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January-February, 2025

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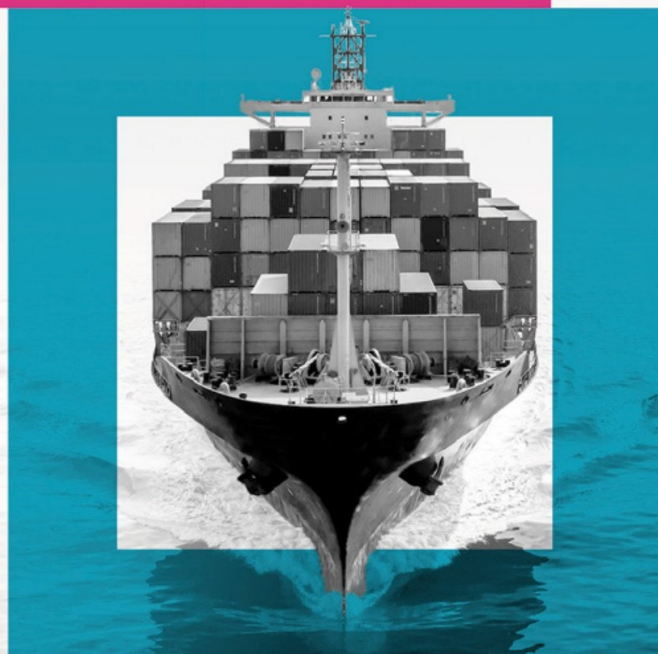
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TONY

Munoz

ALL ABOARD!

The cruise industry is coming off a record year and this year looks even better, so welcome to our annual Passenger Vessel edition!

We kick it off with our cover feature on American Cruise Lines, the leading river cruise company in America. Founded way back in 1973, it's now headed by second-generation Charles B. Robertson, son of the founder, and his two brothers. Family-owned and operated, it pioneered the industry in the U.S. and rivals the best Europe has to offer in terms of luxury, itineraries and unforgettable experiences.

Read all about it in this edition's *Case Study* and *Executive Interview*!

"Building Momentum" is the apt title of Associate Editor Allan Jordan's *Global Cruise Outlook* article. It gives all the facts and figures on just how good things are for cruise companies and their customers. More than 37 million passengers are expected this year, another record, so book early or you might just miss out.

In "Ol' Man River," Senior Editor Jack O'Connell gives you a close-up look at what it's like on an American Cruise Lines voyage. Jack's been on many ACL cruises, and he's a big fan. This one was down the Mississippi from Memphis to New Orleans, one of ACL's most popular itineraries.

Jack also interviewed Tim Klaybor, Managing Director of Fassmer Service America, for his *Executive Achievement* feature. Fassmer, of course, is a well-known name in lifeboats to you *Maritime Executive* readers, and Klaybor and his team have their hands full keeping up with demand.

In "A Cruise, But Green?," E.U. correspondent Erik Kravets wonders whether, despite all its efforts, the industry really is green. But he's sure the E.U., with its zealous over-regulation, will be able to fix whatever's lacking. In "America Gets Serious About Shipping," energy guru Allen Brooks takes a close look at the Shipbuilding and Harbor Infrastructure for Posterity and Security (SHIPS) for America Act, recently introduced in Congress, and concludes that there's still hope for the shrinking U.S.-flagged fleet and the declining number of mariners.

Passenger safety is the subject of Pat Zeitler's article, "Safety Management Systems," in which he discusses companies, including Fassmer, who are leading the way in advanced lifesaving software and equipment. News Editor Paul Benecki discusses water treatment systems, a little-known topic among most cruise passengers, and their vital importance in "Compliance Assurance," while ports' columnist Tom Peters analyzes the "Economic Impact" a booming cruise industry has on ports, large and small – a topic most cruisers know a lot about.

Rounding out this jam-packed edition are three articles on the clean-energy transition and net zero. Master mariner Sean Hogue highlights the benefits of LNG in "Liquefied Natural Gold." Chad Fuhrmann shows how voyage optimization software and systems are "The New 'Great Circle,'" and Sean Holt analyzes the shortcomings and often conflicting impact of decarbonization initiatives in his witty and incisive article, "Finding Zero."

So that's about it for this edition, but I think you'll find it more than enough. We'll see you at Seatrade Cruise Global in Miami in April. All aboard!

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LinkedIn Members 143,576
Subtotal 328,637

**Website (page impressions per mo.) 1,768,386

We Are Number One for a Reason!

*Based on average qualified distribution per edition Jan - June 2024 as filed on June, 2024 Publishers Statement **Based on May 2024 Google Analytics.

2008

Year Fassmer Service America was established in South Florida to provide specialized maintenance of Fassmer lifeboats and davits on cruise ships.

Source: Tim Klaybor, Managing Director, Fassmer Service America

51

Number of European ports with shore power ("cold ironing") at the end of 2023.

Source: Erik Kravets, "A Cruise, But Green?"

80%

Amount of global trade moved by ships.

Source: Allen Brooks, "America Gets Serious About Shipping"

2,340 miles

Length of the Mississippi from its source in Lake Itasca, Minnesota to the Gulf of Mexico.

Source: Jack O'Connell, "Ol' Man River"

37.3 million

Number of cruise passengers forecast in 2025, up 2.3 million or 7% from a record 35 million last year.

Source: Cruise Lines International Association

21

Number of vessels in the American Cruise Lines fleet.

Source: Tony Munoz, "Pioneering an Industry"

80%

Estimated reduction in lifecycle CO₂ emissions from using biofuels.

Source: Sean M. Holt, "Finding Zero"

1959

Year the first successful ocean shipment of LNG was completed by the Methane Pioneer from Calcasieu, Louisiana to Canvey Island, U.K.

Source: Sean Hogue, "Liquefied Natural Gold"



Quoted

"People can come in without any real experience, get trained and then get started in deck or housekeeping or food service roles and grow with us. Some of our best managers have been hired on after their initial employment period with us as a server, for instance. They come back and they do great because that's how most of us got started. I joke that I went to the School of American Cruise Lines, but so many of our executives did the same thing. We started our careers here and grew."

– Charles B. Robertson, President & CEO, American Cruise Lines

"CLIA says member lines introduced eight large ocean-going cruise ships in 2024, adding approximately 26,000 berths to an industry with approximately 600,000 berths. All the ships were orders placed before 2020 and the COVID-19 pandemic. The industry is projected to add just four percent to capacity in 2025 – a total of 16 cruise ships – including the first orders placed after the pandemic."

– Allan Jordan, "Global Cruise Outlook"

"Galveston is the fourth most popular cruise port in North America and eighth busiest in the world."

– Rodger Rees, Port Director & CEO, Galveston Wharves

"Growing up in Fredonia, New York with Lake Erie as my front yard, I was perpetually drawn to the water."

– Tim Klaybor, Managing Director, Fassmer Service America

"If laws can green the world, the E.U. will lead the way."

– Erik Kravets, "A Cruise, But Green?"

"According to naval experts, China's navy in 2024 had 79 more ships than the U.S., including the 30 it added in 2023 compared to just two new U.S. ships. However, these experts say the U.S. fleet is technologically superior to China's because it possesses greater missile capacity, especially in its submarines."

– Allen Brooks, "America Gets Serious About Shipping"

"While a large portion of potential customers once saw cruises as just an excuse to drink by the pool of a fancy ship, an increasing number of travelers now perceive cruises as a way to engage with immersive cultural experiences,"

– Dean Van Es, CEO, Fast Cover Travel Insurance



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TIM KLAYBOR,

MANAGING DIRECTOR,
FASSMER SERVICE
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BY JACK O'CONNELL



Klaybor and his team are the service experts for Fassmer products in North and Central America as well as the Caribbean. It's a lifesaving mission in a market that's growing.

Tell us about yourself - your background and education. What attracted you to the maritime industry?

Growing up in Fredonia, New York with Lake Erie as my front yard, I was perpetually drawn to the water. My parents had a sailboat, and I spent countless hours on it, fascinated by both the ocean and the intricacies of boat maintenance. This childhood fascination evolved into a lifelong passion, steering me towards a career where I could blend my love for the ocean with my innate problem-solving skills and hands-on abilities.

I pursued marine engineering and nuclear power at New York Maritime College, graduating in 1991, fully prepared to dive into the maritime industry.

What did you do before joining Fassmer in 2009? How did they find you?

Post-graduation, I embarked on a career

with Transoceanic Cable Ship Co. as a marine engineer, traversing the globe and honing my technical skills. Life took a beautiful turn when I married my wonderful wife, Kim, and we were blessed with two children, Nick and Ashley.

Heeding the call of family life, I transitioned ashore in 1998, applying my expertise in the cruise industry at Drew Marine followed by a stint in the defense sector with Northrop Grumman. My path through the industry was diverse, culminating in a pivotal role at Flagship Management, the premier maritime recruiting firm. It was here that I discovered the opportunity at Fassmer. They did not find me.

The Fassmer Group is a global leader in maritime and especially lifeboats. Its history dates back to 1850 and its founding in Germany. Tell our readers about that.

The Fassmer Group is a beacon of innovation in shipbuilding, lifeboats, wind power and composite technology. Operating from its base in Germany, we pride ourselves on our ability to craft vessels up to 90 meters including offshore patrol and hydrographic vessels. We built the first LNG passenger ferry and we build specialized vessels of all classes.

Our foray into the wind power sector has us creating generator nacelles for the offshore wind industry, and our expertise in composite technology has led to collaborations with Volkswagen. The lifeboat division, a crucial part of Fassmer, ensures safety across various sectors including cruise, military and commercial vessels.

The company is family-owned in its fifth generation by Harald and Holger Fassmer.

When and why was Fassmer Service America established? How does it fit within the Fassmer Group? Why Florida?

In 2008, Fassmer Service America was founded in South Florida to address a critical need in the maritime industry – specialized maintenance of life-saving equipment, which had traditionally been managed by ship crews. This led to difficulties given a lack of technical knowledge and led to accidents. This shift to having experts in the field, driven by regulatory changes and a focus on safety, positioned us ideally near major cruise lines in Florida, our primary clients at the time.

What does Fassmer Service America do? What are its various products

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"What sets Fassmer apart is our specialized focus. We service only what we build, ensuring unparalleled expertise and safety. This specialization, combined with a hands-on approach to management and problem-solving, positions us uniquely among our competitors, who attempt to service many different manufacturers' equipment, which could lead to lack of knowledge resulting in making mistakes that could end up being catastrophic."

and services and markets?

Fassmer Service America performs annual and five-year service on lifeboats, davits and accommodation ladders. Our market is split into four sectors: commercial, offshore, cruise and military.

What's your most important product?

Our most important product has always been our service. While lifeboats, davits and accommodation ladders represent the core of our business, we also engage in critical engine work and repair any fiberglass damage that may occur. Initially, the cruise industry constituted the bulk of our clientele. However, over time, this focus has shifted, and the U.S. military is now our largest customer by far.

What is your role as Managing Director, and who are some of your

key team members?

As Managing Director, my role encompasses overseeing daily operations and steering our team towards continual excellence. At Fassmer Service America, every team member plays a pivotal role in our operations, yet there are key individuals who help steer our success through their specific managerial roles.

Carlo Lopez, our Technical Director, not only oversees all technical operations but also handles our military accounts, ensuring our services meet the rigorous standards required by military contracts. Mike Kay, our Service Manager, is responsible for managing our offshore commercial operations. His deep industry knowledge and expertise are vital in maintaining the high standards of service that our commercial clients expect. Janek

Aas serves as our Cruise Manager, where he specializes in handling our cruise line portfolios. His role is crucial for nurturing and sustaining our relationships within the rapidly evolving cruise industry.

Christopher Oberheim works alongside Carlo Lopez to manage our military accounts. This collaboration allows us to efficiently cater to the extensive needs of our military clients with precision and dedication. Jessica Caballero, our Office Manager and Accountant, ensures that our financial and administrative operations are conducted

seamlessly. Her meticulous management of our office's daily operations and finances is essential for our overall organizational health.

What makes Fassmer special? How is it different from the competition?

What sets Fassmer apart is our specialized focus. We service only what we build, ensuring unparalleled expertise and safety. This specialization, combined with a hands-on approach to management and problem-solving, positions us uniquely among our competitors, who attempt to service many different manufacturers' equipment, which could lead to lack of knowledge resulting in making mistakes that could end up being catastrophic.

Do you serve any industries other than maritime?

We have two other companies with Fassmer Service America, both in the maritime industry. One is Fassmer Technical Projects and the other Fassmer Performance Marine.

Fassmer Technical Projects (FTP) leverages Fassmer's shipbuilding expertise to provide innovative retrofit, refit and refurbishment solutions for the global maritime industry. With a focus on turnkey project management and cutting-edge engineering, FTP ensures minimal operational disruption and high-quality execution. Led by a dynamic team including General Manager Jonathan Holler and Director of Operations Maija Harju, FTP emphasizes excellence, sustainability and customer-centric service. The leadership team's diverse expertise supports FTP's mission to deliver tailored, reliable solutions to meet the unique demands of cruise lines, government agencies and commercial shipping organizations worldwide.

Fassmer Performance Marine (FPM), established just this year, represents a new venture aimed at servicing pleasure boats and fishing boats. Building on our longstanding success in the commercial maritime industry, we identified an opportunity to expand our expertise into



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"In the coming years, I foresee the cruise industry leading a shift toward hybrid and fully electric tender boats. As these changes take hold, we are committed to evolving our service offerings to meet the new demands of servicing hybrid and electric propulsion systems. We will always remain at the forefront of maritime service providers, ready to support the industry as it embraces more sustainable technologies."

the pleasure craft sector. Shortly after launching FPM, we were honored to be approached by the renowned boat manufacturer, Glasstream, known for their high-quality and performance-driven vessels. This partnership has positioned FPM as the official east coast of Florida representative for Glasstream GSX power boats.

What's your biggest challenge right now?

Indeed, a common challenge many businesses face today is finding individuals with a strong work ethic who are committed to their roles, which can make it notably more challenging to build a team that aligns with our company's standards and ambitions. However, at Fassmer Service America, we remain dedicated to the pursuit of excellence by meticulously

selecting team members who not only possess the necessary skills but also share our passion for the maritime industry.

We place great emphasis on fostering a work environment that values dedication, integrity and continuous improvement. When we do find the right individuals to join our team, they are not merely employees. They become integral members of our family, each contributing uniquely to our collective success.

What's your vision for Fassmer Service America? Where would you like to see it in, say, the next five years?

In the coming years, I foresee the cruise industry leading a shift toward hybrid and fully electric tender boats. As these changes take hold, we are committed to evolving our service offerings to meet

the new demands of servicing hybrid and electric propulsion systems. We will always remain at the forefront of maritime service providers, ready to support the industry as it embraces more sustainable technologies.

What do you like most about your work? What gives you the most satisfaction?

What I find most rewarding about my work is the deep sense of satisfaction that comes from knowing that once my team has resolved an issue onboard a vessel or completed an annual or five-year service, the vessel is safe and fully prepared for the year ahead. It's incredibly fulfilling to know that through our efforts, we've directly contributed to the safety and readiness of each vessel we service.

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ERIK

Kravets

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A CRUISE, BUT GREEN?

IF LAWS CAN GREEN THE WORLD, THE E.U. WILL LEAD THE WAY – AND THAT INCLUDES CRUISING.

Ask Venetians what the biggest threat to their city is and many will say water. They may just as likely say “cruise ships.” And so, in 2021, Venice banned cruise ships from passing the Giudecca Canal into the lagoon – in order to stop the city from sinking.

Like other picturesque coastal cities, Venice is a beneficiary and a victim of the cruise industry. Each visiting cruise ship leaves wealth behind, but also a little slice of chaos.

What kind of chaos? Heavy vessels push sediment into Venice’s canals when they pass through. The sediment is drawn from the lagoon, which in Roman times sheltered the residents from invasion but now invites invasion by tourists. When the sediment is shifted from the lagoon into the canals, plant and animal life lose access to its rich nutrients. Then, at great expense, dredgers clear the canals, removing the

sediment entirely.

Water churning in the canals causes the problem, and even speed restrictions have not been able to stop the harm. “The movement of such a massive amount of water erodes the hundreds and even thousands of years’ old foundations of the palaces and the streets of Venice,” noted Valeria Duflot, co-founder of Venezia Autentica, a local interest group.

Dubrovnik – where “Game of Thrones” filming locations still bring a huge draw – has imposed limits on cruise ships as has the Mallorquin city of Palma. Barcelona and Amsterdam have restrictions, too, and in 2022 a petition against cruise ships in Marseille, orchestrated by the city’s then-mayor, got 50,000 signatures.

FLIES TO HONEY

All of which demonstrates that the visible and invisible effects of cruise tourism are triggering a reaction. Like flies to honey, that reaction is inexorably

drawing in E.U. lawmakers.

