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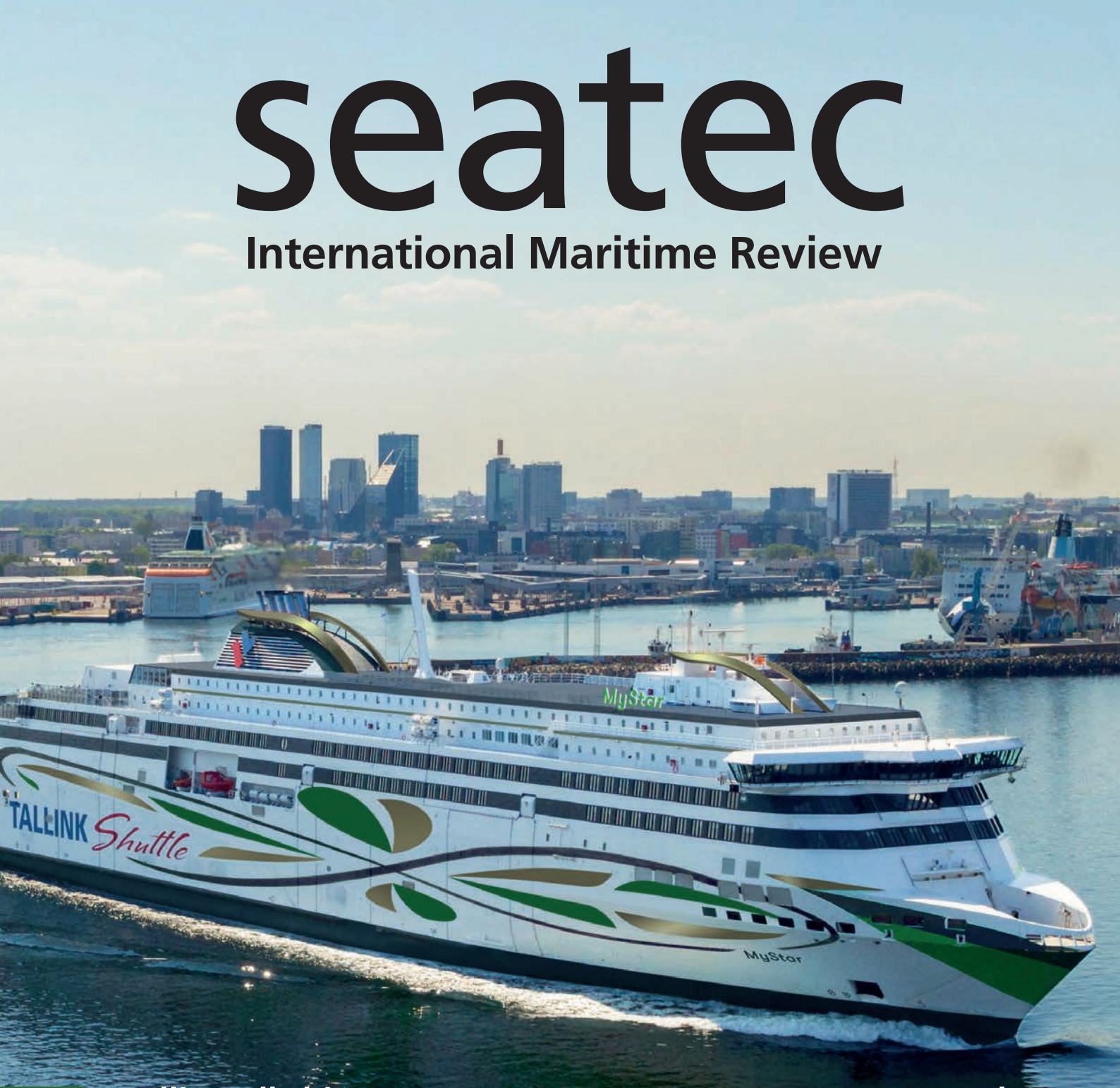
International Maritime Review



Calling all ships! – Reduce emissions

How to protect vessels against cyber-attacks

MyStar is set to shine bright

– The christening of the ship took place in August 2021

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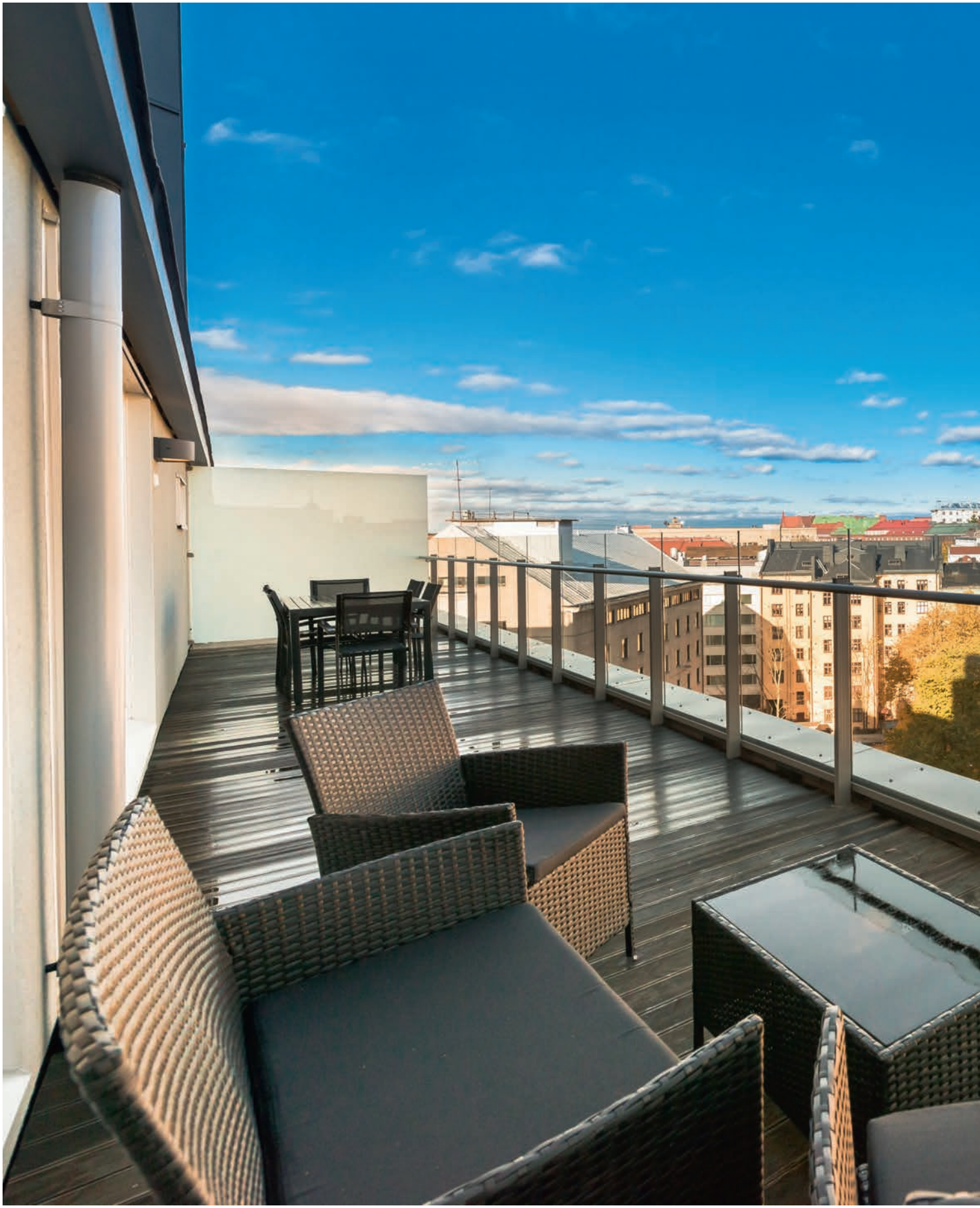

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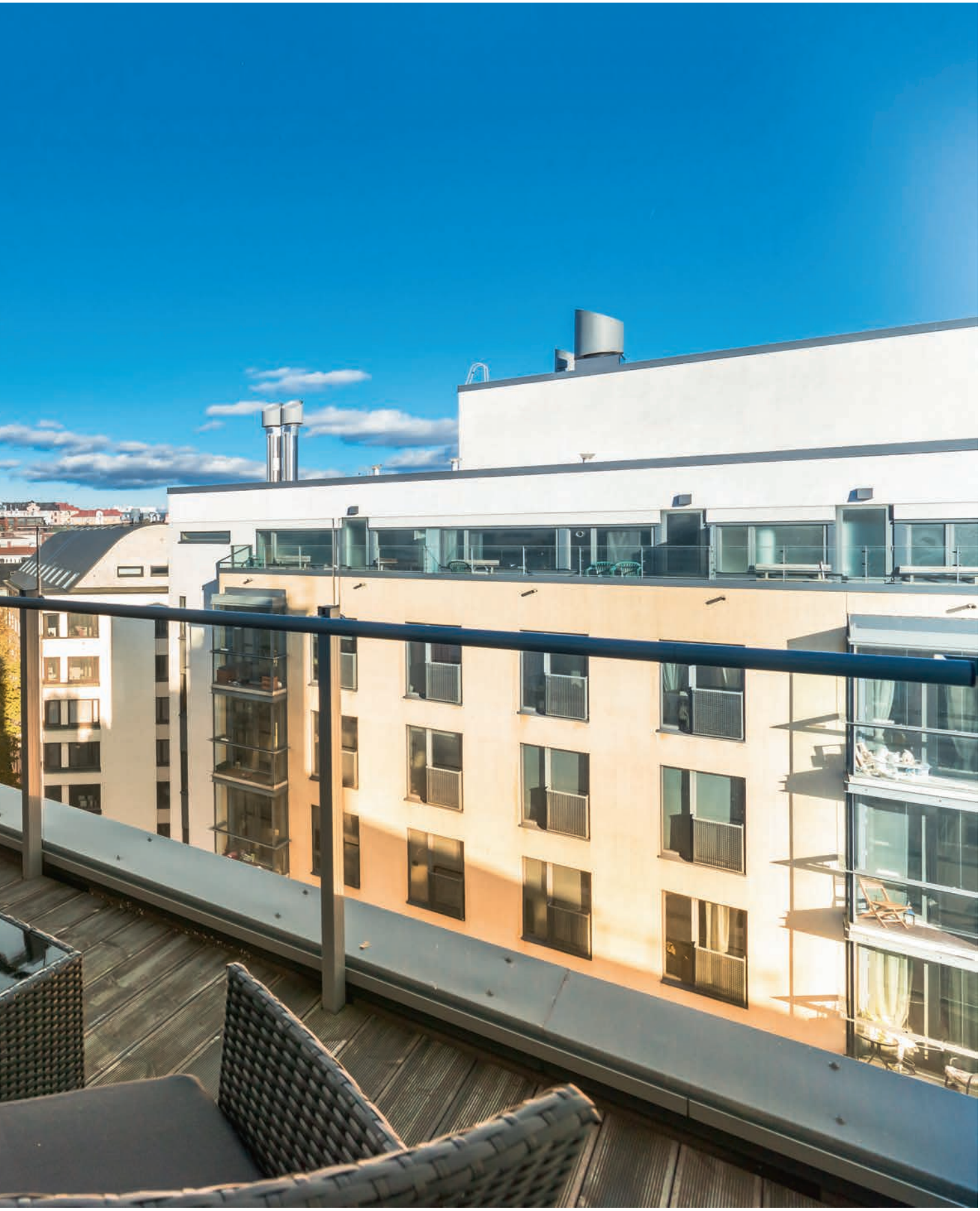

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EDITORIAL

MARINE INNOVATION TARGETS EMISSIONS

EU's Waterborne Technology Platform wants to deploy highly innovative technologies to bring about significant emission reductions in the waterborne transport sector. The platform is tapping into the European Commission's Innovation Fund to reduce carbon.

The EU Innovation Fund is one of the world's largest programs for the demonstration of innovative low-carbon technologies, financed by revenues from the auction of emission allowances from the EU's Emissions Trading System. Deployment of technologies and concepts facilitating the transition to zero-emission waterborne transport can be co-financed via the EU Innovation Fund, too.

This development is highly relevant, since these innovative technologies have reached a technological maturity, but are often not mature enough from a financial perspective.

Thereby, the Innovation Fund is key to deploy the technologies resulting from Research, Development and Innovation, more specifically in the framework of the Co-Programmed Partnership on Zero-Emission Waterborne Transport under Horizon Europe. When Research, Development and Innovation efforts are combined with support for the deployment of innovative technologies, Europe has a real shot to become a true frontrunner in the transition to zero-emission waterborne transport.

Waterborne Technology Platform has been set up as an industry-oriented Technology Platform to establish a continuous dialogue between all waterborne stakeholders, such as classification societies, shipbuilders, ship-owners, maritime equipment manufacturers, infrastructure and service providers, universities or research institutes, and with the EU Institutions, including 19 Member States.

Industry players are "getting greener" by the minute. Finnish marine engine-maker Wärtsilä wants to be carbon neutral by 2030 – including readiness for zero carbon fuels by the decade's end. Granted, the marine sector still relies on the use of fossil fuels, but Wärtsilä's current portfolio already enables its customers to switch to carbon neutral fuels, such as biofuels or synthetic methane.

As the transition from fossil fuels to carbon neutral (or carbon-free fuels) will happen gradually, Wärtsilä is looking to enable this transition by providing technologies that allow its customers to use more sustainable fuels once these become available.

In October 2021, Wärtsilä Exhaust Treatment and Solvang ASA, a Norwegian shipping company, announced a full-scale pilot retrofit installation of a carbon capture and storage (CCS) system on one of Solvang's ethylene carriers, Clipper Eos.

The agreement reinforces Wärtsilä's continued research and development into carbon capture at the point of exhaust to support the shipping industry's decarbonisation pathway. To remain in line with the IMO's decarbonisation targets, Wärtsilä is initially aiming for a 70% reduction in CO_2 emissions at the point of exhaust with its pilot unit.

