Fairbanks Morse announced that **Kimberly Getgen** has joined the company to spearhead global go-to market strategy and initiatives. As vice president of strategic marketing, Getgen is responsible for defining and executing the company's corporate marketing strategy across each of Fairbanks Morse's key vertical marketing segments including marine power and power generation. Previously, she was vice president of marketing at Energy Internet of Things (IoT) company Blue Pillar.

Wiernicki Defines Maritime Industry's Transformation

Christopher J. Wiernicki, Chairman, President and CEO of ABS, delivered the Keynote Address at this year's Society of Naval Architects and Engineers (SNAME) Annual Meeting and Expo. He detailed how the maritime industry's 'new norm' is characterized by sweeping and disruptive changes in technology, skill sets and leadership. "Normal means rapid and impactful change – it's no longer business as usual," Wiernicki said. "Our new normal is data intensive, and drives us to more condition-based, continuous, risk-based and cyber-influenced decision making."

BCGP Names Bon Fleur as General Manager

Brunswick Commercial & Government Products (BCGP) has appointed **Erik Bon Fleur** as general manager. Prior to joining BCGP Fleur served in various other roles inside BCGP's parent company, and has been with Brunswick since 2012, when he joined the Company as a process engineer. Erik holds a bachelor's degree from the University of Central Florida, and a master degree in industrial engineering as well as an MBA from the University of Florida.

Dave German is Port Canaveral's Director, Cruise Business

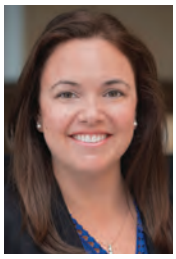
Port Canaveral's Cruise Team is gaining a new dimension with the appointment of **Dave German** as Director, Cruise Business Development. German previously served as Port Canaveral's Senior Harbormaster. He will be responsible for building the Port's alliances with cruise lines. German holds a Bachelor of Science degree from the U.S. Merchant Marine Academy, and earned an MBA in finance from Ohio University.

SpotSee Appoints Malone as Marketing Director

SpotSee announced that it appointed **Jill Malone** as marketing director. Malone brings more than 10 years of expertise in multi-channel digital marketing campaigns. These incorporated eCommerce direct response, app download, loyalty program enrollment, community engagement including user-generated content, brand awareness, event marketing, and sports sponsorship in five languages in more than 20 countries.

Tomlin Named EVP, CFO at Admiral Valve

Admiral Valve, LLC named **Kelly Tomlin** as executive vice president and chief financial officer. Tomlin, who had held the position of chief financial officer at CPV for the past four years, will assume the expanded role of executive vice president. Prior to joining CPV, Tomlin served as an audit and assurance manager at Maillie, Falconiero & Company LLP.


Malone


Tomlin


Bukowski


Yates


Mehta


The Government of Ontario & Damen Shipyards Group

WAGO Names North American Distribution Channel Manager

WAGO has named **John Bukowski** as its new Distribution Channel Manager of North America. He has a Bachelor's degree in Applied Technology and Automated Manufacturing from the ITT Technical Institute. Professionally, he brings a wealth of experience to WAGO having worked in technical sales for over 30 years in companies such as Eaton, Pepperl + Fuchs, Inc. and Schneider Electric.

MH Equipment Welcomes Isaac Yates

MH Equipment has welcomed **Isaac Yates** as a Regional Sales Manager for MH Equipment. Yates will be responsible for sales team leadership and driving revenue at MH Equipment locations in St. Louis and Scott City. He joins the MH team from Fairchild Equipment, where Yates served as President over the West Division of Fairchild Equipment's territory. Yates also comes to MH Equipment with over 40 years of experience in various sales leadership roles.

Raritan Appoints Mehta CEO

Raritan Engineering has appointed **Vinod Mehta** as CEO. For 38 years, he held the position of VP of engineering at the Millville, New Jersey-based business. Mehta has a proven track record of leading large scale projects and is a holder of several US patents.


Tharakulprateep


af Geijerstam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Nunan & Weakley

Ontario Government Awards Two Ferry Contracts to Damen

The Government of Ontario and Damen Shipyards Group have signed a contract for the design, build and delivery for two 'road' ferries to operate in the Canadian waters of the Great Lakes. The ferries will be a 68-meter Damen Road Ferry 6819 and a 98-meter Damen Road Ferry 9819. Both will be hybrid-ready, enabling them to be fitted with batteries when required. Both vessels are being designed in-house by Damen and will be fully customized for the local infrastructure. The ferries will be based at the northeastern end of Lake Ontario and will make crossings faster for the one million passengers and 500,000 vehicles which travel annually between Wolfe Island and Kingston, and the 270,000 passengers and 130,000 vehicles which travel to and from Amherst Island.