Of course, wouldn’t it be wonderful if we could keep the good effects of cruising but get rid of the bad? That’s the goal that new E.U. regulations have in mind.

Since cruising is a mass-market product with global reach, it’s not only vulnerable to local regulations like Venice’s but also to E.U.-scale initiatives such as the Green Deal, the Blue Economy and the Tourism Transition Pathway.

Behind the bureaucratise of these names is Brussels’s master plan to rework almost every aspect of tourism from the top down, including cruising. Imagine greenhouse gas emissions cut by 55 percent by 2030 and by 100 percent by 2050, to start with. But the initiatives also seek to implement a host of sustainability measures promoting “social inclusion and improved livelihoods while ensuring the environmental sustainability of oceans and seas,” according to a report prepared by Deloitte for the European Commission.

The three E.U. initiatives overlap, blending into the kind of legal goulash that is uniquely Brussels. Their combined effect is easiest to understand when broken down into thematic areas: infrastructure, energy and regulation.

INFRASTRUCTURE

Water and solid waste management, alternative fuels, digital monitoring and data tracking systems are all part of the E.U.’s “greening” of infrastructure. But the headline change is the FuelEU Maritime Regulation (2023/1805), which requires ports listed in the trans-European transport network (TEN-T) to provide shoreside power by 2030.

Shoreside power ought to be cleaner than the fossil fuels often used by cruise ships, though this claim is contingent upon generating stations on the grid using renewable sources.

Right now, ports that offer shoreside power are overwhelmingly clustered in the Baltic and North Sea while demand is concentrated in the Mediterranean. According to the International Council on

Water and solid waste management, alternative fuels, digital monitoring and data tracking systems are all part of the E.U.'s "greening" of infrastructure. But the headline change is the FuelEU Maritime Regulation (2023/1805), which requires ports listed in the trans-European transport network (TEN-T) to provide shoreside power by 2030.

Clean Transportation, 51 European ports were offering this amenity at the end of 2023, supplying 309 megawatts of power, which is only 30 percent of the way to the goal. ICCT estimates that this performance needs to be tripled or even quadrupled to meet the new FuelEU standard by 2030.

Greece, where ships use 526 gigawatt hours of power each year, has no shoreside power, but it's the fourth biggest source of demand. Italy, Spain and France, which occupy the three spots above Greece, each have less than 15 megawatts of installed shore power.

No E.U. infrastructure goal can exist without a flanking subsidy to speed it along. And so the Alternative Fuels Infrastructure Regulation is providing 424 million euros worth of incentives for the development of shoreside power infra-

structure in TEN-T ports. The Cruise Lines International Association (CLIA) notes that 210 ships will be able to accept shoreside power by 2028, which represents 72 percent of the total. The industry is along for the ride.

ENERGY

The FuelEU Maritime Regulation also requires carbon emissions reductions, increasingly compelling a transition away from heavy and light fuel oils toward liquefied natural gas (LNG). And cruise lines are certainly embracing that with 25 of the 44 new ships presently under construction being LNG-powered and another seven being methanol ready or capable. This represents \$62 billion of orderbook value – a massive investment.

Europe is fortunate that cruise lines

appear to be willing to go along with this plan – or even to anticipate it. Indeed, as early as 2018, predating the E.U. mandates by several years, CLIA announced that by 2030 the industry fleet would cut its carbon emissions by 40 percent. Arnold Donald, the former CEO of Carnival Cruise Lines and Chairman of CLIA at the time, said the planned reduction “is a strong first step toward realizing that vision” of a carbon-free cruise industry by the end of the century.

REGULATION

Along these lines, infrastructure dovetails into energy regulation. The Emissions Trading System (ETS) is now a reality. It entered into force in January 2024, requiring shipping companies to cover 40 percent of their 2024 emissions, which



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Attached to this is the shipbuilding sector, whose fate is intimately connected to cruising. Eighty-six percent of the European orderbook is made up of yachts and cruise ships, meaning Europe's shipyards are overwhelmingly dependent on tourism. Europe's shipyards had revenues of 55 billion euros in 2020 and employed 312,000 people.

stepped up to 70 percent for 2025.

Broadly, such costs are passed on to customers. For example, from January 1, 2024, P&O Ferries began to apply an explicit EU ETS surcharge to customers for routes operating in the E.U.

Cruise lines will be paying roughly 600 million euros per year in EU ETS costs, according to DNV. While this financial pressure is indeed changing some cruise lines' behavior, e.g., by aggressively pushing adoption of shoreside power, it's steering others to make simple, powerful changes to itineraries, like stopping in Southampton or Casablanca before crossing the Atlantic so as to eliminate legal exposure to E.U. monitoring.

IMPACT ON SHIPBUILDING

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In fact, it's precisely because the E.U. is driving this green transition that European shipyards have a particular interest in guiding and forming the way it unfolds. It's easy to imagine a scenario in which cruise lines operating in Europe are increasingly put under pressure to comply with environmental mandates. This is already happening as it relates to ship recycling: 44 European shipyards are approved as ship recycling yards, and European-flagged vessels are legally

required to use these as part of a "closed loop" approach.

And yet the issue is nuanced. China is building excellent cruise ships now, e.g., the *Adora Magic City* with a capacity of 5,246 passengers. And in contrast to China, steel mills in Europe struggle under ETS, leading to gaps in the supply chain that feeds shipbuilding.

FOR BETTER OR WORSE

If laws can green the world, the E.U. will lead the way – for better or worse. If some fail and others succeed, you will undoubtedly be able to read about it here. But for now, to quote Giacomo Casanova, a son of Venice: "He who makes no mistakes makes nothing."

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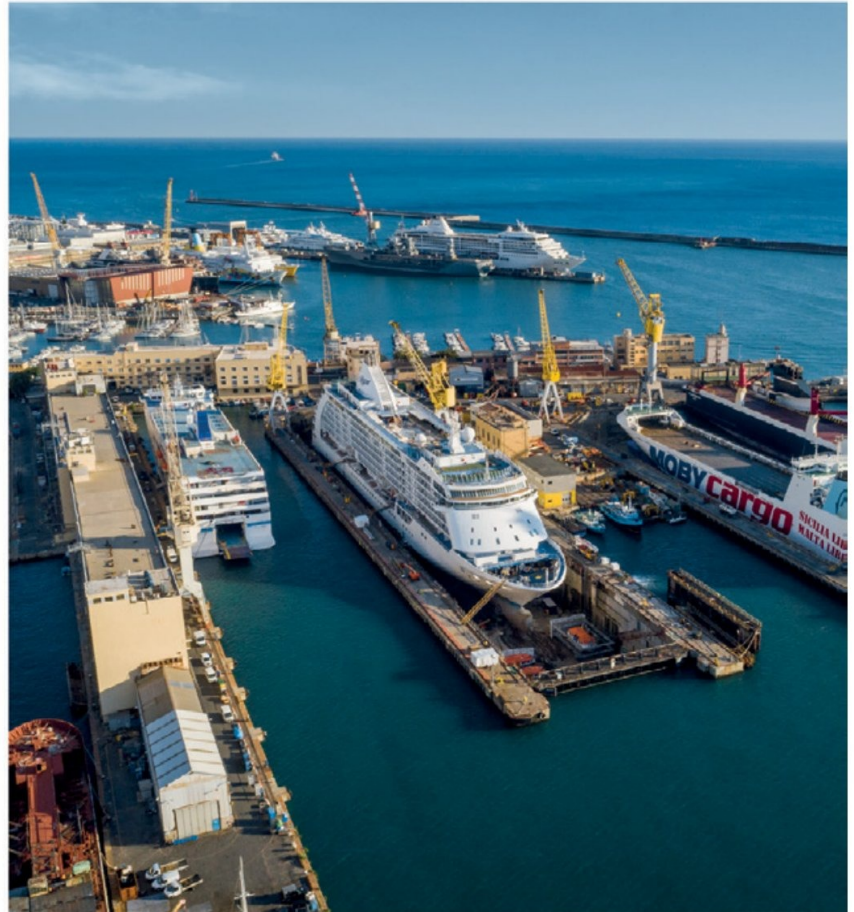
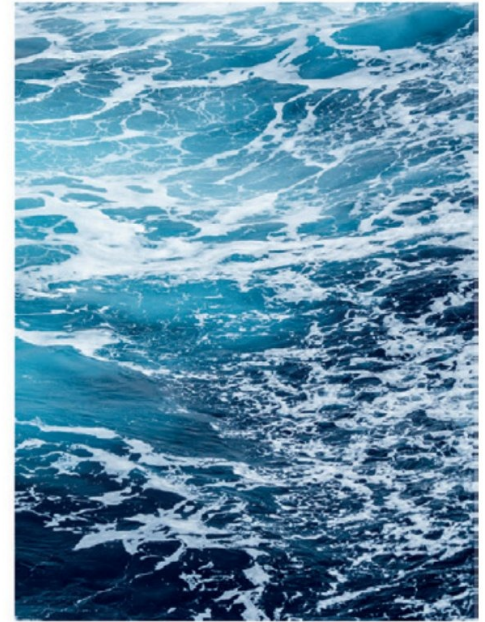
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A NEW ROUTE IN THE SHIPYARD INDUSTRY





G. ALLEN

Brooks

Energy analyst and commentator Allen Brooks is a Senior Fellow at the National Center for Energy Analytics and author of the widely read "Energy Musings" newsletter. His writings - including those for *The Maritime Executive* - can be found at <http://www.energy-musings.com>.



AMERICA GETS SERIOUS ABOUT SHIPPING

THE SHIPS ACT IS DESIGNED TO RESTORE THE U.S. AS A MARITIME POWERHOUSE.

Ships move 80 percent of global trade. Without them, people would be poorer, and few appreciate the critical role they play in our everyday lives.

In December, a bipartisan group of U.S. Congressmen introduced the Shipbuilding and Harbor Infrastructure for Posterity and Security (SHIPS) for America Act. The bill addresses critical shipping issues impacting America's national security and our economy's ability to function in today's politically charged world.

Why the sudden attention to maritime matters?

SAFEGUARDING TRADE

Political leaders recognize that geopolitical tensions are elevated and will remain so, given regional struggles. The key role maritime trade plays in global economic activity means it

must be protected from armed attacks blocking trade routes and/or endangering the operation of vessels and the safety of crews. Navies are essential for protecting these ships and ensuring their free passage.

Geopolitical tensions could erupt into regional wars. Governments and their allies must protect their coastlines and commercial interests. History is replete with episodes of nations using their navies to wage war and gain commercial power over their enemies.

Local pirates, rather than governments, sometimes waged those campaigns. Pirates sought financial gains from capturing ships and selling their cargo or holding ships and seamen hostage for ransom. Recently, the world watched Somali pirates wreak havoc against commercial ships traveling along the western coast of Africa, forcing navies to protect them.

Who can forget the tales of pirates like the notorious Captain Kidd, Blackbeard and Black Bart? How about the Barbary pirates that birthed the U.S. Navy? Amazingly, the South Pacific had massive pirate operations. In the early 1800s, Chinese pirate Cheung Po Tsai commanded a fleet of several hundred ships and 50,000 seamen.

He followed the example of Ching Shih's exploits, the most famous female pirate, who took over her husband's fleet after his demise, expanded it to 1,500 ships and 80,000 men, and plundered shipping along the coast of the South China Sea. She was so successful the Chinese government offered her universal pirate amnesty in exchange for peace.

In today's world, terrorism can also take the form of piracy, as demonstrated by the Houthis in Yemen and their attacks on shipping in the Red Sea.

ENERGY TRANSITION

Besides protecting commercial shipping, governments are undertaking an energy transition that requires vast volumes of critical energy minerals for renewable energy technologies.

The International Energy Agency projects a select group of critical minerals must increase their output by a whopping 30-40 percent while ignoring the role of other critical and essential minerals in meeting clean energy demand and supporting economic growth.

The global challenge for shipping is being able to refresh the existing fleet while growing it to handle the increase in critical mineral volumes. Those minerals oftentimes must be moved from where they're mined to where they'll be refined. Once converted into materials for use in renewable energy devices, they must be transported to manufacturing locations.

Many minerals will embark on long journeys from mines to final manufacturing sites. This may necessitate new shipping routes, depending on where the new mines are located, which may require

Since the enactment of the Merchant Marine Act of 1920, also known as the Jones Act, U.S. cabotage (coastwise trade) has been strictly regulated. All goods transported by water between U.S. ports must be moved in U.S.-built ships that fly the U.S. flag, are owned by U.S. citizens and are crewed by U.S. citizens or permanent residents.

different-sized ships.

SUPPLEMENTING THE JONES ACT?

The SHIPS Act is designed to reinvigorate the U.S. shipbuilding industry, which is critical for our commercial fleet and potentially for our military.

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The Jones Act has become controversial. Opponents argue it reduces domestic trade via waterways relative to other forms of trade and has an inflationary impact on consumer goods. However, military and commercial officials support the act for its promotion of domestic shipbuilding, ship ownership and the training of U.S. seafarers.

The incoming Trump Administration must balance the inflationary pressures and national security interests of the Jones Act.

REBUILDING THE MILITARY FLEET

From a national security perspective, the U.S. Navy's fleet today is less dominant over China's.

According to naval experts, China's navy in 2024 had 79 more ships than the U.S., including the 30 it added in 2023 compared to just two new U.S. ships. However, these experts say the U.S. fleet is technologically superior to China's because it possesses greater missile capacity, especially in its submarines.

A troubling fact is that one recent study concluded larger fleets won 25 out of 28 historical wars.

In a recent set of wargames, China's navy lost 52 major ships compared to 7-20 for the U.S.. Given its more extensive fleet, China's navy still had more major surface vessels than the U.S. and could continue the naval battle. These wargame outcomes are troubling for our military

preparedness and have generated plans to expand the U.S. fleet.

The first updated fleet proposal in 2016 targeted increasing it from under 300 to 355 ships. The latest fleet growth plan calls for 381 ships by 2050. However, the fleet will shrink through 2027 due to





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A key goal of the SHIPS Act is to grow the U.S.-flag international fleet by 250 ships within 10 years. An expansion of this magnitude is a challenge since only about 20 domestic shipyards operate today, down from 80 at the end of World War II. During the war, the U.S. was producing ships in six weeks, enabling the U.S. and its allies to defeat their German, Italian and Japanese foes.

scheduled decommissionings.

The Ship Battle Force lists 296 U.S. Navy vessels of all types. However, 126 are combat support vessels that deliver supplies, armaments and fuel almost daily. Most are part of the Military Sealift Command, which employs 5,500 civilians to operate them. There are 4,500 billets on these ships, but for every 100 civilian seafarers onboard, there are only 127 available. This means that onboard service is four months long with only one and a half months of shore leave – an inadequate work/family balance.

The shortage of civilian seafarers has led to the MSC's removing 17 supply ships from service to free up 600-650 seamen for deployment on other ships.

REBUILDING THE COMMERCIAL FLEET

The SHIPS Act is designed to rebuild the U.S. commercial shipping and shipbuilding industries and develop more seafarers. The global maritime economy is between \$3-6 trillion annually. U.S.-flagged vessels carry less than two percent of this total, measured by cargo weight.

There are fewer than 200 U.S. commercial vessels. Only about 80 are engaged in global trade. The small U.S. commercial fleet compares to 5,500 active Chinese-flagged vessels.

A key goal of the SHIPS Act is to grow the U.S.-flag international fleet by 250 ships within 10 years. An expansion of this magnitude is a challenge since only about 20 domestic shipyards operate today, down from 80 at the end of World

War II. During the war, the U.S. was producing ships in six weeks, enabling the U.S. and its allies to defeat their German, Italian and Japanese foes.

Today, it takes years to build new military and civilian ships, increasing our economic vulnerability.

A 25 percent investment tax credit for shipyard improvements will support the shipbuilding effort. Furthermore, the bill would transform the Title XI Federal Ship Financing Program into a revolving fund and create a Shipbuilding Financial Incentives program to support innovation in shipbuilding and repair.

Other legislative goals include streamlining the U.S. Coast Guard's regulatory process, which often impedes commercial fleet growth and adds to the cost of new ships. As an inducement for building new

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The U.S. government should explore arrangements with shipyards in Japan and South Korea, our allies, to build ships under a special five-year program granting them Jones Act status while the U.S. constructs new shipyards. This could bring state-of-the-art shipbuilding technology to U.S. yards, making them more competitive globally.

ships, the bill mandates that government-funded cargo be transported on U.S.-flag vessels. In addition, a portion of goods imported from China must travel on U.S.-flag vessels by 2029.

A guaranteed market is an incentive to convince shipowners to build new ships and shipyard owners to expand their capacity to build them.

