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# MARITIME REPORTER AND ENGINEERING NEWS

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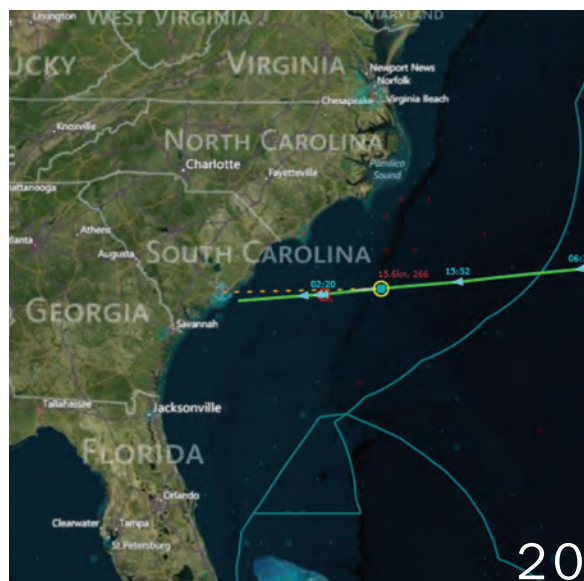
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**FROM OUR ARCHIVES**



**THE COVER**



Pictured on this month's cover is MSC Preziosa, MSC's new flagship. Story starts on page 40.

**Did You Know?**

**William Francis Gibbs, designer of the SS United States, was fanatical about fire safety on-board the ship, essentially banning the use of wood, except for the piano and the chopping block. (He reportedly even tried to get Steinway & Sons to build an aluminum piano)**

(Photo Credit: MSXC)

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GREG TRAUTHWEIN, EDITOR & ASSOCIATE PUBLISHER

# Something Old, Something New ...

I must admit that exploring the historical nature of our business is one of my favorite endeavors, and this month we are pleased to continue our series of articles in celebration of our 75th anniversary. **Patricia Keefe** again graces our pages with her overview of the creation and fate of what is arguably the greatest if not most famous ship in the history of U.S. shipbuilding, the passenger liner SS United States.

The SS United States is one of *those* ships that has intricately interwoven itself into the culture of this industry, and everyone that you talk to seems to know someone, or of someone, that sailed on the ship as a passenger or crew (including my wife Dawn, who's great, great aunt served as a steward on the ship).

From its maiden voyage in 1952 to today, the ship continues to make headlines: then as a technological wonder, the fastest passenger vessel ever; now as the S.S. United States Conservancy, led by Susan Gibbs, executive director and granddaughter of ship architect William Francis Gibbs, continues its fight to save the ship from the scrapyard. The story on the ship and its enduring legacy starts on page 32.

While SS United States is a vestige of passenger transport pre-modern air travel, today's cruise industry is a completely different beast, a \$32 billion global market with more than 400 ships globally and still growing. Last month the Cruise Line International Association (CLIA) held its annual press event in New York, providing details on the 36 new ships representing a \$16 billion investment scheduled to come on line between today and 2018.

Cruise ships today are dramatically different not only from the time of the classic passenger liners of the SS United States genre; they are dramatically different from ships built just a decade ago. A leading driver in this evolution: better, cheaper satellite communication, according to Jim Berra, Chief Marketing Officer, Carnival Cruise Lines. On traditional services, costs continue to drop while speed and reliability rise.

But it is the emergence of Low Orbital Satellite, and the ability to flood the ship with bandwidth, providing passengers with land-like online connectivity experiences that will be a game changer. Simply put, the notion of being out to sea and visiting exotic locales is quaint, but the reality is today's

24/7 connected world demands connection. Read our cruise overview starting on page 26.

Finally, a note of thanks to Tomas Tillberg for his consideration in sharing his views for our "Five Minutes With" interview starting on page 30. Tillberg is a noted and well-respected cruise ship designer, and he is our "go to" guy when it comes to keeping abreast of trends and changes in this high-value niche market. While Tillberg covered much ground in our short interview, he, too, agreed that advances in communication is having a significant and quantifiable impact on cruise ship design, as for example, areas such as business centers disappear as guests have ready access wherever they may be. With all of the advances today, it makes you wish that William Francis Gibbs was still around to see what his modern cruise ship would look like.

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BY JOSEPH KEEFE

## A National Maritime Strategy

### It's Not Rocket Science

Last week, Paul "Chip" Jaenichen, Acting U.S. Maritime Administrator said in his online blog, "... We concluded the Maritime Administration's first National Maritime Strategy Symposium, and we're pleased that it included so many leaders who work every day providing for the economic and national security of our nation's waterways." He added, "The U.S.-Flag commercial fleet, crewed by U.S. merchant mariners, provides safe, reliable and environmentally-responsible transport of cargo to support economic activity – both domestically and internationally. Maritime trade is a critical part of our country's economy." I couldn't agree more. But, perhaps, that's where he and I diverge.

We do need a national maritime strategy. And, it was nice that we had a reported attendance of more than 250 people representing shippers, operators, labor, academics and government agencies, all participating in roundtable discussions, panel sessions and presentations. The mid-January event focused on developing a national maritime strategy. The nation's Acting Marad Chief also insisted, "The symposium was an important step in the right direction ... but only a first step." We can only hope that it wasn't the only step. And you can forgive me for being skeptical of an organization that has just awoken from a self-imposed, four-year slumber.

#### Export for the (Right) Reason

These are exciting times for domestic oil and gas producers, refiners, boat-builders and let's face it, pretty much anyone who counts themselves as a stakeholder on the domestic waterfront. Stakeholders are enjoying a time when we as a nation boast a trade surplus in

terms of refined products and shipbuilding output (up to a certain size and dead-weight and in specific niche trades). Domestic energy production has us in a sweet spot that last year recorded the lowest need for imported feedstocks and crude oil in decades. The analysts say it will only get better. Indeed, some oil majors predict that the United States could be all but energy self-sufficient in as little as five years, if we only play our cards correctly.

As energy demand increases overseas concurrent with our newly robust domestic output, the current situation leaves the United States in a very good position. The latest discussion that would allow the export of LNG as well as crude oil to foreign entities is nominally good news. Mind you, little if any of that output would end on U.S. bottoms, but the corresponding reduction in our still massive trade deficit would be a welcome outcome, if the exports come to fruition. Separately, I read a recent news item which tied the recovery of the foreign (registered) crude oil tanker market to the end of the U.S. Export Ban.

The wire story went on to say that the ongoing energy recovery would leave crude-oil tankers behind unless the United States reversed course on its almost four-decade ban on the exports of most unrefined exports. That may well be true. Beyond this, I do favor the export of excess LNG and any other unrefined assets that we find ourselves blessed to possess on this side of the pond. Doing that to help the greater global tanker market is a decidedly bad reason for doing so. Reducing our trade deficit and increasing domestic employment, especially in the maritime and energy sectors, should be among our main concerns as we move

forward in a changing global energy climate.

#### Simple Steps: Charity Begins at Home

I wonder how many others who attended this month's National Maritime Symposium in Washington, or like me, dialed in on the Web, saw the irony of having such an event hosted by the U.S. Maritime Administration. The same organization that bills itself as the nation's "maritime cheerleader" has only just recently finished awarding nearly USD \$1 million to a domestic vessel operator for the purpose of retrofitting new, LNG burning engines into its vessels. It all sounds good until you realize that the funds will likely be used to perform those alterations in an Asian shipyard. What's wrong with keeping those funds here at home?

At about the same time that U.S. taxpayer funded Marad grant money moves offshore, support for the Maritime Security Program (MSP) that provides a \$3.5 million annual subsidy for about 60 U.S. flagged – but all foreign built – vessels was also pushed at the Symposium. The Marad-administered program is nominally a good idea. That it funds the operations of foreign built vessels, is not. Over a five-year period, the federal government will potentially spend as much as \$1 billion on the program.

MSP rules require the Secretary of Transportation to establish a fleet of active, commercially viable, militarily useful, privately-owned vessels to meet national defense and other security requirements. I constantly find myself asking how many ships we could build domestically with those funds, using loan guarantees, grants in exchange for a certain number of years of MSP par-

ticipation or other creative vehicles. It's nice to count the 60 ships among our "American" merchant marine. Every one of them would probably be reflagged tomorrow if the funding disappeared.

#### It's not Rocket Science

In a statement released yesterday by the U.S. Department of Transportation and attributed to Transportation Secretary Anthony Foxx, the nation's newly confirmed transportation chief said, "In his 2014 State of the Union Address, President Obama laid out a bold vision for increasing opportunity for all Americans. The road to better opportunities can take many forms – a bridge that helps parents get home faster, a transit system that connects a community to new jobs, or a port that helps businesses sell to more markets – and we at the Department of Transportation look forward to doing our part to help connect all Americans to the 21st century economy."

Secretary Foxx's comments were important in only one respect. That he mentioned U.S. ports at all was a refreshing sea change for this administration. Echoing the words of Acting U.S. Maritime Administrator Paul Jaenichen, when he referred to the National Maritime Symposium, that's an important first step. To date, all we have are words. We do need a strong merchant marine. There IS room for the Jones Act in the domestic maritime equation and there is plenty else we could be doing in the meantime to further the infrastructure of the domestic waterfront. It's not rocket science.

Posted by Joseph Keefe on [MaritimeProfessional.com](http://MaritimeProfessional.com)

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# Floating Production

## *\$136B Expenditures Forecast for Floating Production Unit Purchases Over the Next Five Years*



BY JIM MCCAUL, IMA

Today, 319 oil/gas floating production units are now in service, on order or available for reuse on another field. FPSOs account for 65% of the existing systems, 74% of systems on order.

Another 25 floating LNG processing systems are in service or on order. Liquefaction floaters account for 12%, regasification floaters 88%. No liquefaction floaters are yet in service – all three are on order.

In addition, 101 floating storage units are in service, on order or available.

### Available FPSOs

The number of production units off field and available for redeployment continues to grow. There are now 19 FPSOs, 4 production semis and 1 spar idle. The latest to join the inventory of idle units is the Perintis, a 640,000 bbl FPSO with 35 kb/d processing capability that had operated offshore Malaysia since 1999.

Redeploying many these idle units will be difficult. A large portion of the inventory is comprised of FPSOs converted from old, single hull tankers. Eleven of the idle FPSOs are single hull, 7 of which were built more than 30 years ago. They will be difficult to place.

Then there is the need to find a suitable match between the field requirement and the unit. Not so easy to do this. Typically the redeployment contract involves modification of the process plant and mooring system, plus general upgrade to the entire unit. The more different the new field, the higher the modification cost. At some point it makes sense to use a new hull or find a suitable tanker to use for conversion.

But more general, given the historical rate of redeployments, there are simply too many idle units to be fully absorbed. The historical ordering pattern of FPSOs illustrates the ability to absorb idle units.

Over the past ten years there have been orders for 136 FPSOs. Of the total, 82% of the orders (112 units) have been first time FPSOs. They were constructed or converted for the project – and did not

previously operate as production units. Only 18% of the orders (24 units) were redeployments of existing FPSOs to a new field. In effect, it took ten years to redeploy 24 idle FPSOs. At this pace, it will take 8+ years to redeploy the current idle inventory of FPSOs – assuming no additional FPSOs come off field (which of course will happen).

The large, growing inventory of idle production floaters is a warning to leasing contractors and lenders to be conservative on residual values in FPSO bids and financings. Anything more than scrap value is likely optimistic, even for FPSOs built on new or young hulls.

### Production Floater Orders

The market seemed to hit resistance in 2013 – and resistance has continued into 2014. FPSO orders in particular have been relatively weak. Over the past ten years an average of 13 to 14 FPSOs have been ordered annually. Only 11 FPSO contracts were placed in 2013 and no orders for FPSOs were placed in the first month of 2014.

Details for production floater orders in 2013/14 are available at [www.imastudies.com](http://www.imastudies.com).

Resistance seems to be in the supply chain. Construction costs have been increasing, local content targets have been creating bottlenecks and access to financing has been constrained. Oil

company investment resources also have been shifting to shale oil and gas project development. We see supply chain resistance and competition for investment resources from shale/tight oil projects continuing over the near to midterm.

### Backlog of Planned Floater Projects

242 floating production projects are in various stages of planning as of beginning February. Of these, 54% involve an FPSO, 17% another type oil/gas production floater, 24% liquefaction or regasification floater and 5% storage/offloading floater.

Brazil and Africa are the major locations of floating production projects in the visible planning stage. We are tracking 49 projects in Brazil, 50 projects in Africa – 41% of the visible planned floating production projects worldwide.

Brazil clearly leads in terms of future production floater requirements – as several Brazilian projects will require multiple production units. When these large projects are taken into account, Brazil represents almost 30% of visible floating production system orders in the planning stage. There is a caution here. Should Brazil (or Petrobras) have a severe economic downturn, the market for production floaters will take a serious hit.

The large backlog of planned projects is an indication that the recent slowdown in orders is not attributable to lack of demand. There are plenty of deepwater projects at or near the final investment stage. Supply chain issues and better investment opportunities are causing the FID to be deferred.

### Five Year Outlook for Orders

We have just completed a detailed forecast of additional production floater requirements over the next five years. In the most likely market scenario, we forecast orders for 101 oil/gas production floaters, 25 LNG processing floaters and 35 FSOs between 2014 and 2018.

Capex associated with these orders

is expected to be around \$136 billion. FPSO acquisitions will account for 67% of the capex, other oil/gas FPSOs 14%, FLNGs 13%, FSRUs 4% and FSOs 2%.

Our new forecast is significantly lower than the forecast made in early 2013. Over the past year it has become clear that supply chain issues and other constraints are much stronger than previously thought. Deepwater project start opportunities keep growing – evidenced by the growing backlog of projects in the planning stage. But capability limitations in the supply chain, increasing project complexity, escalating costs, access to financing and bottlenecks created by local content targets appear to be worsening. These factors have been constraining – and will continue to constrain – deepwater project starts.

Another reason for the drop is the growing diversion of available investment resources to shale oil/gas projects. Alternative opportunities to invest in shale oil/gas development are eroding oil company investment in deepwater development. We see the diversion of resources becoming greater over the next several years.

### Planned Projects Type of Production System Required

(As of February 1, 2014)

| Type of Required | No. of Projects |
|------------------|-----------------|
| FPSO             | 131             |
| Other FPS        | 40              |
| FLNG             | 31              |
| FSRU             | 27              |
| FSO              | 13              |
| <b>Total</b>     | <b>242</b>      |

### The Author

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# FLNG Market

*Significant Growth in FLNG Market as Export Projects Gain Traction; Natural Gas to Lead Energy Demand*



AMANDA TAY

**T**here are many different views on the future of energy supplies, but strong agreement in two areas; over the next 25 years or so population growth and GDP growth in the developing economies, particularly China and India, will drive global energy demand to increase by some 50% and second; while oil's share of the energy mix will decline, the largest growth will be in consumption of natural gas. Why? Natural gas is an outstanding fuel for power generation, gas-fired power plant has the lowest Capex, it produces less than half of the CO<sub>2</sub> emissions of coal, it is relatively cheap and there are abundant reserves – the International Energy Agency (IEA) suggests sufficient to last 230 years at current consumption levels.

In Asia it's not just China and India that are propelling growth; the South-east Asian nations are also contributing to the dynamic shift. Currently, the region's per-capita energy consumption is suppressed due to the lack of access to electricity. However, as this is addressed, demand is expected to increase by more than 80% by 2040.

Oil, however, is a different subject. It is maintaining a high price and shows signs of an approaching peak in conventional supplies. Some would say that conventional supplies have peaked – between 2003 and 2010 it seems that the world's top-eight international oil companies all saw a peak in production. Furthermore, between 2000 and 2012 the net growth in global oil supplies came from unconventional, such as the United States (US) shale and Canadian oil sands, neither of which rate as cheap oil. Any restrictions in oil supplies will also serve to increase the demand for natural gas.

## Importance of LNG

Most natural gas is used in the region of production, resulting in major pipeline networks in Europe and the US. However, many of the largest re-

**The market for the construction of FLNG vessels is expected to increase from \$3.7B in the period 2007-2013 to \$64.4B during 2014-2020**

serves are often great distances from markets and unlike oil, gas is expensive to transport as pipelines start to become economically unviable much beyond 1,000 km. In this situation liquefaction offers an alternative. By cooling the gas to -162 Celsius the gas liquefies and reduces to one six hundredth of its volume, allowing transportation in large insulated tanks on specially designed gas carrier ships.

Liquefaction requires specially built, high-cost complex plants, often containing several parallel process 'trains,' accordingly LNG plants are expensive. However, the cost of alternative energy sources is increasingly making LNG an option in many markets, Japan being a leading example, where prices are in the order of \$16, compared with \$9 in Europe and \$4 in the US.

Some 30% of global natural gas imports are already being delivered via LNG. Supply growth in recent years has been from LNG plants in Africa, the Middle East countries of Qatar and Yemen. Considerable investment is being made in additional plants and in 2014-15 Australia should greatly add to supplies. Potential future sources of supply also include Canada, Russia, East Africa, the Eastern Mediterranean and indeed US shale gas, when political objections to natural gas exports are overcome. According to the Douglas-Westwood's 'World LNG Market Forecast' over the period 2013 to 2017 \$143

billion (bn) will be spent on liquefaction plants, \$35bn on LNG carriers and \$50bn on import facilities. The total is double that of the previous five-year period.

## FLNG

However, large reserves of natural gas lie stranded offshore, beyond the economic reach of pipelines. In order to address this opportunity, floating LNG (FLNG) vessels have been designed with the first ones now under construction. A floating offshore LNG vessel eliminates the need for costly production platforms and long subsea pipelines to the shore. There are also other advantages; FLNG has attractions in providing more secure operations than onshore plants in regions with unrest such as West Africa. It also offers a solution for unwanted associated gas from oil production, which has traditionally been re-injected into fields or burnt off, resulting in environmental damage. In addition, FLNG reduces the need to construct onshore facilities in environmentally sensitive areas.

In some situations an FLNG vessel built in a specialist shipyard can offer a lower-cost solution than a one-off 'stick built' plant onshore. However, an FLNG vessel is still a high cost item with significant technical challenges.

Build of the world's first FLNG vessel, to be used on Shell's Prelude, is now underway. The vessel will be the

largest ever made, at 488 metres (m) long and 74m wide, and will displace more water than six aircraft carriers. It will be moored at location for 25 years with expected production capacity of 3.6 million tonnes of LNG per year. It will be part of the pioneering batch of FLNG vessels and its success is key to the future of FLNG projects. Shell awarded the design, construction and installation to the Technip-Samsung Consortium in 2011.

## Spending Shift from Middle East to Australasia

The success of the Prelude FLNG vessel is not just critical for future projects; it is also pivotal to Australia's future domination of LNG exports as its geographical location has export advantages given its close proximity to the markets of Southeast Asia.

According to the IEA, more than two-thirds of current global investment in LNG is in Australia, where there are already three LNG export projects operating and a further seven under construction. Currently, the largest producer of LNG is Qatar, which experienced a massive 63 bcm expansion in capacity since early 2009 to reach 105 bcm in 2013.

As of late 2013, Qatar represents approximately 25% of global LNG liquefaction capacity. Other significant exporters include Indonesia, Malaysia and Algeria. Russia, Yemen, Peru and Angola have joined the LNG export business in recent years. With the inclusion of LNG exporting activities by Papua New Guinea in 2014, Australasia is poised to become the second largest LNG exporter behind Qatar by 2016.

Australia's trajectory towards becoming a leading LNG exporter is not without its challenges. The strong Australian dollar, high taxes, labour shortages and regulatory red-tape will work against the proposed LNG projects not yet in production. Its LNG exporter position is also threatened by competition

from proposed projects to liquefy North American shale gas.

### North America's Export Potential

As a result of surging shale gas production, the US is expected to overtake Russia as the world's largest gas producer by 2015, reach self-sufficiency by 2020 and transit from a natural gas importer to a net LNG exporter. US gas self-sufficiency has prompted Canada's search for alternative gas markets and has explored gas exports to Asia. These developments could mean a shift in reliance on traditional oil producing countries in the Middle East and would threaten Australia's LNG export potential.

With North America's potential as a net LNG exporter, there has been skepticism regarding assumed lower prices. Firstly, the present price of US shale gas is due to over-production.

In addition, liquefaction and shipping costs could substantially close up the arbitrage and create a convergence in prices from differing regions. Over time, could exporting from North America be uncompetitive compared to Australia through a weakening Australian dollar and increase in labor supply

prompted by the slowdown in the local mining boom?

### Mediterranean Progress

The eastern Mediterranean is the location of exploration activity off Cyprus, Turkey and Israel and a number of major gas discoveries. It has also been inching towards FLNG with Pangea LNG leading the development of the Tamar FLNG project, located off Israel's coast. A second development is also planned for the neighbouring Leviathan field, which is the world's largest offshore gas discovery in the last decade. However, while the region's development has a compelling future, it is beset by local political instability and indeed civil war in Syria.

### FLNG Capex

According to the Douglas-Westwood's 'World FLNG Market Forecast' the market for the construction of FLNG vessels is expected to increase from \$3.7B in the period 2007-2013 to \$64.4B during 2014-2020. All eyes are on the developments in Australasia and Asia with Shell's Prelude FLNG and Petronas' PFLNG 1 as the pioneer FLNG developments. Asia, which is a

focus area for both floating liquefaction and regasification vessels, is expected to account for 29% of expenditure, contributing \$18.2bn. Australasia accounts for the largest proportion of global Capex at 30%, driven by liquefaction projects with spend of \$19bn in the period 2014-2020.

Given a competitive market, we could assume that LNG will be bought from a supplier closest to the point of consumption. Indeed, factors such as geographical proximity, slowing oil production rates, technological advancement, abundant supply and unprecedented demand growth in Asia point towards a locus of FLNG development in Australian waters.

It could, however, be argued that attention should be shifted to developments in unconventional gas. However, it will be difficult for others to replicate shale gas success in the US within a decade given supply chain constraints and uncertainty over long-term production levels. While not without political issues and other impediments, the FLNG solution will, over the long term, extend beyond the pioneer projects and beyond Australian waters.

## The Author

Amanda Tay BSc is a member of DW's Analyst team, where her principal activities include quantitative analytics and macro-economic analysis, competitive analysis and supply chain mapping. She has a strong background in the Asian finance sector having spent several years with UBS AG as part of the investment banking legal and compliance team.

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# BWT Technology

*Managing systems costs, redundancy are key to Ballast Water Convention Compliance.*



BY BILL BURROUGHS

The current market position for ballast water treatment systems is similar to the early phase of the introduction of oily water separators. Eventually, the systems that did not work reliably were forced out, but at great expense to shipowners. While some ballast water treatment system manufacturers struggle to meet the regulatory and operational requirements of global trade, regulators are still exploring how to enforce the 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments. Shipowners must evaluate these market realities in light of their operational commitments. Otherwise, they risk off-hire time, prosecution and business failure. Severn Trent De Nora delivered a ballast water treatment system to a very large crude carrier (VLCC) currently under construction. Dual Balpure systems will be supplied to the vessel which has two 3000-cu. m./hr. segregated ballast pumps. The design and integration of the Balpure systems demonstrates the trade-offs that shipowners must make in order to meet the dual requirements of business success and environmental responsibility. Several ballast water treatment systems involve either electrochlorination or UV radiation disinfection to prevent the transfer of invasive marine species. Both incur a power penalty that can lead to increased fuel consumption especially if the full ballast flow is to be processed through the treatment system. This creates a situation in which solving the invasive species problem adds to another environmental problem: the emission of greenhouse gases.

The Balpure system applies established electrochlorination technology to oxidize and disinfect aquatic invasive species. The main ballast flow is first filtered, and then a slip stream of seawater is diverted to the electrolyzer and used to generate sodium hypochlorite. Only about one percent of the total ballast flow is processed to treat the entire ballast water. This reduces power usage and system weight to minimize impact on fuel con-

sumption, thus limiting greenhouse gas emissions. Balpure's flexibility adds to this further. Biocide generation rate can be reduced for shorter voyages so that, for a three- to four-week voyage dosed at 8 ppm, the Balpure power consumption is approximately 33ACkWh/1000 cu. m./hr. Shorter voyages can take advantage of lower biocide dosing at 6 ppm where power consumption is approximately 24 ACkWh/1000 cu. m./hr. Where vessel trade routes indicate the cooling water overboard discharge temperature will be below 15°C, an optional steam or electric heating system is available to economically heat only the slipstream.

## Decisions about Deballasting

The most striking operational difference between the various disinfection technologies is when the treatment occurs. For systems that must treat both during uptake and discharge, a hidden problem will manifest when the treatment system is not operable or malfunctions during deballasting. Some technologies that must treat at uptake and discharge make tank stripping nearly impossible. UV-based systems must filter and treat the motive water (that isn't transported in the ballast tanks) and treat the stripped water. Balpure makes tank stripping simple and inexpensive as biocide residual monitoring is all that is needed. The stripping motive water has high enough oxidant demand to neutralize the residual biocide from the stripped ballast water - thus additionally reducing sodium bisulfite consumption.

## Ensuring Operational Reliability

Maintaining operational reliability inevitably means some degree of system redundancy. The treatment system must support operations at all times, even if with limited capacity. In order for vessels with high-paced schedules to avoid a total outage, this means installing redundant auxiliaries. One single fault should not put the whole system out of commission. Marine vessels subject some somewhat fragile subsystems to intense

vibration and elevated temperatures. Additionally, some systems employ on-deck components exposed to seawater.