PETRI CHARPENTIER

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PUBLISHER
PubliCo Oy
Pälkäneentie 19 A
FI-00510 Helsinki
Finland
Phone +358 20 162 2200
info@publico.com
www.publico.com

EDITOR-IN-CHIEF
Petri Charpentier

PROJECT MANAGER
Paul Charpentier

EDITORIAL COORDINATOR
Saara Nikkinen

GRAPHIC DESIGN
Riitta Yli-Öyrä

CONTRIBUTORS
Sami J. Anteroinen
Ari Mononen

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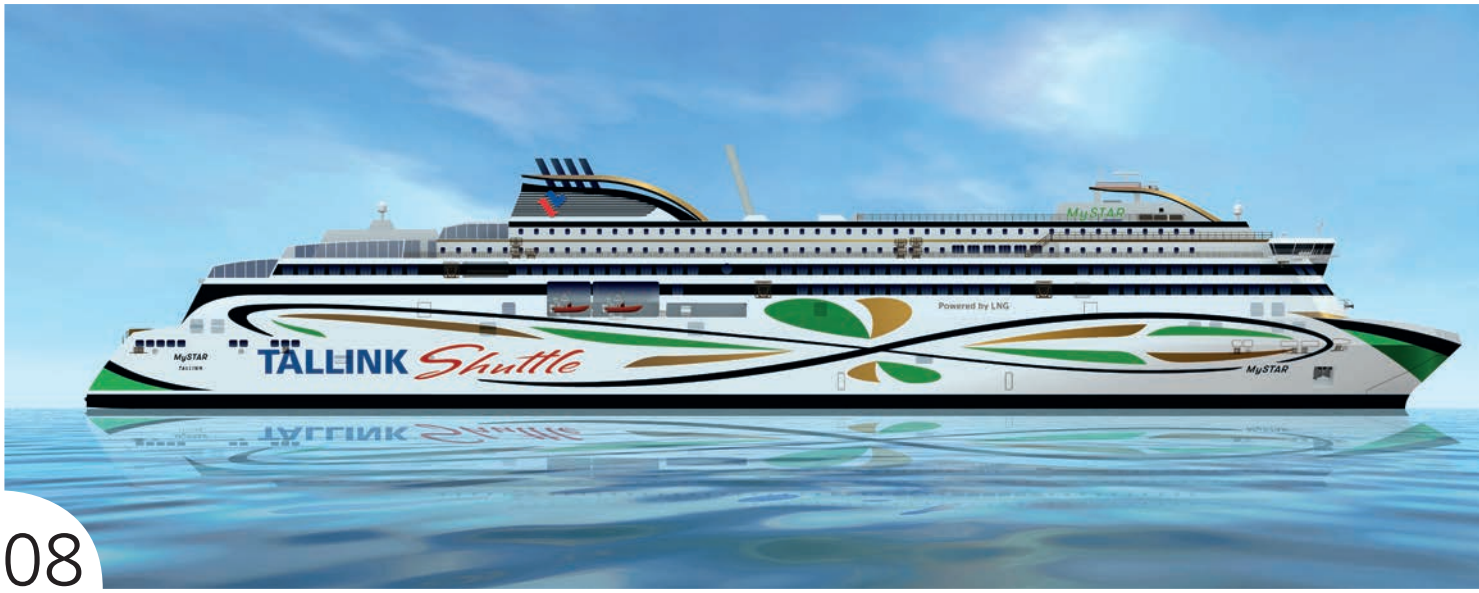

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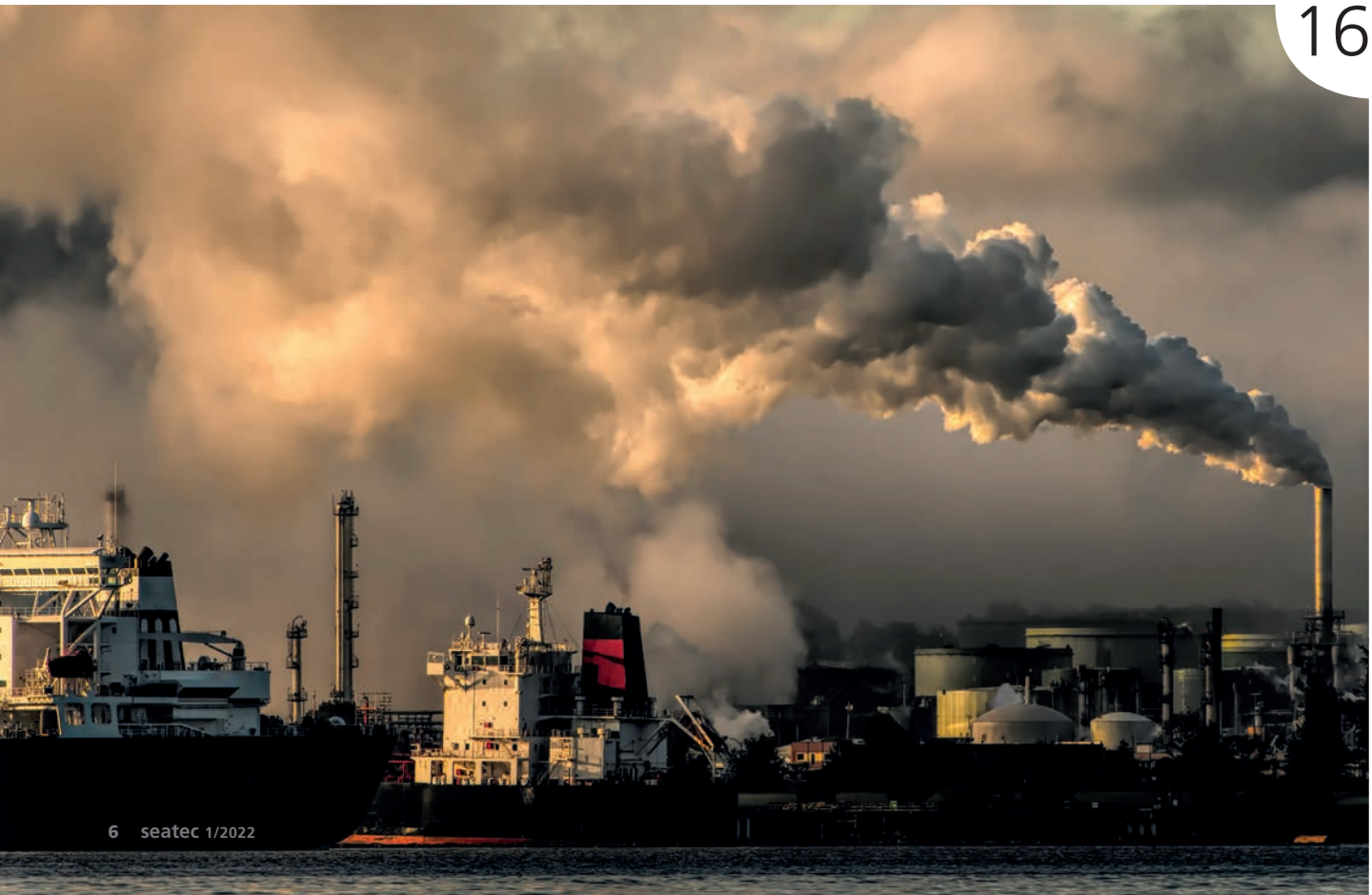

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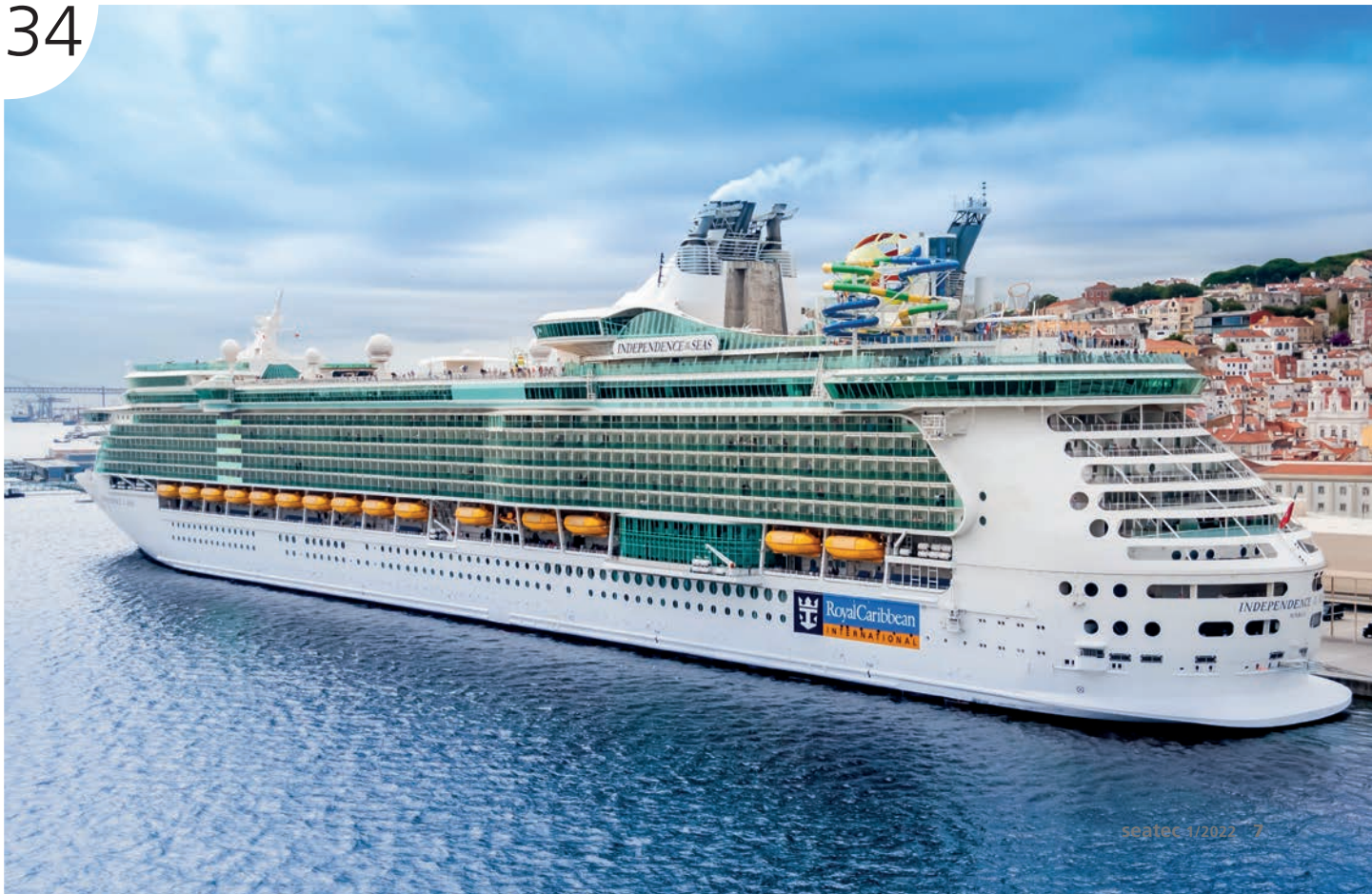
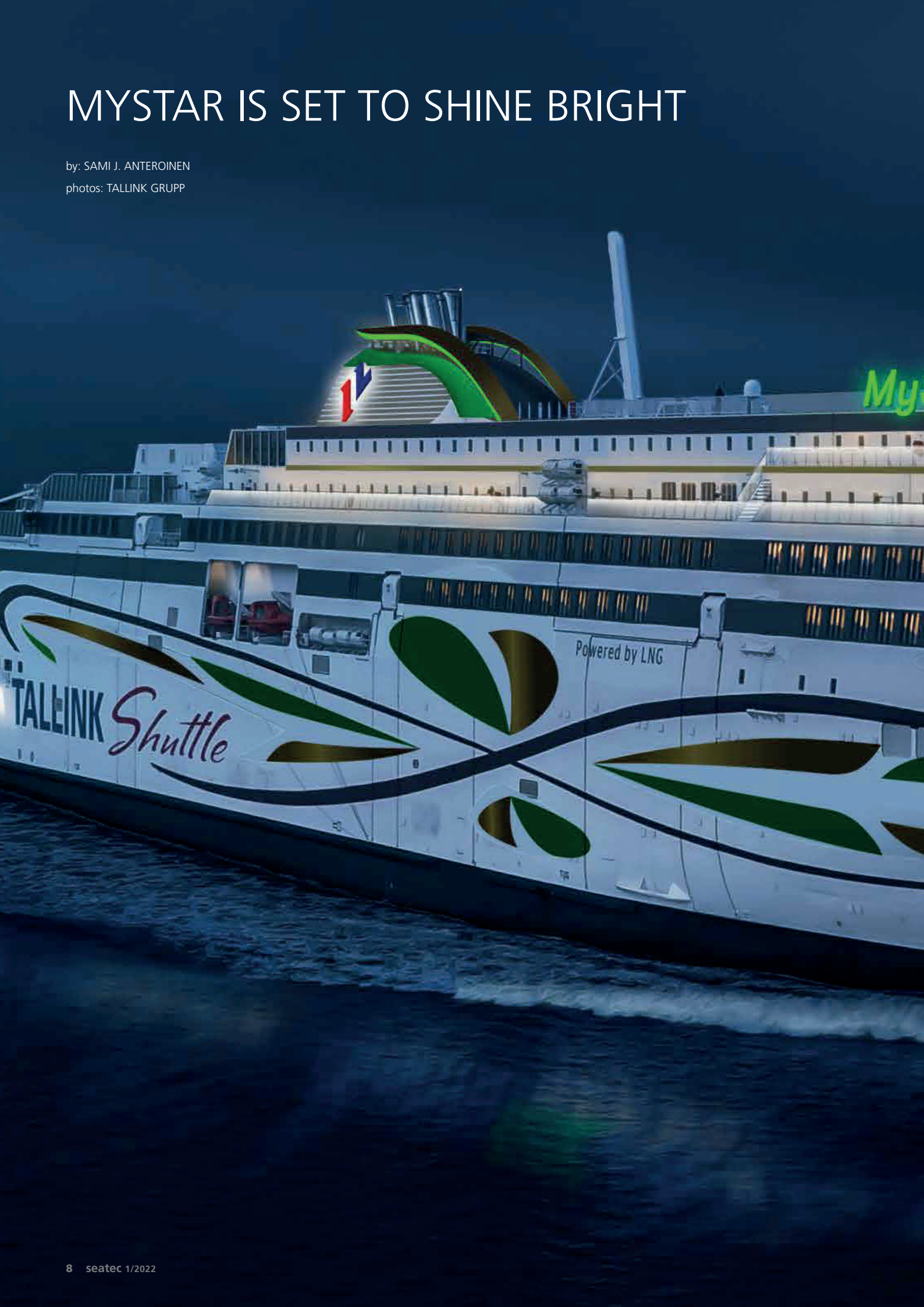