Today's global shipbuilding capacity has declined 30-40 percent from its 2011 peak in new vessel tonnage deliveries. Our research of the mineral needs of the energy transition shows that the massive volume of critical minerals required necessitates 30-50 percent more tonnage delivered in the mid-2030s than global shipyards provided at the 2011 newbuilding peak.

The need to refresh the existing fleet,

plus add new capacity for the energy transition, translates into 60-90 percent more global tonnage capacity than currently exists. Japanese, South Korean and Chinese shipyards are already moving to expand their capacity, leaving the U.S. behind. Asian shipyards already dominate the global shipbuilding industry.

Other ideas for promoting the domestic shipbuilding industry include having the federal government buy and lease new shipyard equipment to accelerate construction efficiency improvements. U.S. shipyards have been late in upgrading their technology to help lower new vessel costs.

The U.S. government should explore arrangements with shipyards in Japan and South Korea, our allies, to build ships under a special five-year program

granting them Jones Act status while the U.S. constructs new shipyards. This could bring state-of-the-art shipbuilding technology to U.S. yards, making them more competitive globally.

ESSENTIAL FIRST STEP

The SHIPS Act is an essential first step in reviving the domestic shipping industry and reestablishing the U.S. as a maritime powerhouse necessary for our national security. Without such steps, the U.S. will depend more on foreign shipyards, shipowners and seafarers to deliver the goods needed for our economy.

It will also leave the U.S. Navy without the resources – ships, shipbuilding capacity and civilian seafarers to fulfill its mission.

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O'Connell

Senior Editor of this magazine, former maritime executive, and private investor who may own shares in some of the companies mentioned in his columns. The views expressed are his and his alone and are not in any way to be construed as investment advice.



OL' MAN RIVER

"HE JES' KEEPS ROLLIN' ALONG."

The hit song from Oscar Hammerstein II and Jerome Kern's 1927 groundbreaking musical, "Show Boat," continues to mesmerize, nearly 100 years later. Haunting and magical, the lyrics and melody seem to cast a spell:

*Ah gits weary/An' sick of tryin'
Ah'm tired of livin'/An' skeered of dyin',
But ol' man river,
He jes' keeps rolling' along.*

Timeless, really, like the river itself.

None of which was going through our minds last year when we decided to sail the Mississippi. We'd done the Snake and Columbia rivers out west, the Ohio two years ago, and the Great Lakes in between. So why not the Mississippi, the most storied of American rivers?

Our favorite cruise line, which happens to be featured on this edition's cover, offered a number of different itineraries: the entire river, from St. Paul to New Orleans; the Upper Mississippi, from St. Louis to St. Paul; the Lower Mississippi, from Memphis to New Orleans; and various combinations thereof, including the stretch from St.

Louis to Memphis.

We chose the Lower Mississippi, partly because of the timing (late August) and partly because of its rich history. It turned out to be one of American Cruise Lines' most popular itineraries, and for good reason.

RIVER TRIVIA

Our vessel was the *American Symphony*, one of the newer ships (built in 2022) in ACL's fleet and part of the so-called River Class of American Riverboats™. Not the traditional paddle-wheelers we had sailed before, she holds just 180 passengers and boasts spacious staterooms and bathrooms (much bigger than on ocean cruise ships) and lots of public spaces.

She also has a unique bow design that opens up to allow passengers to disembark on a retractable gangway. At many destinations the vessel literally grounds itself against the shore; the bow opens up like a beached dolphin, and passengers climb (or take a golf cart) up a steep embankment, called a revetment, to reach the waiting coaches or take a stroll through town.

The revetments are to protect against

floods, of which there have been many over the years. Built by the Army Corps of Engineers and made of concrete and a combination of rocks and sand called "rip-rap," the revetments also provide an anchorage for commercial barge and towboat traffic, which attach lines to the embedded cables or hooks and can "park" for the night or days at a time, safe from the constant flow of barge tows on the river.

The Mississippi is all about commerce.

Hopper barges hauling wheat and corn and soybeans downriver to New Orleans for export. Tank barges carrying oil and petrochemicals to the refineries in Baton Rouge or upriver to St. Louis. Building materials and construction products and ethanol and all kinds of things for consumption at home or export abroad. It's the I-95 of river traffic, and it's always busy. The Corps of Engineers designed it that way.

You won't see many pleasure craft or jet skiers on its waters. It's too dangerous. There's too much barge traffic and, increasingly, riverboats. And there are too many twists and turns, too many blind curves. Mark Twain, in *Life on the Mississippi* (1883), called it "the crookedest river in the world, since in one part of its journey it uses up one thousand three hundred miles to cover the same ground that the crow would fly over in six hundred and seventy-five."

Another feature of the Lower Mississippi is no locks. No dams or rapids to slow traffic. As a result, tows can extend to 32 or 40 barges – an amazing sight and a wonder to navigate. Above St. Louis on the Upper Mississippi and on the Ohio, there are locks and dams galore. As a result, tows are limited to 15 barges – the maximum number that can fit through the locks, which are typically 1,000 feet in length.

Here's an interesting factoid: It takes 90 days or three months for a single drop of water to travel the length of the Mississippi – from its origin in Lake Itasca, Minnesota to the Gulf of Mexico, a distance of

We also toured the Peabody Hotel, home of the famous ducks. You know the story, right? Twice a day the “Peabody ducks,” five of them, come down in an elevator from their rooftop digs and walk a red carpet to their daytime home in the grand fountain in the hotel’s lobby. Hundreds of people arrive each day in time for the 11:00 am entrance and 5:00 pm departure of the ducks, who are directed by a “duck master” outfitted in red velvet and a cane.

2,340 miles. That works out to roughly one knot an hour, but the current on the Lower Mississippi is often much stronger, at up to three or four knots. The average is brought down by all the twists and turns of the “crookedest river.”

SIGHTS & SOUNDS

Our cruise started in “Music City” – Memphis – with a pre-cruise visit to Graceland. You know, Elvis Presley’s place? Loud, boisterous, a little raunchy, people from all over, everyone having a good time – the way Elvis would have liked it.

We also toured the Peabody Hotel, home of the famous ducks. You know the story, right? Twice a day the “Peabody ducks,” five of them, come down in an elevator from their rooftop digs and walk a red carpet to their daytime home in

the grand fountain in the hotel’s lobby. Hundreds of people arrive each day in time for the 11:00 am entrance and 5:00 pm departure of the ducks, who are directed by a “duck master” outfitted in red velvet and a cane.

A sight to see, and a big moneymaker for the hotel as people come and stay for a while, eating and drinking the whole time.

So Elvis and the ducks put everyone in the right mood for cruising, and we boarded the *American Symphony* on a Sunday for the 640-mile, 10-day journey to New Orleans.

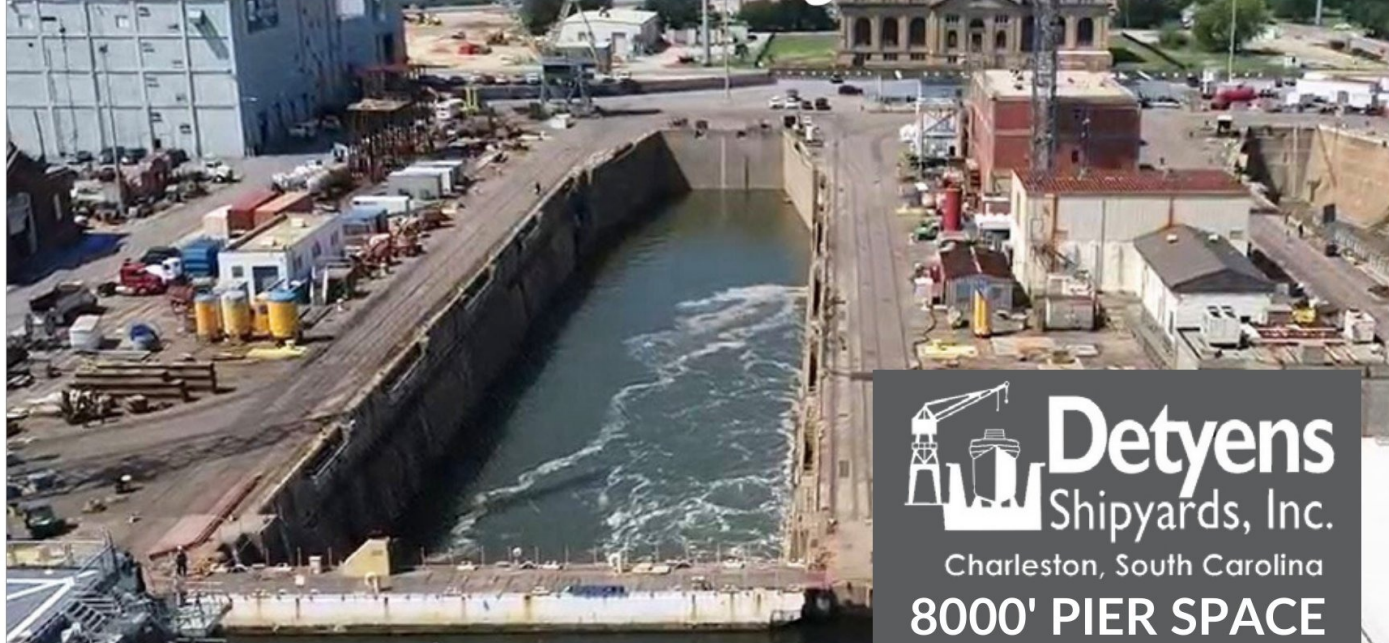
Our first stop was Cleveland, Mississippi, named for the eponymous President and home to Delta State University, the “Fighting Okra.” Located in the Mississippi Delta region, it was a center of cotton and rice production before and after the

Civil War.

Next came Vicksburg, one of the highlights of the cruise and a delight to all the Civil War buffs onboard. We toured by motor coach around the vast battlefield dotted by more than 1,400 monuments and memorials to the men and women who fought and died there. There’s also a wonderful on-site museum, all part of the Vicksburg National Military Park.

Ever been to a cotton plantation? Neither had we, but we got our chance the next day when we docked in Natchez, home to some of the most beautiful mansions you’ll ever see. We crossed the river by bus to Vidalia, Louisiana and visited Frogmore, a restored, highly mechanized 1,800-acre cotton plantation where we toured the fields and visited a working, computerized cotton

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And while I'm on the subject of food, the menus onboard American Symphony were outstanding, featuring many regional dishes. Crawfish hash, catfish po' boy, chicken and sausage gumbo, country fried steak, BBQ ribs, New Orleans Creole pasta, spiced pork belly. A gourmet's delight!

gin. Separating the white "lint" (which is spun into cotton) from the seeds is no easy task, and I finally learned what a "cotton gin" really did.

How about an old-fashioned pig roast? Ever been to one of them? For a foodie like me, it was a definite highlight, and we were not disappointed. Located on Bayou Sara (which was dry due to lack of rain; the year before the boat had been able to pull right up to it) in St. Francisville, Louisiana, we had to travel by bus to reach the Oyster Bar (really a restored fishing shack), where the entire staff was waiting for us. It was easily the best pork I've ever had.

And while I'm on the subject of food, the menus onboard *American Symphony* were outstanding, featuring many regional dishes. Crawfish hash, catfish po' boy, chicken and sausage gumbo, country fried

steak, BBQ ribs, New Orleans Creole pasta, spiced pork belly. A gourmet's delight!

The entertainment in the evening in the River Lounge was equally authentic. Blues band Chris Gill & the Sole Shakers, fiddlers Dwight and Wayne Thibodeaux, jazz trumpeter Wendell Brunious and clarinetist Caroline Fromell, to name a few.

There were other stops along the way, but I'm running out of space here and you get the idea. I do want to mention that at each stop we had an experienced guide on board the bus, who briefed us on the local color and culture of the place we were visiting. Most were retired teachers or local professionals who got a big kick out of spinning yarns and telling tales and just educating us out-of-towners. We soaked it up.

SILENCE OF THE RIVER

But the real joy was just being on the river, sitting in a rocker and watching the river – and the world – go by. And the stillness, the silence, when suddenly a barge tow comes into view, rounding a bend and looking like a mirage, moving ever so slowly toward you, majestic in its size and breadth and lording it over everything else on the river.

You can't hear it yet, but you can see it, coming at you slowly, steadily, relentlessly, timelessly. It's like a freeze-frame, implanted in your memory and your brain. Like the river itself, beautiful, quiet, majestic, enveloping you in its wonder and taking you back to an earlier time.

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LET'S MEET

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BUILDING

A large, modern white cruise ship with multiple decks is sailing on a calm blue sea. In the background, a rugged, rocky island rises from the water under a cloudy sky. The ship's reflection is visible in the water.

Fueled by strong demand, record bookings and higher pricing, the cruise industry soared to new heights in 2024. This year looks even better.

BY **ALLAN E. JORDAN**



THE MOMENTUM HAS BEEN BUILDING SINCE THE INDUSTRY'S RESTART IN 2021. AFTER EXCEEDING 2019'S RECORD 30 MILLION PASSENGERS IN 2023, INDUSTRY TRADE GROUP CRUISE LINES INTERNATIONAL ASSOCIATION (CLIA) FORECAST NEARLY 10 PERCENT GROWTH OR A TOTAL OF 34.7 MILLION PASSENGERS IN 2024.

Analysts now believe the industry exceeded 35 million passengers last year, which led CLIA to increase its forecast to 37.3 million passengers in 2025 on the way to approximately 40 million by 2027.

"The industry has experienced a remarkable uplift," says Dean Van Es, Founder & CEO of Fast Cover Travel Insurance, an Australian-owned and run travel company. "The cruise industry has been going from strength to strength in recent times as many of the sector's lines have successfully pivoted from an older target market to a younger and more adventurous demographic."

SOMETHING FOR EVERYONE

While most analysts believe there continues to be an element of "revenge travel" with people seeking to make up for lost time, most believe cruising is benefitting from consumers prioritizing experiences. The cruise lines have invested heavily in developing their product



ORIENT EXPRESS ACCOR YACHT. PHOTO: MAXIME DANGEAC.

to compete with land-based resorts and theme parks in order to attract more first-time cruisers and different segments of the market.

Family cruising and multi-generational cruising have become a key part of the market that targets the broader demographics.

Royal Caribbean International, for example, introduced the world's largest cruise ship, the 248,663-gross-ton *Icon of the Seas* in January 2024 with eight "neighborhoods" focused on different segments. In July, it followed with another mega cruise ship, the 5,700-passenger *Utopia of the Seas* (236,473 gross tons), entering the three and four-day Caribbean market to provide quick escape vacations from Port Canaveral, Florida.

"While a large portion of potential customers once saw cruises as just an excuse to drink by the pool of a fancy ship, an increasing number of travelers now perceive cruises as a way to engage with immersive cultural experiences," observes Van Es.

The growth has come in all the major segments from

the broad market to niches such as expedition voyages to exotic destinations and river cruising. Many travel advisors report a strong increase in interest in the luxury segment of the market.

"Cruises are no longer just for 'lanyard-clad crowds' wandering buffet decks," says LaDell Carter, Founder of Royal Expressions Travel, a travel consultant that helps travelers craft unique experiences. "Today's ships are re-defining sophistication, catering to affluent, discerning travelers seeking exclusivity and convenience. The cruise industry is sailing into an ultra-luxury renaissance," noting that the experiences are rivaling and surpassing the finest hotels.

The strength of the market has not gone unnoticed by the leading hotel brands.

Ritz-Carlton's first cruise ship, the *Evrina* (25,400 gross tons), entered service in October 2022 while the investment group backing it is building two more ultra-luxury cruise ships for the brand. Another investment group is working with Four Seasons, which will



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RITZ-CARLTON YACHT EVRIMA.

launch the first of two yacht cruise ships in 2025. Meanwhile, France's Accor Group has ordered the world's largest sailing ship, *Orient Express Silenseas* (25,600 gross tons), due to launch in 2026.

HIGHER PRICES & CABIN SCARCITY

The cruise lines built strong momentum in 2024 with travelers finding ships fully booked and no longer offering last-minute escapes at steep discounts. The booking window also elongated with many travelers reserving trips earlier, prompting the cruise lines to release itineraries scheduled for 2026. Many of the major lines have already published schedules at least into the early part of 2027.

At mid-year 2024, Matt Boss, research analyst at J.P. Morgan, noted, "Demand remains robust with not a single historical lead indicator in the business, notably the booking curve and onboard spend, signaling any softening."

"If 2025 looks anything like 2024, that is a good thing," wrote analyst C. Patrick Scholes of Truist

Securities in his mid-January report on the outlook for the industry. Based on conversations with industry executives, he stated, "At a high level, the booking and pricing environment remains strong heading into 2025 with early wave season demand by and large described as 'steady Eddie' to 2024."