Texas A&M Senior Earns Crowley Scholarship

Crowley Maritime Corp. has awarded a Thomas B. Crowley Sr. Memorial Scholarship to **Alex Tarn Tharakulprateep** of Texas A&M University's Maritime Academy, recognizing his academic achievement and leadership skills in pursuit of a maritime career. Tharakulprateep is majoring in marine transportation and minoring in maritime administration. Since 1984, Crowley has provided more than $3 million dollars in scholarship funding for more than 1,000 students. The company has also donated more than $2 million over the years to support other educational programs.

Statoil Names NY Offshore Wind Project "Empire Wind"

Empire Wind is the project name selected by Statoil for the company's offshore wind site located off the southern coast of Long Island, New York. The 79,350 acre site, secured by Statoil in a federal auction in December 2016, has the potential to generate up to 1GW of offshore wind power. Statoil also announced the launch of the Empire Wind website (www.empirewind.com). "The name Empire Wind captures the pivotal role that this important project will play in helping New York achieve its ambitious renewable energy goal," said Statoil's Empire Wind Project Director **Christer af Geijerstam**.

OSVDPA Accredits FLA-Based Resolve Marine Academy

The Offshore Service Vessel Dynamic Positioning Authority, Inc. (OSVDPA) announced Resolve Maritime Academy (Resolve) in Fort Lauderdale, Florida is accredited to begin conducting OSVDPA courses and assessments. Resolve is the fourth training provider to receive approval from the OSVDPA. OSVDPA Executive Director, **Aaron Smith**, said, "We are elated to have Resolve join the fold as another accredited Training Provider. From early in the process it was apparent that Resolve's goal is to provide both aspiring and current DPOs with the best instruction and training available. There's not a doubt in my mind that any mariner, whether they are beginning their formal DP training or seeking to revalidate an existing DPO certificate, will be well trained, assessed, and serviced by Resolve."

USCG, LCA Ink Training Agreement

The United States Coast Guard and the Lake Carriers' Association signed a memorandum of agreement for maritime rescue training at the 9th Coast Guard District headquarters in Cleveland. Signing for their respective parties was Rear Adm. **Joanna M. Nunan**, commander, 9th Coast Guard District, and **James H.I. Weakley**, president of the Lake Carriers' Association. The agreement set forth terms for maritime industry rescue training between Coast Guard Air Station Traverse City, Michigan, Coast Guard Air Station Detroit and LCA enrolled vessels.

NWF, Marad Release Study on Unscheduled Lock Outages

The National Waterways Foundation (NWF), in cooperation with the Maritime Administration (MARAD), have released a study – "The Impacts of Unscheduled Lock Outages" – examining the economic impacts of unscheduled lock outages that highlights economic benefits associated with reliable inland waterways navigation. The study was conducted by the Center for Transportation Research at the University of Tennessee, and the Vanderbilt Engineering Center for Transportation and Operational Resiliency at Vanderbilt University. "This ground-breaking study reveals, for the first time, the broad range


Mecklenborg

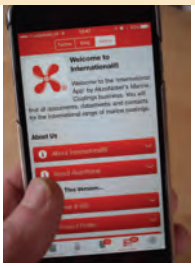

Szabat


Christian

of economic and societal impacts of unscheduled lock outages." said **Daniel Mecklenborg**, NWF Chairman. "The study underscores that if the inland waterways were unavailable to transport the nation's freight, the average number of trucks on rural highways would increase and result in significant impacts on safety, highway maintenance cost, and fuel consumption," added **Joel Szabat**, MARAD Executive Director. See the full study at www.nationalwaterwaysfoundation.org

Port NOLA President & CEO Highlights Port's Considerable Capabilities

Port of New Orleans President and CEO **Brandy D. Christian** highlighted gains in cargo and cruise volumes in 2017 and positioned the Port as an international gateway, offering superior logistics solutions with seamless operations between river, rail and road and serving as an economic catalyst for the region and state. The announcement was made at the annual State of the Port address in November. "We are ready to lead this region to a bright future," Christian said. "Our goals are to serve as an economic catalyst and generate more family-supporting jobs. And we are ready to do just that." Christian also announced Port NOLA surpassed the half-million mark for TEUs handled at its Napoleon Avenue Container Terminal for the third consecutive year. Beyond this, Port NOLA has successfully retained the service of all three-major mega-container carrier alliances.