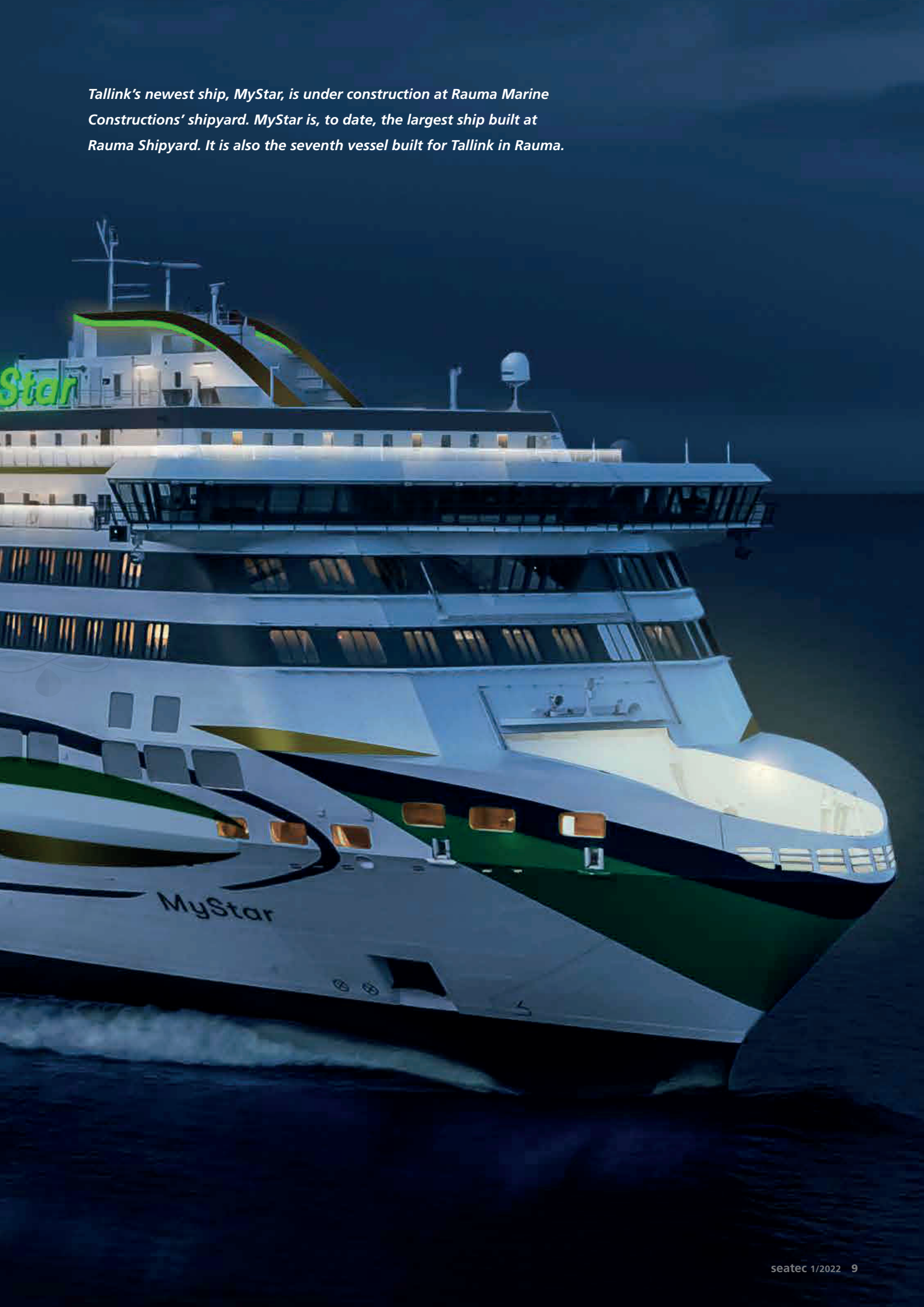
MYSTAR IS SET TO SHINE BRIGHT

by: SAMI J. ANTEROINEN

photos: TALLINK GRUPP



Tallink's newest ship, MyStar, is under construction at Rauma Marine Constructions' shipyard. MyStar is, to date, the largest ship built at Rauma Shipyard. It is also the seventh vessel built for Tallink in Rauma.



MyStar is fueled by liquefied natural gas (LNG) and once completed, will be the most environmentally friendly vessel to operate in the Baltic Sea region. When it starts operating on the Helsinki-Tallinn route next year, two environmentally friendly high-speed shuttle ferries, MyStar and Megastar, will operate between Finland and Estonia. Both ships meet all current and currently known future emissions requirements.

Paavo Nõgene, CEO, Tallink Grupp, says that use of LNG is well in line with the company's climate policy.

"We have made a commitment as a company to build all our new ships to use the most environmentally friendly technologies and to operate using the greenest maritime fuel available at the time. Right now, the most environmentally friendly fuel available for vessels is LNG, so it was a logical step to build an LNG-based vessel," he explains.

GREEN BRIDGE ACROSS THE WAVES

Nõgene is also excited about MyStar operating on the Tallinn-Helsinki route and bringing something extra to the connection.

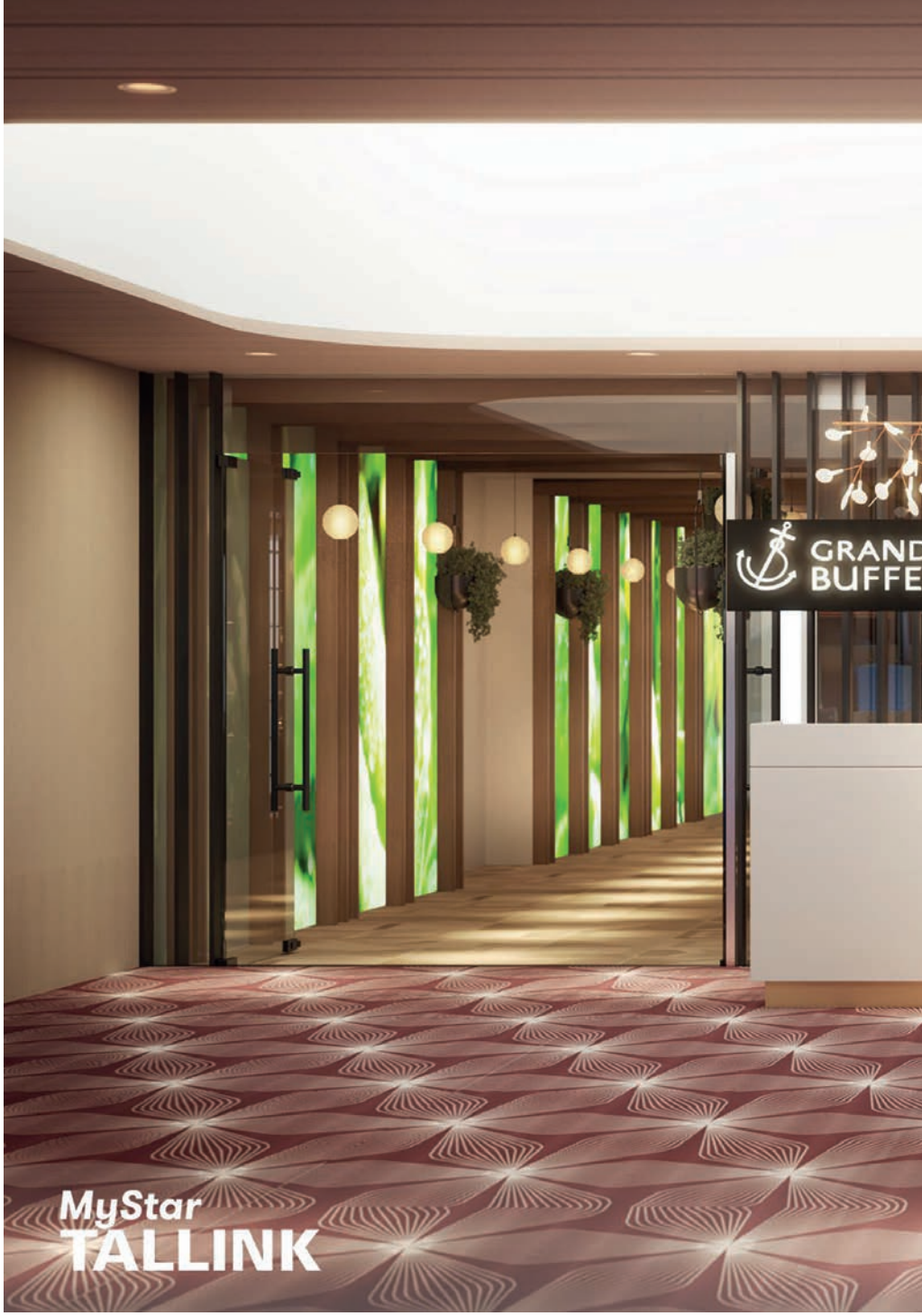
"Together with Megastar, they will create a 'green bridge' across the Gulf of Finland between the two capital cities of Tallinn and Helsinki."

Tallink's flagship shuttle Megastar has a godmother of some renown: Tarja Halonen, former President of Finland. The appropriate and logical choice for MyStar's godmother, then, was former President of Estonia, Kersti Kaljulaid.

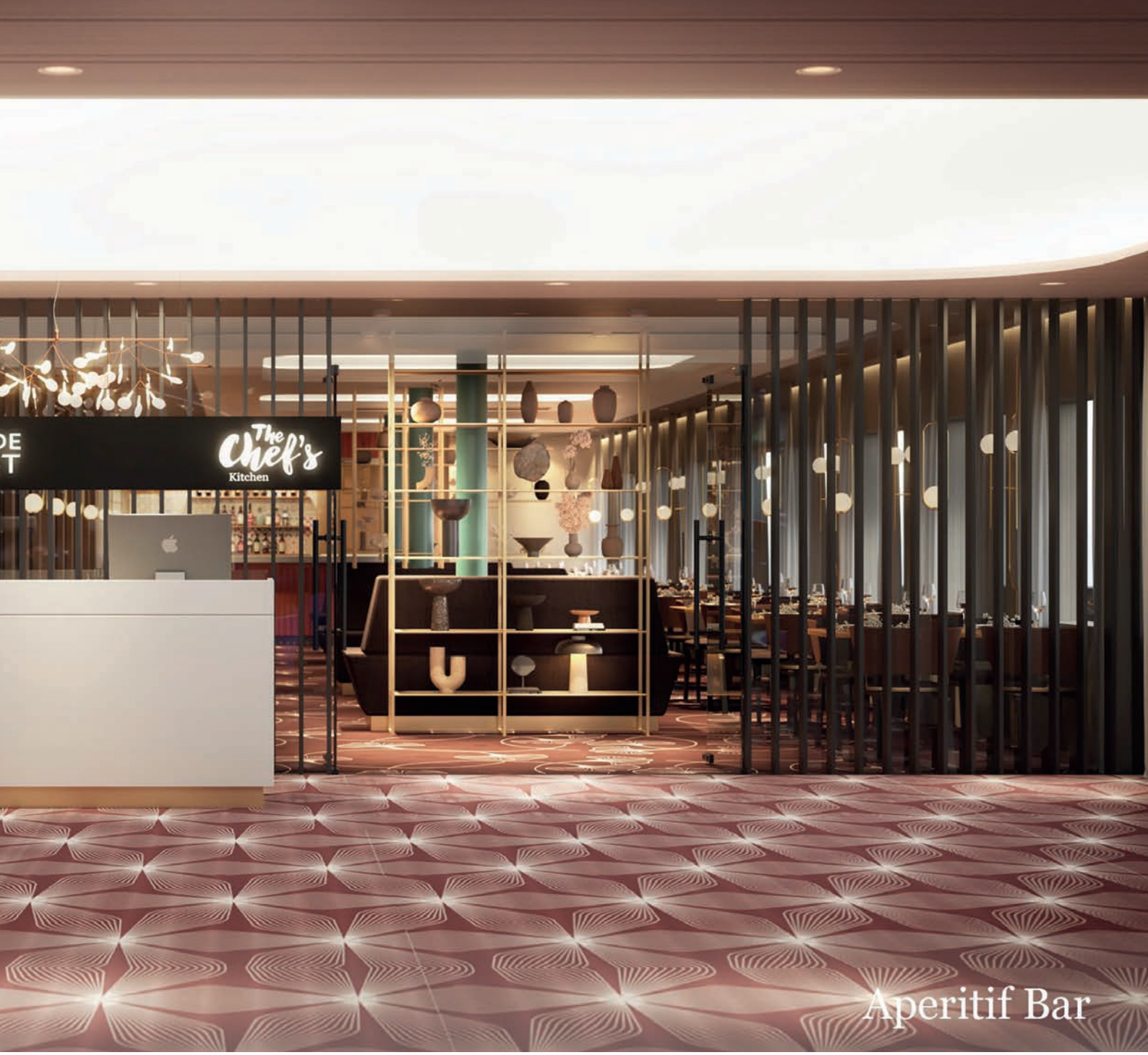
According to Nõgene, the choice was strongly influenced by Kaljulaid's distinguished work for the environment and her efforts to mitigate climate change both globally and in Estonia.

SECURING SUSTAINABILITY

Nõgene feels that MyStar is a good example of the company's environmental aspirations as Tallink Grupp is committed to playing its part in the maritime transport sector, achieving the ambitious emissions reductions and environmental goals.



"We have made a commitment as a company to use the most environmentally friendly technologies.



"It is an important landmark also in our aspirations to continuously develop and offer the latest and top quality passenger transport service in the Baltic Sea region, despite the challenges of the last few years," he says.

Looking forward, the CEO believes people will continue to travel across the Baltic Sea, but their needs and demands regarding the travel and its quality are changing and developing.

"Our job with every new vessel is to understand and even anticipate, where possible, these changing needs and requirements and to give customers what they need. And a little bit more."