Scholes says Truist believes the industry is about 20 percent ahead of where it typically is at the start of the year. Historically, he says, the industry was 60 to 65 percent booked by January for the coming year, but this year he estimates it's closer to 75 percent booked.

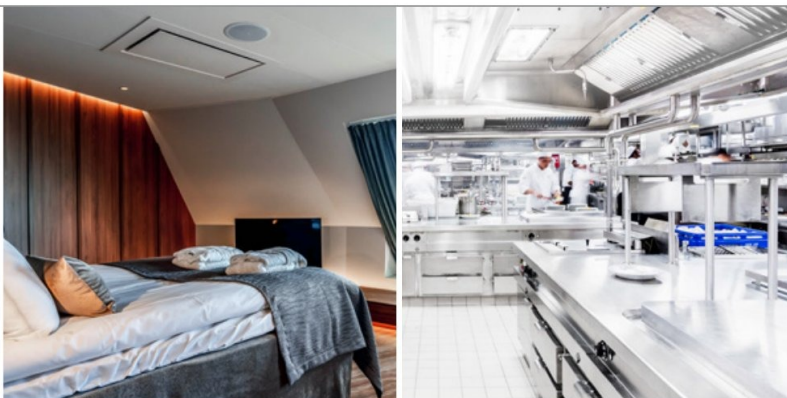
One factor that all the industry analysts note is "cabin scarcity" after the industry retired older ships during the pandemic and delayed replacement orders. Scholes says this has contributed to a sense of urgency and a recognition that the longer travelers wait to book, the higher prices will go.

"Post-pandemic, the cruise industry is now looking at a lower supply growth rate across the industry," adds Robin Farley, senior industry analyst at UBS, in her January 2025 industry outlook report. "We believe it is likely that



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growth will come in even further below historic rates.”

CAPACITY CONSTRAINTS

The capacity constraints, coupled with strong demand, were good news for shipbuilders.

CLIA says member lines introduced eight large ocean-going cruise ships in 2024, adding approximately 26,000 berths to an industry with approximately 600,000 berths. All the ships were orders placed before 2020 and the COVID-19 pandemic. Carnival Corporation, for example, added the first of two large LNG-fueled cruise ships for Princess Cruises and the first newbuild to the Cunard Line brand in 14 years while noting its final pre-pandemic order would be delivered in 2026. Then the brand expects a pause in growth.

The industry is projected to add just four percent to capacity in 2025 – a total of 16 cruise ships – including the first orders placed after the pandemic.

MSC Cruises and Royal Caribbean International will continue the rollout of their mega-ship classes, and in

One factor that all the industry analysts note is “cabin scarcity” after the industry retired older ships during the pandemic and delayed replacement orders. Scholes says this has contributed to a sense of urgency and a recognition that the longer travelers wait to book, the higher prices will go.

December Disney will put the first mega-ship in Asia, *Disney Adventure* (208,000 gross tons), into year-round service from Singapore. Japan’s NYK will also introduce the first newly built cruise ship to the Japanese market in more than 30 years.

Driven by renewed confidence, the industry contracted for 35 new ships in 2024 with orders from Carnival Cruise Line, MSC Cruises, Royal Caribbean International and Viking. Disney placed its largest order which will add four company-owned ships plus a fifth from its Japanese

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Both Carnival Cruise Line and Norwegian Cruise Line will build ships exceeding the 200,000-gross-ton mark and, showing long-term confidence, placed orders due for delivery in the early 2030s.

TECHNOLOGY AND SUSTAINABILITY

"The sector is poised for significant evolution, shaped by technological advancements, a growing emphasis on

sustainability and shifting consumer preferences," highlights Columbia Cruise Services, the cruise management business within the Columbia Shipmanagement Group. Columbia points to the use of technology to create "smart ships" which will offer improved efficiency and personalization through AI, and improved onboard experience with high-speed Internet access via satellite systems.

Seeing an opportunity with the increased focus on sustainability, shipbuilder Concordia Damen is expanding from its traditional base of inland shipping to the river cruise segment.

The builder delivered its first river cruise ship, *Arosa Sena*, in 2022, and recently announced the first of a new generation of hybrid vessels that are more efficient and produce lower emissions for a Swiss luxury river cruise operator. The vessel features lower deadweight to provide a shallower draft, diesel-electric propulsion with smart, peak-shaving battery technology, and the

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AROSA SENA BUILT BY CONCORDIA DAMEN.

integration of solar panels in the railing to charge the batteries.

Concordia Damen says its confidence in the market is demonstrated by its decision to build stock hulls to provide river cruise companies the ability to introduce a new vessel in nine months while also customizing it to their specifications. The company also recently expanded its facilities in the Netherlands so that it has the capacity to construct up to four river cruise vessels annually and conduct vessel refits.

In addition to newbuilds, it sees retrofit opportunities for making vessels more sustainable in areas such as propulsion systems, “recyclable interiors,” heat recovery and energy systems. Another part of the group, Damen Shiprepair, plays a similar role, providing overhaul and refit services for ocean-going cruise ships.

GOOD VIBES

The cruise industry enters 2025 with momentum.

Truist’s Scholes reports continuing to feel “good vibes” after a January meeting with management at the Florida-based companies. He looks for the industry to move forward with the development of its private island destinations to drive growth and financial results. He notes the industry also continues its focus on debt reduction to improve its post-pandemic balance sheets.

“All signs point to another strong year for cruise fundamentals,” reports Brandt Montour, research analyst at Barclays. “We think the cruise recovery is in the 6th or 7th inning and expect another year of share outperformance in 2025.”

MarEx

ALLAN JORDAN is the magazine’s Associate Editor.

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BY PAT ZEITLER

SAFETY MANAGEMENT SYSTEMS

“You can’t manage what you don’t measure.”

Fans of complex management systems tend to live and breathe the analytics of daily operations.

With the help of a strong safety management system (SMS) and properly placed sensors, any inquiring manager can learn what their vessel status is with respect to things like metered engine hours, equipment usage rates, conditions of lubricants and seals, hull conditions, onboard inventory, fire suppression systems and so on.

“You can’t manage what you don’t measure,” the quote often attributed to management wizard Peter Drucker, seems to be the philosophical maxim for fleet management – or at least for safety fleet management.

It’s not a one-model-fits-all situation. SMSs often focus on different aspects of marine operations. On good days, the analytics of operations and finance

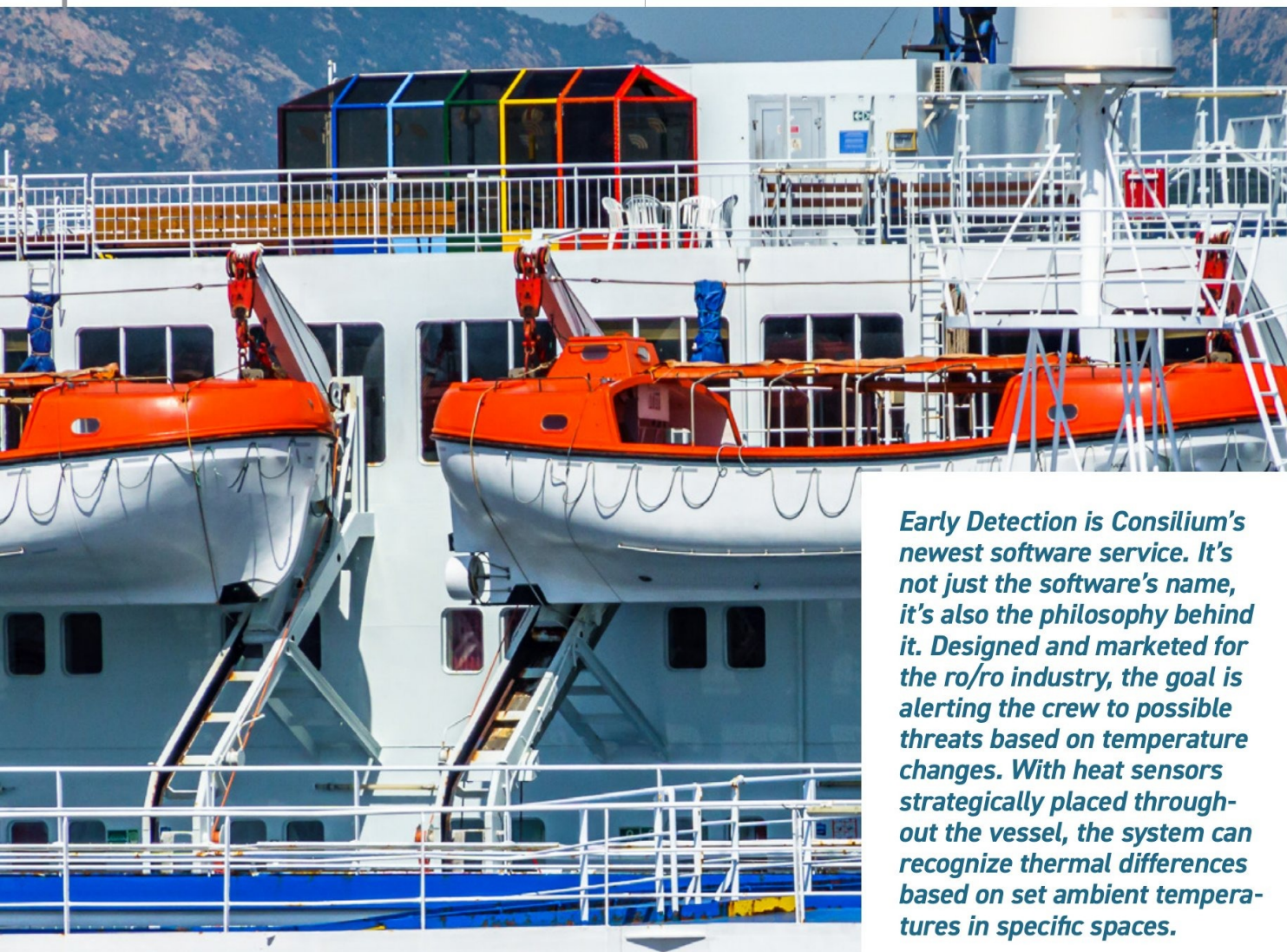


are the topics of discussion. On bad days, the topic becomes a spirited discussion of a serious incident that resulted in personal injury or death. It’s a scenario made even worse when the victims are those who are allowed to be ignorant of the perils of the maritime world – paying passengers on cruise ships.

EARLY DETECTION

Consilium Safety Group’s SMiG system is a next-generation SMS – an integrated alarm system that incorporates fire alarms, gas and vapor detection, sprinklers, lighting, temperature monitoring and general alarms. The recent acquisition of Daspos only enhanced these capabilities.

Martin Steen, Vice President, Americas with Consilium, states, “Two-thirds of all fires on vessels start in the engine room. In most cases, they’re triggered by a failure in the fuel system followed by the contact of oil with a high-temperature surface in the engine room.” In an age of conventional heavy



Early Detection is Consilium's newest software service. It's not just the software's name, it's also the philosophy behind it. Designed and marketed for the ro/ro industry, the goal is alerting the crew to possible threats based on temperature changes. With heat sensors strategically placed throughout the vessel, the system can recognize thermal differences based on set ambient temperatures in specific spaces.

fuels, alternative fuel technologies and electric power vehicles, specialized methods must be employed for each potential threat.

Steen says, "The detection technology developed by Daspos considerably increases early detection of vapors and oil mist from a wide range of fuels."

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This is important because the crew can be alerted and investigate potential hazards prior to a fire occurring. With lithium batteries and EV cargos, uncontrollable fires resulting from thermal runaway is a worst case scenario that must be avoided. Systems like Early Detection may well be the best preemptive defense.

Consilium states that, on average, the crew will receive warning from the system four minutes ahead of a fire igniting. In the case of an engine room fire, this valuable time will enable a fire crew to dress out while the engineering team will secure the fuel, ventilation and electric sources. The preemptive notification will have the fire team well-positioned to enter the space ready to face the worst while in all probability a majority of fires will be contained prior to ignition.

In the case of EV fires, the early alert will give fire teams time to react and eliminate the chance of thermal runaway.

FIRE SUITS

Lalizas Lifesaving has developed the next-generation fire suit. With EV thermal runaway in mind, Lalizas designed, manufactured and equipped vessels with the Antipiros Fireman's Suit.

This suit provides a level of thermal protection, penetration-from-water protection and vapor resistance

A passenger on a voyage should never be expecting the worst, but if it does happen Viking Life-Saving Equipment provides ferry operators with turnkey safety equipment as well as a Shipowner Agreement whereby Viking assumes responsibility for the management of the equipment. From regulatory compliance to scheduled maintenance, the Shipowner Agreement can be customized to accommodate the specific needs of the vessel operator's fleet.

that is fully compliant with upcoming European standards. More than that, it gives fire teams the protection they need if they are to have more than a fighting chance at containing an EV fire. Lalizas is seeing demand increase for these suits, and with good reason. In recent years, car carriers like the *Fremantle Highway* and *Felicity Ace* experienced total loss when the fires could not be contained.

In 2018, Lalizas acquired Houston-based Alexander Ryan, forming the subsidiary company, Lalizas/Alexander. The acquisition strengthened its customer service by providing a base of operations in

the U.S. "As a trusted partner and consultant, we help maritime companies ensure compliance with regulations and minimize downtime," the company states.

The Houston base is certainly doing its part. In the tradition of Alexander Ryan Marine, life rafts are managed and serviced while new products are being introduced. One such product is the Lalizas Embarkation & Pilot Ladder, which has been approved by Bureau Veritas and manufactured on premises out of the Houston location.

LIFEBOATS & LIFESAVING EQUIPMENT

Fassmer Group, headquartered on the banks of the River Weser in Berne, Germany, is a leader in passenger safety.

Since 1850, well before safety management systems were even a thing, Fassmer has been leading the way in critical segments like lifeboats, davits and rescue boats. Integrating digital lifeboat condition-monitoring is where Fassmer is now driving the industry. Ship operators that choose to partner with Fassmer can, as part of their SMS, have lifeboats with digital displays showing



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in real time the condition of every meaningful aspect of the vessel from smoke detection to engine sensors as well as davit and vessel-release hooks.

A passenger on a voyage should never be expecting the worst, but if it does happen Viking Life-Saving Equipment provides ferry operators with turnkey safety equipment as well as a Shipowner Agreement whereby Viking assumes responsibility for the management of the equipment. From regulatory compliance to scheduled maintenance, the Shipowner Agreement can be customized to accommodate the specific needs of the vessel operator's fleet.

Viking began in 1960 with a purpose of producing life rafts for fishermen working in the North Sea. Today, their products and services include marine firefighting, marine evacuation systems, life vests, immersion suits as well as the capability to partner with shipowners in the management of their safety systems.

DATABASE ANALYSIS

Neurocraft Data is a Microsoft Founders Hub, AI-driven company that specializes in innovative solutions for process automation and operational efficiency.

To shipowners, this means it can tap into an expansive Microsoft database that transcends industries for incident reporting and risk analysis. With the help of Microsoft-based AI, shipowners can benefit by identifying trends and prioritizing risks pertinent to each individual operator.

"Neurocraft empowers the maritime industry with intelligent systems that prioritize safety, efficiency, and compliance, enabling operators to navigate the future with confidence and precision," the company states.

Realistic and immersive training is one of the best mechanisms to prepare for underway scenarios and keep the crew safe, compliant and efficient. Neurocraft will work with shipowners to develop customized virtual reality training and simulation programs. Along with the training capabilities, it can help optimize operational capacity by integrating real-time data from ship board monitoring into customizable safety dashboards.

DECK PLATE LEVEL

At the end of the day, artificial intelligence is really just a broker of information as are safety management systems. The real management of passenger safety lies at the deck plate level with a diligent crew that is trained on the proper use of the equipment most suitable for the situation.

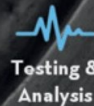
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Commercial diver **PAT ZEITLER** is a frequent contributor.



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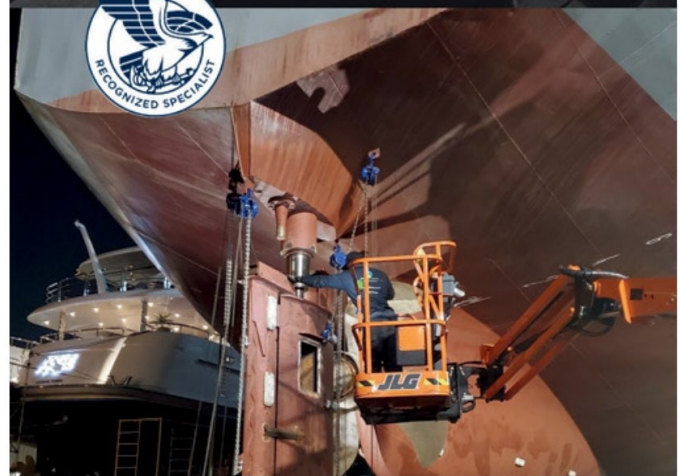
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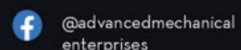
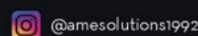
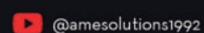
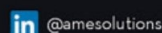


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*The company that basically invented river cruising
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BY TONY MUNOZ



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AMERICAN CRUISE LINES

ACL AT A GLANCE:

Established: 1973

HQ: Guilford, CT

President & CEO: Charles B. Robertson

Vessels: 21

Itineraries: 50+

Employees: 2,500

Affiliated Companies:
Chesapeake Shipbuilding,
Pearl Seas Cruises

AMERICAN RIVERBOAT *AMERICAN SERENADE* ON THE MISSISSIPPI RIVER.