Standard redundancy built into the Balpure system includes multiple slipstream booster pumps complete with preinstalled standby spares. Likewise, the hydrogen dilution (air) blowers are 2 x 100 percent with built-in spare for uninterrupted operations. A self-contained and independent neutralization skid is provided with at least one spare pump built in or on standby. Some vessels require fully redundant systems to support port and starboard ballast header operations with crossover capability.

Additional enhancements to be included aboard the newbuild VLCC include dual Balpure biocide generators with dedicated hydrogen separation and dilution blower systems. Each segregated ballast header has a dedicated 40-µm mesh ballast water filter, and each filter has a dedicated backflush pump and backflush valve. Overall, the only major components not 100% redundant are the centralized controls.

## Minimizing Operational Expenses

Balpure's wide treatment rated capacity allows the natural variations in actual ballast flow rate, sensed by the flow meters provided with the system, to automatically adjust biocide generation rate from "0" to maximum. The typical starts and stops and changes to the discharge head affect ballast flow rates dramatically. Many systems were not conceptualized with these requirements and have warm up and cool down times that could cause periods of ineffective treatment.

During the hypochlorite generation process employed by electrochlorination systems, the cathode surfaces will accumulate scaling from magnesium hydroxide and calcium carbonates. Typically this scaling is addressed with periodic chemical (acid) or mechanical cleaning. However, the Balpure proprietary electrodes are automatically self-cleaned to address this concern.

The Balpure system produces treated

seawater in the ballast tanks that is non-corrosive and will not impact the life expectancy of ballast tank protective coating systems, pipe work and associated valves, valve actuators or other ballast tank fittings and instrumentation. The extensive corrosion testing program undertaken by GL Noble Denton demonstrated that the system has no effect on coated steel, naval bronze and copper-nickel alloys.

Not all treatment systems include a filtration step. Yet reducing the amount of sediment build up in ballast tanks can reduce fuel costs and vessel draft so that vessels such as VLCCs can carry more cargo. By not including a filter, shipowners lose this financial payback. Sediment build up also poses a compliance risk. Balpure's disinfection process leaves a residual amount of biocide in the ballasted water that eliminates re-growth that could otherwise contaminate the water. The potential for regrowth of organisms that could take refuge in sediments could ultimately lead to a breach of IMO discharge standards. Having to undertake more frequent ballast tank cleaning would become an additional operational expense for systems that don't filter or don't maintain disinfected conditions in the ballast tanks.

In conclusion, it is clear that fees and fines will be imposed and examples will be made when regulators discover vessels discharging ballast water that exceeds the limits on living organism counts specified by the ballast water management convention. This will generate much needed revenue to pay for the eventual reversal of the environments harmed by invasive species. But it will be disastrous for shipowners who have purchased and operated ballast water treatment systems in good faith.

## The Author

William (Bill) Burroughs is the Balpure ballast water treatment system product line manager for Severn Trent De Nora.



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# Preemption

*It is time for the Coast Guard to defend the authority granted to it by Congress, the Executive Branch and the courts.*



BY DENNIS L. BRYANT

On December 27, 2013, the US Coast Guard issued a notice stating that it intended to promulgate a rule containing its assessment framework for, and restating its position regarding, the federalism implications of regulations issued under the authority of various statutes within Titles 33 and 46 of the United States Code. Public comment on the proposed rule should be submitted by March 27, 2014.

The notice starts out with some background information on the concept of federal preemption. The United States Constitution includes a Supremacy Clause providing that the Constitution, federal law, and treaties are the supreme law of the land. The Constitution also includes a Commerce Clause providing that Congress has the power to regulate commerce with foreign nations, among the several States, and with the Indian tribes. Maritime navigation is an important component of interstate and foreign commerce. Coast Guard regulation of maritime navigation is founded on the Commerce Clause, but also relies on the Supremacy Clause.

There are three general principles of preemption. Express preemption is when Congress in its enactment of a statute expressly states that it is precluding State regulation in a specific area. For example, 46 U.S.C. § 8501 expressly prohibits States from adopting pilotage requirements applicable to vessels engaged in coastwise trade. Field preemption applies when Congress has so pervasively regulated a particular area that there is no room left for regulation by a State. For example, federal regulation of the design, construction, operation and manning of tank vessels is so detailed that any State regulation would impermissibly disrupt the federal scheme. Conflict preemption is when compliance with both federal and state requirements is impossible or when a state requirement stands as an obstacle to accomplishment of the full purpose of the federal require-

ment. The Coast Guard cites the Vessel Traffic Service (VTS) regulations as an area in which State regulation would create an obstacle to accomplishment of the federal mission of maritime safety.

While the Coast Guard preemption proposal includes its application to "regulations issued under authorities not described above," the proposed regulation devotes most of its attention to a narrow set of regulations for which federal

cific regulations encompassed by field preemption under the PWSA.

The Coast Guard also asserts that field preemption applies to its regulations issued under the authority of 46 U.S.C. Chapter 32, implementing the International Safety Management (ISM) Code of the International Convention for the Safety of Life at Sea (SOLAS Convention). These regulations require a covered vessel to create and implement a

Coast Guard assertion of preemption as regards inspection of vessels and the MSIS, I disagree with the assertion of field preemption regarding marine casualty reporting and investigation. The implementing Coast Guard regulations relate to personal injury, property damage, and environmental protection. These are all areas in which States have broad police powers and public safety concerns. While a State may not be able to take all

Imagine the confusion if a State were allowed to second-guess the Coast Guard on the competency of mariners or whether a commercial vessel was entitled to fly the flag of the United States or if its load line was properly assigned.

courts have sustained federal claims of preemption. The first and most extensively discussed set of regulations are those derived from the Ports and Waterways Safety Act (PWSA). Here, the U.S. Supreme Court has ruled in two major cases that Coast Guard regulations in areas covered by the PWSA preempt State requirements and that the subjects covered by the statute are reserved exclusively to federal control. The Coast Guard proposal lists well over 100 spe-

Safety Management System (SMS) addressing safety and environmental protection policies.

Likewise, field preemption is asserted over regulations issued under authority of 46 U.S.C. Chapter 33, relating to inspection of vessels, and to regulations issued under authority of 46 U.S.C. § 3717 (the Marine Safety Information System – MSIS) and under authority of 46 U.S.C. § 6101 (marine casualty reporting and investigation). While I concur with the

the actions that might be taken by the Coast Guard following a marine casualty involving a commercial vessel in State waters, it certainly has the authority to require that a specified casualty be reported and the authority to undertake an investigation of that casualty. Further, it should be noted that States, not the Coast Guard, investigate the majority of casualties involving recreational vessels.

The final specific assertion of field preemption by the Coast Guard relates

to regulations issued under authority of the Act to Prevention Pollution from Ships (APPS), which implements the MARPOL Convention. Few would argue with this position. It must be noted, though, that California continues to enforce its air emission regulations out to 24 nautical miles off the coast of that State, which directly conflicts with MARPOL Annex VI and the provisions of the North American Emissions Control Area (ECA).

Other than the minor issues noted above, I concur with the Coast Guard approach – with one glaring exception – it is too conservative. The approach would largely put into regulation what courts have already decreed. It plows almost no new ground. Reading the judicial decisions and the legal principles on which they are based leads one to the conclusion that there is much more that the Coast Guard does that also preempts State action.

Treaties of the United States have supremacy over State law. The United States has ratified numerous maritime treaties addressing topics where States are prohibited from treading. The principal maritime treaty is the SOLAS Convention. This convention covers everything from vessel structure to fire safety to lifesaving appliances to radio communications to safety of navigation to carriage of cargo (including dangerous goods) to maritime security. The Coast Guard asserts preemption with regard to MARPOL, but somehow omits to mention its preemption with regard to the more important SOLAS Convention. The same arguments are equally valid with regard to the Load Line Convention and the STCW Convention, to cite the most prominent. These and other international maritime conventions are all woven together into a comprehensive network. States cannot dabble in these areas without creating an obstacle to fulfillment of the underlying concept.

This broad unifying concept of marine safety, security, and environmental protection underlies the foundation of 46 U.S.C. § 2103 which states:

The Secretary [of the Department within which the Coast Guard is operating] has general superintendence over the merchant marine of the United States and of merchant marine personnel insofar as the enforcement of

this subtitle is concerned and insofar as those vessels and personnel are not subject, under other law, to the supervision of another official of the United States Government. In the interests of marine safety and seamen's welfare, the Secretary shall enforce this subtitle and shall carry out correctly and uniformly administer this subtitle. The Secretary may prescribe regulations to carry out the provisions of this subtitle.

The "Superintendence of the merchant marine" statute is a broad delegation of authority and its mandate for uniformity is only achievable if States are prohibited from involvement. Imagine the confusion if a State were allowed to second-guess the Coast Guard on the competency of mariners or whether a commercial vessel was entitled to fly the flag of the United States or if its load line was properly assigned. These are areas in which States are preempted from acting, just as much as the areas specifically cited in the Coast Guard's recent proposal.

It is time for the Coast Guard to defend the authority granted to it by Congress, the Executive Branch, and the courts. I recommend that the Coast Guard revise and broaden its assertion of preemption so that it is clear to the several States, to the maritime industry, and to the public that the Coast Guard truly does superintend the merchant marine and will challenge any attempt by State and local governments to impermissibly interfere. Now is not the time for unwarranted reticence.

## The Author

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# Transferring Risk

## *The Wrong Way Can Sink Your Business*

**B**usiness owners put their companies at risk when a new project gets under way. With even the best advance preparation, things can still go wrong, with the potential for injury, property damage and financial loss lurking in the background.

If you are the project owner who is hiring multiple subcontractors, you may lie awake at night worried about how actions not under your control may lead to accidents, unexpected developments, potential liabilities and unavoidable delays. If you are one of the subcontractors, you may have won the bid on thin margins that could lead to a rushed schedule and careless work practices, while the fine print in your contract may include unanticipated liability for your business.

Whichever side of a contract you are on, one of the keys to long-term success is making sure that risk is managed properly, either by transferring it to others or covering it with the right type and amount of insurance. It is important to understand both the opportunities and the pitfalls of transferring risk so you do not inadvertently end up with significant exposure to losses, some of which may be uninsured. Both your insurance agent and legal counsel can be key resources in identifying and implementing effective risk transfer practices.

### **Two Ways to Cover Risk**

There are two basic ways to transfer risk to others. The first is to require them to indemnify you, to hold you harmless legally when something happens that results in loss or damages. The second is through insurance coverage, typically by requiring the other party to add you as an “additional insured.” Let’s look at the potential pitfalls with each of these strategies.

### **Indemnification**

You may see advantages to compelling your contractors to indemnify you broadly. However, the lower-tier entities need to be very careful not to take on too broad of an indemnification clause.

In a worst-case scenario, an everything-including-the-kitchen-sink indemnifica-

tion clause may mean that a contractor becomes responsible for an accident or mishap that occurs when he is not even present or in a part of the project that he has not been hired to perform. Therefore, it is important to push back on any broad request and insist that indemnification be limited to the part of the project the contractor is working on and to actions for which the contractor is responsible.

In addition, many states have legal requirements about limits on indemnifica-

tion. It is important that both parties in any contract be aware of state laws that impact indemnification so that neither side is surprised if something should go wrong. Finally, it is important to understand the interaction between indemnification clauses and insurance coverage. A contractor may believe its insurance will take care of any liability after they sign an indemnity clause, but the coverage may have limits or gaps that leave you exposed if there is a loss that becomes your responsibility through indemnification.

### **Insurance Requirements**

Here, too, the issue is often about having too broad a requirement. When a contractor is required to add the project owner as an additional insured, it is important to limit the additional coverage to the work being performed by the contractor and any responsibility of negligence that should be owned by that contractor. Otherwise, it is possible for someone suing the project owner to see

a “deep pocket” and go after the contractor’s insurance for a completely unrelated claim or loss. You may wonder what the harm is in letting a party sue for funds from the insurance company, since it does not come directly out of your pocket. However, there are several ways this could still directly impact your business.

First, you may have to pay to defend yourself against a claim if you reach your policy’s defense its limits. This

claims in a single time period. You may be left with uncovered exposure for risks that are actually tied to your business if limits were already reached because of claims with little connection to your core project work. All of these are important reasons to make sure insurance requirements are narrowly crafted to specific responsibilities that you have control over.

From the project owner’s side, there are also important insurance considerations. For example, look for an endorsement from the insurance company, not just a certificate of insurance from an agent. That way you will know exactly what the insurance company has issued and will have confirmation that the coverage is current and in place. You should require that you be provided with any notice of cancellation or non-renewal that might leave a contractor without coverage. In addition to being named as an additional insured, project owners will want to require a waiver of subrogation to discourage claimants from coming after the project owner’s insurance once they have exhausted the contractor’s policy limits.

### **Invest in Strong Relationships and Good Advice**

All too often in the rush to secure the next piece of business, a company signs a contract without paying much attention to provisions that transfer risk. Yet one of the costliest errors you can make is to take on liability for actions over which you have no control, or commit yourself as liable for exposures that your insurance does not cover.

Two critical relationships can help you mitigate these risks: your ocean marine insurance agent or broker and your legal counsel. By developing a relationship with an experienced agent or broker and by investing in quality legal advice, you can tap into expertise on how to avoid taking on unwarranted liability.

In today’s litigious world, it is critical that those on both sides of a contract know exactly what they are committing to; otherwise you could be left with uncovered liabilities that may very well sink your business.

**A contractor may believe their insurance will take care of any liability after they sign an indemnity clause – but the coverage may have limits or gaps that leave you exposed**

may not only prove to be expensive, but may also be particularly aggravating if the claim has nothing to do with you.

Second, every loss that stacks up on your claim record eventually may impact your insurance premium and potentially even your ability to purchase insurance from your usual carrier. Underwriters study carefully to determine a company’s risk level. A business may have a premier safety program and keep its operations in good order, but could still be downgraded by an underwriter for paying little attention to the sophisticated nuances of risk transfer.

In addition, even if you remain insurable, you do not want to see your insurance costs go up in connection with claims that arose only because you added someone to your policy. Insurers who feel a customer does not exercise caution when it comes to risk transfer may want to raise premiums, increase deductibles or limit coverage.

Third, the dollar limits on your policy may come into play if there are multiple

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## YARD NOTES

## Gulf Coast Shipyard Group

John Dane III,  
GCSG

Gulf Coast Shipyard Group, Inc., a manufacturer of a variety of oceangoing and inland marine vessels for commercial and military markets as well as the Trinity Yachts brand, announced its expansion by signing a three-year lease with one-year options with the Port of Gulfport. Specifically, Gulf Coast Shipyard Group will use 400 linear feet of dock space on the Port's East Pier and 15,000 square feet of warehouse space to outfit the dual fuel liquefied natural gas (LNG) powered vessels it is building for Harvey Gulf International Marine. "We are pleased to work with the Port of Gulfport and grow our business in Mississippi," said John Dane III, president of Gulf Coast Shipyard Group. "We've worked together in the past on a smaller scale and look forward to this expanded relationship." The Port of Gulfport is undergoing a \$570m restoration and is roughly 18 months from completion.

## VLCC Luxembourg to FPSO Conversion



(Photo courtesy: Euronav)

Euronav NV sold its oldest double-hulled VLCC Luxembourg (1999 - 299,150 dwt), for \$28m, with a capital gain on that sale of about \$6m upon delivery. The net cash proceeds available to Euronav after the mandatory repayment of its debt obligation will be \$5m.

The vessel will be converted to a FPSO by her new owner, leaving the worldwide VLCC trading fleet. Details on the buyer were not available.

## LNG Hybrid Barge Keel Laid

3D Illustration of the LNG Hybrid Barge



© Hybrid Port Energy GmbH

The keel laying of what is reported to be the world's first LNG hybrid barge took place at a ceremony held at the SAM Shipbuilding & Machinery shipyard in Kormáno, Slovakia.

In the presence of representatives of the shipyard, AIDA Cruises, Becker Marine Systems and Hybrid Port Energy (a

subsidiary of Becker Marine Systems and the barge shipping company), the laying of the keel was carried out following the tradition of placing a coin on the keel block prior to lowering the first section.

The LNG hybrid barge currently under construction is equipped with five gen-

erators from Zeppelin Power Systems, producing a total power of 7.5 MW (50/60 Hz) with zero emissions of sulfur oxides and soot particles. The 74- x 11.4-m, 1.7-m draft barge will be stationed in Hamburg.

The LNG Hybrid Barge will be delivered in the summer of 2014.

## DSNS Cuts Steel for Indonesian Navy Frigate

In June 2012, the Ministry of Defense of Indonesia and Damen Schelde Naval Shipbuilding (DSNS) signed the contract for the first SIGMA 10514 Perusak Kawal Rudal (PKR) Frigate. In accordance with the agreed planning for the construction of this frigate, the Steel Cutting Ceremony took place simultaneously on January 15, 2014 at PT PAL (Persero) Shipyard in Surabaya (Indonesia) and DSNS in Vlissingen (the Netherlands). DSNS will build two modules and subsequently ship them to the yard in Surabaya. The simultaneous construction and testing of the modules at two different locations signifies the unique modular building strategy of Damen Schelde Naval Shipbuilding. All modules will be assembled at the PT PAL (Persero) Shipyard under main contractor ship of DSNS followed by Harbor Acceptance Tests and Sea Acceptance Trials. The engineering process for the second SIGMA 10514 PKR frigate proceeds as scheduled and construction is foreseen to start in approximately six months.



Damen



### Gladding-Hearn Delivers to Colombian Navy

Gladding-Hearn Shipbuilding, Duclos Corporation, delivered the first of six Chesapeake Class pilot boats for coastal and offshore patrol operations and port security, provided by the Colombian Department of the Navy. Designed by C. Raymond Hunt & Associates, the all-aluminum deep-V hull measures 56.6 x 17.7 ft. with a 17.8-ft. beam and 3-ft. draft, with a top speed of 27 knots. The launch is powered by twin MAN R6-800CRM diesel engines, each delivering 800 bhp at 2,300 rpm. The engines turn Ultra Jet UJ-452 water jets through ZF 360 gears. The boat is equipped with a 16kW Alaska Diesel genset.

### d'Amico Launches Four New "Eco-Ship" Vessels

The d'Amico Group launched four new "Eco-Ship" vessels in Ulsan, Korea, designed in collaboration with Hyundai Mipo Dockyard. The four new units will be added to the fleet of tankers belonging to d'Amico Tankers Ltd., 100% owned by d'Amico International Shipping. The "Eco Tankers" project envisioned by

d'Amico Group will be innovative in its scope, allowing the vessels to obtain an average saving of six tons of fuel per day (for vessels with a full load and a constant speed of 14 knots) and the consequent 20% reduction of CO2 emissions. "We are proud to open the year with the launch of the first four vessels built in collaboration with the Hyundai Mipo Dockyard," said Paolo d'Amico, President of the d'Amico Group. "This collaboration has enabled the creation of what we may define the latest generation of eco-ship vessels, that will allow us to further increase our competitiveness and leadership in the international shipping industry. The plan for new launches does not end here, during 2014 the group will launch other new vessels also in the dry cargo business area."

The four new RINA classified vessels, each measuring 183 x 32 m, represent a cumulative investment of \$127m and will be named Cielo di Gaeta, Cielo di New York, High Freedom and High Discovery.

**d'Amico Group, in partnership with Hyundai Mipo Dockyard, launched four new "Eco Ships"**



## LEADERS IN SHIP REPAIR & SHIPBUILDING

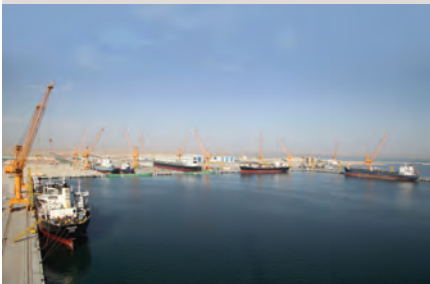


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## YARD NOTES

**Oman Drydock: Strongest Year Ever**

The Oman Drydock Company (ODC), one of the Middle East's newest and biggest shipyards, announced its strongest year of trading. The shipyard undertook 75 drydockings and repairs in 2013, increasing its total number since it was opened in Duqm (Central Oman) in 2011 to 190. ODC now boast a staff of more than 2,000, and the breadth of ship work at the yard is wide, as its workload has included Very Large Crude Carriers (VLCCs), crude oil tankers, container ships, LNG and LPG carriers, chemical carriers, bulk carriers, as well as dredgers, RoRos and barges, from clients including Dynacom Ship Management, NYK, MSC and Exmar Ship Management, Gulf Marine, the Shipping Corporation of India and Pacific International Lines.

"In 2013 we saw ODC continue to establish itself as one of the main ship repair and conversion locations in the Middle East," said Johnny Woo, ODC marketing director. "Our focus moving forward will be to win more business from existing and new customers operating carriers, tankers and container ships. We see real potential for growth particularly in becoming a center of excellence for the repair of LNG carriers (LNGC). As a result we will be ramping up the promotion of our services, which are among the most advanced in the world. This includes offering customers the in depth technical support we receive from our partner Daewoo Shipbuilding and Marine Engineering Company Ltd (DSME) and its subsidiary DSEC. 2014 will see DSEC forge a closer partnership with ODC to provide specialist LNGC repair technology."

Our expansion into LNGC will further be strengthened by our new license to support the French engineering firm Gaztransport & Technigaz (GTT) which specializes in cargo containment systems for high-end liquefied natural gas carriers."

Woo also said ODC saw major growth opportunities in the offshore market.



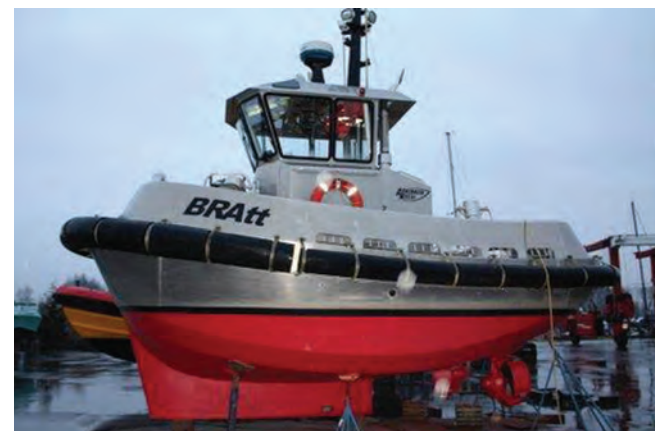
Island Offshore

**M/V Island Dawn Delivered**

Island Offshore took delivery of M/V Island Dawn from the Vard Brevik shipyard in Norway, the third PSV in a series of four Rolls-Royce UT 717 CD designs, delivered from Vard Brevik. As her sister vessels, M/V Island Dawn has an overall length of 84.45m and a breadth of 17m with a deadweight of 3,800 metric tons and a deck capacity of 800 sq. m. M/V Island Dawn will be transporting pipes and general deck load, liquid cargo as well as cement and barite to drilling rigs in the North Sea. She is also prepared for later duties as standby/rescue vessel. M/V Island Dawn was christened during a ceremony at the yard in November 2013, with Mimmi Ulstein as a godmother.

**Harley Adds Mini ASD Training Vessel**

Harley Marine Services added the newest component to its training program by purchasing the Azimuthing Stern Drive (ASD) Training Vessel, BRAtt, from Robert Allen Ltd. BRAtt is representative of a modern ASD tug and was built as a training tool. Its compact design is scaled to proportionately represent a full size tug with dimensions of just 25.6 x 11.8 ft. with 450 hp. HMS BRAtt, stationed in Seattle, joins the Harley Marine fleet of 120 vessels. It will be used extensively in the tractor tug training program for crewmembers. "This vessel will greatly enhance our ability to train qualified and quality operators for our fleet," said Captain Scott Manley, Director of Marine Operations, Harley Marine Services.



Harley Marine

# Zamokona Delivers Tuna Boat



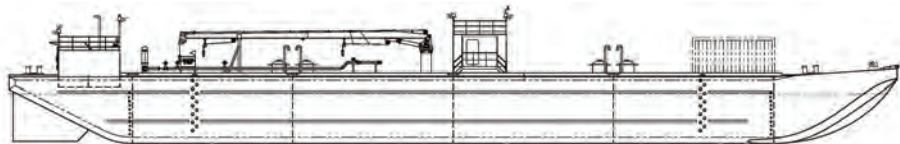
Zamokona

Echebaster Group received its new tuna-freezer vessel from Zamakona Yards after its inauguration at the Maritime Cruise Station at Getxo, Port of Bilbao. The new tuna vessel is almost 90m long and has a capacity of 1,900 cu. m. of fish in its 20 freezers with ac-

commodation for 42 crew aboard and a top speed of 18.2 knots. Iزارo is construction number 720 of the Shipyard at Santurce; it is a project of a new design with the latest technology, built to the specifications of this fishing company at Bermeo. Some of the innovations in the

superstructure and bridge of aluminum, the quick freezing tunnels at -60° and an innovative system of fish separation which returns non targeted fish alive to the ocean with little human intervention. The vessel is equipped with safe zones and antipiracy measures.





## 15,000bbl Tank Barge

Elliott Bay Design Group (EBDG) completed a new 15,000-barrel tank barge design package for Maxum Petroleum, Inc., a design which purports to balance performance with fabrication cost. The 15,000-barrel tank barge features a state-of-the-art tankerman's office, recessed machinery space aft for improved visibility, a dimensionally identical cargo tank, plus bulkhead stiffener and plate seams arranged to maximize material usage and simplify

**This 15,000-bbl design is envisioned to simplify fabrication.**

fabrication. EBDG and Maxum have partnered with Vigor Fab on the vessel construction out of its Seattle facility.