AkzoNobel's Marine Coatings APP

Coatings customers now enjoy anytime, anywhere access to critical data with the launch of AkzoNobel Marine Coatings' International mobile app. The app provides customers with increased convenience and flexibility in accessing a wealth of coatings data. It has been specially designed to provide access to application guides, technical datasheets, product brochures, information cards and regional contacts, as well as social media and blog posts.

www.akzonobel.com

Bosch Rexroth's Innovative Split Hoist System

Bosch Rexroth's split hoist heave compensation system supports a higher working load, while improving system efficiency by 80%. A passive in-line heave compensator supports the load and passively compensates for some of the ship's movement. The passive in-line system is hoisted and held by an existing winch or crane. An actively controlled winch, mounted on deck, compensates for the remaining movement of the load.

www.boschrexroth.nl

CAT Celebrates First North American Complete Tug Solution

Caterpillar is celebrating the first vessel in North America to feature a complete Cat Marine propulsion system with both Cat power and Cat azimuth drives. Owned by Seattle-based Harley Marine Services, this tug is equipped with two 3516C marine propulsion engines, each delivering 2675 hp (1995 kW) to a pair of MTA 524-T azimuth thrusters specifically designed for high performance tug applications.

www.cat.com

Corvus ESS Selected by Rolls-Royce for Hybrid Application

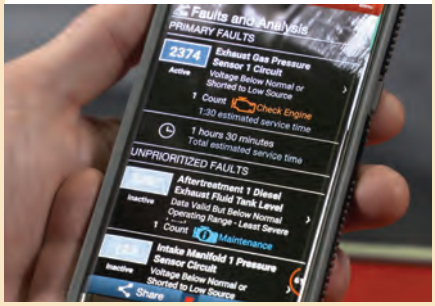
Corvus Energy has been selected to provide a 3 MWh Orca ESS for a new Norwegian Coastal Authority hybrid vessel. The Orca Energy ESS from Corvus will supply electrical power for all-electric propulsion and for electrical needs while docked. The Orca ESS will have an available capacity of 2938 kWh, allowing the vessel to run on battery power for several hours, without diesel engines.

www.corvusenergy.com

Cummins Guidanz Mobile APP Improves Customer Uptime

Cummins customers can read prioritized engine fault codes and key engine information within minutes wherever operating with the new Cummins Guidanz mobile app. Available as a free, the Guidanz mobile app arms customers with critical information about Cummins engines that they can email to managers, service providers or a Cummins Care representative directly from the app to initiate the service process.

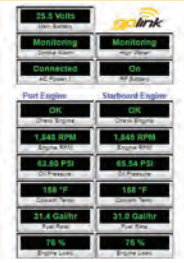
www.cummins.com



Dellner's Lightweight Failsafe Brakes

Dellner Brakes' groundbreaking failsafe brakes combine power with modular, lightweight design at competitive prices. Precision engineered in Sweden, the new spring applied SKP failsafe brakes are designed to quickly stop rotary or linear motion in various applications such as cranes, winches, deck machinery and other machinery. An offshore version, with corrosion protection and hard wearing paint and pistons is specially designed to withstand harsh conditions.

www.dellner-dampers.se/industrial



GPLink, Wheelhouse Partner for Real-Time Diagnostics

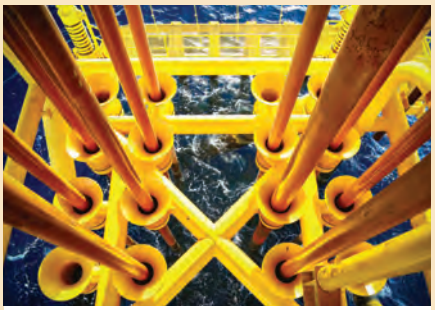
gplink has partnered with Wheelhouse Technologies, creating a comprehensive perspective on vessel upkeep through seamless integration to the Wheelhouse marine maintenance system. With the reliability and breadth of information captured by the gplink system and the robust infrastructure of Wheelhouse's Marine Maintenance Systems, commercial fleets now have seamless access to the most comprehensive remote monitoring and tracking system available.

www.gplink.com

Harken Industrial's LokHead Winch

Harken Industrial's LokHead winch significantly changes the way loads are lifted and rescues carried out. Its lightweight, portable design and use of unlimited length fiber rope allows more flexibility, space savings, and is easier to use in confined spaces. Compact, portable and weighing just 4.2 kg (9.3 lbs), the LokHead winch can be used anywhere a load needs to be safely lifted and lowered.