CONSTELLATION CLASS *AMERICAN CONSTELLATION* IN GLACIER BAY, ALASKA.





AMERICAN CRUISE LINES



IT STARTED SMALL, LIKE ALL GREAT VENTURES, WITH A SINGLE SIGHTSEEING BOAT ON THE CONNECTICUT RIVER IN 1970, AND GREW FROM THERE. EVENTUALLY A SHIPYARD WAS ADDED, THEN MORE VESSELS AND MORE ITINERARIES AS THE CONCEPT OF RIVER CRUISING IN THE U.S. BEGAN TO SLOWLY CATCH ON.

The concept was long established in Europe, where riverboats – essentially extended barges – were common sights on the Rhine and Danube and Europe's other great rivers for decades, and Americans were eager customers. It took the vision and determination of one man – Charles A. Robertson, whose three sons now run the company – to make it a reality in the U.S.

Others had tried and failed, and today American Cruise Lines (ACL) is not only America's largest cruise line with 21 ships operating solely in the U.S. and nine more on order, it's also the only 100 percent American-flagged cruise line. It's pioneered itineraries all over the U.S. – from coastal New England in the East to the Columbia and Snake rivers in the West and everything in between. And it's



AMERICAN CRUISE LINES



CRUISING THE COLUMBIA RIVER GORGE.



pioneered and built new vessels to sail them, creating in the process the modern American riverboat.

You've probably seen the company's ads on TV or gotten one of its brochures in the mail. "Small Ship Cruising Done Perfectly®" is its slogan, and it's not far from the truth. "Perfection is a high bar," says President & CEO Charles B. Robertson, "and that's why it's so perfect. It keeps us striving to improve every day."

LEARNING THE HARD WAY

Robertson says the first thing he had to do when he took over the company in early 2020, following his father's death, was "shut it down." Covid was raging, and everything had come to a halt.

"Even my skeptics didn't think I would kill it that fast," he quips. "We had to figure it out on the fly. It was like the early days of the company when everything was new and everyone did whatever needed to be done."

ACL got through 2020 and 2021 and was smart about how it managed bookings and revenue and kept selling tickets. Importantly, the shipyard never shut down – Chesapeake Shipbuilding in Salisbury, Maryland – and that paid off when the company quickly began running again, meeting the boom

in cruising that came after the pandemic lifted.

"We were able to take advantage of the rebound because we kept building," Robertson explains. "But I think more important than that is what it meant to all the people in both companies – Chesapeake and ACL. We kept people working and it was the clearest possible demonstration of commitment to the business. We were building ships, delivering them into layup and just waiting until we had our moment to get started again."

The company has been on a tear ever since, building new ships at the rate of three a year and feeding them into a market that's growing by leaps and bounds.

SHARING AMERICA'S STORY

The name itself, *American* Cruise Lines, the names of the ships, and the company's red, white and blue color scheme are no accident.

"My parents truly believed that their story and the way they founded the company was only possible in America," Robertson says. "We're an incredibly patriotic company. And the more I travel on our ships exploring America, the more patriotic and the more excited I get about it. We have such an extraordinary history, and it's so much fun to explore it and



AMERICAN CRUISE LINES



to share it with people.”

You can follow the path of Lewis & Clark as they traveled down the Snake and Columbia rivers to the Pacific Ocean, or sail the Mississippi in a modern paddlewheeler the way Mark Twain did, or take an autumn foliage cruise up the Hudson River in New York, or get close to a glacier in Alaska – with more than 50 different itineraries to choose from.

The company keeps innovating new destinations and itineraries that celebrate the American experience and history and culture and appeal to its target audience: affluent Baby Boomers. It’s an elevated, all-inclusive experience with spacious staterooms (much larger than on ocean cruise ships), gourmet food, curated excursions and no more than 180 passengers per vessel. There are no pools, no casinos, no pre-paid beverage packages (drinks are free), no overpriced shore tours and no nickel-diming.

The company is distinguished as much by what it is not as by what it is, and it’s not for everyone. “It’s not like where you would go with your family on a big ship,” says Robert-



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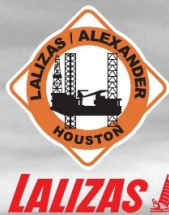
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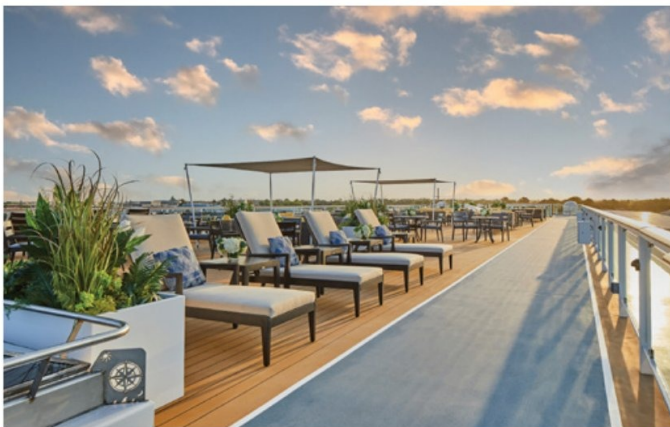
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AMERICAN CRUISE LINES



son. “What the big ships do is add a lot of value to a lot of vacationers’ experiences. It’s just not at all what we’re trying to be.”

PROJECT BLUE

First announced in early 2022 as the pandemic ebbed, Project Blue – a new series of 12 small ships for the U.S. river cruise market – inaugurated the company’s current growth phase and marked the beginning of a new chapter in its history. It was also the largest order of U.S.-built cruise ships in decades.

The new ships – 100-passenger Coastal Cats and 125-pas-

senger Patriot Class vessels – provide the luxury of river cruising with the access and expanded itinerary options of expedition cruising. Their unique design enables the company to continue adding new cruises all over the U.S., particularly on protected waterways along the coasts like in Florida where several new ships have been recently added.

All the Project Blue ships – like the existing fleet – feature state-of-the-art design and environmentally friendly technology that includes using ultra-low sulfur fuel, advanced wastewater management and emission-control systems, and cold ironing (plugging into shore power when docked),



AMERICAN CRUISE LINES



CHESAPEAKE SHIPBUILDING'S CONSTRUCTION YARD IS LOCATED ON 13 ACRES OF LEVEL LAND, WITH MORE THAN 2000 FT. OF DEEPWATER BULKHEAD, ALONG THE PROTECTED WATERS OF MARYLAND'S WICOMICO RIVER.



among many other sustainability initiatives.

"It's all part of our commitment to operating responsibly in the environmentally sensitive areas we visit," says Robertson. "We're doing a lot with Tier IV now, for instance, and it's a challenge, but it's also pretty exciting what the new technology can do."

Two of the Coastal Cats (*American Eagle* and *American Glory*) were introduced in 2023 and two more (*American Liberty* and *American Legend*) in 2024. This year the first two Patriot Class ships will be launched—*American Patriot* and *American Pioneer*.

"The shipyard is really powering our growth," notes Robertson. "We've put a lot into it to ramp up production as much as we have." Investments in technology and manpower have allowed the yard to increase production from one to three ships per year.

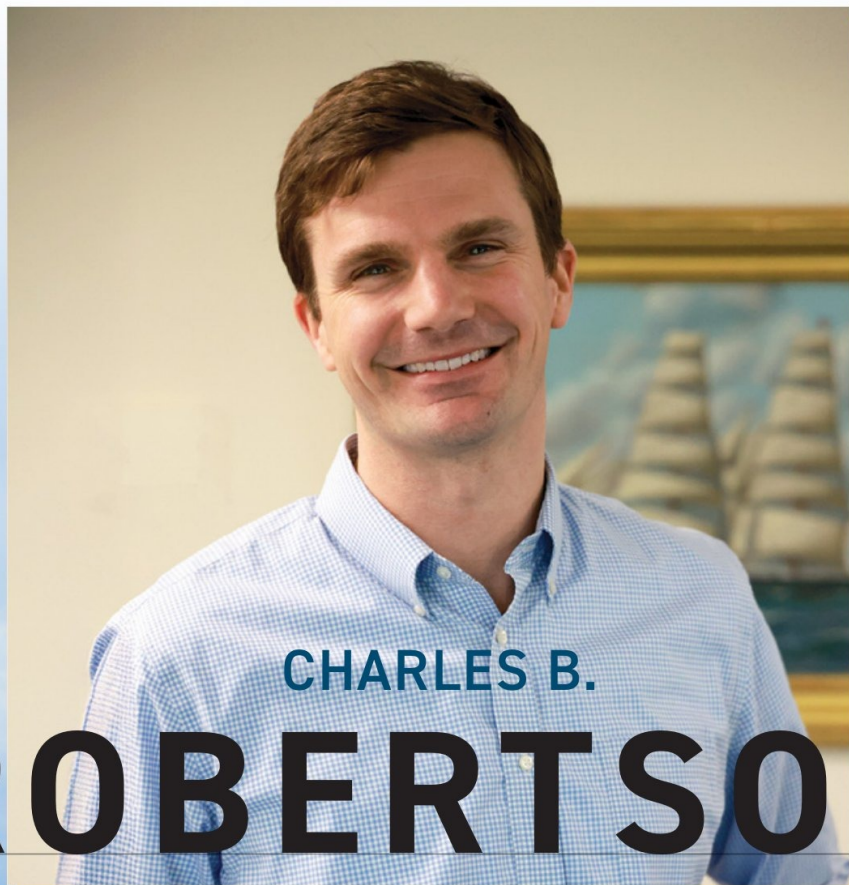
SMALL SHIP CRUISING DONE PERFECTLY

The company has an extraordinary repeat rate among customers, testimony to how much they love the product. The fact that it's family-owned and has a family-like feeling on board is part of the magic. It's a winning formula, all right, and after 50+ years the future has never looked brighter. Happy sailing!

MarEx

TONY MUNOZ is the magazine's Founder, Publisher & Editor-in-Chief.





CHARLES B.
ROBERTSON,

PRESIDENT & CEO, AMERICAN CRUISE LINES

*Unprecedented growth in an all-American
maritime company.*



CHARLES B. ROBERTSON,

PRESIDENT & CEO, AMERICAN CRUISE LINES

“Yes, he really was. He was a pioneer. He was a fighter, and he fought for whatever he believed in. He was sort of fortunate to find maritime and the cruise business back in the Seventies, long before the cruise industry had taken off in any material way. He had been a captain on ferries, so he knew what he was doing around boats, but he didn’t have any business background.”

BY TONY MUNOZ

Welcome, Charlie! Tell us about yourself – how you grew up and prepared to one day run the family business.

It’s been a lifelong preparation, really. I literally grew up with the company, which my parents started before I was born. We were in the dinner and excursion boat business back then on the Connecticut River and they were just getting back into the overnight cruise business.

I grew up on the boats, and it was a unique childhood. I fell in love with the business before I ever knew it was a business or that it had a lot of growth potential. It was just a great thing to do in the summers and on weekends during the school year. I have two brothers and they were the same way. We all kind of found different niches in the company.

Where did you go to school? Did you go to one of the maritime academies?

No, I went the standard college route and have a little bit of Ivy in me, but not so much that I forgot how to work. Like a lot of people in the company, I went to the “School of American Cruise Lines.”

Cool. Tell us about your Dad. He was a legend in the industry and in many ways the founder of river cruising in America. What was his vision in founding the company? How did it all start and work? He was way ahead of his time.

Yes, he really was. He was a pioneer. He was a fighter, and he fought for whatever he believed in. He was sort of

fortunate to find maritime and the cruise business back in the Seventies, long before the cruise industry had taken off in any material way. He had been a captain on ferries, so he knew what he was doing around boats, but he didn’t have any business background.

Give us a brief overview of the company and how it evolved over the last 50+ years.

My parents started American Cruise Lines in 1973, but they were more about shipbuilding until 2000 when the cruise line started taking off. They had one ship in 2000 and a second ship in 2003. They were each only 49 passengers. So we were a really small company when I was in high school and working on the boats. Everybody did everything back then and we just grew organically, slowly expanding into the fleet of ships that we have today.

How many ships do you have now?

We have 21 and nine more under construction.

Do you and your brothers own the company?

We do. We’re a hundred percent family-owned and love it that way. It keeps us very nimble. It keeps us very grounded, and we care unbelievably about the company. It’s pretty unique. We love being private and have a lot of fun with it. I mean, we can really manage the business the way we think is best.

That family feeling extends to the ships and is part of why people love our product so much. Even though it’s now a

CHARLES B. ROBERTSON,

PRESIDENT & CEO, AMERICAN CRUISE LINES

sophisticated environment onboard, it still feels family-like. The way people get to know one another, passengers among themselves and passengers and crew, is very genuine. The whole operation, from the way we run excursions to cocktail hours and onboard entertainment, is designed to be about one another and the experiences we share in extraordinary places.

Wow, very cool! Who came up with the cocktail hour idea?

My parents did. We've had them from the beginning, and that nightly event is so important to the camaraderie onboard. We're absolutely adamant not to have any point-of-sale displays on board. There's no cash registers on board. There's no traditional separation that you would have between the person serving you and the guest. Everything's free. It's all premium drinks and high-end hors d'oeuvres, and everything is face-to-face. It's a very genuine, family-like experience. And that's what we want to create.

Tell us about your employees. How many do you

have and where do they come from? How do you train them?

We have about 2,500 and they come from all 50 states. They're all Americans, and they all go to our facility in Salt Lake City for training. They get a very consistent training program there and are then deployed around the fleet.

People can come in without any real experience, get trained and then get started in deck or housekeeping or food service roles and grow with us. Some of our best managers have been hired on after their initial employment period with us as a server, for instance. They come back and they do great because that's how most of us got started.

I joke that I went to the School of American Cruise Lines, but so many of our executives did the same thing. We started our careers here and grew. So you see this really interesting longevity and progression in people's careers that's rare in many companies.

What about the mariners and deck officers? They went to the academies, correct?

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"I joke that I went to the School of American Cruise Lines, but so many of our executives did the same thing. We started our careers here and grew. So you see this really interesting longevity and progression in people's careers that's rare in many companies."



They come from the academies, the oil patch, and out of the military, but we also make a lot of officers. Take someone young who's never been at sea before. They can get on board as a deckhand with us, build their time in getting a license – we'll put them through a licensing program – then they can apply to be a mate. And that's actually the track I took myself, but later shifted into the office.

Are you a captain?

I am, but I don't sail as a captain. I have the license for it, but I respect the position too much to make myself captain. It takes years of experience at sea to truly be able to handle any situation. As much time as I've spent on board, I don't have that yet. I'm a well-qualified mate and would sail as a mate.

Tell us about the shipyard – Chesapeake Shipbuilding. When did that come along?

It was around 1980, and it's sort of the most fun part of the business. We were, in a way, shipbuilders first. My Dad had worked in shipyards, and when he started his own business he wanted to build his own ships. My parents found the shipyard property that we have now in Salisbury, Maryland. At the time, it was just an abandoned piece of industrial property – abandoned after World War II – but it had the right bulkhead to build on.

It's taken off a lot from there, even in just the last few years. We now have hull fabrication buildings. We have plasma tables, robotic welding equipment, all these different things that really allow us to build ships at the pace we are

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CHARLES B. ROBERTSON,

PRESIDENT & CEO, AMERICAN CRUISE LINES



now. We also have a team of Marine engineers and naval architects on staff who design everything we build.

As the operator, builder, and designer, we have a seamless communication flow between the operational wish list and the construction reality. Understanding both the operation and the construction really helps us see how each ship can be better and how the latest technology can be incorporated into the design.

Each ship is designed specifically for its region in the U.S. with its bridges, its lock systems, its water depths, but also in a regulatory sense. They comply with the latest Coast Guard and EPA requirements in a way that no other passenger vessels in the world really have to. We're very proud to be pioneering this application of technology in some of the most environmentally sensitive areas in the country.

Who's your target demographic? Who are the people you market to?

Our market is older, affluent Americans. Well-traveled people. They're often cruisers who've been around the world.