[www.ebdg.com](http://www.ebdg.com)

## 'Mega' Jack-Up Rig



Drydocks World

Drydocks World signed a deal with Drill One Capital to build the "Dubai Expo 2020 NS" mega jack-up rig. Gusto MSC, a major partner in the project, designed the CJ 80 rig and the rig will be the first of this design to be built and will be the largest jack-up rig ever built, according to the shipyard. It is designed to be operated in harsh environments including the Norwegian Sector of the North Sea at a maximum water-depth of 175m with 25m air-gap. The 101 x 110 m, 5,500 sq. m. unit will be classed by DNV and will meet all rules and regulations in force in the Norwegian and the UK sector of the North Sea. It can be operational at a depth of 175m in standalone mode. The rig is designed to be environmentally benign,

and it features Tier 3 compliant engines; it will generate fresh water using waste heat from engine cooling; it will heat by hot water generated from exhaust waste heat; it uses LED lighting where possible; it reduces emission of CO<sub>2</sub> and NO<sub>x</sub> up to 25% compared to similar rigs; it is prepared for shore power; and it offers zero discharge to sea to meet Norwegian and U.K. legal requirements (fluids less than 15 ppm contamination).

The design draft is 8.5m, minimum operational water depth is 20m and length of legs is 232m. It is designed to accommodate 160. The rig will be able to drill to 40,000 ft. drilling depth, and it will be equipped with four high pressure (7,000 psi) mud pumps.

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Maritime Solutions

# You Can Run But You Can't Hide

Windward Ltd. has taken advances in satellite communications at sea plus the massive amounts of new data available from ships, and created a satellite based maritime analytics system that provides information and insight on unusual vessel movements globally. Co-founder and CEO Ami Daniel explains.

*By Greg Trauthwein*

In the eyes of Ami Daniel and Matan Peled, co-founders of Windward Ltd., nearly two-thirds of the world – the oceans – has literally been “the wild west.”

Until now.

In 2010 this pair of naval officers founded Windward Ltd., a maritime analytics company that brings the power of smart analytics to the oceans. “With the advent of satellite technology, it is now possible to know the whereabouts of vessels globally, but the amount of data is vast and largely meaningless without smart analytics,” said Daniel.

Founded to bring transparency to world fisheries, specifically to tackle the multi-billion-dollar problem of illegal fishing around the world, the company has since spread its focus to include the intelligence community, and most recently the offshore oil and gas business, as it quickly realized that the fisheries market was too limited for a young start up, and more importantly that very few organizations in this space are interested, or able, to tackle the problem through an investment in technology. The company scored a nice reference last year when it cooperated with Reuters to provide insights and analysis for the ongoing coverage of the Libyan oil crisis, Daniel said. Worker protests had halted oil exports from the country, and Windward was

able to provide a full arena analysis on all tankers in and around Libya, including their oil capacities and historical oil trade before the current situation.

“From the get go, we understood that the key was in analyzing the vast global movements of vessels and understanding when a specific ship – or group of ships – was showing unexpected ‘behavior,’” Daniel said. When the company realized that the illegal fishing market was not sufficient or funded well enough to support the company, it turned its attention to the intelligence community. “We designed our first product to meet the needs of intelligence communities, which have a huge interest in understanding the cross-border movement of ships, and a corresponding willingness to invest in cutting edge technologies,” said Daniel.

“Obviously, an intelligence agency would want to know when ships are acting suspiciously anywhere in the world. Windward’s technology has been adopted by intelligence agencies around the world and widely recognized for its unique operational contribution. Now, we have set sail to engage the oil and gas market, giving this industry the ability to have full visibility across the very complex, cross-border operations of oil and gas companies that provide the world’s energy flow.”

## Meet MarInt

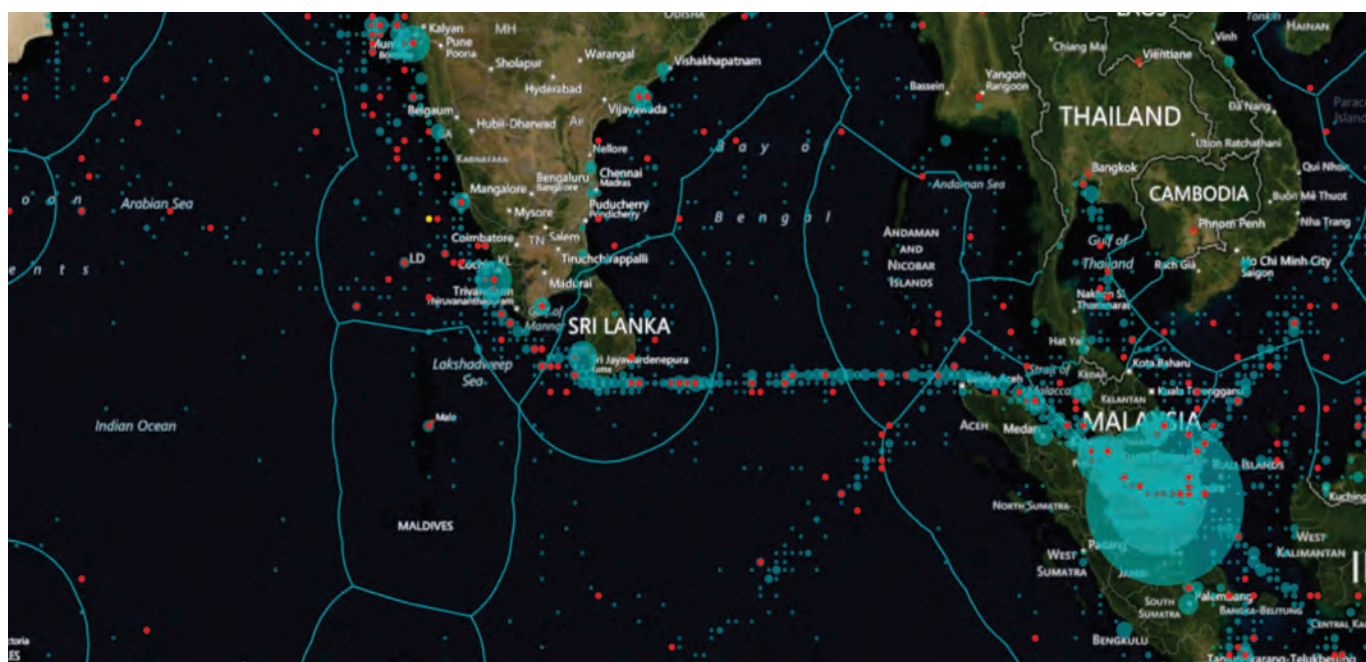
The Windward technology takes the vast amounts of data and distills it into insights and information at a single ship level. Its first product, MarInt, is described by Daniel as the first satellite-based maritime analytics system in the world, developed specifically with the needs of intelligence communities in mind. While he was, of course, not at liberty to explain the exact methodology behind the system, he was able to put in perspective the toll and time it takes to launch such an endeavor.

“We set out to deeply understand and try to solve burning operational challenges,” said Daniel. “A start up is – has to be – a work of love, as it truly takes over not only your life, but the lives of your family and friends. In the course of these four years, we’ve invested more than 100 man years in developing the smart algorithms that make sense of maritime data. We have flown hundreds of thousands of miles a year, connecting the field insights to our development teams’ innovation. And we have been fortunate to attract investors with a passion for our technology and a deep commitment to what we are doing.”

“What has guided us throughout the development of our technology is making sure that we don’t solve ‘theoretical problems’ but provide a response to real-world problems that organizations need to solve,” Daniel said. “We made it our mission to deal with the problem of scale: The Windward technology allows us to apply expert analytics to all vessel movements worldwide. Windward provides full visibility on vessels globally, based on their historical, current and projected behaviors. This full visibility across the seas is unprecedented.”

The beauty of Windward and its mission, could be, above all else, timing. While communication capability on land zips along at light speed, information from, to and about the world’s

**Windward provides full visibility on vessels globally, based on their historical, current and projected behaviors. This full visibility across the seas is unprecedented.**



oceans and its inhabitants is in its infancy. While getting it right is always a solid business mantra, timing it right is, too. With that, Daniel and his team see a world of opportunity ahead. The maritime market is one of the few ‘analog’ markets left out there, and we believe this is the right time to see how state of the art technology can support more efficient maritime operations,” Daniel summarized.

### Hack Attack

While hacking of all computer systems is a continual problem, the issue of hacking AIS – which has been widely discussed in recent months – is not seen as a problem for Windward Ltd.

“While hacking someone’s AIS may seem like to a big problem, the real issue starts when a vessel tries to deliberately change its own transmissions – thus assuming a new or stolen identity. More often than not, such false identities are used to try and conceal illegal activities,” said Daniel.

To that end, MarInt was designed to double and triple check every part of the data set before digesting it into the system. “As we monitor the oceans for some time now, we have built a proprietary analyzed database on all vessels, learning their identities and routine behaviors. MarInt can then analyze and alert on vessels that are suspected of identity theft or tampering with their transmissions,” Daniel said.

# The Founders

**Ami Daniel** (pictured) and **Matan Peled** co-founded Windward in 2010, and Daniel is the CEO. Windward Ltd. is self-dubbed as the *world leader in satellite-based maritime analytics*. Daniel and Peled were naval officers in the same unit of the Israeli Navy, and as Daniel explains it; “this adventure felt like a natural extension of our love of all things maritime.” He said Peled “is somewhat of a captain at heart, both in his personal life and in Windward. He has an unmatched capability for solid, analytic business reasoning, and when he takes something head on – you simply know it will be absolute, no shortcuts, carefully done to the tiniest details.”

“The last several years mark the entrance of the maritime domain into the information age, as ever-growing amounts of data are becoming commercially available. While just a few years ago maritime data was mostly database driven, the introduction of satellite AIS changed the game, and it is now possible for the first time ever to know the actual whereabouts of vessels. This shift in the market is at the heart of the Windward solution – if previously “best practices” included relying on static databases to monitor vessels, we introduced innovative dynamic tools to analyze ship movements in real time and across the globe, with the ability to identify unexpected (some might say suspicious) behavior on a micro level.

Our technology is often able to change the workflow process, bringing new angles to the game that are simply unobtainable without using big data analytics. This is both a huge opportunity and a challenge.”



**“While just a few years ago maritime data was mostly database driven, the introduction of satellite AIS changed the game, and it is now possible for the first time ever to know the actual whereabouts of vessels.”**



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# Cruise Industry 2014-'18 = Growth

The global cruise industry and its fleet of increasingly large, ultra-modern ships is projected to continue its steady growth in 2014, powered by growth overseas, particularly in the German market, as well as the adoption of faster, stronger and generally better satellite communication technology that is moving toward the level of seamless, cost-effective communication connections that can be expected at a land-based vacation destination.

The Cruise Lines International Association (CLIA), the trade association representing the \$32b global cruise industry, projects that 21.7 million people will take a cruise in 2014, up slightly from the 21.3 million that were estimated to

take a cruise in 2013. CLIA is comprised of 63 cruise line members representing more than 95% of global cruise capacity.

The CLIA global fleet comprises 410 ships (including river cruise member vessels) with a cumulative 467,629 beds. The CLIA fleet will add 29 new ships with a capacity of more than 34,000 passengers in 2013 / 2014, with an additional 20 ships and 52,000 beds slated to come online between 2015-2018.

While the U.S. maintains its strong global hold on market share, with an estimated 51.7% of all cruise passengers coming from the U.S., there are strong pockets of growth internationally, with Germany (7.7% total) driving strong demand in Europe. Current projections

forecast Germany overtaking the UK and Ireland (8.1%) as the world's second largest cruise market.

## Technology Onboard

While innovative ship designers and builders continue to conceive and bring to life increasingly sophisticated ships to attract and retain a broadening cruise demographic, according to Jim Berra, Chief Marketing Officer, Carnival Cruise Lines and Chair, CLIA Marketing Committee, better, cheaper satellite communication capability is the defining technology trend on cruise ships today.

**“There are some emerging technologies that could open up significantly more bandwidth,” said Berra. “One of these is what is called Low Orbital Satellites. That will allow you to flood a ship with far more bandwidth. I think as that technology proves out and becomes more prevalent, that type of satellite bandwidth will allow for the types of speeds you need to watch streaming movies. As that satellite technology unfolds, that could be a tipping point.”**

Early in 2013 O3b Networks signed a second, multi-year deal with Royal Caribbean Cruises Ltd. to provide high-speed satellite-delivered broadband service aboard Allure of the Seas, which enabled more than 8,000 guests, staff and crew to connect at fiber-like speeds at sea. Royal Caribbean was the first to enlist O3b's new maritime offering O3b-Maritime aboard, and Allure of the Seas' sister ship, Oasis of the Seas, first signed for the services in the summer of 2012.

While the new low orbit technology holds plenty of promise, existing technology still holds a firm spot onboard cruise ships. “In the current satellite de-

ployment (Ka and Ku band) that bandwidth is becoming more prevalent and less expensive so you're seeing cruise lines starting to buy more bandwidth, which will create a better experience for guests. If low orbital takes off and really becomes viable, that could be the tipping point for having 'land-like levels' of bandwidth at sea,” said Berra.

While advanced communication technology is a visible upgrade to cruise passengers, a bigger investment in cruise ship technology upgrade falls well below the consciousness of the everyday cruise passenger: emissions reduction technology driven by the North American Emission Control Area (ECA).

“I don't think the cruise industry is frightened as much as the cruise industry is frustrated that we've got the ECA,” said Christine Duffy, President & CEO, CLIA, in response to a question at CLIA 'State of the Industry' press conference. “While there is emerging technology and significant investment being made by the cruise industry to determine how they will reduce emissions, we are in some ways playing catch up.” Carnival's Berra, however, said that there is positive movement. “During the last year and a half the progression of (emissions) technology has moved quite quickly,” said Berra. “We're at a place now where we are pretty confident in the technology, and we're in the process of implementing it across a number of ships.”

## The Ships

While the focus on the consumer marketing end of the cruise industry is squarely on the experience and multitude of specialty entertainment options, the continued design and construction of new ships and the major modification

### Ships Launching in 2014: 16 Ships - \$3.9B Investment

| Cruise Line                              | Ship                          | Passenger Capacity |
|--|-------------------------------|--------------------|
| AMA Waterways                            | AmaReina                      | 164                |
| AMA Waterways                            | AmaSonata                     | 164                |
| Avalon Waterways                         | Avalon Illumination           | 166                |
| Avalon Waterways                         | Avalon Impression             | 166                |
| Avalon Waterways                         | Avalon Poetry II              | 128                |
| Costa Cruises                            | Costa Diadema                 | 3,700              |
| Norwegian Cruise Line                    | Norwegian Getaway             | 3,969              |
| Pearl Seas Cruises                       | Pearl Mist                    | 210                |
| Princess Cruises                         | Regal Princess                | 3,560              |
| Royal Caribbean Intl.                    | Quantum of the Seas           | 4,180              |
| Scenic Cruises                           | Scenic Gem                    | 126                |
| Silversea Cruises                        | Silver Discoverer (Pre-Owned) | 120                |
| Tauck River Cruising                     | ms Inspire                    | 130                |
| Tauck River Cruising                     | ms Savor                      | 130                |
| TUI                                      | Mein Schiff 3                 | 2,500              |
| Uniwold Boutique River Cruise Collection | S.S. Catherine                | 159                |
| <b>TOTALS</b>                            |                               | <b>19,540</b>      |

### Ships Launching in 2015: 8 Ships - \$4.1B Investment

| Cruise Line                   | Ship               | Passenger Capacity |
|-------------------------------|--------------------|--------------------|
| American Cruise Lines         | TBD                | 150-200 (2X)       |
| AIDA                          | Prima              | 3,250              |
| Compagnie du Ponant           | Le Lyrial          | 265                |
| Norwegian Cruise Line         | Norwegian Escape   | 4,200              |
| P&O                           | Brittania          | 3,611              |
| Royal Caribbean International | Anthem of the Seas | 4,180              |
| TUI                           | Mein Schiff 4      | 2,500              |
| <b>TOTALS</b>                 |                    | <b>18,006</b>      |

### Ships Launching in '16-'18: 12 Ships - \$7.9B Investment

| Cruise Line                   | Ship                        | Passenger Capacity |
|-------------------------------|-----------------------------|--------------------|
| AIDA                          | TBD                         | 3,250              |
| American Cruise Lines         | TBD                         | TBD (2X)           |
| Carnival Cruise Lines         | Carnival Vista              | 4,000              |
| Holland America Line          | Pinnacle Class              | 2,660              |
| Norwegian Cruise Line         | Norwegian Bliss (Breakaway) | 4,200              |
| Regent Seven Seas Cruises     | Seven Seas Explorer         | 738                |
| Royal Caribbean International | Oasis Class 3               | 5,400 (2X)         |
| Royal Caribbean International | Quantum Class               | 4,180              |
| Seabourn Cruise Line          | TBD                         | TBD                |
| Star Cruises                  | TBD                         | 3,364              |
| <b>TOTALS</b>                 |                             | <b>33,192</b>      |

### 2013\* Top Ten CLIA Cruise Passenger Source Market Overview

| Country               | 2013 Passengers | Global Passenger Share | 5 Year % Change | 2013 Passenger Source Rank |
|-----------------------|-----------------|------------------------|-----------------|----------------------------|
| United States         | 11,016          | 51.7%                  | 15.1%           | 1                          |
| UK & Ireland          | 1,790           | 8.1%                   | 16.4%           | 2                          |
| Germany               | 1,637           | 7.7%                   | 80.5%           | 3                          |
| Italy                 | 860             | 4.0%                   | 26.1%           | 4                          |
| Australia             | 760             | 3.6%                   | 130.3%          | 5                          |
| Canada                | 734             | 3.4%                   | 1.3%            | 6                          |
| Brazil                | 732             | 3.4%                   | 84.8%           | 7                          |
| Spain                 | 600             | 2.8%                   | 20.7%           | 8                          |
| France                | 520             | 2.4%                   | 67.7%           | 9                          |
| Scandinavia & Finland | 350             | 1.6%                   | 184.6%          | 10                         |

to existing fleet is a continued reality to serve this growing market, as new ships more so than any other factor help the cruise lines to create buzz.

New ships for 2014 include:

**NCLs Norwegian Getaway**

The 145,655-gt Norwegian Getaway was built by Meyer Werft in Papenburg, Germany, and offers a host of novel entertainment options, including a magic-inspired "Illusionarium," a Grammy Museum and a theater showcasing the Broadway musical "Legally Blonde." It also offers a three-story sports complex with two swimming pools, five water-slides, a ropes course and a zip wire. In late January/Early February 2014, the ship was docked in New York for five days to add hotel room capacity for the Super Bowl, taken over by Anheuser-Busch InBev and transformed into the Bud Light Hotel.

**Royal Caribbean's Quantum of the Seas**

Quantum of the Seas is being built in German at Meyer Werft, capable to carry 4,180 passengers and scheduled for launch in November 2014. It is highly anticipated as it is Royal Caribbean's

new class of ship, and it pulled out all the stops to ensure the vessel is an industry game-changer, with a number of 'firsts' at sea, including: RipCord by iFLY, a first skydiving experience at sea; North Star, which is a jewel-shaped glass capsule on a robotic arm which transports passengers off the ship and over the sea more than 300 ft. above the ocean; and Virtual Balconies for interior staterooms.

**Princess Cruises' Regal Princess**

Being built at the Fincantieri Shipyard in Monfalcone, Italy, Regal Princess will carry 3,560 passengers and is scheduled for launch in May 2014. Royal Princess' sister ship, the Regal Princess, features a glass-bottom sea walk, an expanded atrium with additional entertainment and casual dining options, and Princess Cruises' largest-ever deck pool, replete with nightly water and light shows and a screen for first-run movies. Additional features include poolside cabanas, live TV studios, spas, theaters, a casino and a special chef's table dining experience.

**Costa Cruises' Costa Diadema**

Costa Diadema is a 132,500-gt, and 1,862 guest cabins, 3,724 passenger ship



scheduled for launch in October 2014. Costa Diadema will be the largest-ever ship to fly the Italian flag when she sets sail in October. Diadema, literally means "tiara" in Italian and Costa has called the ship "the brightest jewel" in its 15-strong fleet, and it promises "majestic and refined elegance," flavors from around the world and the one of the most-spectacular spas at sea. Other features include split-level rooms, an outdoor promenade

to "connect" passengers with the sea, and an extensive kids club.

**TUI Cruises' Mein Schiff 3**

The 2,500-passenger Mein Schiff 3 is scheduled for launch in the spring of 2014, and is the first-ever new build for TUI Cruises, a joint venture between Royal Caribbean and Germany's TUI AG. It will target the German-speaking market. *Greg Trauthwein*

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# HEMPEL

# MIOX Safe Water Management for Cruise Ships

By Greg Trauthwein

Safe water management onboard any ship is a challenge, a challenge magnified exponentially onboard the world's largest cruise ships with thousands of passengers and crew in close quarters. Just last month it again made global headlines as Royal Caribbean's Explorer of Seas was forced to cut its 10-day cruise short due to an estimated 700 passengers dropping ill with a gastrointestinal illness. Keeping quality water flowing, passengers and crew healthy is a priority for the cruise lines, and Howell Laboratories contends MIOX improves performance, reduces operating costs and protects the environment.

It is not a stretch to characterize the marine industry as conservative in the adoption of new technologies, and in the cruise market it can be expected that the introduction of 'new' water disinfection technology is met with a wary eye. But as Howell Laboratories sets its sites on expanding the use of MIOX disinfection technology onboard some of the world's largest and highest value ships, Adam Jones, P.E., Director of Business Development, Commercial Products, Howell Laboratories, Inc., is quick to point out that the MIOX technology is anything but new.

"The core technology has been around for several decades and initially commercialized by MIOX," said Jones. "They started selling systems to land-based water treatment facilities and now have installations all over the world treating Industrial, recreational and potable water supplies."

The technology is scalable, founded as the personal use MIOX Purifier Pen using the MIOX electrolysis process converts brine into a sterilizing solution, using the same simple water disinfection chemistry of mixing salt, electricity and water.

That same technology has been used for decades on land, based in public water treatment facilities and purifying billions of gallons of water daily.

Lest you think this a land-based only tech solution, think again: Howell Laboratories, which has had a relationship with MIOX for more than a decade, has used the MIOX generators as the core

Howell Laboratories sets its sites on expanding the use of MIOX disinfection technology onboard some of the world's largest and highest value cruise ships.

to its water solutions system for some of the largest and highest value ships in the world: more than a dozen of the U.S. Navy's largest ships, including all aircraft carriers.

#### The MIOX Relationship

As Jones explains, MIOX is a technology company that seeks partnerships with outside companies to penetrate specific market channels such as maritime. Interest in the maritime market was sparked by a chance meeting onboard an airplane between a MIOX executive and a cruise executive, with the ensuing conversation turning to the industry's fight to contain the Legionella bacteria. This chance conversation turned into a test and installation aboard the Celebrity Century, with more than five years of successful operation according to Jones. It is this reference, plus the extended run



aboard the U.S. Navy's most valued assets, that Howell Laboratories is hoping will change the tide in the acceptance of the MIOX solutions on cruise ship newbuilds and refits.

"The cruise industry is interested, because frankly it works better (than existing technology) and it changes how they look at, store and handle chemicals," said Jones. "Plus, cruise ships are arguably the largest users of fresh water on the seas." According to Jones, the benefits of the MIOX solutions are fairly straight forward:

- **Effectiveness** The system is proven to kill legionella and eliminate biofilm (which, in layman's terms, is the gunk found in pipes). "Biofilm in the pipes helps to breed everything that you don't want," said Jones. "Jacuzzis are particularly problematic, as the temperature is right in that sweet spot."

- **Cost Less to Operate** The consumable, the salt to run the machine, is relatively stable in price. Factoring in the consumables and the electricity consumption, Jones loosely estimates a savings of "six figures" per ship, per year.

- **Elimination of Chemicals** Simply put, the elimination of chemicals used in traditional system frees space onboard, and eliminates the mix of chemicals on a particular ship.

#### The System

At the heart of the system is a patented electrolytic cell requiring only Water, Electricity and Salt to generate all the disinfection chemicals required. It is capable of producing unique Mixed Oxidant Solution (MOS) chemistry, an effective, yet environmentally benign disinfectant. The presence of a second oxidant in the solution, which co-exists for 24-48 hours after generation, provides dramatically increased efficacy, but the MOS can be monitored and controlled with the same ease as older chlorine-based systems.

It can be used for a multitude of water applications, from drinking water, as MOS chemistry complies with all EPA, IMO, WHO, and CDC standards for safe drinking water, to recreational water, as Jones said the MOS solution achieves a better, more rapid kill on a broader range of microorganisms when compared to hypochlorite.