www.harkenIndustrial.com



Hempel's Advanced "splash zone" Coatings

Hempel's advanced coatings protect vulnerable "splash zone" areas of offshore structures. The "splash zone" is the area of an offshore asset just above the waterline and suffers from the dual impact of atmospheric and immersion-type corrosion; as well as physical damage such as abrasion and impact. Hempadur Multistrength 35840 and 35842 are Hempel's new coatings that will revolutionize the way the "splash zone" is protected.

www.hempel.com

Hyster Supports Barge Operations

The Hyster RS 46-41LS CH is part of Hyster's range of marine cargo handling Big Trucks, specifically designed for barge handling operations where containers are transferred between the dock and barge. The "negative lift" Hyster ReachStacker can lower containers to 1.90m/75 inches below ground level and shares most of the same features as the terminal container handling Hyster ReachStacker, which provides low total cost of ownership.

www.hyster.com

Imtra Offers Next Generation Helm & Operator Chairs

IMTRA's NorSap 1600 Standard, NorSap 1800 Active and NorSap 4000 Impulse models are ergonomic and high-quality helm seats and operator chairs. The NorSap product line offers an array of options to accommodate a wide variety of environments with modular designs and enhanced ergonomics to meet the most challenging conditions. Ergonomic settings can be saved in memory for quick recall of individual operator preferences.

www.imtra.com

JA Moody's Composeal Valves Keep You at Sea

JA Moody provides the perfect solution to damaged, corroded valves requiring repeated replacement. Composeal valves provide a lightweight, cost effective alternative, boasting enhanced performance, corrosion resistance, and a longer product lifecycle. Composeal valves can replace stainless steel and other high priced exotic metals in corrosive service. Made of advanced composite material, they are 100% recyclable, making them the ideal fit for companies committed to sustainable production.

www.jamoody.com

Innovative VFD Technology for Markey

Known globally as an innovative winch manufacturer, Markey has focused on integrating high-efficiency AC electric variable frequency drive (VFD) technology into deck machinery for over two decades, particularly for applications requiring high-response active heave compensation and line control. Markey's Render/Recover and Asymmetric Render/Recover winches are considered the "Best Available Technology" for this application and are used worldwide.

www.markeymachinery.com

Mascoat's VBS Isolation Mounts and Rail System

Mascoat's VBS Isolation Mounts and Rail System eliminates vibrations and rattling of ceiling panels that can be disruptive to passengers and crew as they work and sleep, and can also cause vessels to be out of compliance with the IMO Noise Codes. Offered in 3 different rubber densities depending on weight and fire requirements, Mascoat works to find the best fit for each application.

www.mascoat.com/vbs

Metal Shark's Swamp Shark Propulsion System

Metal Shark and Angelle Development have a new vessel propulsion system. The "Swamp Shark Drive" is specially engineered and built for operation in extreme shallow water, riverine, and mud flat environments. The durable system will safely and reliably propel a vessel through vegetation, mud, and debris-strewn waters. Swamp Shark Drives are available in a range of sizes to accommodate a variety of gas and diesel-powered boats.

www.metalsharkboats.com

Miller's Powered Air Purifying Respirator with T94-R Series Welding Helmet

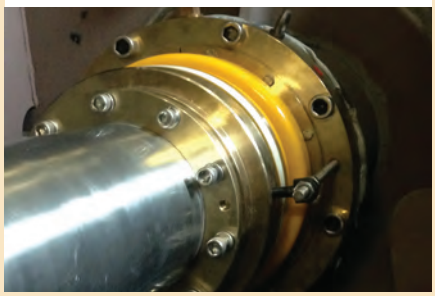
Miller Electric's Powered Air Purifying Respirator (PAPR) paired with new T94-R Series Welding Helmets is engineered for comfort to keep the system on, driving productivity, safety and compliance. The new patent-pending Dualtec manifold system features six interior vents and dual air speeds for high-performance airflow output and maximized perceived cooling. An overall balanced design reduces neck torque, and shoulder straps alleviate lower back pain.

www.MillerWelds.com

Offshore Towing Opts for Thordon Shaft Seal

Offshore Towing has completed refurbishment of a 1974-built 9000hp-class tug at Conrad Deepwater shipyard. The project involved the retrofitting of TG100 seals in what marks OTI's first mechanical shaft seal installation and the largest diameter TG100 series seals ever supplied by Thordon Bearings. An 11.75in (298mm) diameter seal was installed to each propeller shaft of the 66.88t bollard pull twin-screw workhorse.