Now they want to explore their own backyard a little bit, and they want to relax. They want to learn something. They want to move on from the mass luxury that exists around the hospitality space generally to a more intimate, sophisticated atmosphere.

Our product is designed to appeal to that luxury traveler and provide them a venue and an experience they would never expect to find in the U.S. I mean, it's unbelievable to be in a luxury hotel cruising through the Snake River canyons or the Ohio River locks. It's just an extraordinary experience. We're really creating these domestic cruise markets and adding routes that no one's done before.

So, our marketing program is as robust as it is because we're really educating people that you can get a ship into these places and you can have an experience that you thought was only available on European riverboats. It's as much about education as it is about promotion. And it works because we bring people who graduate from other areas of the cruise industry and move into our product.

We have a local expert on every cruise, usually a historian

CHARLES B. ROBERTSON,

PRESIDENT & CEO, AMERICAN CRUISE LINES

of some kind who has a real background in the region we're visiting and gives daily presentations on each destination. We feature local cuisine and local wines and local entertainment. We also offer at least three different shore excursions at each stop. So passengers are immersed in the history and culture of the region.

What's your biggest challenge right now? What keeps you up at night?

What keeps me up at night is all these ships running. We have people at sea and we have machinery running 365 days a year. And that means we always have to stay sharp. We always have to be prudent in our operations and always have to be ready for whatever comes next. Growth is also a challenge, but it's a blast and we just want to keep absorbing all the potential we see in the market.

Awesome. Any final message for our readers?

"Small Ship Cruising Done Perfectly" – that's been our slogan from the beginning and it's a fantastic slogan because

"Our product is designed to appeal to that luxury traveler and provide them a venue and an experience they would never expect to find in the U.S. I mean, it's unbelievable to be in a luxury hotel cruising through the Snake River canyons or the Ohio River locks. It's just an extraordinary experience. We're really creating these domestic cruise markets and adding routes that no one's done before."

perfection is a high bar. You can always be better. It forces you to keep evaluating yourself, keep changing, keep trying to be better. It also speaks directly to our mission to share America's story on the finest American ships.

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It's the transition fuel of choice for getting to net zero.

BY SEAN HOGUE

For four days in London, you couldn't see the nose on your face.

The air was black with smog. A temperature inversion had settled over the city, trapping smoke from the cheap, poor-burning, high-sulfur coal used for heat and power right down to street level. The city ground to a halt as people tried to hide from the noxious gas.

Officials at the time estimated there were 4,000 deaths during those four days with later estimates as high as 12,000. Cases of bronchitis and pneumonia climbed dramatically.

Those four days in December 1952 stand as one of the worst air pollution events in history.

Something had to change.

In response, the U.K. Parliament passed the Clean Air

Act in 1956. This introduced measures to control domestic smoke emissions and encouraged the use of cleaner fuels. One of those fuels would be liquefied natural gas.

And it came from an unlikely place.

FROM FLARING TO SHARING

In the early days of offshore drilling, flaring off natural gas was common practice.

Platforms as far as the eye could see would be lit by massive balls of flame, like stubby candles on the horizon. There was no technology to capture the gas, and no pipeline infrastructure to transport it. So it was burned like the byproduct it was.

The problem was that gas is highly flammable and hard to store – at least until 1915, when Godfrey Cabot patented a method of converting gas into a liquid by cooling it to approximately -260°F (-162°C). This reduced





the overall volume by 600 times and enabled the storage and transportation of large volumes of the liquefied gas safely.

By the time the U.K.'s Clean Air Act was passed, the storage technology had advanced far enough to create the perfect commercial conditions. In 1959, the first successful shipment of LNG was delivered from Calcasieu, Louisiana to Canvey Island, U.K. onboard the world's first oceangoing LNG tanker – the *Methane Pioneer*.

A new industry was born.

LEADING THE WAY IN THE USA

The modern-day LNG business is booming.

By driving a 62 percent reduction in GHG emissions compared to traditional marine fuels, it plays a vital role in the energy transition and net-zero initiatives. Strengthening infrastructure and innovative solutions

make it an ideal fuel for short-run industries such as cruise ships or the cargo liner trades.

Florida-based TOTE Services is leading the way in America as the first domestic carrier to build and operate an entirely LNG-powered fleet of Jones Act vessels, servicing Puerto Rico from JAX LNG in Jacksonville, Florida and Alaska from Puget LNG in Tacoma, Washington.

This required significant investment in both vessels and port infrastructure, which also includes the Port of Alaska (Anchorage). TOTE's ORCA class ro-ro container vessels *Midnight Sun* and *North Star* were converted to full LNG power in 2022 and 2023, respectively, while still in service – a feat made possible thanks to TOTE's considerable experience in newbuild management.

TOTE also operates a fleet of LNG bunker barges in North America for Seaside LNG. Seaside LNG in turn owns the largest LNG bunkering fleet in the U.S.

Noting that we've come a long way on our journey to address the problem for all engine technologies, Mitrou says we should not overlook the technology that is readily available. Today, most vessels using LNG as maritime fuel are fitted with high-pressure, two-stroke engines, which are essentially methane-slip proof.



Supporting Seaside LNG – the only platform with integrated shoreside liquefaction, LNG storage and Jones Act-compliant bunkering capabilities in North America – TOTE operates the barges *Clean Everglades* and *Clean Jacksonville* (America's first LNG barge and the first barge in the world to utilize membrane storage tank technology). Operating in both Florida and Texas, these can deliver over 500 cubic meters of gas per hour, crucial for the growing LNG-powered cruise ship fleet.

With the LNG market expanding quickly, the company is in a great position with resources in place to meet the growing demand.

THE SLIPPAGE CHALLENGE

One of LNG's big challenges is that of methane slip.

This occurs when unburned methane is released into the atmosphere, resulting in GHG emissions 28 times more potent than CO₂ over a 100-year period. Eliminating slippage thus becomes crucial when considering LNG as an alternative fuel.

Panos Mitrou, Global Gas Segment Director at Lloyd's Register (LR), is championing the problem as chair of the Methane Abatement in Maritime Innovation Initiative (MAMII). Through initiatives such as MAMII, LR is "actively engaging and working with partners to identify well-researched solutions" in the abatement technologies space.

Noting that we've come a long way on our journey to address the problem for all engine technologies, Mitrou says we should not overlook the technology that is readily available. Today, most vessels using LNG as maritime fuel are fitted with high-pressure, two-stroke engines, which are essentially methane-slip proof.

These diesel cycle, slow-speed engines allow for improved combustion and complete sealing of valves. Paired with shaft generators for electrical loads, such as the LR-classed LNG carrier *John A. Angelicoussis*, and you have the optimum methane slip-proof combination that allows power generation at a slip factor of only 0.2 percent.

Other, more advanced abatement technologies are also being studied. These include the use of fuel catalysts, hydrogen injection, innovative combustion chamber designs and plasma reactors that convert LNG into far less potent emissions.

LR is also developing a complete portfolio of solutions to guide maritime's decarbonization journey, from LNG to ammonia, hydrogen and even nuclear. "We're ready to work with you to assess and derisk *any* option," says Mitrou.

ADVANCING THE INFRASTRUCTURE

One of the biggest challenges to fuel adoption in this global industry is availability.

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Burning cleaner than diesel, it's already a recognized solution with over 590 vessels in operation that are delivering significant carbon reduction right now. An additional 564 vessels are on order, which will nearly double the number of LNG-powered vessels in operation by 2028, and the availability of LNG as a marine fuel has never been better.

engaged in projects to develop infrastructure to support the dual-fuel methanol vessels already sailing and the ammonia-powered vessels yet to come. Combine this with a dedicated, educated and specialized “new fuels” team that covers all time zones, and Glander is ready to assist and support clients in their fuel-transition efforts.

With the myriad of new regulations such as EU ETS, CII and more to come, wading through the paperwork can slow any operation to a crawl. Glander helps by providing

Where do you fill the tanks? Glander International Bunkering aims to answer this challenge. With a dedicated new fuels team, it's committed to the journey of decarbonizing the shipping industry. Located in key maritime hubs like Dubai, Mumbai, Oslo and Singapore, the company can support a broad range of marine fuels and lubricants including alternative fuels like LNG and biofuels.

The strength comes from its network with biofuel supply alone to be found at 120 locations worldwide. It's also

targeted compliance plans for fleets, ensuring adherence to regulations in ports and areas on every voyage.

“Our team is available to share market knowledge and guide companies on reducing emissions,” says Frederik Moser, Head of New Fuels.

RECOGNIZED SOLUTION

LNG plays a vital role in the journey towards decarbonization.

Burning cleaner than diesel, it's already a recognized solution with over 590 vessels in operation that are delivering significant carbon reduction *right now*. An additional 564 vessels are on order, which will nearly double the number of LNG-powered vessels in operation by 2028, and the availability of LNG as a marine fuel has never been better.

New initiatives in technology development continue to make this a continually cleaner option. From plasma generation and even bio-LNG made from organic waste and burning up to 80 percent cleaner than traditional LNG, the options continue to get cleaner, more accessible and easier to use.

While not a full net-zero fuel, LNG serves as an important bridge that will carry the maritime industry steadily toward net zero marine operations.

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Master mariner **SEAN HOGUE** is a regular contributor.





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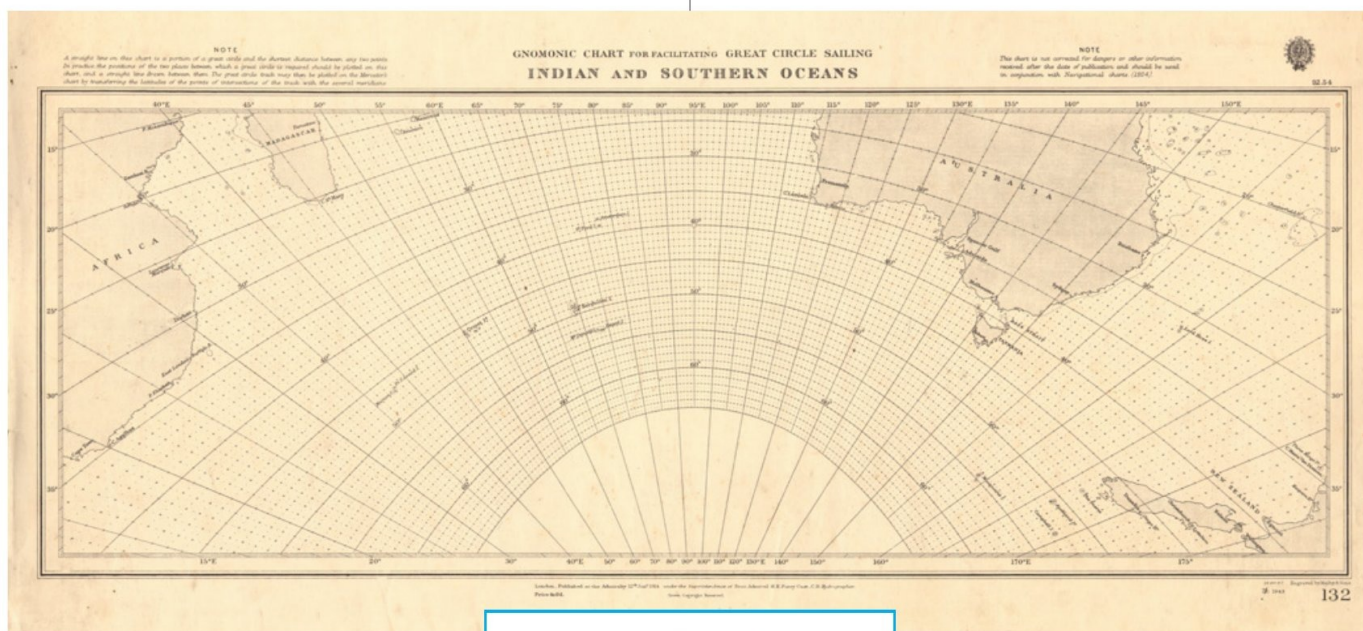
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**GREEN
MARINE**

THE NEW “GREAT CIRCLE”

*Voyage optimization is the new equivalent
of the Great Circle route.*



BY CHAD FUHRMANN

The ultimate goal of navigation has always been to arrive at a predetermined destination in the shortest time possible.

For centuries, that objective has meant utilizing the Great Circle route. At the risk of offending any flat-earthers among you, this generally means that the shortest distance between two points on a sphere (our planet, in this instance) is not always a straight line.

Over time, as the maritime industry transitioned from sail to steam and beyond, fuel efficiency became a critical element in managing operating costs. Of course, as the seas became ever more crowded with vessels that not only served as cargo carriers but also passenger vessels, safety and comfort also increased in consideration.

As a result of these and other changes, the modern definition of navigation still holds timeliness in high regard but has expanded to include the globally integrated transportation system and its mission of ending up where you want to be while avoiding collisions and minimizing fuel consumption.

Enter “voyage optimization, a dynamic approach to navigation that modernizes the Great Circle route and not only minimizes distance but also takes a more comprehensive approach by factoring in real-world variables.

Progressive routing systems adapt to storms, currents and wind conditions, ensuring smoother and safer journeys. Enhanced routes and speeds (faster or slower) lower fuel consumption, thereby improving efficiency and supporting global decarbonization efforts. Advanced sensors and AI algorithms detect and respond to hazards in real time, adapting to vessel traffic, wildlife migration patterns and even political turmoil in volatile regions.

UNDER THE RADAR

Voyage optimization has experienced a slow evolution alongside centuries of innovation – so much so that its growth and development have largely occurred under the radar (pun intended). But make no mistake: Efforts to improve the safety and efficiency of navigation have been continuous throughout history and are nothing new.

In recent decades, pioneering companies have been able to leverage new technology to make significant advances.

“Our expertise in voyage optimization goes back to the 1990s,” explains Petter Andersen, Senior Vice President of Shipping Digital at StormGeo, a Norwegian company providing advanced decision support based on real-time weather forecasting. With over 1.3 million voyages optimized in total, StormGeo has established itself as a global leader in the field. Andersen notes that “optimization” is comprised of services spanning the voyage timeline, adding, “StormGeo supports shipping companies top to bottom from pre-voyage planning to real-time optimization to post-voyage analysis using weather routing, vessel performance optimization, bunker management, emissions reporting and more.”

Likewise, industry giants better known in other fields are emerging as strong proponents of voyage optimization and bring decades of expertise to the space.

Avikus, founded in 2021 as a wholly owned subsidi-

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and even political turmoil in
volatile regions.**

ary of shipbuilding giant Hyundai, leverages the knowhow of its parent company by pioneering new technologies that are reshaping maritime navigation. “Voyage optimization is a critical value proposition,” explains Jungwoo Seo, Avikus’ Chief Strategy Officer. “As an autonomous navigation solutions provider, we integrate AI-driven decision-making with real-time sensor data, transforming maritime operations into safer and more efficient endeavors.”

Any discussion of voyage optimization and the technology it incorporates inevitably turns to autonomous ships and operations. Both StormGeo and Avikus are investing heavily in AI and machine learning to enhance navigation and situational awareness, including IoT-driven fleet management platforms, to improve vessel speed-down estimations and weather forecasts.

Avikus employs digital twins for predictive maintenance and operational analytics, supported by Hyundai’s R&D resources. The company is also focusing on autonomous navigation solutions with its flagship product, Hyundai Intelligent Navigation Assistant System (HiNAS) Control, which seamlessly integrates these factors and executes optimized routes that reduce fuel consumption, emissions and crew workload while enhancing safety.

According to Seo, “Our AI-powered systems dynamically adapt to real-time conditions, enabling vessels to achieve optimal performance in safety and efficiency.”

While the company is expanding HiNAS as a standard feature in Hyundai newbuilds, retrofit opportunities are a strategic priority and already underway in the company’s Korean manufacturing facilities and in repair yards in Europe, Greece and Singapore. These markets represent a significant share of the maritime industry and align with Avikus’ goals for broad adoption of voyage optimization and autonomous technology.

Similarly, StormGeo’s cloud-based solutions enable real-time data integration and scalability. This allows vessels to leverage AI technology to automatically identify the best routes while maintaining a human-in-the-loop approach to account for vessel-specific needs

and cargo requirements. “Voyage optimization helps vessels navigate efficiently by considering weather conditions and avoiding adverse weather, thereby saving on fuel and emissions while improving overall efficiency,” Andersen says.

COLLABORATION

For any manufacturer or provider to stand as a holistic supplier of voyage optimization services, it must of necessity partner with other manufacturers, vessel operators, regulators and government agencies. Success can only come with a certain level of cooperation among stakeholders and, of course, a level of agreed-upon standardization across regions and industry sectors.