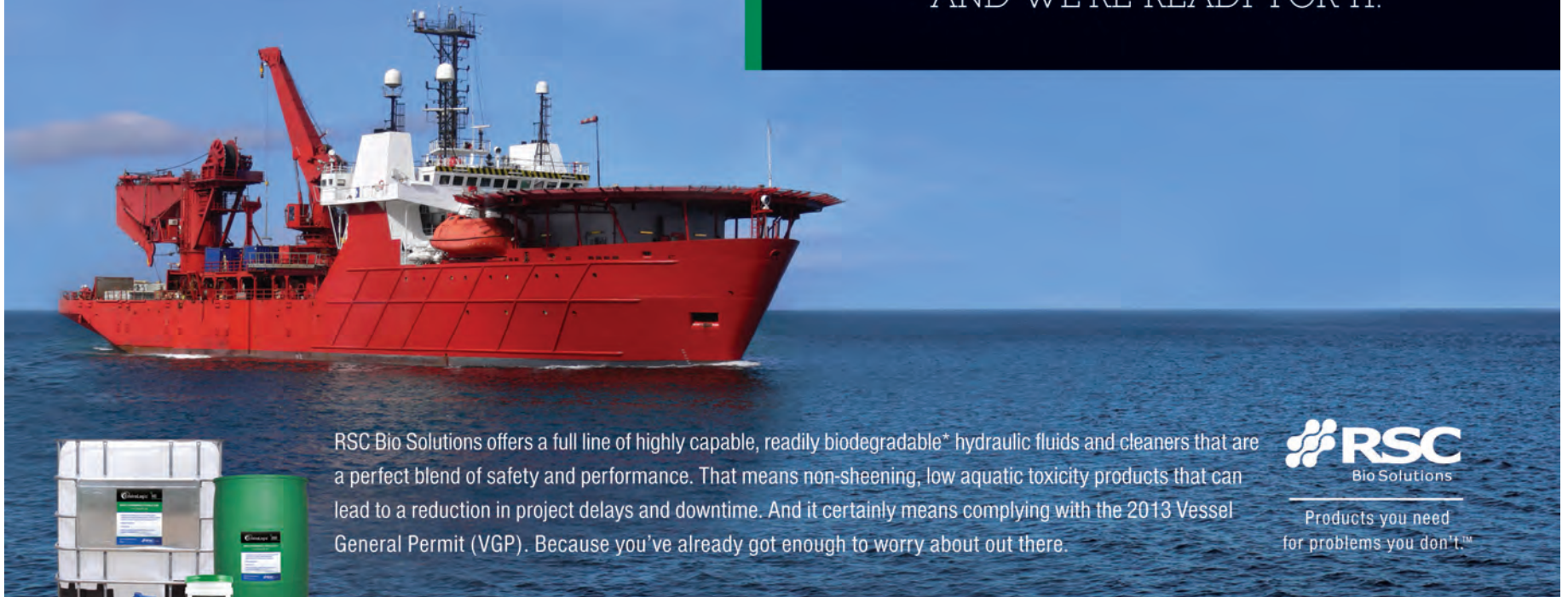
Similarly crucial is the system's proven effectiveness in the removal of biofilm, an invasive substance that naturally forms throughout water distribution lines and serves as a shelter for disease-causing microorganisms.

The Howell/MIOX systems use no hazardous chemicals to generate the disinfection chemicals, and at a generated concentration of 0.45%, there is no need for Hazmat planning and reporting, as the solution is safe to handle.

As space onboard cruise ships is a premium, the system's modular design approach is attractive. All tanks and components are individual units, allowing optimal placement for maintenance, expansion, and even replacement of legacy equipment. Systems also interface with existing control systems.

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**Five Minutes With ...**

# Tomas Tillberg

Modern cruise ships can cost upwards of a billion and built to last more than 25 years, so the platforms much be built for change, as evolving style & taste, material innovation & maritime regulation dictate. *“Built to stand the test of time”* is the mantra, so in seeking insight on modern cruise design we sought insights from a designer that also has stood the test of time, Tomas Tillberg of Tillberg Design International.

*By Greg Trauthwein*

**Mr. Tillberg, as a long-tenured and well-respected member of the Cruise Ship design community, put in perspective the overriding design trends that you have seen in cruise ships over the last decade?**

There are more diverse and better defined cruise ship designs today than 10 years ago and there is more attention to intimacy, variety, options and multiple functions in the designs than ever before.

One reason is that there are more cruise lines catering to better and better defined segments of the cruise market, which means the designs have to be more conscious of the different brands and how they are marketed, a wonderful challenge for us as a design firm.

The itineraries are also more diverse than before and present interesting

choices for the passenger that were non-existent 10 years ago. As one of the factors considered when designing the interiors of a cruise ship is the itinerary this too presents new and exciting challenges for us.

Cruise lines have always been looking for new potential revenue sources. The retail areas have been an important one of those and have developed considerably during the last 10 years as have casinos and food venues. There are more restaurants with different food choices than ever before. The designs have to reflect this, so today we design Asian food venues as well as the very best French or a casual Italian “Eataly” or even a fully authentic Moorish Café.

There is a trend to introduce what you can find on land also on the ship such as the Central Park on the RCCL ships or different amusements or sports

activities. Also the ship can actually be a destination today rather than a means of travel. Today families with children of all ages are an important part of the guests of many cruise lines and large areas on ships are devoted to these different age groups.

Technology has moved forward at a rapid rate and today we see wireless communication as a natural part of the experience on a cruise. This means that areas such as the business center tend to diminish in importance as the guests are able to use their laptops, iPads or phones for emails, Skype etc. anywhere on the ship.

To summarize, the trend is towards more of a boutique hotel atmosphere and residential feeling, multiple choices in itineraries, level of comfort and luxury, food and entertainment and basically more bang for the buck!





“Today we see wireless communication as a natural part of the experience on a cruise. This means that areas such as the business center tend to diminish in importance as the guests are able to use their laptops, iPads or phones etc. anywhere on the ship.”

**What, today, do you see as the defining design trends?**

■ The design is more understated, contemporary and timeless. Our challenge is to take the design to the next level, thinking ahead of current design trends.

**What are the hot trends today in regards to interior design, as far as accommodation, public and entertainment spaces?**

■ In accommodations, cabins are larger, closer to hotel accommodations with improved bedding (mattresses are important). The design of the bathrooms has improved. In public spaces it's more about diversity; smaller areas and more choices. Regarding entertainment spaces, the level of entertainment has increased, sometimes to Broadway quality and the designs of the entertainment venues have to be equally creative.

**Can you provide an overview of the projects that you are currently involved?**

■ We are working for all the major cruise lines on newbuilding, revitalization and refit projects and are currently designing cabins and public areas as well as crew areas.

**Technology is a recurring theme in our pages: what technologies, or evolution of technologies, has in your opinion had the most dramatic impact on the design of cruise ships, and why?**

■ The fast development of wireless technology has meant a re-thinking of the designs of several types of areas. The constant development of new materials also impacts our designs. An example of this is the Trevira CS fiber. It is inherently inflammable and the diversity of textiles manufactured today with this fiber is astonishing.

**You are involved in an industry which designs assets that are expected to remain functional and attractive for decades, while serving an ever-evolving consumer base. What is the secret, in**

**your estimation, to your (or anyone's) long term success?**

■ To have an active interest in our clients, to be open and receptive and understand the specific brand identity. There is also a familiarity with what is desired that comes from experience. A sense of practicality in choosing materials and designs that will last is also necessary as well as having an understanding for the economy and the cost of the designs.

**Personally, professionally, what do you count as the greatest influences to your ship design style, and why?**

■ We ultimately design for the passenger, which means that we have to be very attentive and understand really well who our client is planning to market the ship to. It makes each project an exciting challenge in its own right. Experience is of course an important part of design, the lessons learned help us stay real and meet budgetary expectations



for example, but there is actually not so much influence from the past, it's happening right now and with each ongoing project. Our goal is to stay ahead of the game and to design for tomorrow.

**If you had to pick one cruise ship of all time that is your hands-down favorite, which ship is it and why?**

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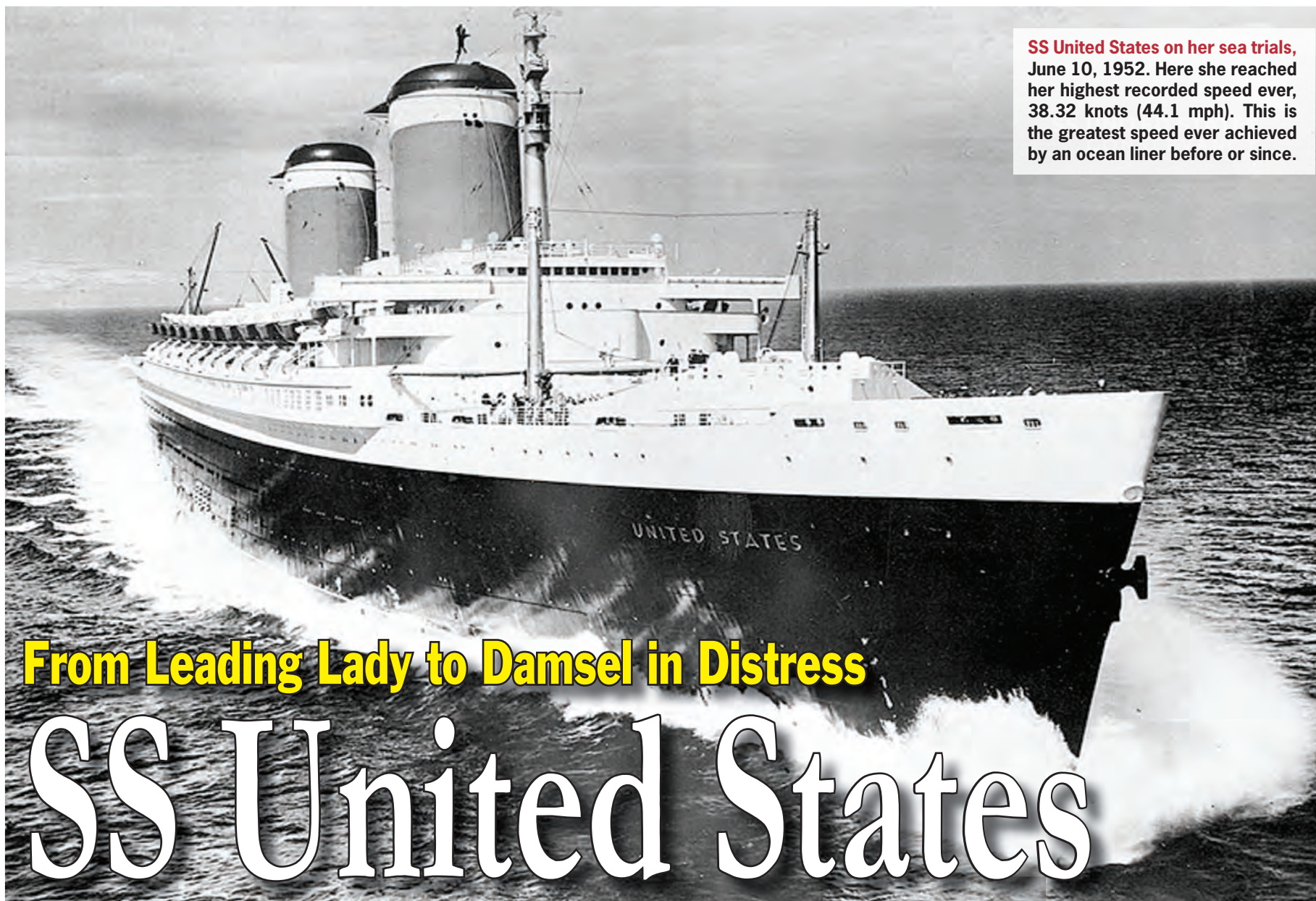


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**SS United States on her sea trials, June 10, 1952. Here she reached her highest recorded speed ever, 38.32 knots (44.1 mph). This is the greatest speed ever achieved by an ocean liner before or since.**

**From Leading Lady to Damsel in Distress**

# SS United States

Photo courtesy of Charles Anderson and the SS United States Conservancy.

Once queen of the express liners, and the fastest, safest and biggest passenger liner in history, the SS United States today quietly awaits rescue from a pending cruise to the scrapyards.

*By Patricia Keefe*

## The Big Ship

the Big U, the one that didn't sink. The S.S. United States, still the fastest passenger liner ever and enduring symbol for many of American post-war industrial might and ingenuity, is today more aptly called "the Lady in Waiting."

She is waiting for a rescue that may never come from an appointment with the scrap yard looming large on her summer schedule. And that would be a shame according to her many supporters, not the least of which was the late newsman and sailor, Walter Cronkite.

"It [current state] is a crime against ship building, a crime against history," said Cronkite, himself an American legend, in the 2008 documentary, *SS United States, Lady in Waiting*. "It was tear-jerking to see it just laying up there in that yard and gouging to pieces and nobody caring. Its restoration would be a restoration in American pride, in something America should be very proud of," he lamented, over footage of the once proud liner.

To some, the ship, which was once the standard to which other express liners aspired – is today a rusting, gutted hulk, a mere shadow of her former self. On some level that is true, but the ship retains her sleek lines, trademark hull profile and famous stacks, and more importantly, her place in not just maritime history, but American history.

Everything about this ship, considered a technological wonder in its day, incited awe. It was, in many ways, larger than life – from its famous architect, William Francis Gibbs, to the outrageous size of its naval subsidy, to its compact, high-octane propulsion system, to its ultra light aluminum superstructure, propeller strategy, size, unparalleled attention to safety and the greatest power-to-weight ratio ever produced in a commercial passenger ship.

### Capturing the Blue Riband

Overshadowing all that is its greatest claim to fame – its record-breaking speed. On its maiden voyage in July 1952, the United States shattered speed

To celebrate *Maritime Reporter & Engineering News'* 75th Anniversary, each edition in 2014 will offer a specially commissioned feature article which examines a historical topic. This month we look at the arguably the most famous American ship: SS United States

Don't miss the special 75th anniversary edition to publish in June 2014, made possible in part by our 75th Anniversary sponsors seen on pages 33 & 35.



records crossing the Atlantic and back (see related story on page 35), ripping the fabled Blue Riband prize from the holder of 14 years, the R.M.S. Queen Mary, and holding onto it for life – 62 years and counting. "The great mystique was her power and speed," notes Greg Norris, treasurer of the U.S. United States Conservancy, a non-profit group spearheading the campaign to save the ship, and a one-time passenger on the ship. "Essentially what Gibbs did was to shoehorn an aircraft carrier power plant

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**“The ship emerged on the world stage at a particular moment in American history. It was the fastest, most powerful and safest ship – a culmination of ocean liner design to that point.”**

**Susan Gibbs**, executive director of the S.S. United States Conservancy and granddaughter of ship architect William Gibbs.



**SS United States** graced the cover of the July 1, 1952 edition of **Maritime Reporter**

into this fine, narrow, long hull.”

“It was HUGE when an American ship took the record,” says Arthur Taddei, who served as a junior engineering officer on the United States. “That’s why people were so passionate about it. It set a new standard. It was like the Constitution, which changed naval warfare. Of course, when something comes out with huge red, white and blue funnels, that makes it a very dramatic symbol of this country.”

Adding to its allure, the whole package came veiled in a tantalizing wrapper of secrecy. Lessons learned from the close of World War II when the U.S. had to rely on British ships to ferry servicemen home, tensions building in Korea and the frosty early days of the Cold War, convinced the U.S. Navy of the need for a passenger liner that could be converted quickly into a troopship. But it wanted more. Naval requirements for speed, safety, redundant engine rooms, heavy compartmentalization, insulated wiring, dimensions, etc., both dovetailed nicely with Gibb’s own wish list, and ensured

that many parts of the ship design would remain classified into the early ‘70s. The SS United States was the first passenger liner to be built almost entirely in dry-dock – far from prying eyes.

Those demands heavily influenced the design, and also pushed up the cost of the project to the point where Gibbs was able to convince the government to pick up two-thirds of the cost \$78 million, with the remainder to be paid by the operator, United States Lines. As for the secrecy, Gibbs wasn’t above using it to feed the ship’s mystique, and he preferred to keep his design under wraps, even from the Navy.

“Mr. Gibbs was extremely proud of that ship. It was his key piece of work in his lifetime. He wanted to keep [the design and construction] secret. In fact, he was very anxious to keep the government out of it as much as he could,” said Prof. Jacques Hadler, a researcher for 31 years at the David W. Taylor Model basis, 17 of them as head of hydrodynamics, and a former Dean and currently part-time professor at the Webb Institute.

Considered the nation’s leading expert on conventional propeller design, Hadler got his start in the Navy working on the speed trials for the United States, and for the men who redesigned her propellers.

But the real wonder of the ship lay not in just the individual components, but more in the way Gibbs took pieces of existing technology, and pushed or deployed them to the max, weaving together a whole much greater than the sum of its parts to accomplish his goals of faster, lighter, safer.

“The lesson she suggests by her very presence, is that anything is possible. We don’t have to have all the answers, we need only look back at the ingenuity of our ancestors for ideas and inspirations as we confront new problems and re-define old ones,” observes David MacCaulay, author of series of books on how things work or how they were built. A member of the Conservancy, he immigrated to the U.S. on the United States as a child and is currently writing a book with the ship at its center.

“I compare it to the space shuttle.

We were able to do something no other country was able to do in the construction, design and build of the ship – things no other ship in the maritime world has been able to do or do since,” Joe Rota, who worked on the ship in a myriad of positions, culminating as ship photographer, and is currently a Conservancy board member. “She was an absolute marvel. She was never late, and she never needed a repair.” Heck, she could sail for 10,000 nautical miles without stopping for any reason. No other passenger ship could do that.

#### **Key Elements of the Ship**

The reliability of the whole in turn, speaks to parts, and to issues that Gibbs and the Navy focused on.

For starters, at the heart of the ship was the carrier-class propulsion system and power plant. At the insistence of the Navy, the vessel had redundant engine rooms equipped with eight IOWA-class Babcock & Wilcox boilers operating at 1,000 psi and 975°F, always with four online and four offline. In contrast, the



Photo courtesy SS United States Conservancy.

While the story of **SS United States** is multifaceted, a story of industry and innovative, steel and speed with a liberal dose of national pride, ultimately it is a human story, from the people who designed, built, worked upon and sailed aboard her.

Pictured here are two telegrams from the Maritime Reporter archive, messages between William Francis Gibbs and his brother Frederic Herbert Gibbs

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s/s **SS UNITED STATES** VIA AT M. DATE **JUL 10 1952** 195

13 WCC JN NEWYORK 32  
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QEII had three boilers in constant use, which is why it always had turbine trouble, according to Norris.

The Big U had four sets of Westinghouse double-reduction geared steam turbines, rotating at 5,240 rpm; and 250,000 shaft horsepower (SHP). In addition, there were six 1,500 kilowatt steam turbo generators on board, backed by two 250 kilowatt diesel emergency generators. Those boilers ran on water distilled on ship, and nothing else.

Throughout her service, the United States cruised at an average of roughly 30 knots, about two thirds the maximum speed of 38 knots she was actually capable of – a top speed that was classi-

fied throughout the '60s. "You had to keep the speed low enough so as not to increase the fuel consumption or you'd run out of gas. We had plenty of capacity but the last 5 knots double fuel consumption," explains Taddei. Moreover, the ship only needed 130,000 SHP, but the Navy wanted more power in order to protect future troops from waiting subs. "If you are going slow, you are sitting target."

Contributing to the speed were the signature hull and a four-screw propeller design.

Gibbs based the hull on an existing design known as the Taylor Nu. 40 hull, and modified it further, creating a knife-

like stem, tiny bulbous bow and rounded cruiser and transom stern combination using a special lightweight steel and building in 16 watertight compartments, according to Norris. Taylor was a marine engineering who did a lot of pioneering work on hull design. "She had better watertight integrity than other ships of the day. If she had a thing like the Titanic, she would not have sunk. Up to 13 compartments on the ship could have been flooded and the United States would have maintained watertight integrity," says Charles B. Anderson, Conservancy president, a maritime attorney and the son of the longest serving commodore of the ship, John W. Anderson.

A key safety feature was an elaborate labyrinthine of wing tanks built into the double hull. If the ship was punctured on one side, the tanks could be cross flooded starboard to port or vice versus, allowing the ship to remain on an even keel. Proof that it worked came from an incident involving the Gibbs-designed S.S. Malolo, which collided with another ship and took in over 7,000 tons of water and yet stayed upright and made it back to port.

"If you think about the recent Costa Concordia accident, where the ship keeled over and they couldn't launch lifeboats properly on their side, you see the value of Gibb's idea," adds Norris.

It had an extraordinarily long and nar-

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“Essentially what Gibbs did was to shoehorn an aircraft carrier power plant into this fine, narrow, long hull.”

Greg Norris, treasurer of the S.S. United States Conservancy, and a one-time passenger on the ship.

## Maiden Voyage First Time is a Charm

**On July 3, 1952, the SS United States steamed out of the Ambrose Channel** in New York Harbor and headed off into the North Atlantic on her first voyage to Le Harve, Normandy, and then to the Port of Southampton on the southern coast of England by way of Bishop Rock, off Cornwall. After a slow start due to fog, **Captain Harry Manning** made up the time with an average eastbound speed of 35.59 knots, reaching Bishop's Rock on July 7, in a then jaw-dropping three days, 10 hours and 40 minutes, despite encountering gale force winds and heavy swells. Even more awe-inspiring, the United States broke the record while using only two-thirds of her available power, never exceeding 158,000 SHP.

**One side effect of her record-breaking speed could be seen in the bare patches on the hull, where the sea peeled the paint right off as the ship raced through the water.**

The next day, she entered Southampton to tremendous fanfare from the thousands of cheering onlookers onshore and onboard a riot of various size craft, all sportingly saluting the American feat, despite the dethroning of its own grand ocean liner. **Winston Churchill** and the captain of the Queen Mary, which had previously made the same crossing in three days, 20 hours and 42 minutes, were among the many that sent congratulatory notes welcoming the American ship to the North Atlantic and hailing her success.

**The United States eventually lost the eastbound speed record in 1990 to a British-flagged, empty wave-piercing catamaran passenger/car ferry.**

On July 14, 1952, on the return to New York, the United States set a second record, completing the westbound crossing in three days, 12 hours, and 12 minutes, running at an average speed of 34.51 knots. With a symbolic 40-ft. blue banner flying high, she sailed triumphantly into port, accompanied by a raucous feet of smaller craft vying for the honor of escorting the new speed queen home (**see photo**). Fireboats sprayed water, thousands of people lined the waterfront. Four days later, the designers and crew were treated to a ticker tape parade in the city. The impact of the United States' feat is sometimes compared to that of the launch of the space shuttle, which expanded once again our definition of travel and its limitations. In the days before commercial passenger air flight, transatlantic travel was critical, so critical that Churchill has credited passenger liners pressed into troop ship service with shaving a year off WWII. In that environment, the United States thrived for a good 17 years of flawless service, until she too was outgunned and left in the surf by the next revolution in transportation speed – hours instead of days - via commercial air service. “She just snuck in under the wire – the airplane was about to take it all away,” notes David Macaulay, author of series of books on how things work or how they were built. “By the end of the 60s, it was all planes.” Business travel, and ocean liners, would never be the same. The very attribute that Gibbs had worshipped – top speed – became the undoing of his life's obsession.



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## THE S.S. UNITED STATES

Largest and fastest liner ever built in the United States, and the world's most modern passenger ship sails on her maiden voyage

At 12 o'clock noon, next Thursday, July 3, a whole chapter in the history of our American merchant marine will be written with the sailing of a single ship. After almost a hundred years this country will be back in proud competition with European steamship companies in the business of transporting passengers and cargo at record-breaking speeds across the Atlantic—a level of competition which was abandoned after the passing of the famous American clipper ships of the 19th Century.

At that time, the largest, largest and most luxurious passenger liner ever built in America will leave Pier 86 in New York and will sail on her maiden voyage to Le Havre and Southampton. Christened the United States and built in the United States for operation by the United States Lines, this new queen of the American Merchant Marine is all-American—

from mast-top to keel and from the tip of her prow to the foam of her 100-ft-long wake! She's 109% YANKEE!

Climaxing seven years of planning and more than two years of actual construction in the yards of the Newport News Shipbuilding and Dry Dock Company, the \$22,000,000 United States will move out into the channel of New York Harbor in full dress, with every available pennant and flag rippling from her 100 yards. She'll have 2,400 passengers and 1,000 crew members on board, and when she moves out past the Statue of Liberty, she'll receive the geyser-like salute of the harbor's entire fireboat fleet. Every whistle in the harbor will blow its own individual "Bon Voyage!" and every man, woman and child will be reminded of her departure through the nation's press, radio, television and newscasts.

Built to supersede the S.S. America as flag-

ship of the United States Line's fleet, the United States is actually two ships in one—a peacetime luxury liner and a wartime troop ship—probably the only reason she was ever allowed to be built.

Since the passing of the clipper ships, Europe kept building the big ones and knocking off the speed records while this country was content to sit back and raise the challenge. There was always an excuse—wars and depressions, the idea that American shipbuilders' most the competition economically. But World War II lent a persuasive argument that changed all this. The Queen Mary and Queen Elizabeth had shown the value of big, fast transports that could whisk a whole division of troops at a time across the oceans. So the Maritime Commission sees the Maritime Administration came across with a subsidy for

(Continued on Page 21)



### Sperry Salutes the S.S. United States

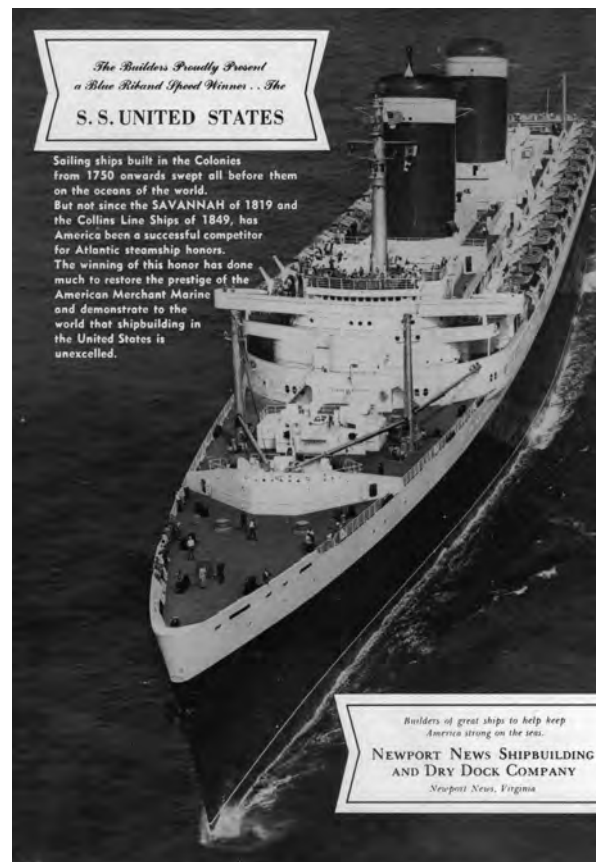
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**NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY**  
Newport News, Virginia

Coverage of the **SS United States** was voluminous, including the pages of the MR July 1, 1952 edition, in the years leading up to and including its maiden voyage.

row beam and was configured to have less resistance from the water at top speed, Anderson adds, noting "It left virtually no wake."