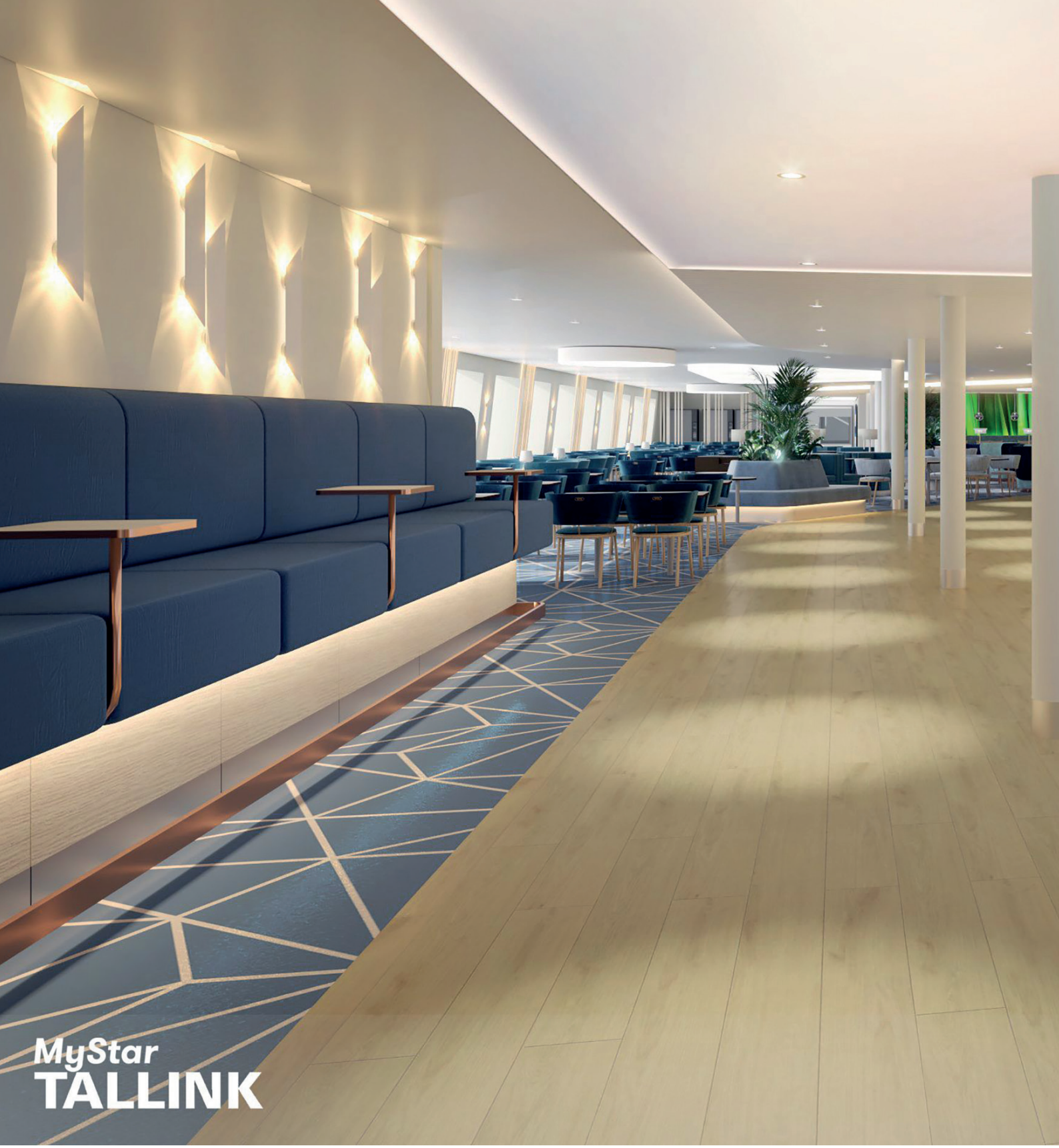
PANDEMIC PACKS A MEAN PUNCH

The global COVID-19 pandemic has had a huge impact on the cruise business. Nõgene comments that it is not exactly news that the company has lost both customers and revenue.

"Our ships have been suspended from operations on and off, we have had to demonstrate extreme levels of flexibility, speed and adaptability due to travel restrictions and different rules by our home markets' governments and authorities throughout the last 21 months," he says.

"It has all been tough, but the toughest part of the whole pandemic has been the impact on our people with lay-offs, redundancies and constantly changing environments and demands," he says.

"I take my hat off to every single member of Tallink Grupp's staff who have demonstrated commitment, dedication and loyalty during this extremely dif-



ficult time", Nõgene adds, pointing out that Tallink is about the people who make it work, every day.

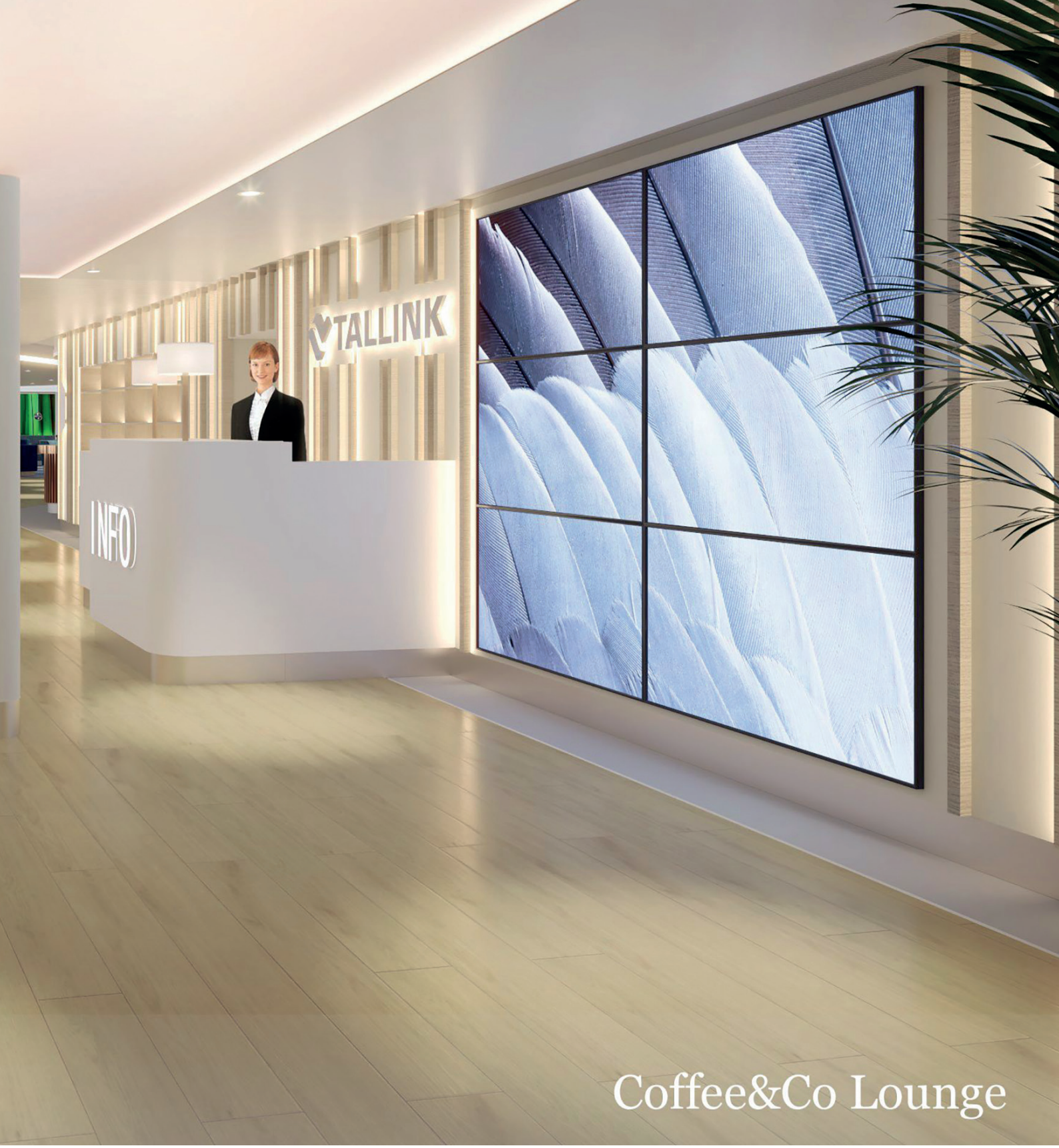
RECOVERY IS A LONG ROAD

Tallink Group believes that travelling will start to return to some level of normality in the next year or so, but the recovery for international transport and tourism companies will take far longer – many years after COVID, even.

"We expect to see more regional travel for a while as travellers' confidence returns, but expect to see visitors from more distant shores making their way back to us again after a while, too. We, the transport and travel companies, must work to prepare for that and attract the visitors back here when the time is right – and the health dangers are behind us once again."

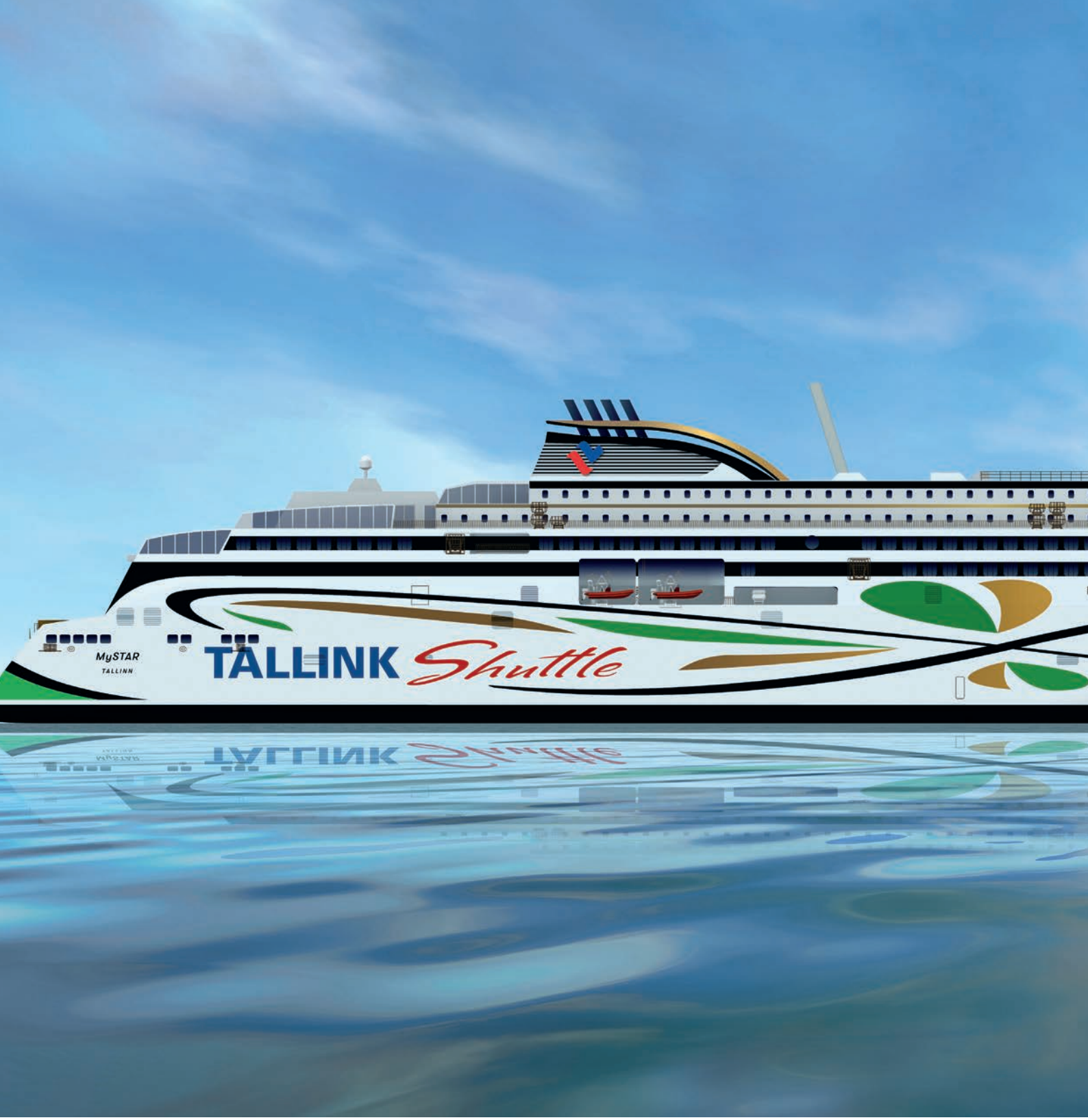
MASKED CEREMONY

Naturally, strict COVID-19 safety meas-



"I take my hat off to every single member of Tallink Grupp's staff.

ures are implemented at the Rauma shipyard during the building project, and they impacted also the August 2021 christening of the vessel. The christening and float-out of the ship took place outdoors and the invited guests were divided into several different areas in order to minimise personal contact.



The event was also streamed live, making it possible for guests to view the ceremony remotely.