Collaboration with OEMs allows providers like StormGeo and Avikus to improve their services and ensure near-seamless integration and adaptability across platforms that may vary in data type and delivery. Moreover, feedback from on-site application is critical. StormGeo relies on daily customer engagement to refine its solutions. “We allow shipowners to share validated CO₂ emissions data with charterers, reducing the need for multiple systems,” Andersen states.

Perhaps most important of all, collaboration allows for in-depth discussions and dialogue among the varied stakeholders – regulators, vessel operators, charterers – who recognize the benefit of voyage optimization and are pushing for its widespread adoption.

DNV straddles the maritime industry as a consultancy

Any discussion of voyage optimization and the technology it incorporates inevitably turns to autonomous ships and operations. Both StormGeo and Avikus are investing heavily in AI and machine learning to enhance navigation and situational awareness, including IoT-driven fleet management platforms, to improve vessel speed-down estimations and weather forecasts.

and classification society and offers a unique perspective on emerging tech like voyage optimization, including the varied forces behind it.

Jarle Coll Blomhoff, DNV’s Head of Digital Ship Systems, points to initiatives like the IMO’s regulatory framework and the E.U.’s evolving fuel policies: “These regulatory efforts are

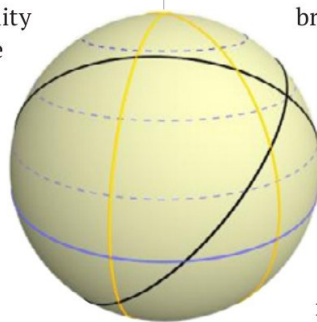
prompting shipowners to adopt sustainable practices and ‘encourage’ operators to optimize emissions and adopt greener technologies.”

More directly, Blomhoff notes that fuel costs represent a significant operational expense. The simplest of optimizing efforts can save up to 10 percent on fuel consumption, delivering both financial and environmental benefits. A less obvious but equally important

benefit comes in the form of marketing and branding paybacks, particularly for non-cargo vessels like cruise ships. Environmental consciousness is increasingly a key marketing factor. Although passengers may not directly pay a premium for sustainability, the ability to brand a cruise line as environmentally responsible provides indirect value.

Above all, Blomhoff states, “Charter requirements are a bigger driver than regulatory schemes” as they increasingly demand energy-efficient operations. As a result, vessel owners and operators proudly emphasize the efficiency of their vessels to gain a competitive edge in securing contracts.

Collaboration with leading organizations like DNV has enabled Avikus and others to achieve groundbreaking milestones, including the world’s first autonomous navigation type approval. DNV has likewise partnered with entities such as DeepSea, Kongsberg and Ocean Infinity in verifying solutions that can adjust speed and routing autonomously, saving significant fuel while maintaining arrival schedules.



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The evolution of voyage optimization reflects a journey from manual navigation to early weather routing and now to dynamic, data-driven optimization. With all of this emphasis on AI, algorithms and innovation, it may be easy to dismiss the actual human navigator. However, as the maritime industry progresses toward fleet-wide synchronization and increasingly autonomous operations, the human element becomes ever more nuanced but never irrelevant.

While automation can handle repetitive, precision-driven tasks, the brilliance of human adaptability

While automation can handle repetitive, precision-driven tasks, the brilliance of human adaptability remains critical in responding to unexpected challenges. This human-machine collaboration, supported by robust cybersecurity measures and efforts at standardization, ensures that technological advances are not only functional but safe.

ity remains critical in responding to unexpected challenges.

This human-machine collaboration, supported by robust cybersecurity measures and efforts at standardization, ensures that technological advances are not only functional but safe.

Ultimately, the synergy of people, process and technology, guided by good ol' fashioned seamanship, redefines what it means to navigate the seas – heralding a new era where optimization, rather than mere efficiency, is a new, redefined Great Circle.

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Maritime consultant **CHAD FUHRMANN** is the founder of Revolution Consulting X Engineering.



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BY SEAN M. HOLT

FINDING ZERO

The emissions reduction circus continues.

The global maritime industry is racing to cut emissions with solutions ranging from cutting-edge tech to, well... sails. Yes, we've come full circle.

The same technology that powered pirates is now hailed as the future of sustainable shipping. What a time to be alive!

While we await warp drives and fusion reactors, the industry juggles alternative fuels – methanol, ammonia, hydrogen – plus hybrid propulsion, carbon capture and electrification. Regulations tighten the noose: IMO 2023 introduced energy efficiency rules; the EU ETS expanded to maritime in 2024, tripling compliance costs by 2030, and FuelEU Maritime kicked in this year with strict emissions targets.

The IMO's 2023 GHG Strategy aims for net-zero by 2050 with milestones along the way: 20 percent reduction by 2030 and 70 percent by 2040. Mid-term measures are due by 2027, following key meetings this year.

The race is on – powered by wind, data and just a dash of regulatory panic.

“GO GREEN, SAVE SOME GREEN”

The Liberian Registry (LISCR), the world's largest ship registry by gross tonnage, is deeply embedded in the maritime industry's efforts to meet decarbonization targets. Thomas Klenum, Executive Vice President of Innovation & Regulatory Affairs, sheds light on how the registry adapts to the decarbonization challenge.

“Our goal is to accelerate the transition to net-zero by 2050, embrace innovation and apply new IMO regulatory frameworks,” he says, referencing the launch of LISCR's Innovation and Energy Transition Team in 2024. The

team collaborates directly with shipowners, shipyards and design firms, ensuring sustainability is embedded from the design phase onward.

A key part of LISCR's strategy is its incentive programs.

“We offer discounts on registration fees for ships enrolled in green programs,” Klenum states. The registry actively enhances these schemes to align with the evolving regulatory landscape, including EEXI and CII requirements. The message is clear: “Go green, save some green.”

While alternative fuels dominate the discourse, Klenum quickly points out that efficiency gains are just as critical. “Wind-assisted propulsion systems are showing promising results,” he notes, with LISCR soon to release an entire year's worth of data from Liberian-flagged vessels employing these systems.

Hull optimization also remains a priority. “With zero or near-zero emission fuels expected to be expensive and limited, efficiency becomes a survival strategy,” Klenum emphasizes. Optimizing hull forms can significantly reduce both fuel consumption and operational costs.

When it comes to onboard carbon capture, LISCR is pushing the boundaries. “We've submitted proposals to the IMO to recognize carbon capture as a legitimate decarbonization technology,” Klenum reveals, stressing the need for regulatory frameworks to catch up so shipowners can receive proper credit for captured emissions.

The revised 2023 IMO GHG Strategy adds another layer of complexity by expanding from tank-to-wake to well-to-wake emissions. “Depending on how the fuel is produced and transported, you could even bunker fuel with a negative CO₂ impact,” Klenum says, noting the potential for new net-zero pathways.

LISCR is also exploring emerging technologies. “We're conducting trials with artificial intelligence and autonomous shipping (with Avikus),” Klenum states. These technologies offer efficiency gains in route optimization, machinery operations and even collision avoidance, contributing to both decarbonization and navigational safety.

Klenum provides a candid assessment of nuclear power: “We've been involved in nuclear power plants for fixed locations, which is simpler due to localized regulatory

frameworks. However, trading with nuclear-powered vessels globally faces complex challenges. The IMO's nuclear ship code is outdated, though discussions are underway to update it."

Despite the hurdles, he sees potential: "In the long term, nuclear could play an important role. A nuclear-powered vessel (which may not need refueling over its lifecycle) might offer a more stable, low-emissions solution compared to the cumulative risks of handling toxic alternative fuels like ammonia over 25 years."

He also voices concerns over regional emissions regulations: "We're not in favor of fragmented regional requirements for international shipping. Global regulations should come from the IMO to maintain consistency and fairness."

Regarding the timeline for the IMO's mid-term measures, Klenum was cautiously optimistic: "It could be achieved, but it requires global collaboration, technological innovation and scaling up near-zero carbon fuel availability." The roadmap includes the MEPC 83 meeting in April with critical decisions expected on fuel intensity standards and carbon pricing mechanisms. "We're up against a tight deadline," he admits, with implementation slated for early 2027.

Klenum concludes that decarbonizing shipping isn't about a single solution: "The biggest challenge is balancing innovation, new technologies and alternative fuels. It's not as simple as discovering a zero-emission fuel."

FUTURE FUELS FOG

In maritime decarbonization, Finland-based Auramarine is the go-to specialist for fuel supply systems across methanol, ammonia and biofuels. But beyond the polished technical specs, there's a landscape riddled with practical challenges that even the most sophisticated systems can't mask.

Methanol is often pitched as a "drop-in" fuel, but as Auramarine's responses make clear, it's more of a "rip out and rebuild" situation. Its systems demand dedicated safety automation, leak detection

and specialized handling – hardly the seamless transition some in the industry like to suggest.

Auramarine CEO John Bergman says, "Quality is key as shipping navigates a multifuel future." Translation: Swapping fuels is easy; making it work safely isn't. Plus, methanol comes with a hidden caveat: Its lower energy density means vessels need up to twice the volume compared to traditional fuels to achieve the same range – a detail often missing from the marketing brochures.

Ammonia offers zero-carbon potential, but toxicity levels make LNG look like a scented candle. Auramarine's



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Ammonia Release Mitigation System (ARMS) sounds impressive on paper, focusing on gas capture, leak prevention and zero emissions to both air and water. Yet, behind the jargon, it boils down to one thing: mitigating risks that could make a minor leak catastrophic.

Risk thresholds for ammonia exposure are measured in parts per million (ppm), leaving no margin for error in operational settings. Bergman acknowledges this tightrope act, noting, “In navigating the energy transition’s unknowns, experience and collaboration matter.” Experience, yes—but even experience doesn’t entirely solve ammonia’s operational headaches.

Any volunteers for the first engine room crew? Ya, me neither.

When it comes to *biofuels*, Auramarine shifts from pioneering to pragmatic. Its Porla Fuel Measurement System is designed to ensure fuel stability, but the broader issue remains: Biofuels may work technically, but scaling them sustainably is another matter entirely. While biofuels can claim up to an 80 percent reduction in lifecycle CO₂ emissions, feedstock availability is the elephant in the engine room. Without sustainable sourcing at scale, the emissions savings look good on paper but falter in practice.

Regulatory pressure is accelerating these transitions, particularly from the IMO 2023 GHG Strategy and the EU Emissions Trading System (ETS). But even as regulations tighten, the real issue isn’t whether Auramarine can build systems for these fuels – it seems they can. The question is whether the fuels themselves are ready for prime time.

Bergman’s closing sentiment, “If we want a healthy planet for our children, we need to start now,” feels right. But the industry still seems to be debating where “now” even begins.

EMISSIONS DATA SMOG

While fuel suppliers tackle decarbonization from the engine room, Houston-based Cyanergy works from the data deck. Its focus? Continuous emissions monitoring systems (CEMS) that promise not just compliance but clarity.

In an industry where emissions reporting often relies on manual fuel logs and conversion formulas (like the EPA’s “1 gallon of diesel = 22.8 lbs. of CO₂”), Cyanergy’s

approach is refreshingly direct: Measure what you emit, not what you estimate.

“Estimates leave room for inaccuracies, which can result in misleading reports, unattainable targets and even regulatory fees,” says CTO Mohammed Khambaty. Enter continuous monitoring, where real-time data reduces anomalies, identifies inefficiencies and minimizes carbon accounting errors. Translation: less guesswork, fewer surprises.

Cyanergy estimates that over 90 percent of ships still rely on manual emission calculations, exposing operators to the risks of inaccurate reporting and potential penalties. Its IoT-enabled system, utilizing LoRaWAN (a low-power, wide-area networking protocol), integrates seamlessly with onboard sensors, including physically installed CO₂ sensors in the engine and exhausts.

“Direct measurements have shown a three percent discrepancy compared to EPA/MARPOL formulas,” Khambaty notes, “translating to significant cost savings for large vessels.”

Steve Manz, CFO of Cyanergy, emphasizes the financial impact: “The carbon market is around \$70–75 per metric ton for CO₂. A big ship emits about 250 tons of CO₂ per day at sea. Those are big numbers. The financial risk is huge if you’re underestimating – or worse, overpaying.”

Cyanergy claims its technology can save large vessels around \$150,000 annually. Based on Shelf Drilling data, they’ve reported four to seven percent fuel savings with an ROI projected within one year. Manz adds, “These savings don’t even factor in reductions in administrative and labor costs tied to compliance.”

Looking ahead, Cyanergy is exploring blockchain for immutable, transparent carbon credit tracking and machine-learning to enhance predictive capabilities. It anticipates a standardized emissions monitoring scheme within five to six years.

FINDING ZERO

And so the maritime industry sails on, powered by wind, data and a fair amount of regulatory paperwork. What a time to be alive!

MarEx

SEAN HOLT writes from Singapore.



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BIO-UV CUTAWAY OF TREATMENT SYSTEM.

COMPLIANCE ASSURANCE

Shipowners want reliability when it comes to ballast water treatment systems. Failures can be costly.

BY PAUL BENECKI

Compliance is a top priority for shipowners, and that includes the handling of effluent and emissions.

Merchant ships have at least five major waste streams – exhaust, bilge water, solid waste, ballast water and sewage – each with stringent limits. Of these, ballast water requires treatment for almost every deepsea shipping application, and treatment failures mean costly delays in cargo operations.

Day-in, day-out reliability requires a working ballast water treatment system (BWTS) and long-term support from the OEM. For a busy merchant ship, that service relationship may make the difference between on-hire and off-hire.

LONG-TERM SUPPORT

Alfa Laval, the market leader in ballast water management, was among the first companies to begin developing a system for BWB Convention compliance. When the convention finally entered into force in 2017, it installed thousands of systems for shipping companies around the world.

Now that the big surge of retrofits is over, it's extended its lead as many other suppliers have pulled back or disappeared altogether. This long-expected market consolidation is making it harder for many owners to keep legacy systems in proper operation: Parts and knowledgeable service techs are tough to find at some of the OEMs that have disinvested from the sector.

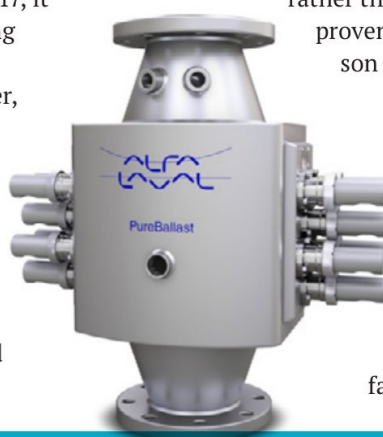
At the same time as support is declining, port state-control inspectors are stepping up scrutiny of BWTS compliance. This is a challenging combination of trends as an unfixable BWTS is a costly liability if it halts a vessel's cargo operations.

Given the difficulty of maintaining unsupported equipment, some owners are deciding to replace their BWTS outright. Many are turning to Alfa Laval. The company has already replaced more than 250 systems from 30 different manufacturers with its PureBallast 3 system and expects that more owners will be coming.

"We see an increasing number of them making the tough decision to replace the system on board with a more reliable one," a company spokesperson said.

A big part of the reason, according to Alfa Laval, is stability and support. The company is the biggest BWTS supplier and one of the largest marine systems OEMs with service locations around the world and an ongoing compliance service package for peace of mind. "We believe it's key to have a close relationship with the BWMS supplier and go the recommended preventive maintenance way rather than the troubleshooting way, which has proven to be a lot more costly," the spokesperson said.

Alfa Laval continues to invest in R&D for ballast water treatment and has distilled customer feedback into a newly-revised model of its BWTS released in 2024. The system has proven itself effective in all water conditions, Alfa Laval says, even in challenging turbidity. It's also energy-efficient compared to other UV systems – a key factor for merchant ships as ballasting and



deballasting occur during periods of peak power demand.

BALLAST WATER BACKUP

What happens if your ballast water treatment system does break down during in-port cargo operations? Do you have to stop loading in order to wait for spare parts and repairs?

Missouri-based SciencoFast has a solution that makes it easy for ships to carry on with their work even if the onboard BWTS can't keep up. This could save thousands of dollars a day in downtime costs for a busy merchant vessel.

SciencoFast has recently come up with a containerized version of its InTank ballast water treatment system, which chlorinates and treats water inside the ship's tanks. The original InTank is permanently mounted and treats ballast while under way, without any filtration. The containerized version keeps the same basic concept but is designed for temporary use while in port. Installation is as simple as hoisting the container on deck and running a circulation line into each tank, says Rudy Mes, SciencoFast's Senior Vice President of Operations.

The best news is that the containerized system is automated and self-monitoring. It takes care of everything – dosing, measuring and neutralization. After enough time has passed for treatment and discharge, it produces a certificate of technical compliance that the crew can show to the authorities to demonstrate proper operation. None of these steps requires any specialized knowledge or additional effort on the part of the crew.