The United States sped across the Atlantic on its maiden voyage on four 18-ft, manganese-bronze propellers - two outboard four-bladed propellers and two inboard five-bladed propellers - said to be the first used of mixed blades, designed

by Elaine Kaplan of Gibbs & Cox. The propellers did their job on the record-breaking trip, says Hadler, but when the ship came back into port, they had severe propeller damage. "One was so badly eroded, at the root you could see through 8 or 9 inches." As a result, the propellers ended up being designed three times to address two problems: cavitation, erosion and vibration. More blades can de-

liver more power, but fewer blades are more efficient and create less turbulence. "It's something we in later years, by the late '60's, got a handle on," Hadler says.

#### Taking off the weight

More easily solved was the weight issue. And the primary answer to that was an almost obsessive use of aluminum through the ship, both for its super struc-

ture and in its fittings, furnishings and décor.

While shipbuilders began using aluminum more during WWII - because it was lighter than but as strong as steel - its use was limited because it can't be welded, it weakens when heated and it doesn't mate well with steel. Gibbs was not dissuaded. He not only built his entire superstructure from aluminum - extremely unusual at the time - to make the ship as light as possible, but he used it everywhere possible, driving his decorators crazy while consuming 2,000 tons of the stuff. It was the largest amount used in any project in the world until the Twin Towers were built in the early '70s, according to his granddaughter, Susan Gibbs, executive director of the Conservancy. Gibbs and his team figured out how to outsmart the corrosive effect the two metals had on each other. "When steel and aluminum met, they didn't like each other, so they had to put a layer between the two - neoprene," says Norris. Frozen rivets got around the welding and heat issues.



Photo Courtesy of Northrop Grumman Shipbuilding, Newport News, VA

**SS United States** launching at Newport News Shipbuilding, (now Northrop Grumman Newport News,) June 23, 1951.

**That was then ...**

Above, the SS United States on a cruise to St. Thomas, 1966. The SS United States took 23 cruises during her service career, in addition to 400 round-trip transatlantic crossings.

**This is now ...**

United States seen from S. Christopher Columbus Blvd., Philadelphia.

“Its (current state)  
is a crime against  
shipbuilding ...  
... a crime  
against  
history”

Walter Cronkite, late newsman,  
in the 2008 documentary, *SS  
United States, Lady in Waiting*.

If you want to donate to the cause, or  
learn more about the ship, visit the  
Conservancy website [www.ssusc.org](http://www.ssusc.org)



# SS United States Facts

Name: ..... SS United States  
 Nicknames: ..... The Big Ship, The Big U  
 Designer: ..... William Francis Gibbs (Gibbs & Cox, Inc. naval architects)  
 Builder: ..... Newport News Shipbuilding and Drydock Co., 1950-1952  
 Operator: ..... United States Lines Co., NY  
 Port of registry: ..... New York City  
 Launched: ..... June 23 1951  
 Maiden voyage: ..... July 3, 1952  
 Years in Service: ..... July 1952 – Nov. 1969  
 Voyages: ..... 400 transatlantic crossings for 772,840 miles.  
 Cost: About \$78 million - \$28 million from United States Lines; \$50 million from the U.S. MarAD (the ship had to be convertible in 48 hours to a troop ship with capacity of 15,000).  
 Length: ..... 990 ft.  
 Beam: ..... 101.5 ft.  
 Depth: ..... 75 ft. Keel to top of Superstructure, 122 ft.; Keel to top of forward funnel 175 ft.  
 Draft: ..... About 31 ft.  
 Total cargo capacity: ..... 148,000 cubic feet  
 Funnels: ..... Two, 65 ft. tall  
 Decks: ..... 12  
 Complement: ..... More than 3,000 passengers and crew  
 Speed: ..... Cruising 30-33 knots, Max. 38 knots  
 Horsepower: ..... 248,000 SHP (180,000 kW)  
 Electric plants: ..... 6 x 1,500 kW steam turbo gen; 2 x 250 kW diesel emergency gen  
 Propellers: 4 x 18-ft, manganese-bronze propellers, over 60,000 pounds each. Forward outboard props have four blades; aft inboard props have five.  
 Bunker Capacity: ..... 10,306 tons fuel oil  
 Distance without stopping: ..... At 35 knots, 10,000 nautical miles or 12 days.  
 Hull: ..... Comprised of 183,000 separately fabricated sections of 2-inch steel plating  
 Tonnage: ..... 53,330 GRT; 29,475 net  
 Displacement: ..... 47,300 tons at maximum draft

## Classified Status:

Naval requirements for speed, safety, redundant engine rooms, compartmentalization, insulated wiring, dimensions, etc., led to a closed construction site, limited access on ship to key systems and a classified designation until the early '70s.

## Hallmarks:

Aluminum (2,000 tons) superstructure, record-breaking speed and HP, subassembly construction, extremely sleek hull, unusually narrow beam, propeller system, Naval-grade propulsion, aggressive compartmentalization, virtually fireproof construction and furnishings, fully air-conditioned, ship-to-shore telephones in all staterooms, listed on the National Register of Historic Places.

## Record holder:

"Blue Riband" holder, given to the passenger liner crossing the Atlantic Ocean in regular service with the record highest speed. Set new record when sailed from New York Harbor to Cornwall, U.K. in 3 days, 12 hours and 12 minutes at an average speed of 34.51 knots. Return voyage also completed in record time, in 3 days, 12 hours and 12 minutes at an average speed of 34.51 knots.

## Propulsion:

Separate engine rooms equipped with 8 IOWA-class Babcock & Wilcox boilers operating at 1,000 psi and 975°F; 4 sets of Westinghouse double-reduction geared steam turbines, rotating at 5,240 rpm, which produced up to a combined 247,785 shaft horsepower (SHP).

## Current owner:

Acquired in February 2011 by The SS United States Conservancy, a non-profit dedicated to saving the ship. Purchase (\$3M) and maintenance funding (\$300,000) were provided by Philadelphia philanthropist H. F. Lenfest.

## Maintenance costs:

In 2010, then owner Norwegian Cruise Lines put annual maintenance costs at \$800,000/ year. The Conservancy spends roughly \$65,000/month (some estimates go to \$80,000-\$100,000) in dockage, insurance, security and other costs.

## Current Status:

Berthed in Philadelphia at Pier 84 since 1996, awaiting final disposition - development or scrap yard - with a summer 2014 probable deadline.

Another example of where Gibbs took existing technologies to an extreme is Safety. "Gibbs was a fanatic about safety, he had an absolute paranoia about fire," says Norris, noting that the naval architect was deeply affected by the 1934 burning of the S.S. Morro Castle, which killed 137 passengers and crew. The disaster spawned improvements in ship safety overall, but Gibbs left nothing to chance, going well beyond all the safety standards of the day.

Everything had to be fireproof right down to the paint and the bedding, leading to the use of chemical retardants, fiberglass and Maronite, panels encasing an asbestos layer that coated the ship. He famously banned wood from the structure, "except for the piano and the chopping block." Not that Gibbs didn't try to get Steinway & Sons to build an aluminum piano. Instead, Steinway proved to Gibbs his pianos would not burn by pouring gas on top and light one up in a demonstration.

Other safety features included more lifeboats and rafts than the ship needed, and a remotely controlled from the bridge system that would close doors in the event of a fire, containing damage.

All combined, the super-secret hull design, compact state-of-the-art engines, 250,000 HP, boiler system with its super-heated dry steam, the five-bladed propellers, the super lightweight all-aluminum super structure, the unheard of attention to numerous safety measures deployed within and about the ship and its celebrity clientele - are just part of what created a legend. But it wasn't enough to fight the continued march of technological progress.

## Up, Up and Away

In a nutshell, commercial air travel, which debuted in 1958, and progressively improved and expanded through the '60s, killed the trans-Atlantic passenger liners. As Bob Sturm, another former engineer on the ship notes, "Six hours on a plane beats 4.5 days to New York or France." Passengers voted with their feet, especially businessmen, for whom time is money.

Rising fuel costs and restless unions on the heavily staffed ships took their toll as well. "She consumed 700 tons a day in fuel. When it's \$2 a barrel it doesn't matter, but in the end fuel costs began to escalate pretty dramatically," said Norris. Tug strikes forced Commodore Anderson on more than one occasion to pilot his ship into the dock by himself.

One by one, passenger liners started dropping by the wayside. By 1969, the United States was sent home to dry dock in Norfolk, Va. in November; after a mere 17 years of service, she never sailed again.

Initially, she was mothballed by MARAD. Once the ship was declassified, the agency divested itself of the now white whale. After passing through multiple hands, being dragged to various ports and suffering several waves of gutting, the ship ended up in the hands of the Norwegian Cruise line, which had hoped to restore it back to a working ship. Ultimately the ship was sold in 2011 to the Conservancy, notably at a lower price than could have been gotten from ship scrapper, financed with a donation from Philadelphia philanthropist H. F. Lenfest, a finance package that included two years of monthly maintenance fees, funds which today are gone. Today, the group relies on donations and revenue from the sale of precious metals in the ship to cover the \$65,000 to 80,000/month in dockage, insurance, security and other costs while it tries to land a development deal to secure a future for the ship.

But the clock is ticking. To keep the ship safe until a deal can be worked out, "We need money, money, money," says the Conservancy's Gibbs.

## An American Icon

Half the battle in raising funds lies in the difficulty in trying to articulate to a modern audience why The Big Ship is so important, laments Anderson, who sailed on the ship as a teen. "Most cruise ships today are more like floating hotels. There was no transatlantic air service in the '50s and most of the '60s. The big liners were used to transport not just vacationers, but business men and immigrants - it's an important distinction that is completely lost on people today. It was a ship with a real purpose.

A dual purpose actually, although the ship only came close once to functioning as a military transport, when it put on standby during the Cuban missile crisis.

Conservancy members and fans of the Big U say the ship should be preserved as a symbol of American strength and technological know-how, as well as one of the few remaining examples of a once proud U.S.-flagged merchant marine. "This country has lost its connection with its maritime history and



the importance of shipping. We don't have our own ships. We rely entirely on foreign ships to carry goods and passengers to the U.S. Aside from the Jones Act, there is virtually no U.S.-flagged merchant marine left," said Anderson. While supporters also like the impact of the ship to that of the first space shuttle and other historic treasures, they also acknowledge the difficulty in trying to preserve a piece of history that is three football fields long.

Gibbs and other board members talk about developments encompassing hotels, restaurants, a museum, educational and convention facilities etc. The fact that the ship externally remains intact while the interior has been gutted and stripped of its asbestos is a plus for any developer with deep pockets and imagination. And the project is not without precedent. The S.S. Rotterdam was renovated, returned to her namesake city in Holland and re-opened in 2010 as a combination museum/hotel and school for vocational training. It has since been sold to a hotel chain. "The United States today is a blank slate; the possibilities are endless," said Gibbs.

But time is not on their side. According to Norris and Anderson, efforts to find a project is caught in a Catch-22 of developers who don't want to commit unless they know where the ship will be based. Cities don't want to provide pier space unless they know developers are committed. And once a site is found, before the ship can be renovated, a decision has to be made from a regulatory aspect as to whether to treat it as a ship or a building. "The sad irony is that an organization that has worked so hard to save this ship is ultimately going to be the one to wind up scrapping her if that happens," said Norris.

Truth be told, it doesn't look good for the old girl. But as William Gibbs would be the first to say, obstacles are just that. It doesn't mean they can't be overcome. The S.S. United States had a spectacular past; who's to say she won't surprise the world again, with a spectacular rebirth. As Gibbs would say, "Here's to the Big Ship."

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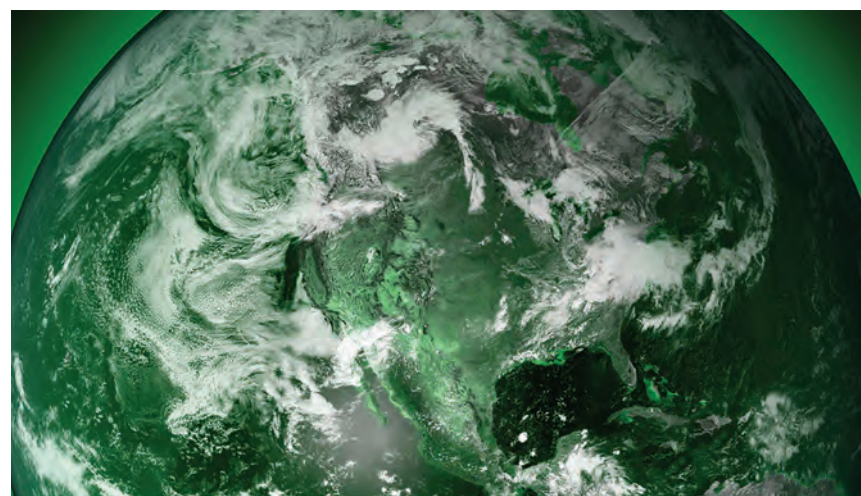
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Photo Bernard Beger-STX France

# MSC Preziosa Ultimate in Cruise Ship Tech

MSC Cruises recently added a new state-of-the-art liner, the MSC Preziosa, helping the Italian company, truly a family business, attain the status of third largest cruise line in the world.

*By Claudio Paschoa*

**M**SC Preziosa is a Fantasia class cruise ship owned and operated by MSC Cruises. It entered service in March 2013 as an enhanced version of its sister ships, MSC Splendida and MSC Fantasia, and is identical to MSC Divina, which was launched in 2012. Built at the STX shipyard in St. Nazaire, France, MSC Preziosa is the new flagship of MSC Cruises. The new ship gained immediate recognition famous courtesy of its christening by actress Sophia Loren, and was significant as it signified that MSC Cruises is now the third largest cruise line in the world.

#### From Humble Beginnings

MSC Cruises had a humble start, created in the 1960s when Gianluigi Aponte, owner of Mediterranean Shipping Company, acquired Starlauro, a one-ship cruise line whose fleet consisted of the Achille Lauro, the infamous ship which had been hijacked by terrorists in 1986. This ship continued its troubled under the MSC flag, as in 1996 it caught fire off the coast of Africa and ultimately sank. A setback for sure, but it did not hinder MSC's growth, as the small cruise line

had steadily increased its fleet to include MSC Melody and MSC Rhapsody. The turn of the century was a breakthrough for MSC, which for the first time commissioned its own series of newbuilds.

MSC Lirica, a 59,058-ton, 1,445-passenger vessel was the first to emerge in April 2003, followed by the slightly larger MSC Opera, carrying 1,756 passengers, in June 2004. The introduction of an even larger class of ships, ships with more amenities and an even higher ratio of private verandahs, began with MSC Musica. At 89,600 tons and accommodating 2,550 passengers, that flagship of the class was launched in June 2006, its sister ships include MSC Orchestra, launched in of spring of 2007 and MSC Poesia launched in the spring of 2008. MSC Magnifica, the fourth ship in the Musica class, was launched in 2010. MSC's biggest step forward to date has been the innovative new design for its Fantasia class of ships.

MSC Fantasia (133,500 tons, 3,300 passengers), which sailed in December 2008, was the first of four Fantasia class vessels. Sister ship MSC Splendida (133,500 tons, 3,300 passengers) debuted in 2009, and MSC Divina

(139,400 tons, 4,232 passengers) arrived in May 2012.

The new MSC Flagship, MSC Preziosa (139,400 tons, 4,232 passengers) joined the fleet in 2013. These two post-Panamax-sized vessels are based on a unique prototype that incorporates novel features, such as the ship-within-a-ship Yacht Club concept for suite holders, a pool with a dome for all-seasons swimming and an interactive center with a 4D theater and a Formula One simulator. Both the MSC Divina and the MSC Preziosa were built by STX Europe.

#### Eco Ship Concept

While it has taken some time for cruise lines (and for that matter, most of commercial shipping) to become environmentally conscious, the last 10 years have been transcendent with a significant, legislatively mandated decrease in emissions from the cruise industry along with an increase in the efficiency of waste management systems, water treatment systems and energy monitoring and conservation systems.

According to MSC Cruises' owner Gianluigi Aponte, "We maintain high standards in disposing of waste materials

MSC Preziosa's Captain Giulino Bossi.



4D Cinema on the MSC Preziosa.



Photo MSC Cruises

and monitoring our energy usage, doing our utmost to minimize the impact of our ships on the ocean water. We are totally committed to ensuring that our vessels are as environmentally friendly as possible." Also according to Aponte, "MSC Cruises is committed to making green choices that keep the oceans blue." The company's energy efficiency matches the industry-leading ecoship and cleanliness credentials and its green efforts have been recognized with a string of environmental certifications, along with awards recognizing its creative interior design, comfort, cuisine and service.

The latest flagship in the MSC fleet is set to become a green paragon in the industry, with Bureau Veritas officially conferring the "7 Golden Pearls" award to the ship, which is one of highest awards for cruise vessels in recognition of the specific voluntary attention paid, from design and building to operation, to "Quality Health Safety Environment" (QHSE).

The ship features an energy monitoring system, too. In order to decrease unnecessary energy use, a cabin monitoring system manages climate conditions in cabins and public areas at all times, automatically intervening in instances of wasteful overuse of air conditioning systems. MSC Preziosa had its hull painted with a new "foul release" paint, with flour polymers, a non-toxic substance which helps reduce CO<sub>2</sub> emissions through the reduction of fuel consumption. The ship also boasts a "Voyage Planning and Monitoring System" which is a 'track and trace' system used for planning and monitoring positions and itineraries of the MSC fleet in real time with updates as frequent as every two seconds.

#### Waste Management

Advanced Water Treatment (AWT) is a system that recycles and treats wastewater. A distillation plant produces all

the fresh water needed onboard using two evaporators and two reverse osmosis plants. In normal operating conditions, the ship does not require water from shore water stations. The vaporators are pollution-free and use a system of free heat recovery as its power source. Scanship provided the waste-water treatment plant (AWP) and also the vacuum food waste conveying and handling systems. An agreement was also established with the Italian Consortium for Waste and Aluminum Recycling (CiAl), for the collection onboard of aluminum and disposal ashore to recycling facilities.

#### Propulsion Machinery

The propulsion machinery on the MSC Divina and the MSC Preziosa are different from those aboard their earlier sister ships thanks also to technological developments that have taken place over the years. The MSC Preziosa is equipped with Converteam's (now called GE Energy, Power Conversion) latest induction-type electric propulsion machinery, first applied on a cruise ship in 2010 aboard the Norwegian Cruise Line's MS Norwegian Epic, which has a maximum rated power of 2 x 24 MW at 130 rpm at max 6.6kV. It is fitted with propulsion motors identical to the NCL vessel, with a power of 2 x 21,850 kW at 138

rpm and a maximum speed of 143rpm. In short, these motors, fed by two PWM MV7000 type frequency converters each (MV7612) are fitted with a low resistive squirrel cage rotor, with no active insulated parts. The torque is produced by an induced magnetic field into the rotor without the need to feed any current.

The result is a simpler design, an improvement in efficiency by about 1% and a lighter design compared to earlier synchronous motor technology, resulting from its shorter shaft and casing. The weight savings is close to 10%. Maintenance is simpler too, as there are no excitation converters nor brushes, no rotating transformer parts, no rotating rectifier and no winding in the rotating part. GE also delivered the five alternators, 2 x 19.2MVA, 3 x 14.3MVA, providing 11kV voltage at 60Hz. The total alternator power installed is 81.3MVA

#### Navigation and automation

As on the previous MSC vessels, the integrated navigation system is supplied by SAM Electronics, part of L3 Communications. The NACOS 65-5 system is identical to that of the previous sister ships. The bridge is laid out with safety desk aft in the same room. Also, the Integrated Automation System is supplied by Valmarine AS.

#### MSC Preziosa Main Particulars

|                                      |                            |
|--------------------------------------|----------------------------|
| Built .....                          | 2013                       |
| Gross tonnage .....                  | 139,072 tons               |
| Number of passengers.....            | 3,502                      |
| Crew members.....                    | 1,388                      |
| Number of cabins .....               | 1.751                      |
| Length .....                         | 333.3m                     |
| Beam .....                           | 37.9 m                     |
| Height .....                         | 67.7 m                     |
| Decks.....                           | 18                         |
| Maximum speed .....                  | 24.21 knots                |
| Average speed .....                  | 18 knots                   |
| Number of whirlpools: .....          | 12                         |
| Number of restaurants: .....         | 4                          |
| 1 dedicated to MSC Yacht Club guests |                            |
| Number of bars: .....                | 21                         |
| Theater: .....                       | 3 levels, seating capacity |
| .....                                | approximately 1,700        |

#### MSC Preziosa Highlights

Number of guest staterooms: 1,751 including; 1,125 Balcony Staterooms, 28 of which are wheelchair accessible; 124 Oceanview Staterooms, 2 of which are wheelchair accessible; 405 Interior Staterooms, 13 of which are wheelchair accessible

#### MSC Yacht Club:

Exclusive area comprised of 69 suites located on four decks; 24-hour Butler and Concierge services; Top Sail observation lounge; The One Pool & Bar with a swimming pool, two whirlpools, sun deck and bar-buffet; two dedicated massage rooms in the MSC Aurea Spa; and private restaurant.

#### Number of swimming pools:

4, including the main pool, an aft infinity pool, a covered pool and a pool in the MSC Yacht Club area

#### Medical facilities:

Medical Center located on Deck 4 includes 2 doctor's offices, intensive care unit, operating room, x-ray developing room, laboratory, and pharmacy.

#### Number of guest elevators:

17, including 2 panoramic elevators and 1 elevator inside MSC Yacht Club.

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# Alfa Laval Green & Efficient Shipping

By Peter Pospiech

When Gustaf de Laval read in 1877 an article in the German periodical "Milchzeitung" (Milk News Paper) about centrifugal separators, he certainly did not expect that it would lead to his founding of a global acting company with around 16,400 employees nearly 140 years later. His first continuous separator, with a capacity of 130 liters per hour, was demonstrated 1879 in Stockholm; and four years later, in 1883, he and his partner, Oscar Lamm, established the company AB Separator. And again 80 years later, in 1963, the company changes its name from AB Separator to the now well-known Alfa Laval AB. The name "Alfa" derives from the alpha discs (a separator technique) and "Laval" from the founder of the company. Today the company is listed on NASDAQ OMX, and, in 2012, posted annual sales of about \$4.8B.

Today, the company focuses on energy optimization, environmental protection and food production through technological leadership in heat transfer, separation and fluid handling in the widest range. The company's activities in respect of the international shipping market is of

great importance. As the company says, "...the marine market is changing with ever-increasing speed, especially when it comes to new demands concerning energy efficiency and environmental protection."

In accordance to this its product portfolio covers all necessary components that are designed to make shipping reliable, environmentally friendly and efficient. Whether you talk about environmental protection, oil treatment, cooling and heating, steam and heat generation, waste heat recovery, tank cleaning, safety and desalination – the products from Alfa Laval for the global, green shipping industry are future oriented and innovative.

### New Test & Training Center

To improve and testify its ability to deliver top quality product and service, the company recently opened a ship simulation facility – touted by the company as the largest and most advanced in the marine industry – which adds considerable strength to the company's research and development efforts. With this, the company said, it is no longer needed to make expensive tests on board a vessel for the

relevant Alfa Laval marine products, as they can now be tested and certified in a 500 hours test procedure in this new test facility.

The 250 sq. m. testing area is built around a 2-MW MAN medium-speed four-stroke marine engine of type 9L28/32. The engine drives an AvK-generator and generates 1,880 kW at 750 rpm. For the city of Aalborg, the start of operations at the center has meant an immediate energy bonus. The power generated by its 2 MW engine is fed into the local grid, while the facility's excess heat is made available for district heating. The engine can operate on diesel and HFO 380 cst with high sulfur in order to test the scrubber under practical and worst conditions.

The new testing facility comprises commercial and prototype equipments from all of Alfa Laval's marine product portfolio. A dedicated control room and a training complex are connected to the test system. Located close to the Limfjord, the test center is supplied with seawater via an 800m-long pipeline.

The process lines are full size and organized as they would be on an actual vessel at sea, though connected to a

unified control system. They comprise a fuel line, an integrated water line, a steam line and an exhaust line, as well as the heat exchangers and other auxiliaries needed to support them.