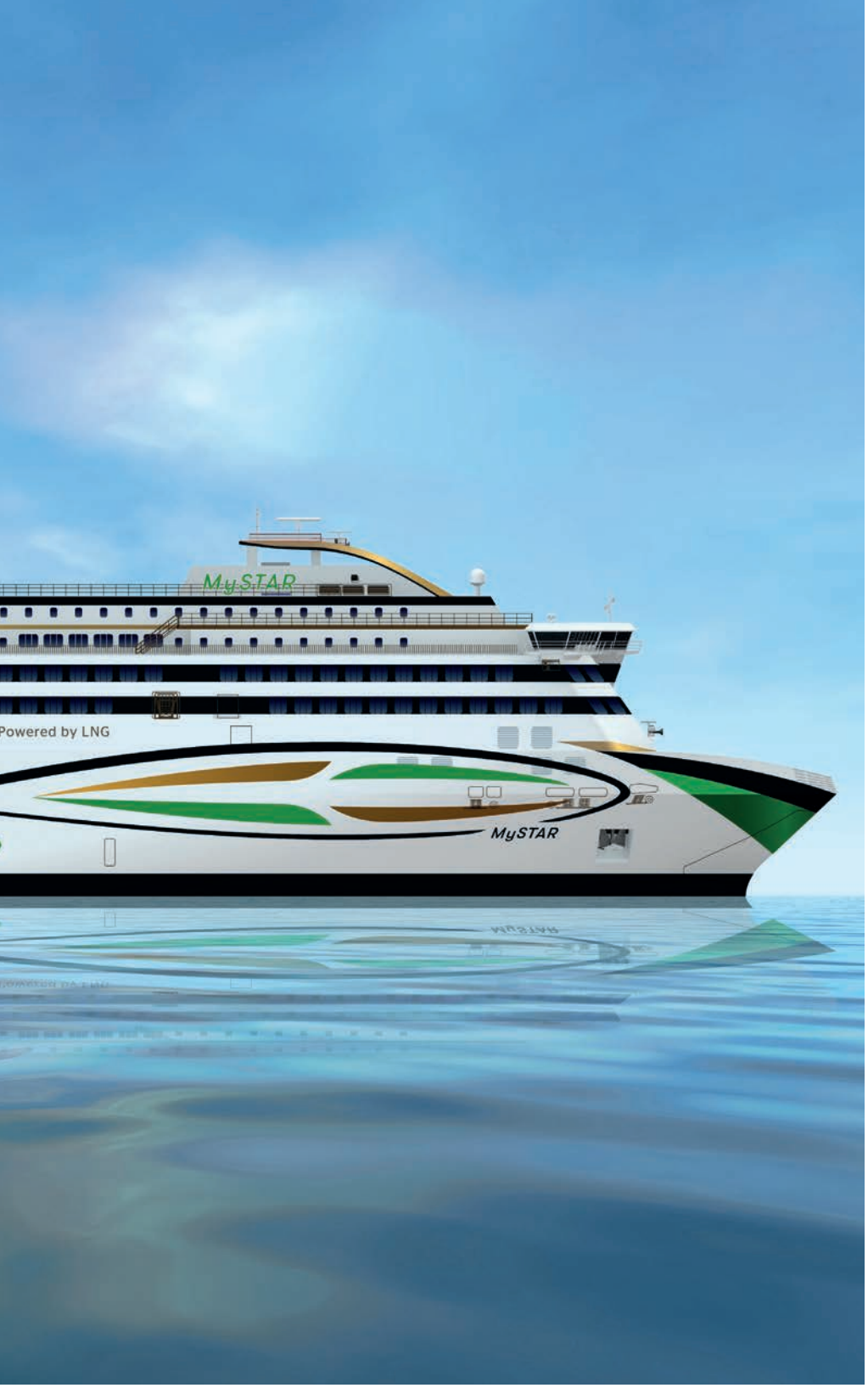
At the christening ceremony, Jyrki Heinimaa, CEO of Rauma Marine Constructions, noted that RMC and Tallink have been working together for over a year, and both Tallink's and RMC's project teams "deserve great praise" for the work they have done in the challenging conditions. Heinimaa was also excited to see the project proceed to a new stage as the work shifts from the exterior of the ship to the interior.

The final milestone in the construction process is the handover of the vessel from Rauma shipyard to Tallink, which is scheduled to take place in the first half of 2022.

ORDERBOOK IN ORDER

The Rauma shipyard has its hands full: it's also working on four corvettes for the Finnish Defence Forces and another car and passenger ferry, Aurora Botnia for Wasaline.

Furthermore, in March 2021, RMC and Tasmanian shipping company TT-Line Company signed an agreement on



the construction of two car and passenger ferries.

At the moment, the shipyard can build two different ships side by side, which has sped up the shipyard's growth. In the future, the goal is to establish RMC as a global leader in the production of RoPax ferries and to keep producing prominent government vessels. ■

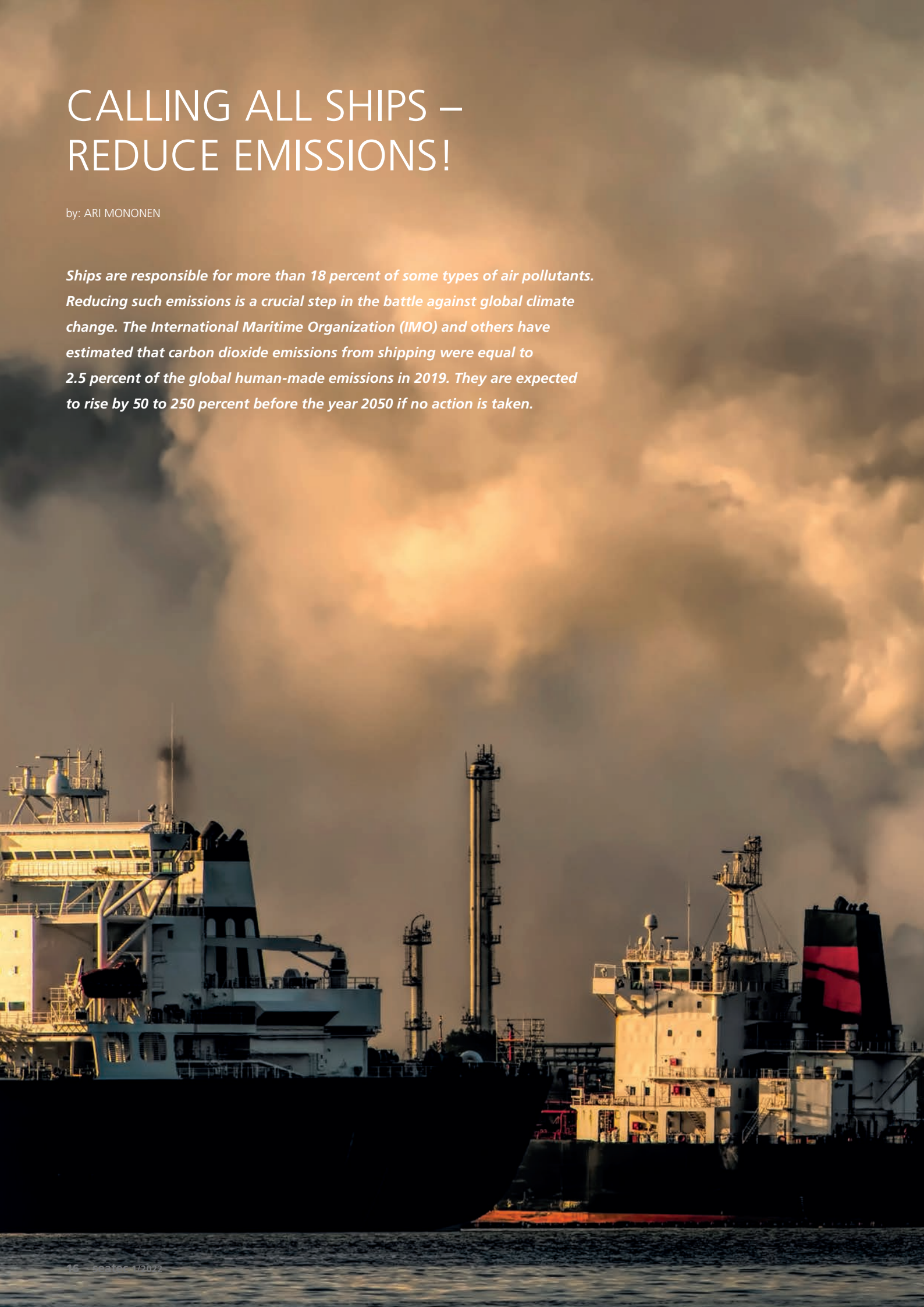
TALLINK MYSTAR – FAST FACTS

- Length: 212 m
- Width: 30.6 m
- Draught: 7 m
- Gross tonnage: 50,000
- Speed: 27 knots
- Lane metres: 3,190
- Passengers: 3,000
- Cabins: 48

CALLING ALL SHIPS – REDUCE EMISSIONS!

by: ARI MONONEN

Ships are responsible for more than 18 percent of some types of air pollutants. Reducing such emissions is a crucial step in the battle against global climate change. The International Maritime Organization (IMO) and others have estimated that carbon dioxide emissions from shipping were equal to 2.5 percent of the global human-made emissions in 2019. They are expected to rise by 50 to 250 percent before the year 2050 if no action is taken.



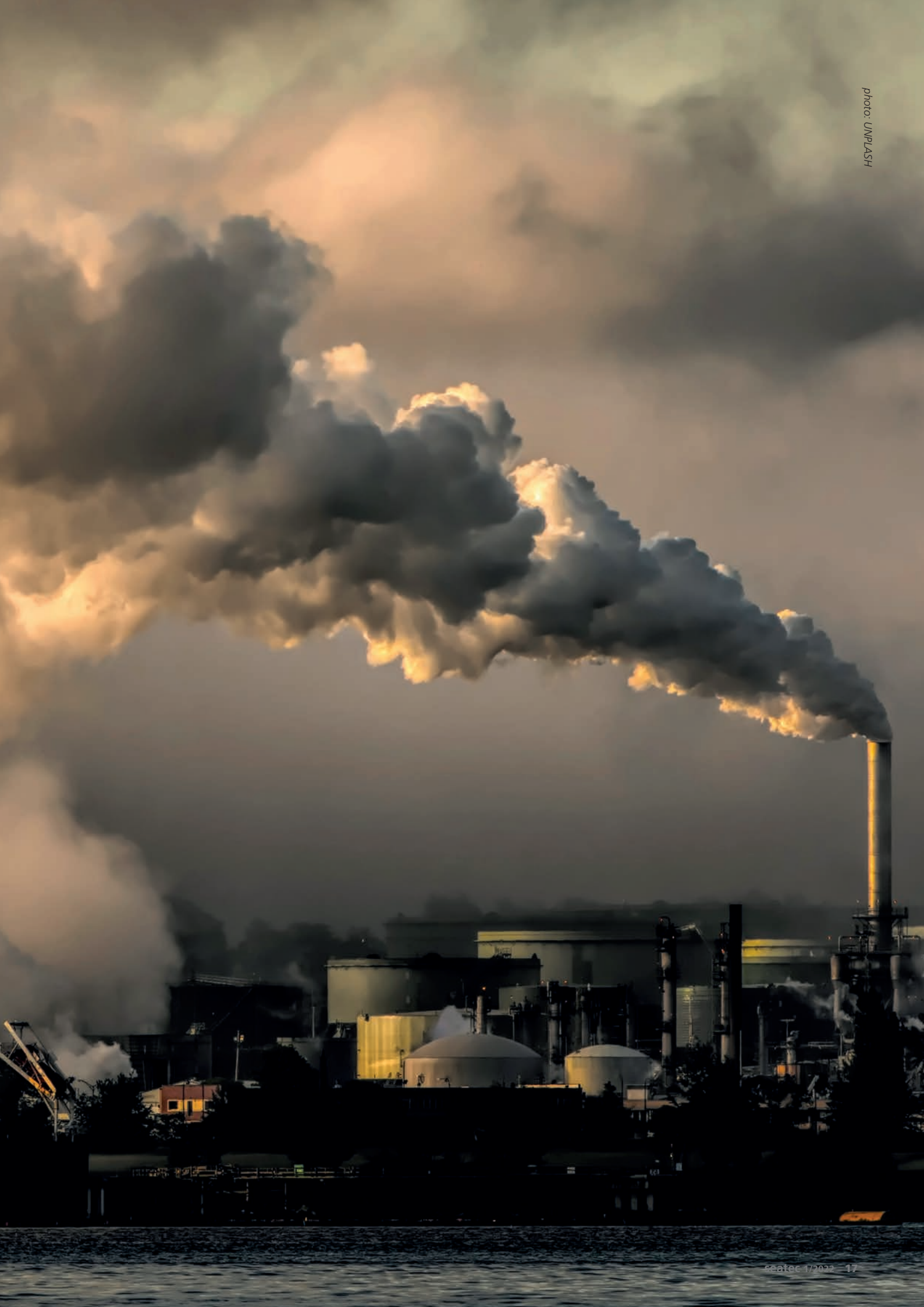


photo: UNPLASH

Adverse effects of climate change include flooding, severe storms, melting of permafrost and polar ice, and extreme temperatures that make large regions of the world uninhabitable. Solutions are needed without delay.

On the sidelines of the United Nations climate conference in Glasgow in late 2021, emissions from transportation and traffic were discussed by a number of nations – even though such emissions were strictly speaking not on the official agenda. The International Energy Agency has estimated that transportation is one of the most significant sources of greenhouse gas emissions.