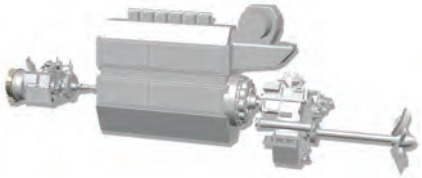
www.thordonbearings.com



PPG Debuts Next-Generation PSX 805, PSX 800 Coatings

PPG has introduced PSX 800 and PSX 805 coatings for steel and metal surfaces, two next-generation products formulated with greater flexibility and hiding performance than competing polysiloxane coatings. These coatings withstand the cracking under stress commonly associated with difficult steel, tank exterior and building exterior applications. PSX 805 coating adds a durable satin-sheen finish that masks imperfections on metal surfaces.

www.ppgpmc.com



REINTJES Revolutionizes Hybrid Market

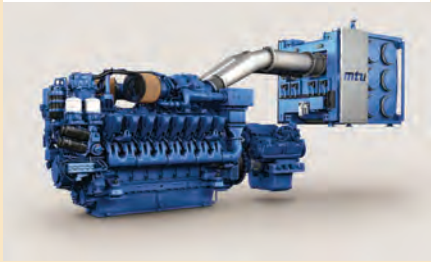
REINTJES recently demonstrated its hybrid competence with their new BAE HybriGen Zero system, which offers reduced operating costs, reduced emissions, and reduced maintenance costs. With its high torque, this electric motor / generator can also be used as a starter to substitute the air-starting system. Furthermore the usage of the PTO provides the possibility to switch off the onboard gen sets during operation.

www.reintjes-gears.com

Rolls-Royce EPA Tier 4-Compliant Propulsion from MTU

MTU will supply six 16V 4000 engines complete with SCR, ZF transmission and automation to the San Francisco Bay Area Water Emergency Transportation Authority (WETA). The 20-year MTU-San Francisco Bay Area ferry partnership yields over 30 engines for vessels serving the region. These MTU engines meet EPA Tier 4 requirements with 5% lower fuel consumption, 75% lower nitrous oxide, and 65% lower particulates.

www.rolls-royce.com



RSC Bio Solutions' High Performance Biodegradable Grease

RSC Bio Solutions' RSC Enviro-Logic Grease 2 WREP, water resistant, biodegradable grease is a Lithium Complex, extreme pressure EAL designed with polyalphaolefin (PAO) and hydrocarbon related type base fluids. Compliant with the 2013 U.S. EPA VGP, it was formulated to meet or exceed the performance of conventional and biodegradable greases in applications where water resistance is integral to the performance of the equipment.

www.rscbio.com

First U.S. Tug Installed with Veth Z-Drives

Barbour JB Shipyard of St. Louis, Missouri, has laid the keel for a new harbor tug, the first here in the USA that will be powered by Veth Z-drives. Twin Disc is the distributor for Veth Propulsion in the US, exclusive of the Gulf Coast region. The tug will be powered by twin 750 hp Cummins diesels and Veth VZ-700 Z-drives.

www.twindisc.com

Sea-Fire Protects Offshore Comms Hub

SeaRoc Group's monitoring, voice and data communication solution links operations to offshore petroleum platforms via satellite, fiber and data services. An engineered fire detection and suppression system from Sea-Fire protects sensitive and valuable electronics inside these unmanned SeaHubs. Sea-Fire' engineered solution meets IMO and SOLAS requirements. The system includes smoke and heat detectors, an extinguishing release panel and cylinders containing 3M Novec 1230 fire suppression fluid.

www.sea-fire.com

Yanmar's DTorque 111 Turbo Diesel Outboard

The Dtorque 111 is designed for the small workboat market where its expected lifespan of well over 10,000 hours doubles that of comparable outboard gasoline engines. The Dtorque 111 offers a smooth and quiet diesel engine, delivering 50 hp at the propeller with a torque output of 111 Nm at just 2,500 rpm. It is the world's smallest diesel engine with common-rail fuel injection.

www.yanmarmarine.com

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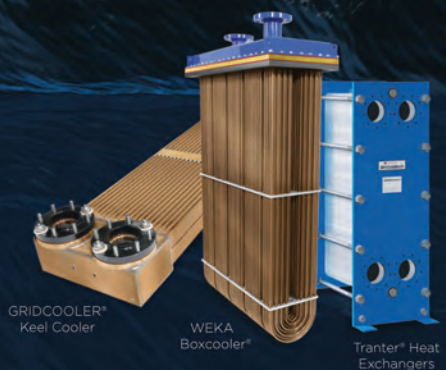

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