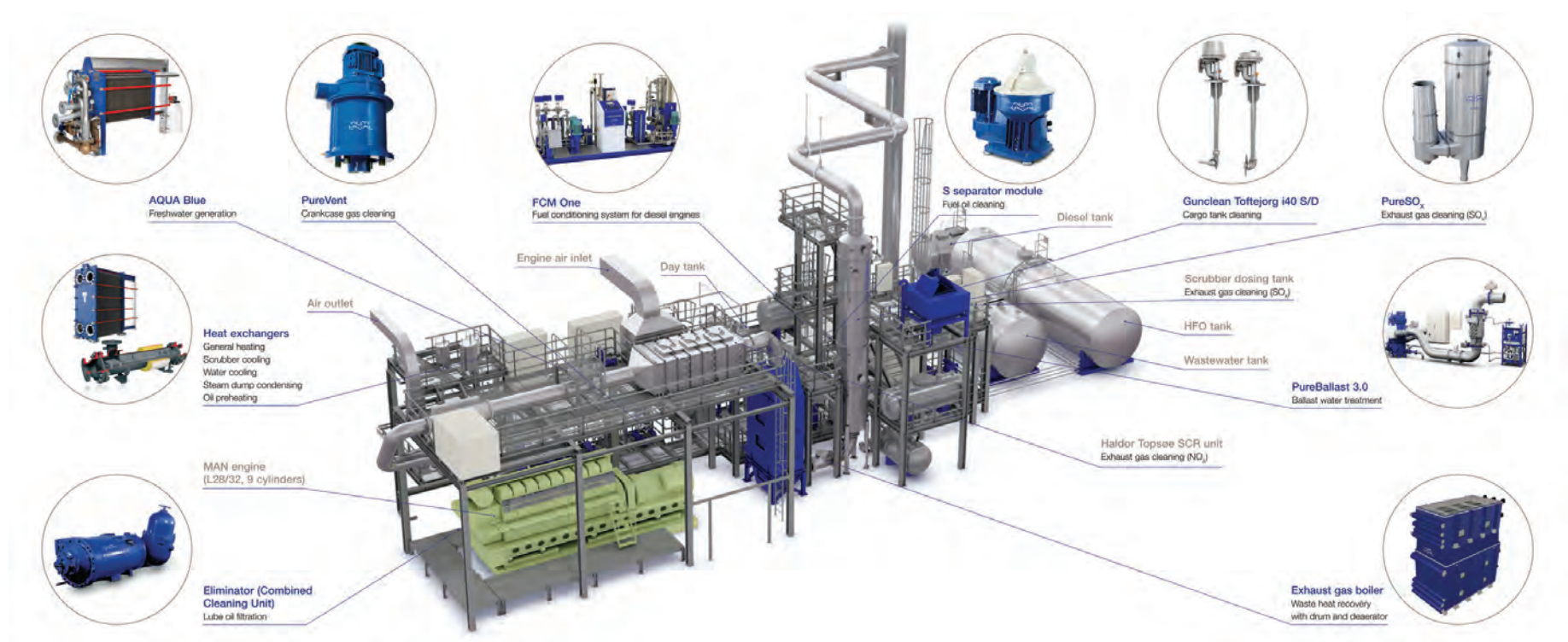
### Green Tech

According to the company, the initial reason for building the facility was the advancement of the company's exhaust gas cleaning technology PureSOx.

Apart from further developing the scrubber, which has recently seen repeat orders from both DFDS and Spliethoff, the center will be working with NOx reduction in association with the company Haldor Topsøe. The project will focus on selective catalytic reduction (SCR), which is a technical alternative to exhaust gas recirculation (EGR), a process already supported by Alfa Laval's PureNOx, a water treatment system that uses a centrifugal separator to clean the wash water in the wet scrubber.

In other areas, the Alfa Laval Test & Training Center will be working to combine greener methods of operation with financial benefit. Energy efficiency will be explored at the facility, as a means of both saving money on operating costs

## Overview of the new test & training facility in the city of Aalborg, Denmark



“The Alfa Laval Test & Training Center is the ultimate proof of our commitment to R&D and meeting the challenges faced by the marine industry. It’s inauguration was a celebration of that commitment and the starting shot for a new era.”

### Peter Leifland, Alfa Laval’s Marine & Diesel President



and further reducing CO2 and other emissions, according to Alfa Laval.

Among the facility’s key components in this regard is the new FCM One (Fuel Conditioning Module), with which a more efficient changeover between HFO and distillates can be managed. Another key component is the center’s exhaust gas boiler, which will be involved in one of the first research projects.

“Energy efficiency is one of the greatest challenges facing the global shipping industry today, but also one of the greatest opportunities for competitive gains,” says Niclas Dahl, Alfa Laval Market Unit Manager, Energy. “Here at the center we can explore the interaction between components – within and even across process lines – in a controlled and consistent manner. This will speed up the development of more energy-efficient equipment and new energy-saving techniques.”

#### Training Opportunities

The new center will allow Alfa Laval to intensify its training activities, adding Aalborg to existing training sites in Stockholm, Manila and Shanghai. Beyond in-depth training for Alfa Laval sales and service employees, the center will provide a range of external training options.

In the future, shipowners and operators can send engineers and technical supervisors to the center for hands-on training in new technologies and Alfa Laval products as well as service training aimed at minimizing maintenance-related operating costs. For shipbuilders, there will also be training in the sizing and configuration of equipment for maximum economy, as well as the impact of design choices on service possibilities

and the equipment’s daily use.

An additional and equally important test component is the newly developed Ballast Water Treatment System Pure-Ballast 3.0.

#### Unwanted Stowaways

It is a scene suited for a horror film. Each year in May hundreds of thousand of mitten crabs crawl out of the river Elbe next to Geesthacht, whereby the palm-sized animals could be captured and destroyed. In 1912 the hairy crab species, which actually originates from

North China, were found for the first time in Germany. “They have been introduced together with the ballast water from ships,” said Dr. Gerhard Schories, Technical Director of the ttz-institute for water-, energy- and landscape management, Bremerhaven, Germany.

While ballast water is essential for safe and efficient modern shipping operations, it poses serious ecological, economic and health problems due to the multitude of marine species carried in ships’ ballast water. These include bacteria, microbes, small invertebrates,

eggs, cysts and larvae of various species. The transferred species survive to establish a reproductive population in the host environment, becoming invasive, out-competing native species and multiplying into pest proportions.

The UNO considers this undesired spread of so-called invasive species one of the greatest threats to the maritime environment. This is why new regulations for ballast water have been put in place by the IMO convention. These strict guidelines state that ballast water management systems may not harm the



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**Left:** View on the inline PureSOx scrubber arranged in the test facility. **Right:** The heart of the center: a MAN 9L28/32 engine which is coupled to a AvK-Generator with an output of 1,880 kW at 750 rpm.

environment. The substances used must be biodegradable and may not present any kind of additional risk to humans, the environment or the ship.

Ballast water treatment is no longer an issue thanks to Alfa Laval's PureBallast 3.0.

With the Alfa Laval's PureBallast 3.0, it is very simple to ensure that there is only water in the vessels ballast tanks – with no harmful organisms such as plankton, bacteria or viruses. PureBallast, which was developed in cooperation with Wallenius Water, was originally launched in 2006 as the world's very first commercially available ballast water treatment system. Since then it has matured considerably, arriving in an updated PureBallast 2.0 version with EX options in 2010. Already then there were improvements to its energy efficiency and its basic construction, but nothing to compare with the advances in PureBallast 3.0.

"This time we've completely rewritten the book when it comes to PureBallast," says Per Warg, the Alfa Laval Business Manager responsible for the system.

"We've achieved space savings of 50%, energy savings of up to 60% and huge improvements in flexibility and flow capacity. But we've also learned a great deal that can be of impact for ballast water treatment in general."

The key component in a UV-based system is its reactor, the chamber where UV treatment actually occurs. In standard UV treatment, organisms are eliminated directly or rendered unable to reproduce through damage to their DNA and biological structure. In PureBallast, the treatment process is enhanced by AOT (Advanced Oxidation Technology), which creates free radicals that cause irreversible cell membrane damage. The AOT effect has a proven biological impact leading to better treatment performance and lower energy consumption.

The completed PureBallast 3.0 system, while based on the same treatment technology as its predecessors, is a leap forward in terms of its compactness, energy efficiency and flexibility. Most striking at a first glance is its size.

Where previous PureBallast reactors handled 250 cu. m./hr. each, individual

PureBallast 3.0 reactors can handle either 300 cu. m./hr. or 1,000 cu. m./hr. Using the larger reactor, which is not much bigger than the original 250 cu. m./hr. version, the footprint of a 1,000 cu. m./hr. system is literally cut in half. The bigger the system, the bigger the space savings.

"Needless to say, the new reactor capacities greatly reduce the footprint of larger systems," said Warg. "With one reactor doing the same job that four did before, PureBallast 3.0 is competitive across the entire flow range up to 6,000 m<sup>3</sup>/h."

The size, however, is not the only thing that makes PureBallast 3.0 competitive. The new system is also as energy efficient as it is compact.

"The new 1,000 cu. m./hr. reactors consume just 100 kW at full power, which is a minimum energy savings of 30% over previous versions," said Warg. "And when full power isn't needed, the energy savings can be as much as 60%."

For shipyards, the most appealing aspect of PureBallast 3.0 will not be its energy-efficient operation, but rather

its high degree of flexibility and ease of installation, even when it comes to the highest flow rates. With the new reactor capacities, only one reactor will be needed per 1,000 cu. m./hr., which makes designing a system considerably simpler.

"Alfa Laval has always been at the forefront of ballast water treatment, but PureBallast 3.0 truly redefines that leadership," said Warg. "We're looking not just at a new generation of the system, but rather at a whole new standard that lives up to the tougher demands raised by today's customers. Where size, economy and energy efficiency are important, I've no doubt that customers will find what they're looking for in PureBallast 3.0."

And Alfa Laval's Marine & Diesel president Peter Leifland summarizes:

"The Alfa Laval Test & Training Center is the ultimate proof of our commitment to R&D and meeting the challenges faced by the marine industry. It's inauguration was a celebration of that commitment and the starting shot for a new era."

# WETT-O

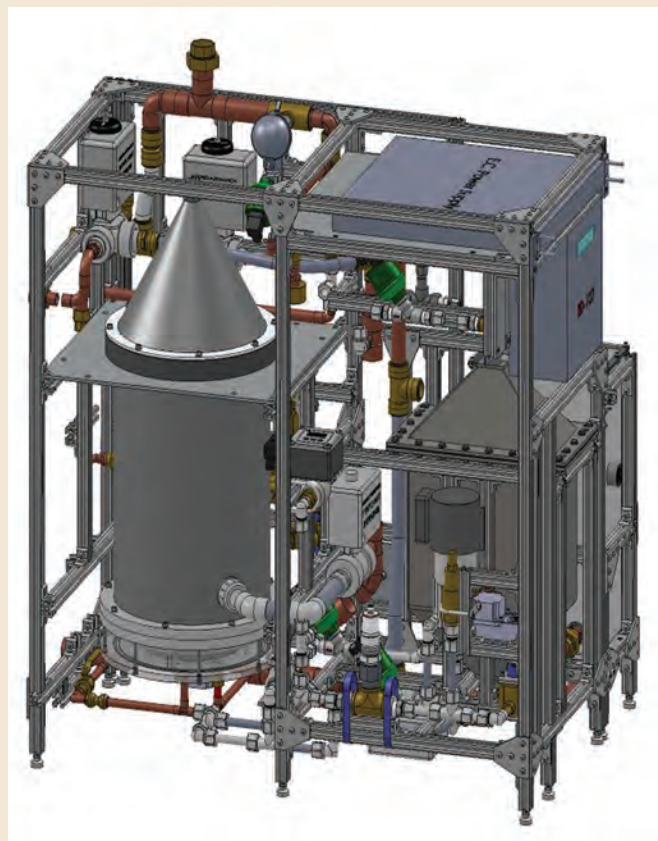
Terragon Environmental Technologies has been developing the Wastewater Electrochemical Treatment Technology for oily water, or simply WETT-O, for the past six years. ETT-O uses an electrochemical process to transform oily wastewater into reusable or dischargeable water depending on the application. WETT-O uses electrochemistry and does not require filters, membranes, chemicals or biological treatment commonly found in alternative approaches.

Terragon's proprietary Electrocoagulation (EC) cartridge employs sacrificial anodes and electricity which release ions that act as coagulants. This process is designed to be effective for the removal of oils and greases, metal ions and other contaminants. The system is designed to be compact, simple to operate and maintain, even by non-technical personnel, and processes oily water on a constant basis without the need for operator attendance.

WETT-O has been through four design iterations over the last few years, with the latest being demonstrated on a commercial transport vessel. The system operated for a period of three months with exceptional results; consistently processing oily bilge water below the targeted 5 ppm. The fifth evolution of WETT-O is currently onboard a Canadian Coast Guard vessel, in conjunction with other Terragon technologies, allowing the ship to demonstrate its ability to become a zero-waste discharge vessel, while recovering and using the resources from the varying waste streams. This fifth iteration will also be used on other commercial ships in 2014 to evaluate the technology using different oily water streams which will have varying compositions.

Terragon expects to commercialize WETT-O technology in early 2015.

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## Siemens Patent

The U.S. Patent Office awarded Siemens Water Technologies a patent for a system and method to control biofouling of filters used as a first stage of treating ballast water in its SeaCURE™ Ballast Water Management System. The patent, entitled “Method and System for Biofouling Control of Shipboard Components” (U.S. patent no. 8,591,740 B2), involves injection of biocide into ballast seawater before it reaches the large surface filter intakes to reduce the growth of marine organisms that can clog the filters.

The technology is already incorporated in the Siemens SeaCURE Ballast Water Management System that uses a combination of physical separation and a proprietary, on-demand treatment with biocides, produced in-situ from seawater, without the addition of chemicals. The SeaCURE system is based on more than 30 years experience on over 2,500 shipboard installations of Siemens’ well-known Chloropac biofouling control system.

The SeaCURE system employs filters to remove or break larger organisms using a 40-micron weave-wire screen and provides reliable, non-stop operation at high sediment loads while minimizing backwash flow. The biofouling control provided to the filter assures SeaCURE’s reliable function and minimizes maintenance requirements of the system. The SeaCURE system can be used not only for treating ballast water, but also for treating onboard cooling water circuits. The SeaCURE system is designed to comply with IMO Convention D-2 regulations for ballast water management and received IMO final approval in 2012. SeaCURE is available in skid-mounted, containerized or as modular components depending on customer requirements for installation in newbuilds and existing ships. It is particularly well-suited for retrofit installations because biocide generation takes place in a small side stream taken off the ballast water main, minimizing footprint and maximizing available space.

E: [tony.a.foster@siemens.com](mailto:tony.a.foster@siemens.com)

# New BWM Regs Cometh

## Are you ready?

The global market for BWT systems is predicted to grow to over \$34 billion through 2020 in response to IMO and USCG-based ballast water discharge regulations (Frost and Sullivan, 2012). BWT systems are now manufactured by dozens of companies around the world, including traditional suppliers of marine equipment, suppliers of municipal water and wastewater treatment equipment, and shipbuilders. As of November 2013, 35 BWT systems have received IMO-type approval from foreign administrations, and 28 of these have been

accepted into the AMS program by the USCG.

As shown in **Figure 1**, these systems include various treatment technologies and combinations but are typically arranged to provide two stages of treatment: (1) physical solid-liquid separation to reduce sediment and remove larger organisms, and (2) disinfection to kill or inactivate smaller organisms. The disinfection processes can be further classified into physical or chemical treatment processes. The latter may involve residual control to meet discharge limits for active chemical substances or physical enhancement technologies to

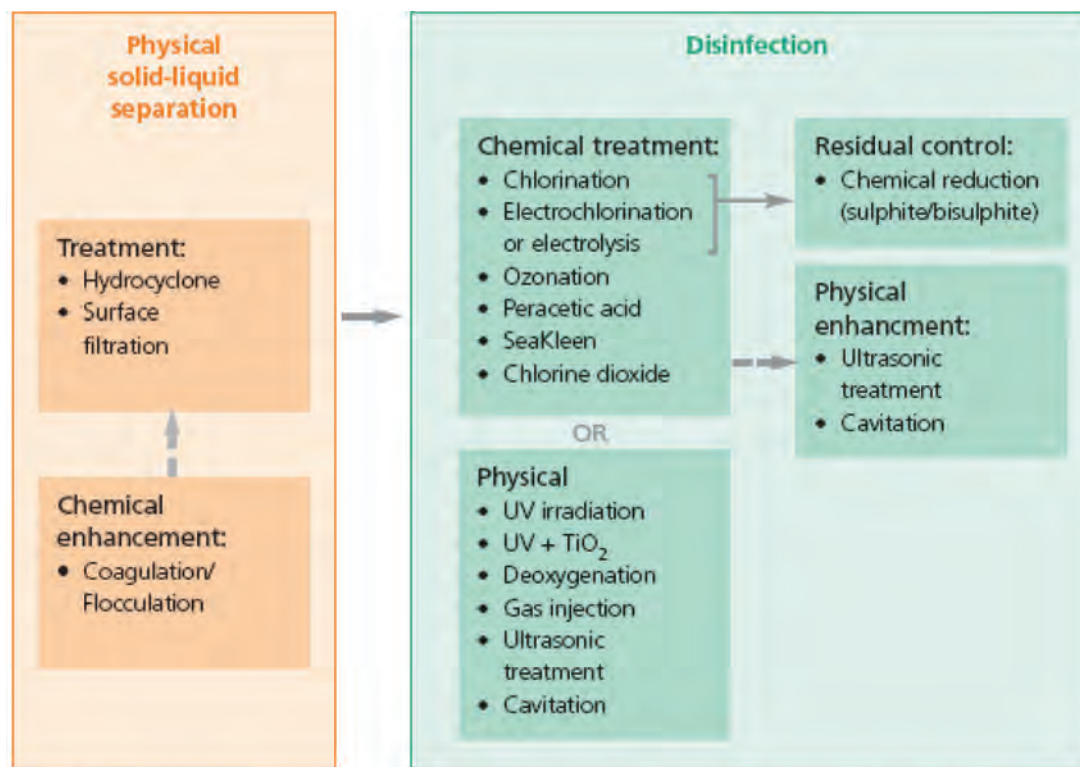


Figure 1: Treatment Technologies Used in IMO-Type Approved Ballast Water Treatment Systems

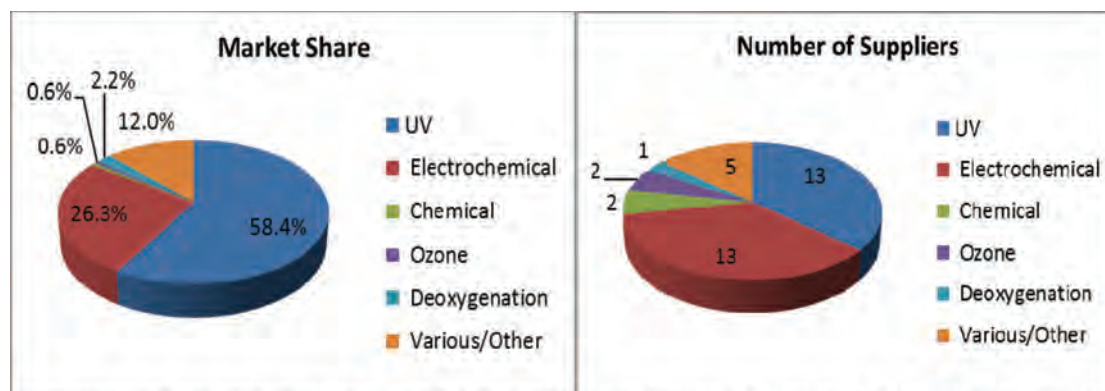


Figure 2: Market Analysis for Ballast Water Treatment Industry (Clarkson's Market Data, 2012)



## The new BWM regulation will increase costs for ship owners/operators to evaluate, install, operate (including additional record-keeping) and maintain BWT systems with regulatory compliance dates, starting now for new build vessels and at the next scheduled dry-dock for many existing vessels.

improve treatment performance.

As shown in **Figure 2**, the global market for BWT systems is dominated by two treatment technologies - UV and electrochlorination. These are manufactured by 26 equipment suppliers and compose 85% of the approximately 1,500 IMO type-approved BWT systems installed to date. The basic process trains are generally described below:

**UV Disinfection:** This is a two-stage treatment process with a pressure-rated filter unit (typically with micron-rated disks or membrane elements) to remove sediment and larger organisms, followed by a UV disinfection unit to inactivate smaller plankton, bacteria and viruses. No chemicals are required to operate the system. During ballasting, water is typically processed through both the filter and UV stages as water is pumped into the ballast tanks. Solids captured by the filters are discharged at the ballasting location. During de-ballasting, the filter is typically bypassed and water is treated by the UV unit only before discharging overboard.

**Electrochlorination:** This is a two-stage treatment process with a micron-rated pressure filter or strainer followed by an electrochlorination unit. The latter is essentially an on-demand chemical system, which uses electrolytic cells to generate a sodium hypochlorite (bleach) solution from seawater and electricity. Some treatment systems pump the entire ballast water flow through the electrolytic cells, whereas others use a small slipstream to generate a concentrated hypochlorite solution, which is then recombined with the main flow. During ballasting, water is processed through both the filter and electrochlorination unit as water is pumped into the ballast tanks. A chlorine residual (or residual oxidant) is maintained in the tanks for a minimum contact time (typically a few days) to improve disinfection and eliminate regrowth of organisms during transit. During deballasting, a neutralization chemical (e.g., sodium bisulfite) is added to the water to remove the oxidant residual as it is pumped overboard. Note

that this type of system cannot be used in freshwater areas such as the Great Lakes because it requires salinity for hypochlorite production.

### Complying with the New Regulations

The new BWM regulation will increase costs for shipowners/operators to evaluate, install, operate (including additional record-keeping) and maintain BWT systems with regulatory compliance dates, starting now for new build vessels and at the next scheduled dry-dock for many existing vessels. They must therefore quickly become familiar with the new requirements, risks of non-compliance and necessary steps to bring individual ships or fleets into regulatory compliance.

For owners/operators of seagoing commercial vessels, most important will be to select an appropriate type-approved BWT system that is compatible with the ship's existing ballast water system and can be operated to ensure compliance safely by the crew. Key design considerations for BWT system selection include:

- Ballast pump capacities and operating pressures,
- Ballast tankage volume (if required for disinfection contact time),
- Available space for the BWT equipment,
- Uptake and discharge piping arrangements,
- Chemical storage location (if required),
- Discharge sample location (for USCG inspection use),
- Ship routes (and associated ballast water quality conditions),
- Integration of the BWT system controls into the ship's ballast control system,
- Training requirements for crew members.

BWT system selection is made more complicated in that the USCG has not type approved or certified any systems yet, although it plans to over the next

year or two. In the meantime, AMS-accepted systems must be used with only a five-year regulatory compliance horizon, with no certainty that they will ultimately be approved by the USCG for long-term compliance with the BWM regulation.

Given the complexity and uncertainties of the BWM regulatory requirements, tight implementation schedule, system installation challenges, and the myriad of BWT systems on the market, many ship owners are hiring a qualified engineering firm to assist in selection of the most appropriate BWT system and work with the selected equipment supplier to design and install the BWT system on a particular ship or fleet. The planning, engineering and installation of the BWT system needs to be carefully coordinated with the vessel drydock projects.

## The Authors

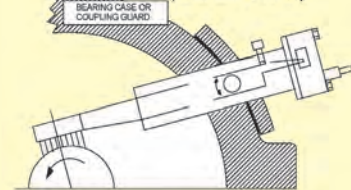
Christopher R. Schulz, P.E., is Senior Vice President at CDM Smith. Chris Schulz has over 30 years of experience in the planning and design of water treatment facilities in the United States and throughout the world. He served on the expert review panel for the USCG's Shipboard Technology and Evaluation Program (STEP), which evaluated prototype ballast water treatment systems in shipboard environments. Randy Kullmann is Vice President at CDM Smith. Kullmann has over 27 years of experience in consulting, engineering, construction and operations. His experience spans all aspects of water treatment and he has been leading CDM Smith's marine services, including compliance, information and safety management, as well as water treatment.

*Excerpted from an article published in the Q4 edition of Maritime Professional*

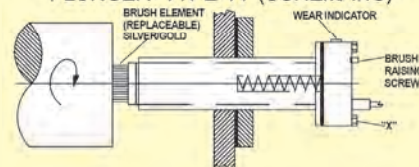
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# Idle to Full Load Time Halved by Intelligent Valve Train

One of the new tools that engine builders are using these days to reduce fuel consumption and greenhouse gas emissions is Valve Control Management (VCM), ABB's variable valve train system, more so since dual-fuel engines become an increasingly popular choice by shipowners.

Initially introduced in the shore-based gas plant sector, Christoph Rofka, Senior General Manager for New Business at ABB conjectured at that time and with an eye to the future: "A technology like this speaks to the increasing trend to explore dual-fuel options and create solutions for gas. These engines are also very similar to what you find on many ships, and we believe that VCM will very soon be highly relevant for and effective in the marine industry."

Basically the technology helps a turbocharger to manage air actively and is particularly effective for high-performance engines in which large operating ranges or rapid load responses are required such as tugboats, icebreakers, pump drives, compressor drives and power generators.

The manufacturers explain that generally, most valve train systems must be set for a particular

engine load and they are matched to a particular operating condition, consequently they cannot switch flexibly from one load to another and so compromise on fully leveraging the engine's full potential. Running an engine with this type of valve train system at a load other than what it was originally set to results in lower efficiency, smoke, and greater thermal load on the engine.

To ameliorate, VCM was specifically designed as an intelligent valve train system that responds adaptively to change the timing in an engine's valves so that it always receives an ideal amount of air. This technology thus manages transient behaviour, i.e. changes in engine speed, load or both, so that engines can accelerate more rapidly from one load point to another. VCM optimizes the configuration of the engine for every load, allowing the engine to work as efficiently as possible. A turbocharging solution equipped with VCM can take an engine that is idling to full load in half the time that it normally takes, in some cases even more quickly.