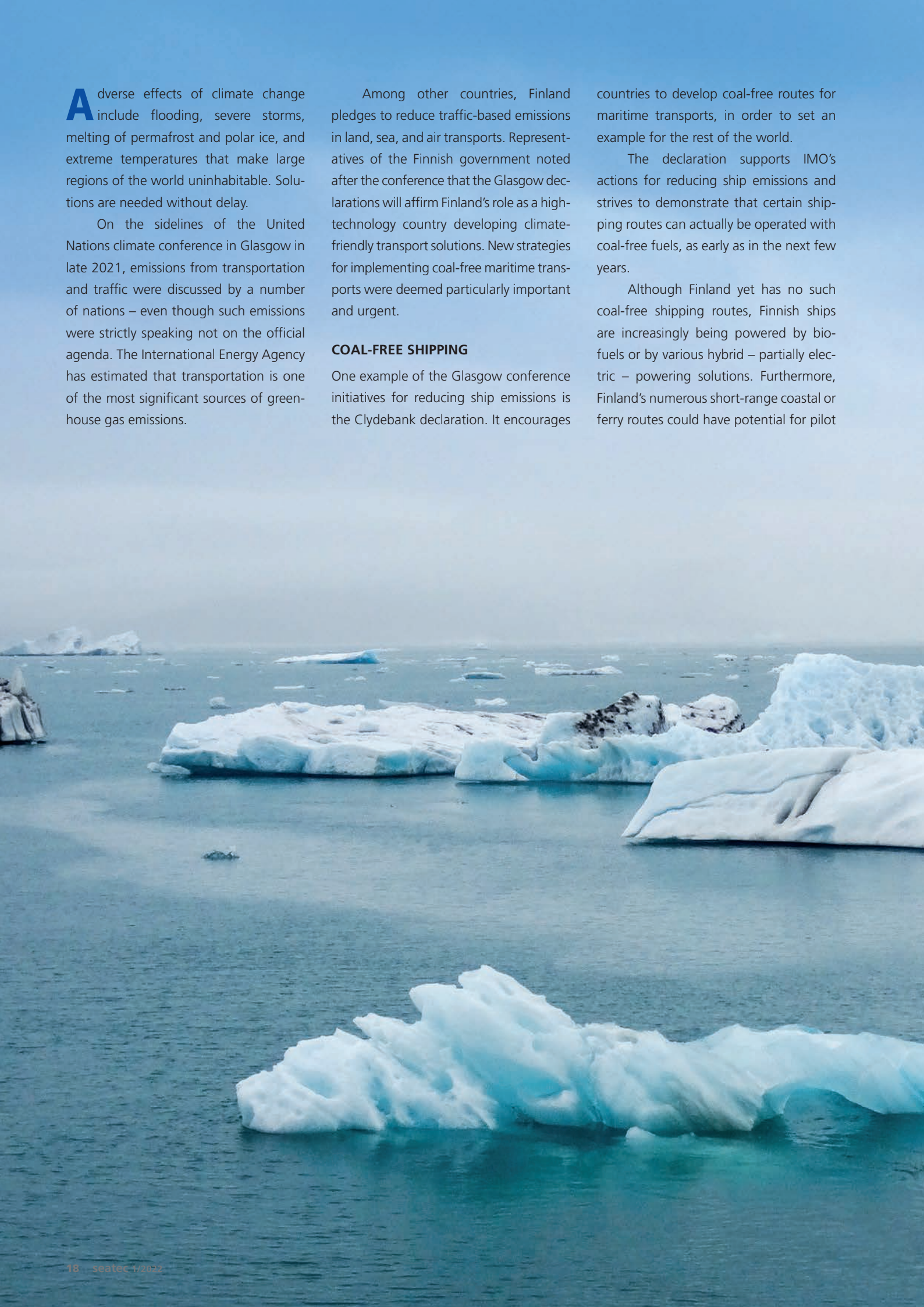
Among other countries, Finland pledges to reduce traffic-based emissions in land, sea, and air transports. Representatives of the Finnish government noted after the conference that the Glasgow declarations will affirm Finland's role as a high-technology country developing climate-friendly transport solutions. New strategies for implementing coal-free maritime transports were deemed particularly important and urgent.

COAL-FREE SHIPPING

One example of the Glasgow conference initiatives for reducing ship emissions is the Clydebank declaration. It encourages countries to develop coal-free routes for maritime transports, in order to set an example for the rest of the world.

The declaration supports IMO's actions for reducing ship emissions and strives to demonstrate that certain shipping routes can actually be operated with coal-free fuels, as early as in the next few years.

Although Finland yet has no such coal-free shipping routes, Finnish ships are increasingly being powered by biofuels or by various hybrid – partially electric – powering solutions. Furthermore, Finland's numerous short-range coastal or ferry routes could have potential for pilot



projects for electrically-powered vessels in the near future.

Additionally, Finland is participating in Denmark's initiative that aims to implement totally greenhouse-gas-free sea transports by the year 2050.

LOW EMISSIONS – LIMITED POLLUTION

In some estimates, maritime transport emits approximately 940 million tons of carbon dioxide emissions annually. Fifteen of the largest mega-ships alone cause as much air pollution as 760 million cars. International shipping is responsible for 87 percent of CO_2 emissions in shipping.

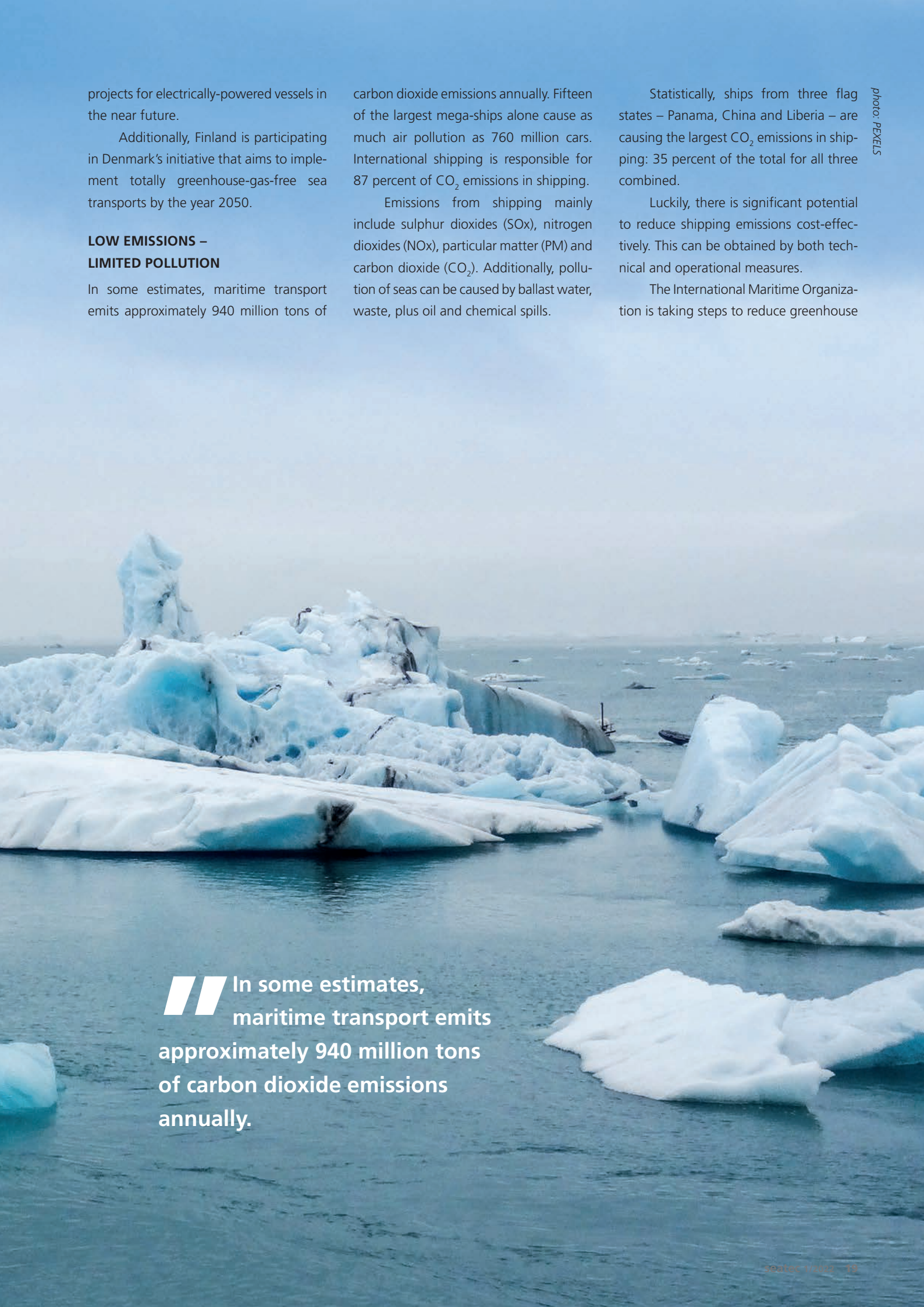
Emissions from shipping mainly include sulphur dioxides (SOx), nitrogen dioxides (NOx), particular matter (PM) and carbon dioxide (CO_2). Additionally, pollution of seas can be caused by ballast water, waste, plus oil and chemical spills.

Statistically, ships from three flag states – Panama, China and Liberia – are causing the largest CO_2 emissions in shipping: 35 percent of the total for all three combined.

Luckily, there is significant potential to reduce shipping emissions cost-effectively. This can be obtained by both technical and operational measures.

The International Maritime Organization is taking steps to reduce greenhouse

photo: PEXELS



"In some estimates, maritime transport emits approximately 940 million tons of carbon dioxide emissions annually.

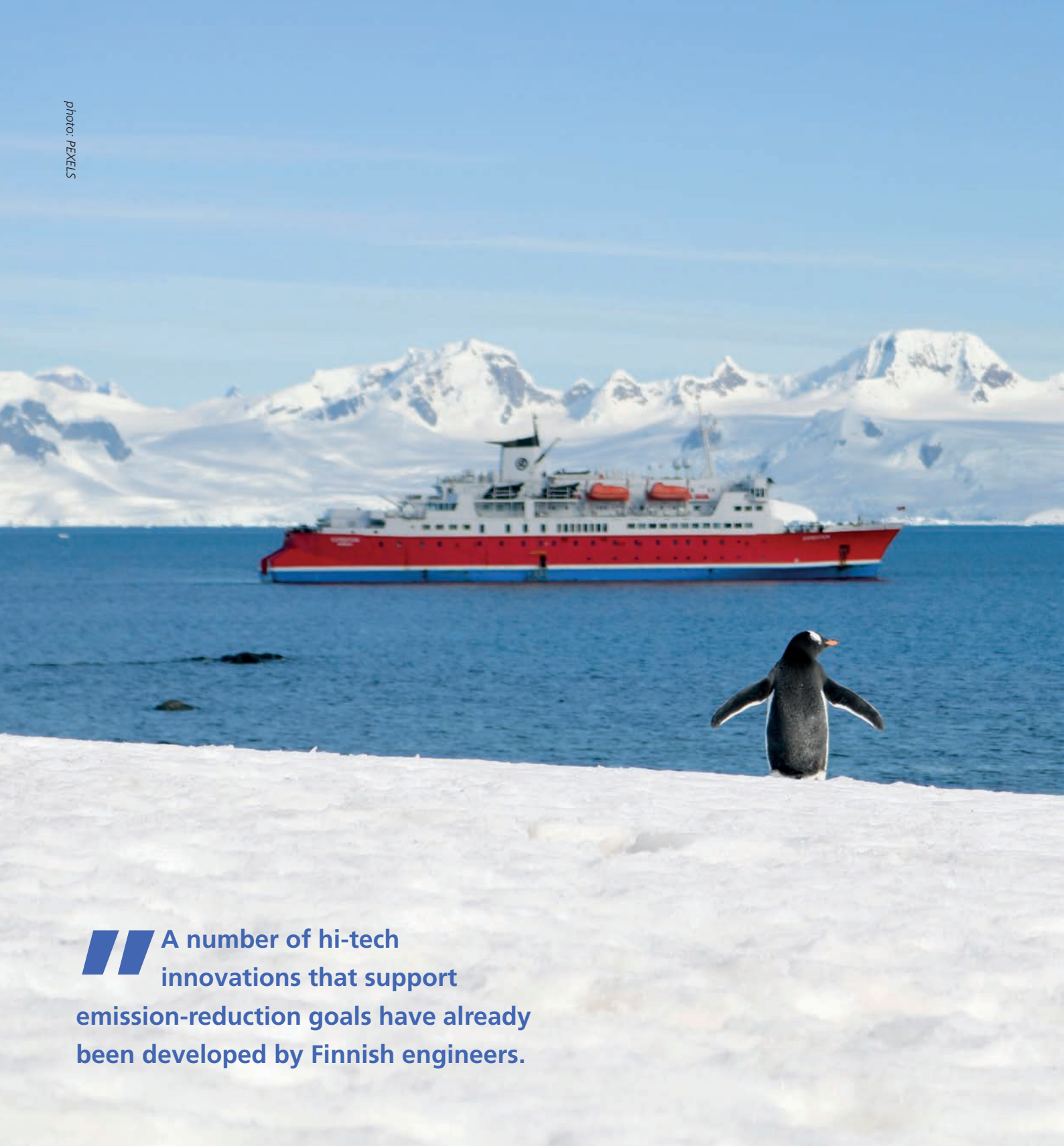


photo: PEXELS

"A number of hi-tech innovations that support emission-reduction goals have already been developed by Finnish engineers.

gas emissions from international shipping. For one thing, sulphur content in shipping fuels is limited to less than 0.5 percent.

As to operational measures, reduction of speed and route optimisation would reduce fuel consumption considerably. By reducing average speeds by 12 percent, daily fuel consumption could be decreased by some 27 percent. Weather-based route optimisation in shipping can result in further fuel savings of some 3 percent.

Technical measures can also reduce emissions. Possible solutions include propeller optimisation, heat recovery systems, hull designs, and emission filtering.

LNG-FUELLED CRUISE SHIPS

Coal-free powering of vessels is one solution. Innovations in battery technologies are gradually paving way for electrically powered ships, at least for short-range routes. Wind-assist systems are also possible and are already in use aboard some cruise ships.

Today's environmentally-friendly fuel solutions include LNG (liquefied natural gas) that is already being utilised, even for powering very large cruise ships.

LNG is a practical solution e.g. around the Baltic Sea region where IMO's environmental regulations have in recent years become very strict. For LNG-fuelled ships, coastal LNG terminals are needed. Such terminals already exist in various countries.

Some cruise ships have dual-fuel systems: while the main fuel of the ship is LNG, the engines may also be able to utilise MGO gas oil or other substitute fuel. Running on LNG, this type of vessel has virtually no SOx emissions and its NOx emissions remain well below IMO regulation levels. The particular-matter and CO_2 emissions should also remain on low levels.

Future environmentally-friendly fuel options for ships will also include ammonia and hydrogen fuels.

NEW TECHNOLOGIES AND INNOVATIONS

A number of hi-tech innovations that support emission-reduction goals have already been developed by Finnish engineers. For instance, Wärtsilä – known for its ship engines and power plants – is in the process of designing new types of environmentally-friendly engines.

A ship engine running on ammonia-based fuel is about to be launched to the market. Ammonia consists of nitrogen and hydrogen. Burning ammonia will not release CO_2 into the atmosphere.