"It shows which tanks are treated, what level of the chemical was injected, how long that was in that tank, when it was neutralized, and what the remaining total residual oxidant (TRO) was after neutralizing," says Mes. "So that's basically a guarantee for the vessel owner that the system has worked and that the water is fully treated and safe to pump overboard."

The system is designed to be light, compact and usable anywhere, on any vessel up to 50,000 dwt (or larger, with multiple units). The treatment chemical is simply industrial bleach, a standard product available in any port. And its electrical load is exceptionally low, saving power during port calls when the vessel's generators are working hardest.

SciencoFast's ultimate hope is to mount the containerized treatment system on a tank barge and provide ballast water treatment as a service. The barge would pull alongside the ship; the ship would deballast into the barge's tanks, and the barge-mounted treatment system would sanitize the water. There would be no waiting at all. The ship would deballast into the barge at full speed, and the water would be treated later.

For minimal fuel consumption and emissions, the treatment could even be done when the barge gets back to the pier and plugs into shore power.



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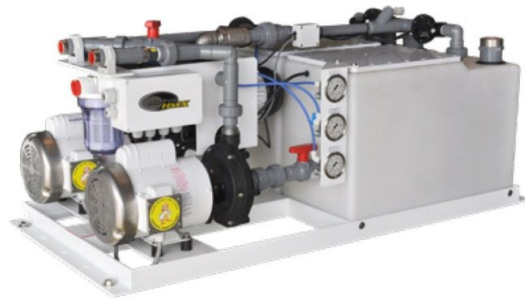
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DIVERSIFIED UV TREATMENT

French water system manufacturer BIO-UV has been making UV treatment systems for water disinfection for 25 years.

It started with shoreside treatment applications, then branched out into solutions for BWM Convention compliance, adapting proven technology to a marine operating environment. It's well known in the yacht, workboat and specialty-vessel markets for its compact UV-based treatment units (including the smallest BWTS commercially available).

BIO-UV is quite active in the American workboat and naval markets. Last year it delivered six of its BWTS units to a leading American offshore vessel company, and it has a new system for the U.S. Navy in the operational test phase.

Combining its experience in ballast water treatment and shoreside water systems, BIO-UV recently branched out with a purpose-built pool and spa water disinfecting system for cruise ships. For BIO-UV, it's also a return to familiar ground: The company's very first product was a UV disinfection system for swimming pools, and its systems equip more than 6,000 public pools around the world.

Based on the same technology as BIO-UV's BWTS, the new device uses UV to kill at least 99.99 percent of all microorganisms in the water from a cruise ship's pools, hot tubs and spas, a rate far higher than chlorination can achieve. It's certified to treat cryptosporidium, a microscopic parasite that can cause outbreaks of gastrointestinal illness on cruise ships.

With a UV system installed, the cruise ship's recreational water supplies can run with 75 percent less chlorine, reducing the unwanted byproducts of chlorination. When chlorine reacts with biological matter in the water, it forms chloroform and chloramines, common and irritating pool water contaminants that are known to have human health effects.

By maintaining high levels of disinfection while reducing the byproducts of treatment, the cruise operator can offer passengers a better experience, the company says.

PRACTICAL EXPERTISE

Fort Lauderdale-based Headhunter is a well-known name in marine sanitation with deep roots in the demanding luxury yacht segment. Its team builds and installs complete black- and graywater systems for vessels of all kinds for capacities up to 50,000 gallons per day.

Some of its biggest contracts are for the U.S. Navy's Military Sealift Command, which uses Headhunter's TidalWave HMX system aboard the Expeditionary Fast Transport (EPF) catamaran and the follow-on hospital ship version, the Expeditionary Medical Ship (EMS).

A big driver of Headhunter's success is the quality of its aftersales service, which is key for military customers. "We've received a lot of positive feedback from MSC regarding our technical support," says Headhunter President Mark Mellinger, "which takes place around the world. The Philippines is a popular destination, and we've provided service in Croatia, Singapore, Bahrain, Italy, France and the U.S. West Coast. We've never missed a service call for them."

Headhunter's expertise is so well known that Mellinger was selected to advise the U.S. delegation to the IMO. "I was invited to join a subcommittee called PPR – Pollution Prevention and Response – and we've worked on rewriting the annex on sewage (MARPOL Annex IV)," he says. "It's a privilege to be invited, and I'm the only U.S. manufacturer in our group."

His input has had a meaningful effect on the details of the regulation. Mellinger gave the subcommittee practical guidance on the order of operations for black-water treatment, helping write rules that better fit the real-world design of sewage systems for use in international waters.

Mellinger has also encouraged the subcommittee to base its requirements on how many people are going to be aboard a vessel, not just on vessel size. Current regulations determine the required size of the treatment system by gross tonnage, which does not have a direct relationship with the crew and passenger count.

"People are what makes sewage," he says. "You could have a 400-gross-ton ship – the size where the rules take effect – but it might only have two or three people, especially now with more autonomy on board. If the new rules allow it, you could shrink the sewage system down to a size that's actually appropriate to the smaller crew. That would reduce displacement and power consumption, creating savings on fuel and emissions."

MarEx

PAUL BENECKI is the magazine's News Editor.



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ECONOMIC IMPACT

The boom in cruising has benefited port communities large and small, many of which are investing in sustainability upgrades like shore power.

BY TOM PETERS

PORT EVERGLADES.



At the eastern end of the Canadian province of Nova Scotia on the island of Cape Breton sits the small port of Sydney. By comparison to dozens of other North American ports, it's small potatoes. But what's important, and even vital, to Sydney is the revenue generated by its cruise industry.

In 2024, Sydney had a record year with 117 vessel calls, 13,297 passengers arriving on 20 cruise lines and millions of dollars in economic activity. Again, in comparison to the Miamis of the world, small potatoes. But big impact.

For both large and small ports, figures show the growing economic impact of cruising. Cruise Lines International Association's (CLIA) global economic impact study in 2023 "revealed the highest-ever global economic impact from cruise tourism and reaffirmed that 2023 surpassed 2019 as the benchmark year for cruise industry performance." The report also confirmed the cruise sector's role as a "robust job creator." According to the study, the global cruise industry in 2023 generated \$168.6 billion in total eco-

nomic impact, a nine percent increase over 2019.

And 2024 was even better, although final figures are not yet in.

Cruise lines are riding the wave of popularity with over 25 cruise ships on order in the next two years, according to a Travel Market Report. Capacities will range from 100 to 6,700 passengers. Cruise ports also continue to see the ever-growing importance of cruise and are investing in infrastructure with a continued focus on clean energy.

New Records

In 2025, the Port of Seattle will mark its first full season with all three of its cruise berths having shore power capability. The installation of shore

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power at the Bell Street Cruise Terminal at Pier 66, a \$44 million investment, made Seattle capable of providing shore power simultaneously to three cruise ships, eliminating harmful emissions.

“With the installation of shore power at Pier 66, I’m proud to say Seattle is one of the only ports globally able to simultaneously power three cruise ships with low-carbon electricity,” says Port of Seattle Commissioner Fred Felleman. Seattle has announced all homeported cruise ships will be required to plug into shore power by 2027, moving the original target date up by three years.

Seattle is also expecting new cruise lines.

“This summer we’ll welcome the *Queen Elizabeth* from Cunard for a series of 10- and 11-day cruises from Pier 91,” notes Brad Olsen, Senior Manager of Maritime Marketing. “In addition, existing homeport brands are deploying larger ships in 2025 including Norwegian’s *Joy* and Oceania’s *Riviera*. In 2026 we’ll see MSC and Virgin Voyages

sailing seven-day cruises from Pier 91.”

Seattle posted 275 ship calls and 1.75 million passengers last year. The preliminary schedule for 2025 includes 299 vessel calls and an expected 1.9 million passengers. “We’ll continue to set new records for cruise traffic,” Olsen says.

Linda Springmann, the port’s Director of Cruise & Maritime Marketing, adds, “Cruise passengers are a crucial part of our economy’s success and contribute significantly to Seattle’s vibrancy. Plus, SEA (Seattle-Tacoma International Airport) has strong international reach, which means cruise lines can attract international visitors who tend to stay longer, go further into our region and spend a little more.”

Banner Year

It’s expected to be a banner cruise year for the Port of Galveston as the port celebrates its 200th birthday.

PORT OF SEATTLE.



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PORT OF GALVESTON.

“Galveston is the fourth most popular cruise port in North America and eighth busiest in the world because our cruise partners offer a great product and because of our location,” exclaims Galveston Wharves’ Port Director Rodger Rees. “As the only cruise homeport in Texas, we serve much of the central U.S. and beyond, offering more sailings to more destinations on newer and larger ships. We host Carnival, Disney, Norwegian, Princess and Royal Caribbean.”

In 2024, a total of 3.4 million passengers moved through Galveston’s three cruise terminals, a new record in the port’s 25-year history as a homeport. More than 380 cruise ships called in 2024, another record. In 2025, the port forecasts more than 400 sailings and almost 3.6 million passengers. To meet the growing demand, the port will open a fourth cruise terminal in 2025. The \$156 million terminal will be home to MSC and Norwegian cruise lines.

Similar to many ports, Galveston’s cruise industry is a major economic engine for local and regional businesses. In 2023, cruise operations generated 4,547 jobs, \$733 million in business revenues, \$291 million in personal

income and \$25 million in state and local taxes.

The port’s cruise operations are located adjacent to Galveston’s historic downtown, filled with restaurants, shops, galleries and attractions. More than a third of cruise passengers stay in local lodging before or after their cruises to enjoy the many attractions.

Powering Up

Florida’s Port Everglades, the third busiest cruise port in the world, has jumped on its own clean energy bandwagon and completed a study to add shore power to its eight cruise terminals.

The study by Moffatt & Nichol, a global infrastructure advisory firm working in cooperation with Florida Power & Light (FPL), Carnival Corporation, Disney Cruise Line and the Royal Caribbean Group, recommended a plan to deliver up to 16 megawatts of electricity simultaneously to each of the eight terminals. The projected cost, including estimates for FPL upgrades, is approximately \$21.5 million per terminal for a total of \$172 million. The project is expected to be financed through federal and state grants, contributions from FPL, the participating

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PORT OF SAN DIEGO.

cruise lines and Broward County.

“In just the first few months of our fiscal year, we’re seeing solid growth in our cruise business,” says Joseph Morris, CEO & Port Director at Port Everglades. “There are cruise ships making more visits to our port and we anticipate a record 4.4 million cruise guests this year. We’re also making progress on our Master/Vision Plan Update that will improve the experience for cruise lines and their guests, and we’re powering forward with plans to renovate Terminal 29 for the Royal Caribbean Group.”

Port Everglades, which hosts 10 cruise lines and a ferry, welcomed more than four million guests in FY 2024, a 39 percent increase over FY 2023 and a new record. There were 889 ship calls including 241 calls from Baleària’s Caribbean ferry. Disney Cruise Line opened its second homeport at the beginning of FY 2024 and joined Celebrity, Princess and Royal Caribbean with year-round sailing itineraries.

Terminal Upgrades

On the California coast, at the Port of San Diego, shore power will be a sure thing.

The port’s Board of Commissioners has approved a contract for an additional shore power outlet to enable vessels with starboard connections to access shore power at the B Street Cruise Terminal’s south berth, adding further versatility to the existing system. The shore

power addition will be accompanied by other infrastructure work.

Early this year the port is expecting to have the construction and design document completed for the B Street Cruise Terminal’s upgrades with construction beginning as soon as late summer and completion sometime in 2026, states Josh Kellems, Principal Marketing & Public Relations Representative: “Terminal upgrades will include expanded security screening, new bathroom facilities, improved lighting and new flooring.”

The port anticipates 265,000 passengers in 2024-25 and 324,000 in 2025-26.

In addition, notes Kellems, “We’re excited to have a six-call increase with Holland America Line in the 2025-2026 season with the *Nieuw Amsterdam* being homeported in San Diego.” The port will also welcome a new cruise ship in the 2025-2026 season, Virgin Voyages’ *Brilliant Lady*.

We’re #1

At PortMiami, the world’s leading cruise port with over 8.2 million passengers, up 12 percent in FY 2023-24, it’s only fitting it should be home to a massive new cruise facility. MSC Cruises will open the world’s largest cruise terminal this year in Miami, able to accommodate two MSC ships simultaneously.

In addition to the new terminal, the port has launched

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a shore power program. In partnership with Miami-Dade County, Carnival Corporation, MSC Cruises, Norwegian Cruise Line Holdings, Royal Caribbean Group, Virgin Voyages and FPL, PortMiami is the first major cruise port on the U.S. eastern seaboard offering shore power capability at five cruise berths. In the coming year, 21 cruise ships will be outfitted for shore power and will connect in Miami. The seaport will have more than 350 vessel calls plugging into its shore power system.

"We're committed to being a sustainable global gateway," says Hydi Webb, PortMiami Director & CEO.



"We thank our mayor, county commissioners and port partners for their continued support of our resilience initiatives."

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Ports columnist **TOM PETERS** writes from Halifax, Nova Scotia.

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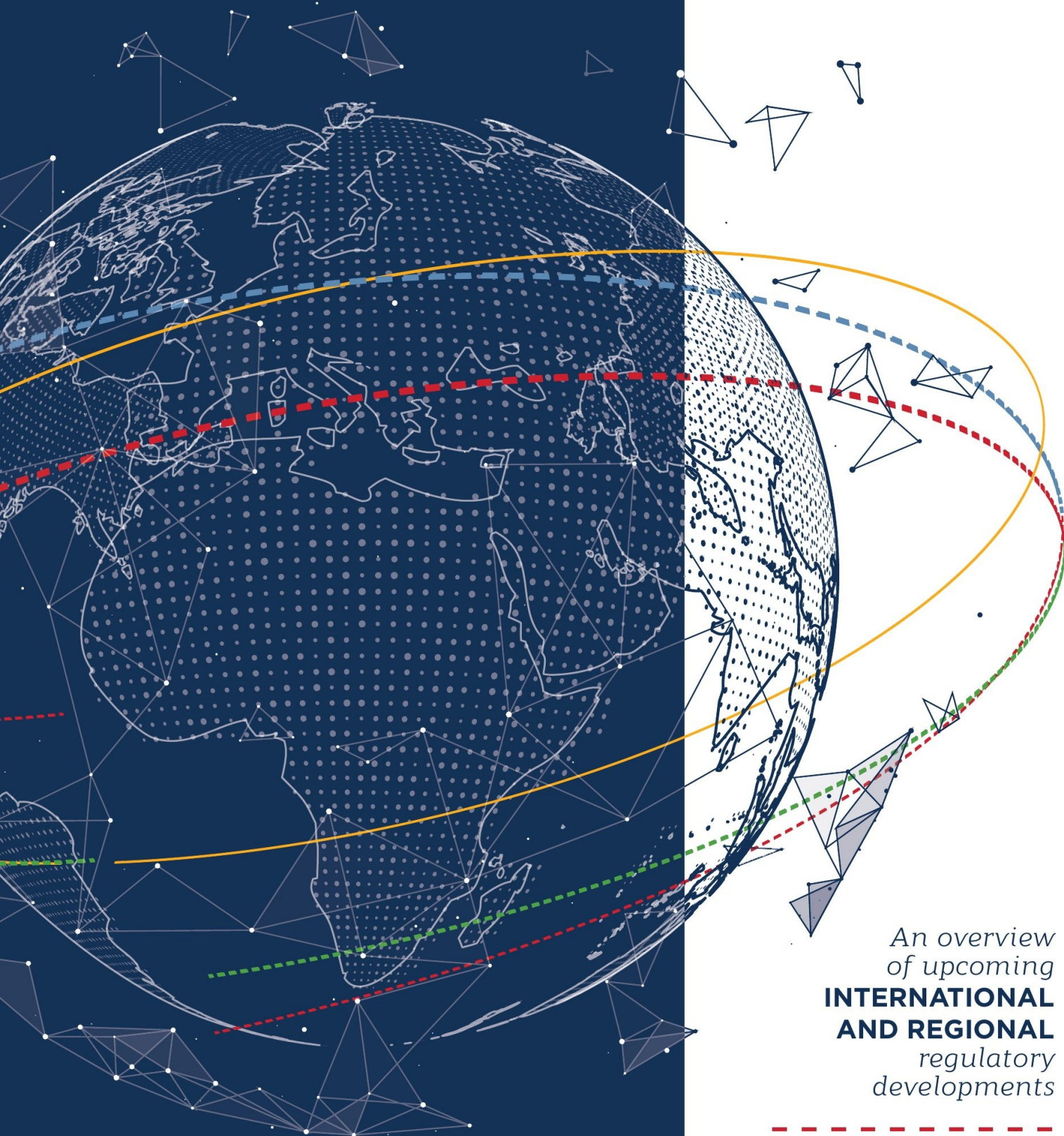


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