Posted by George Backwell @ [www.maritimepropulsion.com](http://www.maritimepropulsion.com)

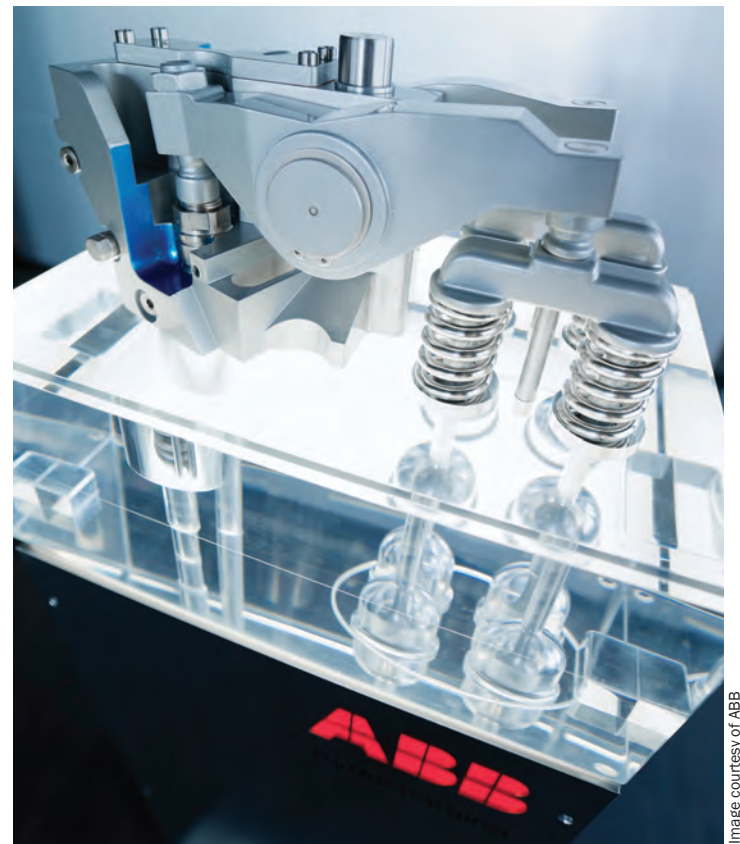


Image courtesy of ABB

## Clean Marine EGCS Deal

Clean Marine has been selected by Hudong-Zhonghua Shipbuilding in China to supply exhaust gas cleaning systems (EGCS) for two 38,000 dwt. Chemical Tankers being built for Stolt Tankers and NYK Stolt Tankers. The two ships are in a series of six sister ships, where the remaining four vessels will be designed with the flexibility to add an EGCS at a later stage. Clean Marine has developed an EGCS based on the Advanced Vortex Chamber technology that provides unique cleaning efficiency, according to the company. The system's integrated fan and gas recirculation technology allows the one EGCS unit to simultaneously serve several combustion units. The system supplied to Stolt Tankers is a hybrid system that allows the vessel to operate seamlessly in all types of water (including low alkaline and saline water) without loss of efficiency.

[www.cleanmarine.no](http://www.cleanmarine.no)



## Wärtsilä X72 Powerplant

Wärtsilä said that the first ever Wärtsilä X72 mid-bore, low-speed engine has passed the factory acceptance test and has been accepted by the customer and the Lloyd's Register of Shipping. The tests were carried out at the Doosan Engine Co. Ltd. factory in South Korea, where the engines are being produced under license from Wärtsilä.

Wärtsilä launched its low-speed Generation X engine series in May 2011.

"This is another important milestone for us since this is the first ever Wärtsilä X72 engine to roll off the production line. The fact that it has successfully fulfilled the factory acceptance test requirements means that in every respect it meets our expectations, as well as the expectations of our customers. We are now moving with



great confidence to the full commercialization of this outstanding engine," said Martin Wernli, Managing Director of Wärtsilä Switzerland and Vice President, Wärtsilä Ship Power, two-stroke.

## Shipping Companies Will Choose Marine Gas Oil

A recent North European conducted survey of some of the biggest shipping companies in Europe shows that they will choose the low-sulfur marine gas oil when the new emission regulations comes into force next year.

Some of Europe's large shipping owners without doubts will choose to use the more expensive, low-sulfur marine gas oil once the environmental regulations aimed at reducing the sulfur content in ship fuel comes into effect on January 1, 2015 in the European SECA zone. The alternatives to switching to marine gas oil with a lower sulfur content include continuing to use the traditional high sulfur fuel and cleaning it with scrubber (exhaust cleaning system), or switching to natural gas (LNG).

While a big number of shipping companies have announced intentions of switching to natural gas on the long term (there is no doubt it will come), the survey shows that a majority of the carriers choose marine gas oil as the immediate solution, although it costs much more than fuel with the current sulfur content.

But there are, as usual, exceptions: Shipping and logistics company DFDS - whose entire current business area is located within the SECA zone - decided to go to make a significant investment in scrubbers. A total of 12 of the carrier's ships will have scrubbers installed by the end of 2014, and even more of the company's ships will have similar equipment installed in 2015. On the other hand, Finnlines has announced that the company is waiting to see how things develop, intending to use whatever fuel is available. In a letter to the shipping company's collaborators and customers, from November 8, 2013, Finnlines' new CEO Emanuele Grimaldi points out that the best solution in terms of the 2015 fuel regulations remains an open question. "Our strategy, for the time being, is to study, test and wait. As technology advances, it will become easier to judge which solutions are the most adequate to our ships and services. We could even opt for changing nothing, as there are already contacts with various fuel producers for purchasing 0.1 percent sulfur products at competitive prices," said Emanuele Grimaldi.

Posted by Peter Pospiech @  
[www.maritimepropulsion.com](http://www.maritimepropulsion.com)

# Ghost Ships on the Ocean

## Who Says it Doesn't Work?

Drones do it and spacecraft have too, for many years. Recently, also, automobile makers and small boat makers have introduced their first autonomous vehicles on the streets, and waterways.

Unmanned vessels on the ocean is no longer a dream - it is a reality. And according to those in the know, the reality will really start to come to fruition in the coming decades.

The MUNIN project (Maritime Unmanned Navigation through Intelligence in Networks) is investigating potential concepts for a fully or partially unmanned merchant vessel. The case ship is a dry bulk carrier of handymax size, operating on routes between Europe and South America in the beginning. The project is being partly funded by the EU in pursuit of one of the project outcomes of the European Waterborne Strategic Research Agenda: The autonomous ship.

Partners of the MUNIN project are: the Fraunhofer CML, MARINTEK, Chalmers University, Hochschule Wismar, Aptomar, MarineSoft, MARORKA, University College Cork. The available budget is of \$5.13m in total whereby \$3.9m is funded by the EU. The MUNIN project was started on September 1, 2012, and will be finished in three year time.

Partly or fully unmanned ships will offer many possible benefits, but one of the main driving forces for the project has been the problem of recruiting sufficient

qualified crew-members. This is already a significant problem in Europe, and it will increase as "slow steaming" becomes more widespread. Lower speeds and longer voyage durations will increase the overall demand for crew while reducing the attractiveness of the job: staying at sea for three weeks or more and communicating with friends and family via cost intensive telecommunication systems.

The idea of a ship sailing without a lookout and helmsman is worrying and even frightening to many people. One important part of the project, therefore, is to show that unmanned ships can be at least as safe as conventional vessels, and may even be safer. Professionals agree that "human error" is the cause of between 65 and 90% of shipping accidents. While the definition of human error and the role played in it by technology can be discussed, there is arguably great potential for improving safety by relieving the crew of the most tedious tasks, such as keeping a lookout over open sea for three weeks at a stretch. The MUNIN project will employ the KISS principle: Keep it Simple Stupid! It is important that the technology employed is well-trying and trustworthy. It is also important to use the appropriate technology for the problems at hands.

Posted by Peter Pospiech @  
[www.maritimepropulsion.com](http://www.maritimepropulsion.com)



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World Leader  
in Fuel Flow Computers

### New Stainless Steel Flowmeters Receive ABS Product Design Assessment Certification

FloScan Instrument Company, Inc. is pleased to announce that we have obtained ABS Product Design Assessment Certification for our new line of Series K Stainless Steel Diesel Fuel Flowmeters. This certification permits the installation of FloScan Fuel Monitoring Systems on ABS-classed vessels and oil rigs requiring steel piping components. See PDA Certificate Number 13-HS1050296-PDA.

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# Simon Hutt

## VP Americas, Wilhelmsen Ships Service

*The business of ship service has changed mightily in recent years, with many new regulations and technical mandates on modern ships, the continued and rapid consolidation of major players and a historic shift in vessel trading patterns driven by the shale energy revolution in the U.S. To help put it all in perspective, MR reached out to Simon Hutt, the new VP of the Americas for Wilhelmsen Ships Service.*

*By Greg Trauthwein, Editor*



### Please encapsulate your maritime experience to date.

■ My career has always been in maritime. I was in the Royal Navy as an officer for 17 years, specializing in diving and navigation. In 1993 I came ashore and worked for a shipping services company for five years. From there I joined Denholm Shipping Service, and I was part of the team when we sold 40% of Denholm to Wilhelmsen. Then I was recruited eight years ago to come across and work at Wilhelmsen. Among other achievements, I helped to develop our presence in West and North Africa, and we opened an office in Dakar last year that has been hugely successful.

### You recently were named VP Americas for Wilhelmsen Ships Service. What was the attraction to this post?

■ The attraction is the fact that the Americas covers such a large region, with a multitude of cultures and different countries at different stages of growth and development. Look at South America, and the differences between Argentina, Venezuela and Brazil, for example. Then you look into Central America, and North America into Canada, and there is a huge potential opportunity. I have an ambitious plan to grow our business throughout the Americas. It will be interesting once the gates open (on the new) Panama Canal, and interesting to see the opportunities that it brings. We see great potential in the offshore industry in and around Trinidad, the Gulf of Mexico and off of Brazil. I think there is a great opportunity to expand our business geographically, as it is evident that our customer's trading patterns are changing.

### So then, what do you consider to be the key(s) to keeping up in this evol-

### ing market?

■ Our customers are facing some tough times, not only from compliance issues, but also from a technical issues. Many regulations changes are taking place through class and IMO, and we must work with our customers to understand, develop new products and services that meet their needs for the future.

We understand that ships are becoming more technical and efficient, and our customers (and potential customers) are looking for global supply partners because many of our customers are becoming larger through acquisition. They want to partner with companies that can meet their global aspirations. Many companies can say that they are a global organization; to be truly known as global you have to be in a position where your products and services are standardized: it doesn't matter if you order chemicals in Houston or Singapore ... it is the same drum, it is the same consistency.

### In your career in ships services, what do you reckon has changed the most? What has stayed the same?

■ That's a very interesting question. Shipping has always been a very traditional business. Fundamentally, when you look at a ship's agency, there is nothing that has really changed in the last 100 years. The only thing that has changed is the way in which we communicate. We still see a lot of the documentation has remained the same. There is a movement afoot, and we are a part of that to inject new ways to do things, looking at things from a different perspective and to modernize the way that ship's agency is done.

### Looking at the coming 12 to 24 months, how will your company invest

### to meet its initiatives?

■ I think investment to become more standardized in what we do, and also introducing new products to meet the aspirations of our customers to market. For example, we see many regulation changes: we saw the introduction of our life raft exchange program; we've seen the introduction of the phase-out of R22 and have come to market with a new solution for that. We will bring more fire rescue and safety to market to further expand our portfolio. We will improve our chemical base and our gaseous and our welding equipment. There are many aspects of what we do that we will modernize, but throughout there will always be an element of innovating and bringing new products to market. Also, we will be more technical based rather than generic products. For example, our customers are dealing with the reduction of emissions (NOX and SOX), they are dealing with Ballast Water Management; these demand more technical solutions.

### What are the top markets for growth?

■ The offshore market has potential, particularly in Brazil and Trinidad as well as the Gulf of Mexico. I think also, the dry bulk market in general we will go further into. Cruise is a well established market, and they are always looking for new ports of call, with particular growth in South America.

### Around this time last year WSS was opening its new training facility in Houston. Put in perspective how you see training and education as it relates to your overall business.

■ The way we see it, we have a duty and obligation to our customers because we are fitting our equipment on the

vessel. Part of our service is continuous training and development of their staff. It's a part of the added value services that we provide. If we can continue to educate staff as to the correct use of our equipment, we will enhance the longevity and efficiency of that equipment. The majority of our customers are telling us that they want to derive greater efficiencies from their vessels, and they are looking to their suppliers for answers.

### Every business has its challenges. What are yours?

I think maintaining a clear focus on working with our customers is critically important. We say within our organization: **"There are two ways of doing the same thing, and that's doing it the right way or doing it the wrong way."** A big focus now and in the future is compliance and governance; doing things in an ethical way. This entails educating our suppliers and our customers, and it's about professionalizing and improving standards. This becomes more of a challenge as you look at emerging markets. Good governance is and will continue to be a cornerstone of our business. Also, keeping pace with our customer's expectations. With emerging regulations, and acquisitions making larger companies, I think staying close to our customers as markets evolve and develop is a challenge.

### What are your goals this year?

■ I expect that we will grow our business 10 to 15%. I will expect that we will have completed an internal service audit of all of our sites, information that we will use to help us perform better, but also to help us determine where we need to be. I would expect us to grow significantly in Brazil.



Engelstoft



Hansson



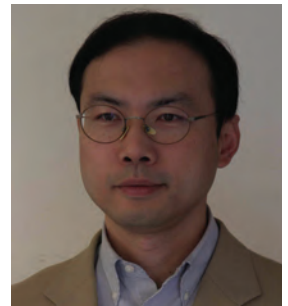
Craig



Tørstad



Carpenter



Wang

Photo courtesy of Nordic American Tankers

### Engelstoft Takes Over as Maersk Tankers CEO

**Morten Engelstoft** has been appointed CEO of Maersk Tankers effective January 1, 2014, following **Hanne B. Sørensen's** appointment as CEO of Damco. Morten Engelstoft has also been appointed CEO of Services & Other Shipping which consists of Maersk Supply Service, Maersk Tankers, Svitzer and Damco. Engelstoft brings with him several years of experience from the Maersk Group.

### Nordic American Tankers CEO: Market is Improving

Nordic American Tankers Limited (NAT) issued a letter to shareholders from the company's chairman and CEO, **Herbjorn Hansson**, in which he noted improved market conditions for NAT's Suezmax tankers. "We do not predict spot tanker rates," Hansson said. "I would note, though, that we are very pleased to see this strongly improved rate picture for Suezmax spot tankers."

### Philippine Coast Guard Chief Appointed Vice Admiral

President Aquino has promoted Philippine Coast Guard (PCG) Commandant **Rear Admiral Rodolfo Isorena** to the rank of Vice Admiral (VADM). Isorena is the 25th Commandant of the Philippine Coast Guard.

### MOL America Promotions

MOL (America) Inc. announced changes to its North American sales management, including the promotion of **Richard Craig** to the position of executive vice president, sales and operations. **Richard Jung**, who currently assistant vice president of sales, central region, was appointed to assume the duties of vice president of sales in replacing **Dennis Sheehan**.

### New England Ropes Cofounder Passes Away

New England Ropes, a wholly-owned subsidiary of the TEUFELBERGER Group, said that the company's original cofounder, **Herb Repass**, passed away recently in Vero Beach Florida. Repass cofounded New England Ropes, Inc. in New Bedford, Mass., with his friend and associate David Aigler in 1967. Repass served as President and chief designer of specialty ropes that were manufactured by the company for yachting, safety and rescue, arborist, mountaineering, lariats for cowboys, and Navy and Coast Guard operations. Herb, Dave and his son Randy also collaborated to sell rope for boating on the west coast, spawning West Marine. Many of the rope designs developed by Repass are still in use today, combining superior design with the use of today's fiber advancements. Repass retired in 1990 and passed the

stewardship of the company to his son, Jay Repass. In 2007, the Repass family sold the company to TEUFELBERGER Group in Austria.

### Tørstad new CEO in DNV GL - Oil & Gas

**Elisabeth Tørstad** was appointed CEO in DNV GL - Oil & Gas. She took on the role from January 2014, operating from the company's Oil & Gas headquarter in Oslo. Tørstad has significant industry and management experience at legacy DNV, and comes from the role of Chief Technology Officer for DNV GL and prior to that as Chief Operating Officer for DNV's maritime and oil and gas operations in division Americas and Sub-Saharan Africa.

### Carpenter Promoted AWO EVP

The American Waterways Operators said that **Jennifer Carpenter**, AWO's Senior Vice President - National Advocacy, has been promoted to the new position of Executive Vice President, effective immediately.

### Willard Names Wang as New Director

Willard Marine appointed **Ning Wang** as director of operations and program management. Wang will be responsible for overseeing Willard Marine's planning, purchasing, stockroom and IT operations.

### APL to Reorganize Management Structure

Container ship operators APL says it is to move from the current geographically-organized structure to a functional one. The functions will be in the areas of trade, commercial, operations, procurement and planning & strategy. "The container shipping industry is undergoing profound changes, characterized by low growth and intense competition. We recognize there is a need for APL to respond more quickly to the market and to our customers. We are pushing ahead with our strategy to sharpen our competitive edge through cost efficiency and organizational agility while building on our strong reputation for service quality," said **Kenneth Glenn**, President of APL. A new APL leadership team has been formed to ensure the successful execution of APL's objectives, effective February 10, 2014. Members of the new team, led by Kenneth Glenn, APL President, are: **Peter Jongepier**, Chief Commercial Officer, **Calvin Leong**, Chief Trade Officer, **Nathaniel Seeds**, Chief Operations Officer, and **Jason Wong**, Chief Procurement Officer.

### MTN Appoints Venegas GM, Oil & Gas

MTN Communications (MTN) announces **Santos Venegas** has joined the company as general manager for its Oil

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**Obituary****Michael E. Ford, USMMA '60**

Michael E. Ford, 75, of Waretown, N.J., passed away on January 4, 2014. Born in Washington, DC and raised in Chevy Chase, Md., he graduated from the United States Merchant Marine Academy, Kings Point, N.Y., in 1960 with a degree in Marine Engineering, and earned a master's degree in International Business from Bernard M. Baruch College, New York, in 1979. He served his country as an officer



in the United States Naval Reserve.

Following his graduation from Kings Point, he sailed for the Alcoa Steamship Company, raising his Coast Guard license to Chief Engineer, unlimited. He was First Assistant on the Alcoa Marketer

when brought ashore in 1965 to work in the engineering department of the company's New York office. He also helped outfit Alcoa's Victory Ship fleet during the Vietnam sealift, and was later involved in the new construction and conversion of bulk and liquid carriers for that firm.

He joined the M&R department of National Bulk Carriers in 1970 as a liaison with marine insurance groups and salvage/underwriters' reps to handle engineering aspects of casualties and claims. He later became M&R Supervisor in the same department. He joined Puerto Rico Marine Management in 1974 as superintendent engineer, with supervisory responsibility for port engineers and overall responsibility for vessel maintenance and repair. In 1980, he joined Ocean Service Corporation, a subsidiary of Energy Transportation Corporation, as superintendent engineer. He rose to vice president, marine, and was involved in the operation, maintenance, acquisitions and sales of fleet vessels.

He started independent consulting in 1984 and was involved in various marine transportation projects up to 1990, when he joined Marine Design and Operations, Inc. as a principal in the firm. He retired as vice president in late 2003. He then consulted as a marine engineer and surveyor for Lakeford Associates, continuously maintaining an active Chief Engineer's license (Issue 11). Most recently, he worked as an inspector for the Liberian Ship Registry, and also as professional referral service coordinator for the Society of Naval Architects and Marine Engineers, Jersey City, N.J.

He was a 47-year member of the Society of Marine Port Engineers of New York, serving as both Chairman of the Board and President. He was also a member of SNAME and of the Marine Society of the City of New York.

**Venegas****Mahmood****Davey****Mantel**

and Gas Division. This appointment further solidifies MTN's position in the market as a pioneer in communications technology spanning across various market segments.

**Mahmood Manager at Marine Response Alliance**

**Samina Mahmood**, former commercial manager for TITAN Salvage, has been appointed manager for Marine Response Alliance, an association of the top U.S. emergency responders providing OPA 90 Salvage Marine Firefighting (SMFF).

**Davey Appointed GM at Fairweather, LLC**

Fairweather announced the appointment of **Lori Davey** as the company's new general manager. Davey will be responsible for directing all of Fairweather's business activities and overseeing the company's expansion and management of Deadhorse Aviation Center.

**Mantel Tapped to Lead New BMT Company**

BMT Group Ltd. (BMT) announced a new commercial operating company, BMT SMART Ltd., which will focus on the provision of high value, innovative vessel performance management and decision support solutions for the maritime industry. As part of the company's development plans, BMT has appointed **Peter Mantel** as new Managing Director, a Marine Engineering graduate with more than 20 years of senior marine management experience.

**Woodruff Named VP at Offshore Inland**

Offshore Inland Marine & Oilfield Services, Inc. (OIMO) appointed **Keal Woodruff**, Vice President of Projects. "As OIMO continues its trajectory of growth within the Offshore and Marine Service sector, adding experienced and innovative leadership is critical to our continued success," stated Robin Roberts, Founder and President. "Keal brings exceptional knowledge, experience and capabilities that will help to propel us to the next level."

**PPG Appoints Bausch Vice President**

PPG Industries announced that **Shelley J. Bausch** will join the company as vice president, global industrial coatings, effective Jan. 16.

**Neumann New CEO of Starboard**

**Beth G. Neumann** has joined Starboard Cruise Services as CEO and President. Owned by LVMH Moët Hennessy Louis Vuitton, Starboard is the largest and

leading onboard retailer in the cruise industry. Neumann holds an MBA from Harvard Business School and a BS in Engineering from Cornell University.

**Petersen Joins Trans Marine Propulsion**

Trans Marine Propulsion Systems, Inc. (TMPS), known worldwide for its diesel engine service and engineering capabilities, announced that **Jesper Th. Petersen** has joined the company as the Senior Technical Superintendent-Manager of Two Stroke Service.

**New Take on An Old Name:****SeaLand to Commence in 2015**

Ocean transportation company Maersk Line, a unit of the A.P. Moller-Maersk Group, announced the formation of a regional, containerized shipping company – SeaLand – dedicated to the intra-Americas market. The new affiliate will have a structure similar to Maersk's other regional carriers such as intra-Asia carrier MCC Transport and intra-Europe carrier Seago Line. This new, independent unit will officially commence operations on January 1, 2015. Maersk Line will begin the transition of their Intra-Americas business to SeaLand in a phased approach throughout 2014. SeaLand will be led by Maersk Line veteran, **Craig Mygatt**, who will serve as CEO. The company will be headquartered in the United States with exact location to be determined. SeaLand will share specific Maersk Line operational services, such as finance, land-side operations, and HR.

**Teekay Forms New Tanker Company**

Teekay Tankers Ltd. and Teekay Corporation jointly announced the creation of Tanker Investments Ltd. (TIL), which will seek to opportunistically acquire, operate and sell modern secondhand tankers to benefit from an expected recovery in the current cyclical low of the tanker market. TIL has completed a \$250 million private equity offering in which Teekay Tankers and Teekay have co-invested \$25 million each for a combined 20 percent ownership interest in the new company.

**Netsco Forms Choice Ballast Solutions**

Rich Mueller, President and CEO of Netsco, a company in marine engineering and naval architecture firm since 1984, established Choice Ballast Solutions, LLC (Choice) to offer shipowners assistance with selection, engineering and installation of ballast water management systems.



Woodruff



Bausch



Neumann



(Source: A.P. Moller - Maersk)

The "SeaLand" name is back!



(Photo: Teekay)

Teekay

### GTT Opens U.K. Branch Office

GTT opened a U.K. branch office to continue providing the LNG Industry with additional services and support. GTT's U.K. team, led by **Ray Gillett**, will focus on developing new tools and services that maximize GTT's expertise in specific areas to help address some of the issues that the LNG industry may encounter as it expands.

### Collaboration for BMT Nigel Gee, Ares Shipyard

BMT Nigel Gee, a subsidiary of BMT Group Ltd., has announced further collaboration with Ares Shipyard in the design of a series of eight luxury passenger ferries, destined for Qatar. At 18m long with a beam of 6.7m, the composite catamaran design will be able to carry up to 51 passengersto the new Anantara Doha Island Resort & Spa, 11km east of Doha.

### ClassNK Opens Casablanca Office

ClassNK established a new exclusive survey office in Casablanca, Morocco, which began operation on January 1, 2014. Located on the Atlantic Ocean in northern Africa, Casablanca is Morocco's largest city and one of North Africa's largest ports.

### Griffin Hires New GM in Norway

Griffin Global Group, a marine and offshore travel specialist, announced the appointment of Wenche Eeg as General Manager based in Bergen. Wenche has more than 30 years of experience in the travel industry most recently with Cruise Norway AS where she held the position for seven years.

### Herbert-ABS Opens Singapore Office

Herbert-ABS Software Solutions LLC opened an office in Singapore to reinforce service and support for Asia-based shipowners, operators and shipyards. The new office will be led by **Rob Tagg**, who will expand the activities and strategic plans of Herbert Engineering and Herbert-ABS Software.

### Prestige Files for an IPO

Moody's Investors Service said Prestige Cruises International, Inc. , the indirect parent company of Oceania Cruises, Inc. and Seven Seas Cruises S. DER.L. filing to take the company public is a credit positive. Oceania is a five-ship cruise company. Oceania targets the upper premium segment of the cruise industry. Regent is a three-ship (plus one on order) cruise ship operator that targets the luxury segment of the cruise industry.