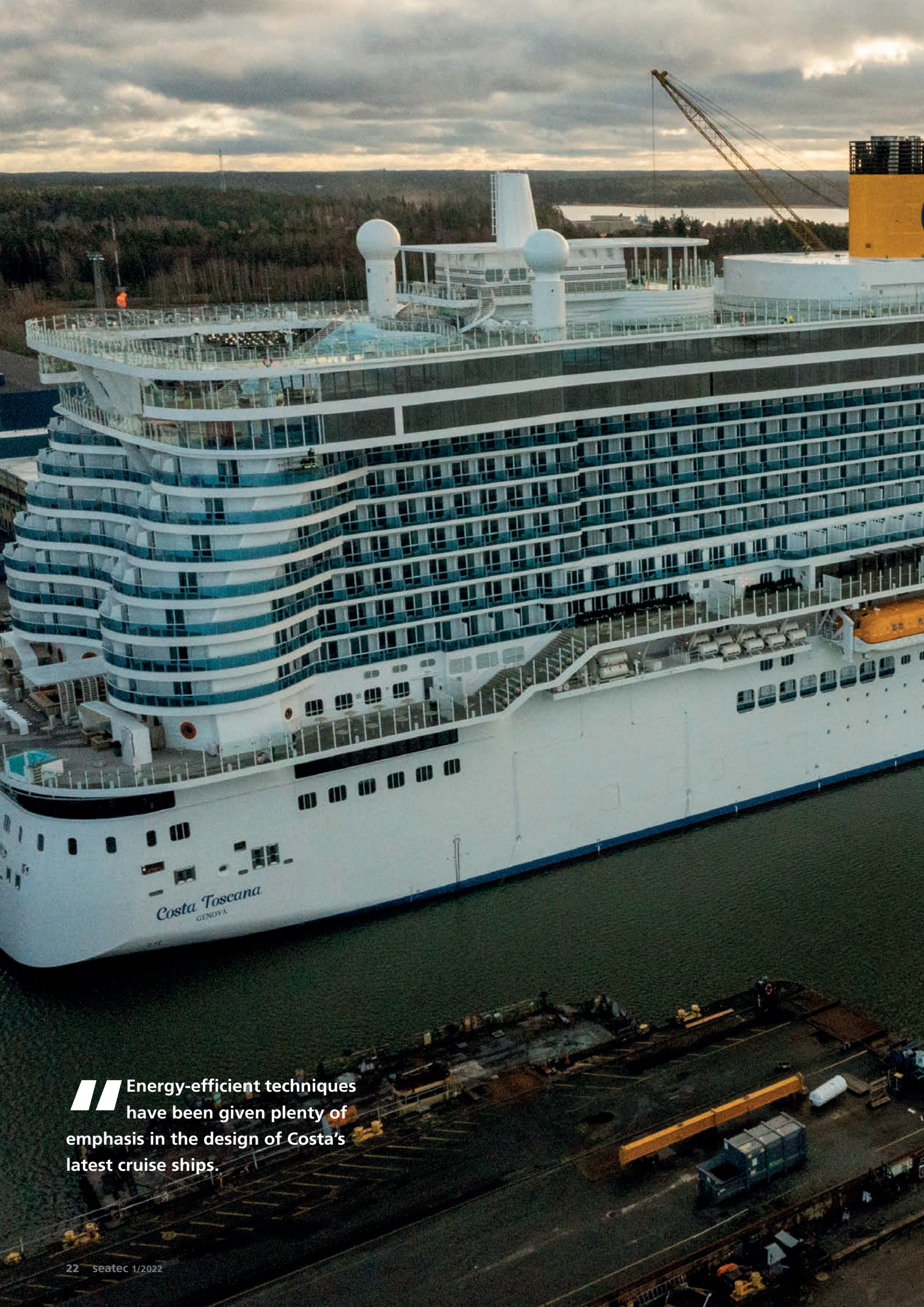
Another ship engine concept utilising pure ammonia fuel is scheduled to be complete in 2023, while ship engines running on pure hydrogen are expected to be launched by 2025.

Two other Finnish companies, Flexens and Elomatic, are now cooperating to presently produce hydrogen and synthetic fuels in Naantali, especially for the maritime fuel markets.

Furthermore, VTT SenseWay has researched into reducing emissions of cruise ships in particular. Approximately one third of the fuel consumption of cruise ships is caused by passenger cabins – the second-largest energy consumption figure, right after propulsion. When a cruise ship is docked, energy consumption of passenger cabins rises to first position.

VTT SenseWay's intelligent sensor device can be used to limit energy consumption in empty cabins and other areas where there are no passengers present. This matchbox-sized device can be utilised for energy optimisation, but it also can also yield an overview of the locations of passengers, thus assisting rescue work in fire emergencies or other high-risk situations.

The device can be integrated into the ship's various automation systems. Pilot projects have been scheduled to start in early 2022. ■



"Energy-efficient techniques have been given plenty of emphasis in the design of Costa's latest cruise ships.

NEW CRUISE SHIP 'COSTA TOSCANA' WAS BUILT FOR SUSTAINABLE SAILING

by: ARI MONONEN

photos: MEYER TURKU

In December 2021, the brand new cruise ship Costa Toscana was delivered after completion to Costa Cruises, the Italian cruise line brand for Carnival Corporation. Built by Meyer Turku shipyard in Finland, the ship was designed and constructed to be one of the most environmentally-friendly cruise ships in the world.

The Costa Toscana is one of the world's biggest ocean liners, with a tonnage of 185,000 GT. She is the cruise line's second and Turku shipyard's third ship to be powered by LNG fuel (*liquefied natural gas*).

The first metal sheet cutting took place in July 2019 and its hull assembly began in February 2020. The float-out ceremony of the Costa Toscana was held at the Meyer Turku in January of 2021.

"The Costa Toscana is equipped with dual-fuel engines. Their primary fuel is LNG but they can also be powered by diesel oil," says Mr. Tapani Mylly, Head of Communication and Sustainability at Meyer Turku shipyard.

The cruise ship has four main engines that produce 61,760 kW of power. She operates with two Azipod motors for a service speed of 17 knots, with four thrusters yielding increased maneuverability.

"This ship has the very latest LNG system of the best possible variety. Apart from that, she also has many other features designed to minimise the ship's environmental impact. They include heat-recovery technology, intelligent lighting, plus other systems for optimising energy-efficiency," Mylly recounts.

ENERGY-EFFICIENT TECHNOLOGY

In a statement from the ship's owner Costa Cruises, the sustainability of LNG fuel is emphasised. The cruise line regards the selection of LNG as one further step towards zero-emission ships, already reducing sulphur dioxide emissions and most of the other particular-matter emissions as well as nitrogen oxides and CO_2.

According to Mr. Mylly, a number of similar design features were already integrated into Costa Toscana's sister ship, the Costa Smeralda, also built by Meyer Turku

and completed two years earlier – then the fifth-largest cruise ship in the world. The ships share a common platform and technical specifications with some customization of the passenger areas.

"Both of these ships also largely utilise the same types of environmentally-friendly technologies. Such features have been refined a lot over the years. Energy-efficient techniques have been given plenty of emphasis in the design of Costa's latest cruise ships," Mylly points out.

Energy-efficiency has been enhanced by the hull design, as well as by intelligent automation. Design refinements have been made by aid of simulation, experimentation, and thorough testing, to minimise the ship's environmental impact. The end result is a floating "smart city."

The special desalination plants on board will process seawater directly and meet the ship's daily water supply requirements. Furthermore, a 100 percent separate collection and recycling of such mate-

"We proved that the shipyard can operate even in difficult times.

rials as plastic, paper, glass, and aluminum will be carried out on board, as part of an integrated approach aimed at supporting circular-economy projects.

All in all, the sustainable design features of the Costa Toscana will make it one of the most environmentally friendly cruise ships in the world.

ENTERTAINMENT GUARANTEED

The ship's hull assembly began at Turku shipyard in February 2020. The onset of the global Covid-19 pandemic presented a number of challenges throughout the shipbuilding project.

"Still, we proved that the shipyard can operate even in difficult times. As it happened, the shipbuilding was completed right on schedule," Mylly rejoices.

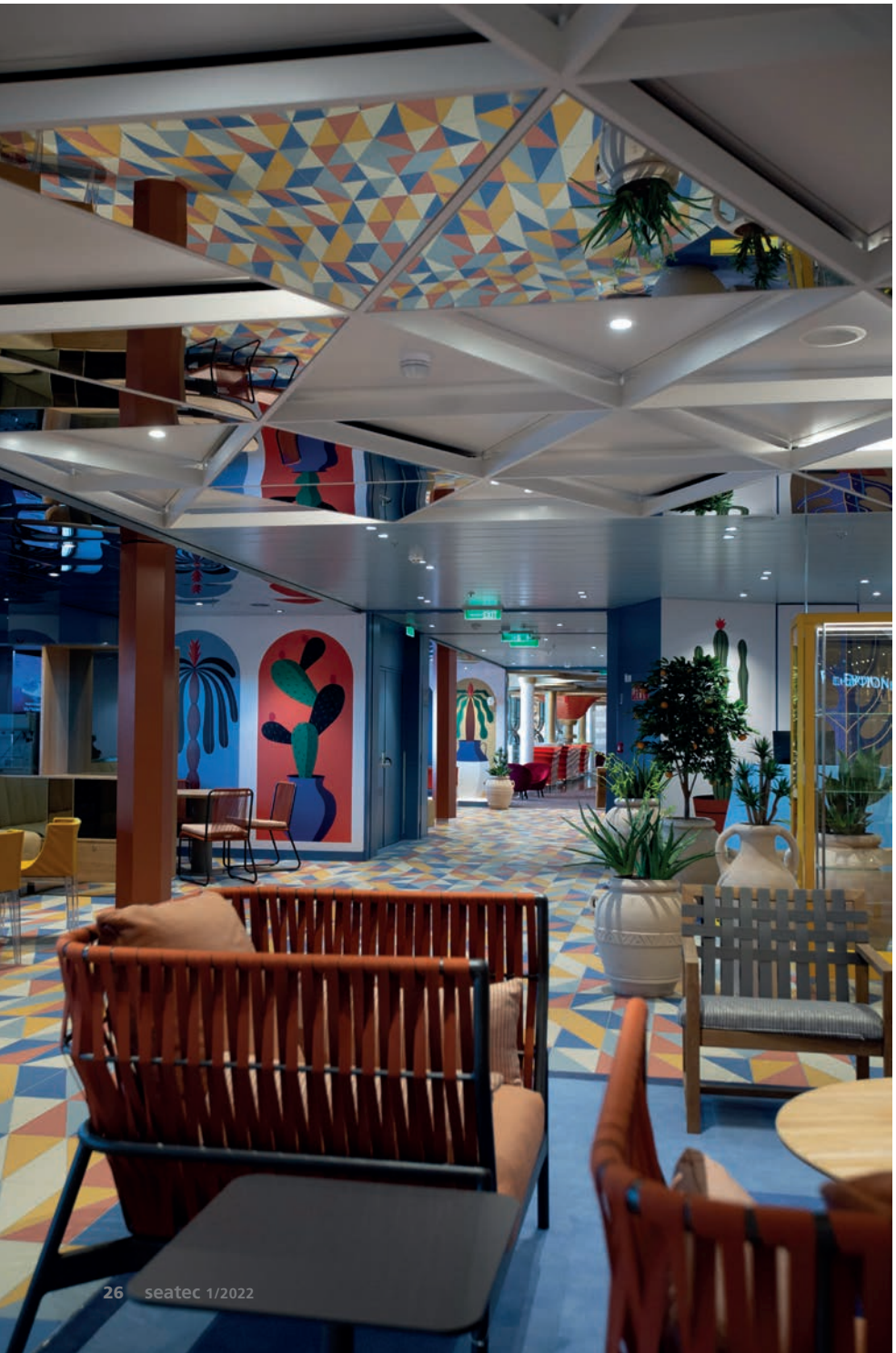
Now that the ship has been delivered, the first passengers will board the ship in March 2022.

"The ship's interior design is aimed to please the travellers. In addition, the interior's colour scheme is in a league of its own."

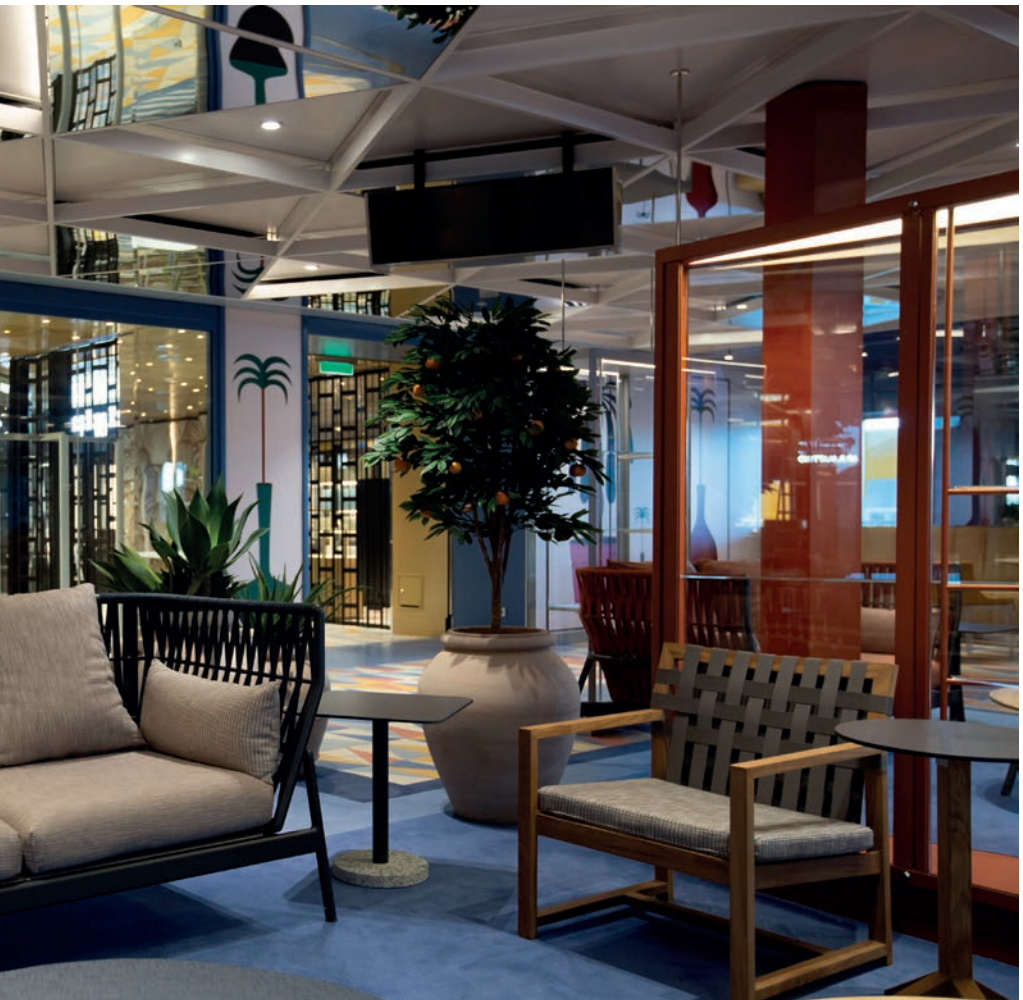
The interior design of the ship was created as a tribute to Tuscany by designer Adam Tihany who oversaw the project working with the four participating design firms.