## Vigor to Build Three Tugboats for Tidewater



Vigor Fab has been awarded a contract by Tidewater Barge Lines to build three new tugboats. Construction of the first tug will start on Jan. 24, 2014, with the keel laying at Vigor's facility in Portland. Vigor explain that while Tidewater has rebuilt and repowered several of the vessels in its fleet, these tugs will be the first newly built vessels for the company in nearly 30 years. Delivery of the first tug will be in December 2014, with the second and third to follow in 2015. Designed by CT Marine, the 102 x 38 x 11 ft. vessels were designed to service the Columbia River market and are powered by two Caterpillar 3516 Tier 3 engines, 4,500 HP total

### NAO Takes Delivery of PSV

Nordic American Tankers (NAT) said that NAO took delivery of the last of the six recently built Platform Supply Vessels (PSVs) from the Ulstein Group of Norway. NAO is fully operational. NAT is the sponsor of NAO, owning 26% of the share capital in NAO. A subsidiary of NAT is the manager of NAO. NAO has its six PSVs in the North Sea offshore market, and according to NAT, NAO is seen as an important investment. Three vessels were delivered from the seller to NAO in December 2013. The last three were delivered in January 2014, a few days later than planned because of bad weather which delayed necessary underwater inspections. The vessels were delivered from the yard to the seller between January 2012 and September 2013. Five of the six vessels are now on contract employment. The PSVs are on contracts to major energy companies with an average duration (including options) of a little over two years with rates between \$25,000 and \$29,000 per day per vessel.

## Rolls-Royce Power Systems is the New Name for Tognum AG

Effective immediately, the former Tognum AG will now operate under the name of Rolls-Royce Power Systems AG. Since March 2013, the specialist for large engines, propulsion systems and distributed energy systems has been a wholly-owned subsidiary of Rolls-Royce plc and Daimler AG, each of which has a 50% shareholding in the company via a joint venture. The group of companies with MTU Friedrichshafen GmbH as the core company has been consolidated in the Rolls-Royce Group's results since the beginning of 2013. The regional companies will also operate with immediate effect under a new name: Tognum America Inc., which is based in Novi/Michigan, U.S., will now operate as MTU America Inc. and Tognum Asia Pte Ltd, which is based in Singapore, will operate under its new name of MTU Asia Pte Ltd.

The product portfolio includes MTU brand high-speed engines and propulsion systems for ships, for heavy land, rail and defence vehicles, and for the oil and gas industry. Under the MTU Onsite Energy brand, the company markets diesel gensets for emergency, base load and peak load applications, in addition to cogeneration plants for the generation of combined heat and power based on gas engines or gas turbines. The Norwegian subsidiary Bergen Engines manufactures medium-speed engines for marine and power generation applications. L'Orange rounds off the portfolio with fuel injection systems for large engines.



## Hempel Debuts Hempaguard



**Torben Rasmussen,  
Hempel Product Manager**

days during idle periods plus fuel savings of 6% on average with HEMPAGUARD.

Hempel offers a performance satisfaction guarantee contract for vessels complying with a full Hempaguard X7 specification. Group Product Manager Torben Rasmussen explained, "If you are not satisfied for any reason using Hempel's top tier product Hempaguard X7, Hempel will pay, under the performance satisfaction guarantee contract, for the conversion of Hempaguard back to conventional antifouling and with no questions asked."

Hempel spent five years developing and testing Hempel's patented ActiGuard technology. ActiGuard integrates silicone-hydrogel and full diffusion control of biocides in a single coating. Surface retention of the biocide activates the hydrogel, which effectively holds fouling organisms at bay, cutting friction to a minimum while utilizing a minimum amount of biocide. It also has the long-term stability and mechanical properties required of a durable solution, Hempel said.

Hempaguard demonstrates flexibility in that it can cover most combinations of sailing routes and trading patterns.

[www.hempel.com](http://www.hempel.com)

Hempel launched Hempaguard which it said offers outstanding resistance to fouling during idle periods and significant fuel savings. The technology, dubbed ActiGuard, has been five years in development and is based on silicone-hydrogel and biocide science. HEMPAGUARD available as two separate products: Hempaguard X5 and Hempaguard X7. Hempel's tests reportedly show excellent fouling resistance of up to 120

## Ecofix Corrosion Repair with Ecoshield Application



Subsea Industries announced a new product for filling and building up a corroded and pitted steel surface to its original form prior to recoating with Ecoshield. According to the manufacturer, Ecofix is as tough as the steel itself, machinable and can be used to repair most pitting or corrosion damage on rudders, stabilizer fins, thrusters and other underwater gear.

Ecofix is used in combination with Ecoshield, the ultimate rudder protection coating. When a rudder or other piece of underwater ship gear has not been properly protected, the surface will become corroded. Cavitation damage can cause severe pitting. The steel needs to be restored to its original shape with a smooth surface prior to recoating. This is where Ecofix comes in as a tested and proven filler. Because it uses the same basic resin as Ecoshield, the coating can be applied just one hour after the filler. The bonding and hardness are extraordinary. This is the effective alternative to metal facing or very expensive alternative fillers. And because it is part of the Ecospeed/Ecoshield family, it is fully compatible with the coating.

Subsea Industries claims Ecoshield gives permanent protection against cavitation damage for rudders. The glass-flake reinforced coating protects the rudder

for the service life of the ship without need for recoating or major repair and comes with a 10-year guarantee. It is the only coating known to fully protect a rudder from all cavitation damage for the remainder of a vessel's service life. Now with the launch of Ecofix, the repair work needed on the underlying steel can be done effectively and economically prior to the Ecoshield application.

Ecoshield and Ecofix are also suitable for stabilizer fins, thrusters, nozzles and other underwater ship gear which needs special protection from corrosion. Now these items can also be repaired prior to recoating where other, less effective coatings have permitted corrosion and cavitation damage to occur.

With the launch of the new product, Subsea Industries offers a full package; Ecofix restores the surface of the rudder or other underwater gear and Ecoshield will protect the area from ever suffering corrosion and cavitation damage again.

[ecospeed.be](http://ecospeed.be)

## PPG Launches Sigma Nexeon710



Photo: PPG

The Sigma Nexeon range is designed to provide a complete copper-free antifouling solution. Sigma Nexeon710 is the antifouling solution for operational vessels and can be applied during construction and dry dockings. For newbuildings where outfitting takes longer than six months, a high activity copper-free topcoat antifouling, Sigma Nexeon 750 is specified.

Both products combine unique self-polishing zinc-acrylate binder technology with high performance to help protect ships during the new-building process and while in service.

A key benefit of Sigma Nexeon copper-free antifouling according to the manufacturer is its property of 'smoothness from start.' Thanks to the absence of copper, the leveling and smoothness right after application is significantly improved, delivering better fuel efficiency from the start. Third party testing with universities and test institutes in Korea and Japan has confirmed the properties and performance of the Sigma Nexeon antifouling, the manufacturer claims. From these studies, PPG has classified Sigma Nexeon as a 'low friction antifouling.'

Another benefit: excellent cosmetic appearance, thanks to the absence of copper, there is no so called 'whitening' effect. Sijmen Visser adds; "For prolonged outfitting periods, common for newbuilding FPSOs, drill ships and offshore structures and also for shorter outfitting periods of general commercial ships, there is an increasing demand for vessels to look good at delivery both above and below the water line. Sigma Nexeon 710 and 750 are ideal as initial and finishing coats to keep vessel hulls clean under water whilst providing a brand new cosmetic finish above the water line."

[www.ppg.com](http://www.ppg.com)



# Envelop Protective Covers

Since 2004 Shield Technologies Corporation of Eagan, Minnesota has been the leader in corrosion prevention cover technology by providing over 60,000 Envelop Protective Covers to all branches of the U.S. military. Envelop Protective Covers are used to protect a variety of high value U.S. military equipment to include topside naval weapons, Army ground combat vehicles and both fixed and rotary wing aviation assets.

The FY2014 National Defense Authorization Act includes language encouraging the enhanced use of anticorrosion cover systems so more components within DOD can realize the cost savings and readiness benefits of this technology.

“Corrosion remains the largest preventable cost to the U. S. Military, a cost which exceeds \$23b per year,” said the FY14 NDAA Report. “Failing to protect the Department of Defense’s hardware from the preventable problem of corrosion leave hardware susceptible to damage and degradation associated with exposure to heat, dust, ultraviolet rays and moisture.”

Envelop Protective Covers provide the military with a sustainment solution by using a multilayered breathable fabric incorporating a vapor phased corrosion inhibitor. Repeated tests by independent laboratories and branches of the military have shown that the use of Envelop Protective Covers can reduce the damage caused by corrosive environments by factors up to 95%. Envelop Protective Covers have proven to be the most effective, durable and dependable protective cover technology available today.

“Sustainment of our nation’s war fighting fleet has never been more important. Shield Technologies is proud to support our nation’s war fighters by being the leading supplier of this type of technology to DOD. We remain dedicated to providing solutions that aid our military in completing their missions” said Mike Dupasquier, COO of Shield Technologies.

“The committee encourages the military services to follow the lead of the Navy and set a comprehensive service-wide strategy to mitigate corrosion that includes fielding more waterproof, breathable anticorrosion cover technologies,” continues the FY14 NDAA Report. Shield Technologies Corporation stands ready with its Envelop and Envelop Magnum Series of protective covers to answer that call.



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## GAC Launches Eco-friendly Hull Cleaning Solution



photo: GAC

GAC EnvironHull, part of global shipping, logistics and marine services provider GAC Group, has launched HullWiper, its new offering diver-free, cost effective and eco-friendly underwater hull cleaning. Despite its compact size of 3 x 1.5 x 0.80 m, the high-speed, remotely-operated vessel cleaning vehicle is capable of cleaning up to 2,000 sq. m. of hull per hour without causing any damage to anti-fouling surfaces. After cleaning, vessel speed and performance is significantly improved as a result of reduced resistance, which in turn decreases carbon emissions and fuel consumption. And as the system does not use divers to carry out the cleaning, the risk to life is also significantly reduced. HullWiper cleans the vertical sides of a VLCC (approximately 8,000 sq. m.) in seven hours, half the 14 hours the

same job would take using conventional cleaning methods with divers.

The easy-to-operate machine enables hull cleaning to be carried out alongside during loading or discharge, reducing or even eliminating the need for off-hire time. The entire process is in line with the GAC Group's stringent HSSE and compliance policies as well as all local and regional environmental regulations. Residues and harmful marine growths captured during cleaning are disposed of in an environmentally-friendly manner instead of being discharged into the sea as done using traditional methods.

[www.gac.com/hullwiper](http://www.gac.com/hullwiper)

## CS Unitec

CS Unitec's Trelawny Floor Planer tackles the most demanding surface preparation and material removal applications. The TFP 200 is ideal for the removal of coatings and corrosion from concrete and steel surfaces to prepare for recoating. In addition, this walk-behind planer roughens concrete and produces a keyed or grooved profile on concrete for waterproofing and non-slip surface applications.



The TFP 200 has an 8" cutting width and 1/8" max. cutting depth per pass. Depth control enables removal of surface materials without damaging the substrate, maximizing performance and extending cutter life. Other features include a fully adjustable handlebar, integrated vacuum connection and hold-to-run handle.

Three models are available with different motors to meet the needs of the working environment. The 3.5 HP, air-powered unit, Model 320.2012T, consumes 165 CFM of air at 90 PSI. Model 320.2000T is powered by a 5.5 HP Honda GX160 gas motor. The electric-powered Model 320.2004T features a 3HP, 220V-240V motor.



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## Hatch Sealing Tape



World Wide Metric added DrySeal Hatch Sealing Tape to its products list after partnering with Soprema, a manufacturer in the waterproofing industry. DrySeal is an adhesive “winter grade” hatch sealing tape manufactured in Canada from SBS Modified Bitumen, making the product water resistant, elastomeric and durable with cutting edge technology. According to World Wide Metric, the tape provides a solution for waterproofing a ship’s hatch covers and ensuring that valuable cargo arrives damage free at unloading.

[www.worldwidemetric.com](http://www.worldwidemetric.com)

## New Aluminum Vise Action Compression Latch



Southco added a lightweight, aluminum version of its E3 VISE ACTION Compression Latch, which is designed to deliver robust, vibration-resistant fastening. The aluminum E3 is suitable for use in a variety of transportation applications and across numerous other industries. The E3 Compression Latch features lightweight, aluminum construction. Commonality with existing products allows for simplified installation.

[www.southco.com](http://www.southco.com)

## High Strength, Vibration Resistant Fastener from Huck



Alcoa Fastening Systems debuted the premium BOM (blind oversized mechanically locked) fastener. The BOM is the highest strength blind oversized fastener in the world, providing typical tensile strength up to 29,100 lbs. and shear strength up to 45,100 lbs. The unique push-and-pull design of the BOM allows for easy installation in all blind side applications, without the need for torqueing tools. Additionally, the large bearing area on both sides of the work piece ensures a permanently held, tamperresistant joint.

[www.afshuck.net](http://www.afshuck.net)

## Gumdrop Debuts Cases for Marine Industry



Gumdrop rolled out the Marine and Industry Series of cases. Featuring a weatherproof enclosure, easy access to buttons and plugs and boat mounting options, the Marine is a revolutionary case designed exclusively for the marine lifestyle.

Key Features of the Gumdrop Marine, according to the manufacturer: Weatherproof Enclosure: Double Layer of Rugged Protection; Easy Access: Access to all buttons and ports via watertight plugs and seals; and Versatility: Rugged built-in adjustable stand. The Gumdrop Marine will be available in March for the iPad 3, iPad 4 and iPad Air for \$149.95.

[www.gumdropcases.com](http://www.gumdropcases.com)

## New handheld Marking System FlyMarker PRO

For durable markings of big and unmovable work pieces of the ship building industry, a portable handheld marking system means simplification. The handheld marking system FlyMarker PRO of the German company MARKATOR is battery operated and with this very flexible. The dot peen marker weighs slightly over 4 kg and can be easily carried across the shipyard to mark work pieces on site.



The control unit is installed in the break-proof housing of the hand-held marking system and is with this protected against external influences, and there are no cables to endanger the work.

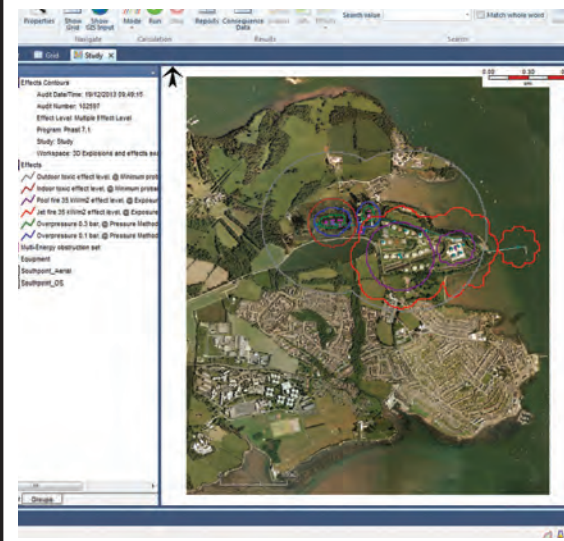
[www.flymarker.com](http://www.flymarker.com)

## Viking Refits Four NGSCO Vessels with the Unique Nadiro LRRS System

New IMO regulations call for major and mandatory improvements to safeguard lives both during lifeboat drills and during emergencies at sea. For more than a decade, LRRS including on-load release hooks have been the cause of numerous accidents, some involving fatalities. Those accidents have tarnished the reputation of lifeboats as a safety device. As NGSCO have a strong commitment to excellence and strive for superior safety, they made it a priority to get the lifeboat hooks retrofitted as soon as possible with the latest technology, even though the regulations would allow them to wait until the next dry dock period in five years.

[www.VIKING-life.com](http://www.VIKING-life.com)

## DNV GL Debuts New Explosion Hazard Software



DNV GL’s new Phast 3D Explosions software module enables advanced 3D modeling, increasing both the accuracy and detail of the evaluations as well as information about the speed of vapor cloud explosion (VCE) analyses. Phast software is used to model safety aspects of design options for proposed new facilities and for operational changes in existing facilities. The software examines the progress of a potential incident from the initial release of hazardous substances to far-field dispersion including flammable and toxic effects. The analyses take numerous parameters into consideration including variables such as wind direction and speed.

“The 3D modeling functionality in the Phast 3D Explosions module allows you to complete a more realistic and more detailed evaluation of explosion hazards and the blast potential using either the Multi-Energy or the Baker-Strehlow-Tang explosion model,” said Nic Cavanagh, Director of Operations for Risk and Reliability, Software, DNV GL. Phast 3D Explosions can be used in a number of applications, including occupied building analysis, facility siting, escalation assessment, plant layout optimization, determination of design accidental loads on structures and equipment, definition of exclusion zones and in demonstrating regulatory compliance. Key features of Phast 3D Explosions software: detailed vapor cloud explosion (VCE) modeling; development of combined hazard contours; and consideration of directional effects.

[www.dnvgl.com](http://www.dnvgl.com)

## Handy, Quick Legionella Tests for Cruise Ships



Albagaia announced its range of Hydrosense Legionella testing kits which are designed to suit the marine industry. Shipping has been increasingly hit by demands of officialdom in health and safety compliance viz a viz Legionella. Vessels failing tests can be stuck in port for days awaiting remedial solutions and yet more tests proving compliance; the latter can take up to two weeks. This can mean a lot of refunds for Pax vessels or lost charter days for others, not to mention damaged reputations. An expensive diving team or ROV operator crew going sick with legionnaires disease is never going to be a cheap activity. Albagaia MD Graham Tyrie said, "The beauty of these kits is that they are economical, can be stored on board and will give an accurate result in 25 minutes ... this is a process that the second engineer, for instance, can carry out and you don't need a contractor." This allows owners to do tests on the spot, without lab trained personnel and without the hassle of sending samples from remote locations to test laboratories that can take up to 14 days to produce results. Various test options are available, including a simple "quick single test." Other test kits come in compound form that allow for multiple system testing (showers and pipes, for instance) and bio film testing in tanks, spas, aircon and hydrofor, for instance.

[www.albagaia.com](http://www.albagaia.com)

### AMSOIL Introduces New Arctic Synthetic Grease



New AMSOIL Arctic Synthetic Grease is formulated to withstand extreme low temperatures while ensuring maximum performance and protection. It provides low-temperature pumpability in harsh climates where temperatures drop below freezing. AMSOIL Arctic Synthetic Grease provides excellent mechanical stability, long service life and superior protection against wear and corrosion. It has the ability to withstand high loads and pressures where conventional greases have proven ineffective. AMSOIL Arctic Synthetic Grease is recommended for industrial machinery, heavy-duty automotive and industrial equipment, chassis, bearings, off-road and heavy equipment operating in arctic climates.

### The New FARO Laser Scanner Focus3D X 33

FARO Technologies released the FARO Laser Scanner Focus3D X 330. With a range almost three times greater than previous models, the Focus3D X 330 can scan objects up to 330m away and in direct sunlight. With its integrated GPS receiver, the laser scanner is able to correlate individual scans in post-processing making it ideal for surveying based applications. In addition, the Focus3D X 330 scan quality has been increased and noise has been reduced, providing precise three dimensional models in a photo-realistic style. These advances in performance did not come at the expense of safety as the Focus3D X 330 includes a Class 1 "eye safe" laser. With its increased range and scan quality, the Focus3D X 330 considerably reduces the effort involved in measuring and post-processing. The 3D scan data can easily be imported into all commonly used software solutions.

[www.faro.com](http://www.faro.com)

### Clean Marine to Supply EGCS for Tanker Newbuilds



Clean Marine has been selected by Hudong-Zhonghua Shipbuilding in China to supply exhaust gas cleaning systems (EGCS) for two 38,000 dwt. Chemical Tankers being built for Stolt Tankers and NYK Stolt Tankers. Clean Marine has developed an EGCS based on the Advanced Vortex Chamber technology that provides unique cleaning efficiency. The system's integrated fan and gas recirculation technology allows the one EGCS unit to simultaneously serve several combustion units. The system supplied to Stolt Tankers is a hybrid system that allows the vessel to operate seamlessly in all types of water (including low alkaline and saline water) without loss of efficiency. Furthermore, the Clean Marine EGCS meets the current pH limit for washwater discharge in Europe and U.S.

[www.cleanmarine.com](http://www.cleanmarine.com)

## Engineered Ventilation Systems Keep Engine Rooms Humming

Circulation of dry, cool air is critical for engine performance, longevity and safety. Delta "T" Systems said it offers a single comprehensive source for all the components that make up an engineered system.

Effective marine ventilation requires more than just fans to promote air flow. Equally important in maintaining an optimal engine room environment, moisture eliminators maintain the dry conditions that motors demand, while dampers provide an all-important safety mechanism. The control system coordinates all operations. Delta "T" not only carries a full range of such custom-designed ventilation products, it provides the expertise necessary to engineer the ultimate engine room formula for recreational and commercial vessels of all sizes. Moisture eliminators are the first line of defense in a Delta "T" engineered system. The company's marine-grade moisture control products, available in any size and shape, effectively extract mist and sea water from intake air to help keep engine rooms dry.

Delta "T" engineers its fans expressly for tough marine environments, rather than adapting units from other industries.

The brain of any engineered ventilation setup, a control system regulates air flow into and out of the engine room. State-of-the-art, demand-based modules from Delta "T" are designed specifically for marine applications. They automatically maintain optimum air pressure and flow volume under any conditions, yet enable manual control when needed. A touch screen interface offers numerous diagnostics that make operation and adjustment simple and pinpoint accurate. Features such as variable fan speed and direction control ensure maximum efficiency.





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### Service Manager

**Job Location: USA, Cleveland / Tampa**

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gineering, start-up, commissioning and field service activities of Choice Ballast Solutions (Choice). The Service Manager oversees and manages service personnel and processes. The Service Manager is responsible to develop and maintain key external relationships with vessel owners, operators, suppliers and shipyard. The Service Manager will collaborate and coordinate with other departments within Choice to uncover and develop opportunities.

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2. Minimum five (5) years marine engineering experience
3. International business experience is beneficial.
4. Good communication skills and computer skills

Choice Ballast Solutions (Choice), a maritime service company, founded by Rich Mueller, President and CEO of Netsco, bridges the gap between survey and service in the ballast water sector. Netsco is a Naval Architecture and Marine Engineering firm with more than two centuries of in-house experience.

Choice is a blend of theoretical engineering and practical experience with first-hand knowledge of ballast water management systems, IMO and USCG regulations, extensive vessel survey and retrofit experience. Choice has working knowledge of shipyards and dry dockings. Choice, delivers service solutions with a customer-focused attitude.

John P Dooley  
Choice Ballast Solutions, LLC  
Email: [jobs@netsco.us](mailto:jobs@netsco.us)

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Positions at other locations become available periodically.

Candidates with a Master or Chief Mates License and sailing experience are preferred, but applicants with other grades of Unlimited sea-going licenses are welcome to apply. Graduation from a recognized

Maritime Academy (e.g. Kings Point, SUNY, etc or International equivalent) is required.

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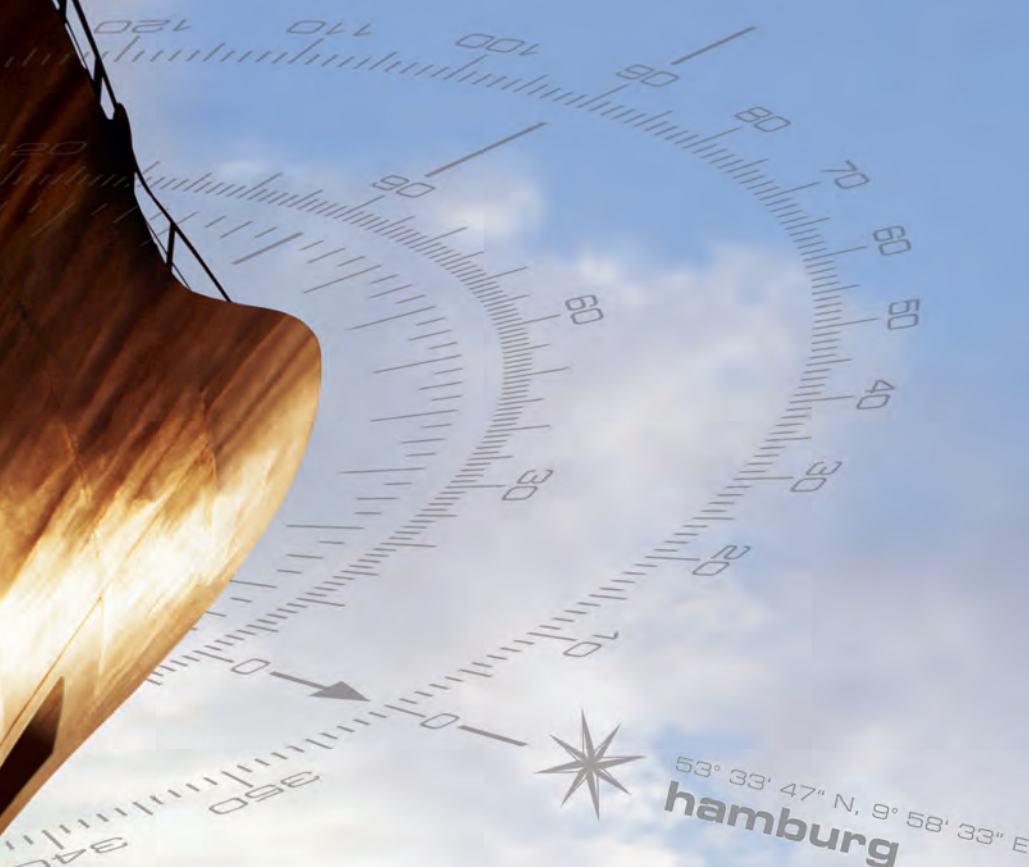


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