"Special features include 21 restaurants – with emphasis on Italian and Tuscan culinary art – and an indoor pool area, complete with water-slides and four swimming-pools," notes Mylly.

In addition, the ship will offer premium sports facilities, entertainment, and spa treatments. An entertainment venue



"Special features include 21 restaurants and an indoor pool area.



amidships is spread over three levels for concerts and shows, featuring large-sized LED screens on the dome and walls.

The ship's furnishings, lighting, fabrics, and accessories are all made in Italy and have been specially designed for the Costa Toscana by 15 different companies.

The cruise ship's length is 337 metres and width 42 metres. She is able to accommodate 6,730 passengers – in more than 2,660 cabins – plus 1,646 crew members. Some of the cabins are equipped with outdoor balconies.

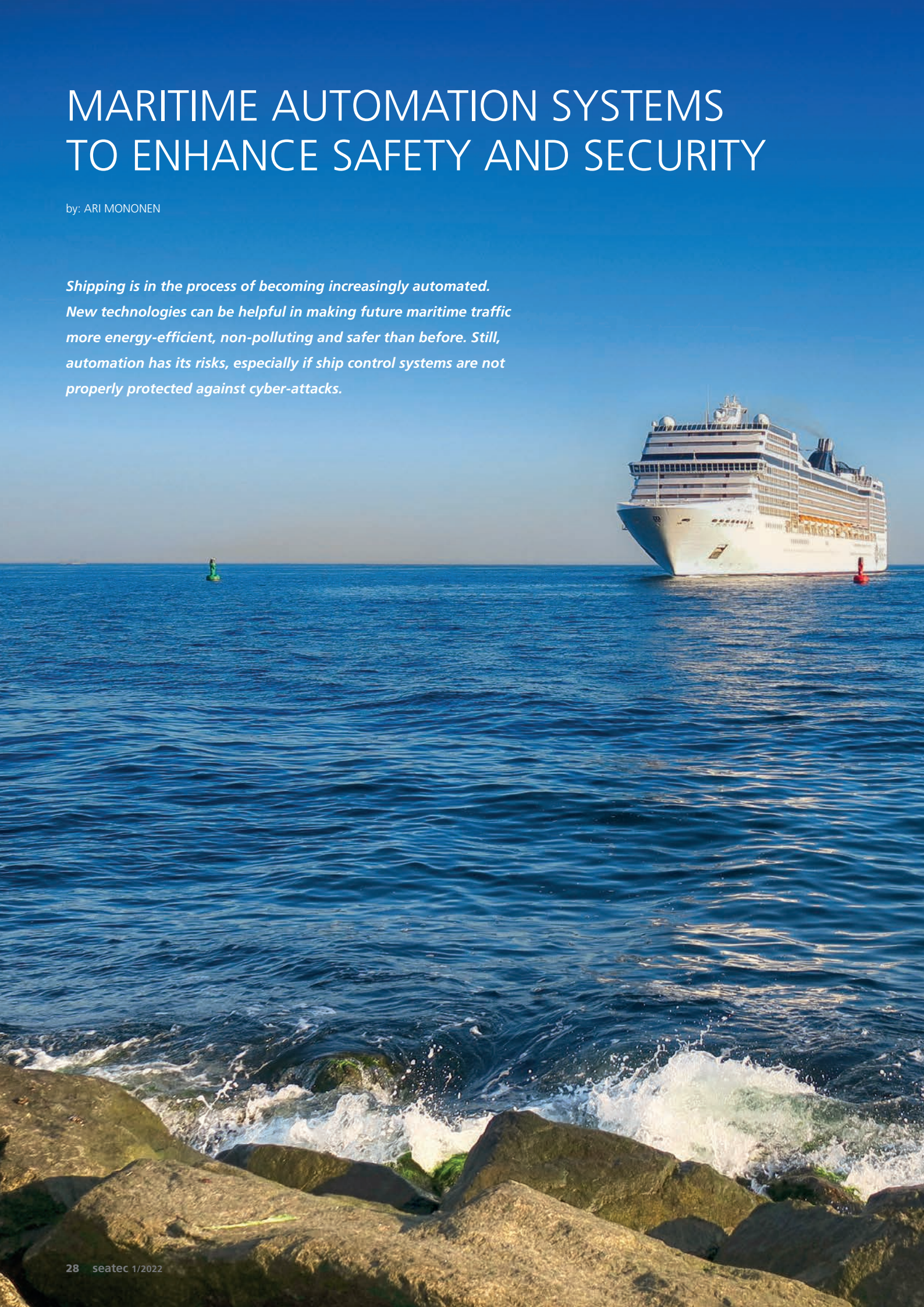
"The project was carried out in a rapid and professional manner. We can be proud of our shipbuilders."

The Costa Toscana is scheduled to enter service on 5th March 2022, sailing weekly cruises from Savona, Italy. After the first one-week cruise to Marseille, Barcelona, Valencia, Palermo and Rome, the ship will remain in the western Mediterranean for round-the-year cruising operations. ■

MARITIME AUTOMATION SYSTEMS TO ENHANCE SAFETY AND SECURITY

by: ARI MONONEN

Shipping is in the process of becoming increasingly automated. New technologies can be helpful in making future maritime traffic more energy-efficient, non-polluting and safer than before. Still, automation has its risks, especially if ship control systems are not properly protected against cyber-attacks.



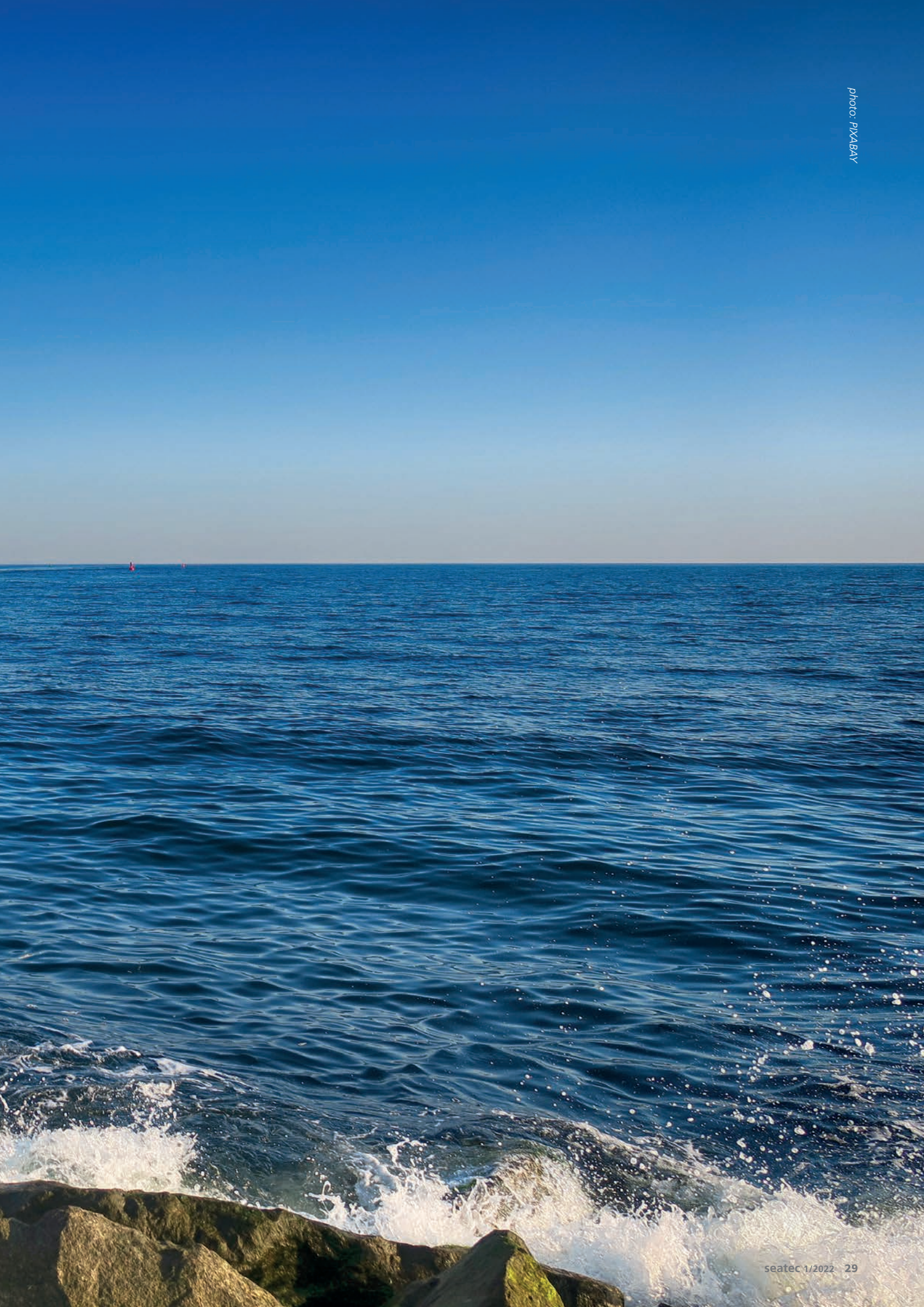


photo: PIXABAY

For a number of years, designers have developed various kinds of concepts for highly developed automation systems for ships, including remotely controlled and even totally autonomous vessels.

In North European waters, Rolls-Royce and the towage operator Svitzer demonstrated the world's first remotely operated commercial vessel – a tug – at Copenhagen harbour in 2017. Around the same time, Rolls-Royce Marine established a research centre for remote-controlled and autonomous ships in Turku in southwestern Finland.

In April 2019, Rolls-Royce Commercial Marine became a fully integrated part of Kongsberg Maritime, but the research centre is still operational.

New technologies for various autonomous ship projects also include artificial intelligence (AI) systems for ship navigation. Among others, the Finnish Aalto University has participated in some of these projects.

VERSATILE AUTOMATION

However, maritime automation systems are not always intended to replace the ship's human crew of operators by remote control or robotics. The development of sensors and automation systems for maritime applications can also benefit the operators of more traditional kinds of vessels.

In 2019, for instance, AI-based systems were tested on board Tallink's ship 'Megastar' in order to improve the performance of ship positioning and to have a more complete and error-free picture of the ship's surroundings, e.g. by recognising and eliminating possible errors of radar imaging and of navigation satellites. Such errors might be caused by environmental

factors but also by intentional jamming or cyber-attacks carried out by criminals or hostile nations.

One Sea, the industry alliance promoting and developing autonomous ship technology, has in recent times researched into various aspects of ship safety and autonomous technology. The alliance consists of a number of competent partners: ABB, Cargotec, Ericsson, Finnpilot, Fintraffic, Haltian, Inmarsat, Kongsberg, MTI, Napa, TietoEVRY and Wärtsilä, plus DIMECC, a Finnish innovation hub specialising in industrial digitalisation.

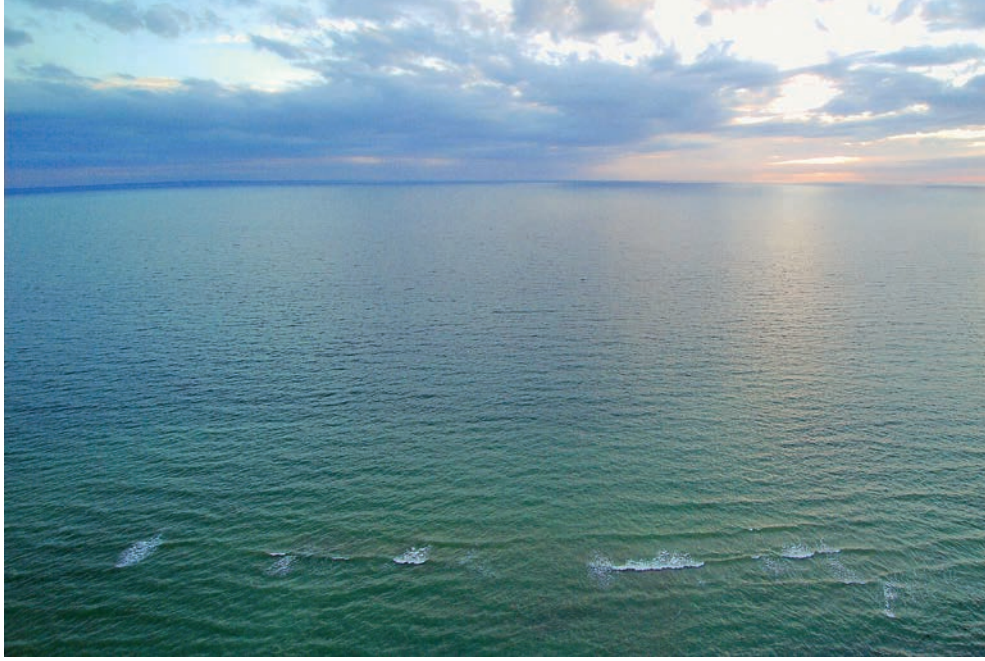


photo: PIXABAY

photo: PIXABAY

> **"Automation offers possibilites to improve the safety of navigation.**

COOPERATION FOR SAFETY

The Finnish Shipowners' Association is one of the participants of the international One Sea alliance that is striving to enable commercial autonomous maritime traffic by 2025. The aim is to create better conditions for making shipping significantly safer and more energy-efficient.

"We have been in cooperation with One Sea for a few years now. Maritime automation is important for the shipping industry. It has a lot of development potential," notes Ms. Sinikka Hartonen, Head of Environment and Technology at the Finnish Shipowners' Association.

"Automation offers possibilities to improve the safety of navigation but it also creates much-needed tools to cut emissions and to make sea transportation even more environmentally efficient than it is today," she continues.

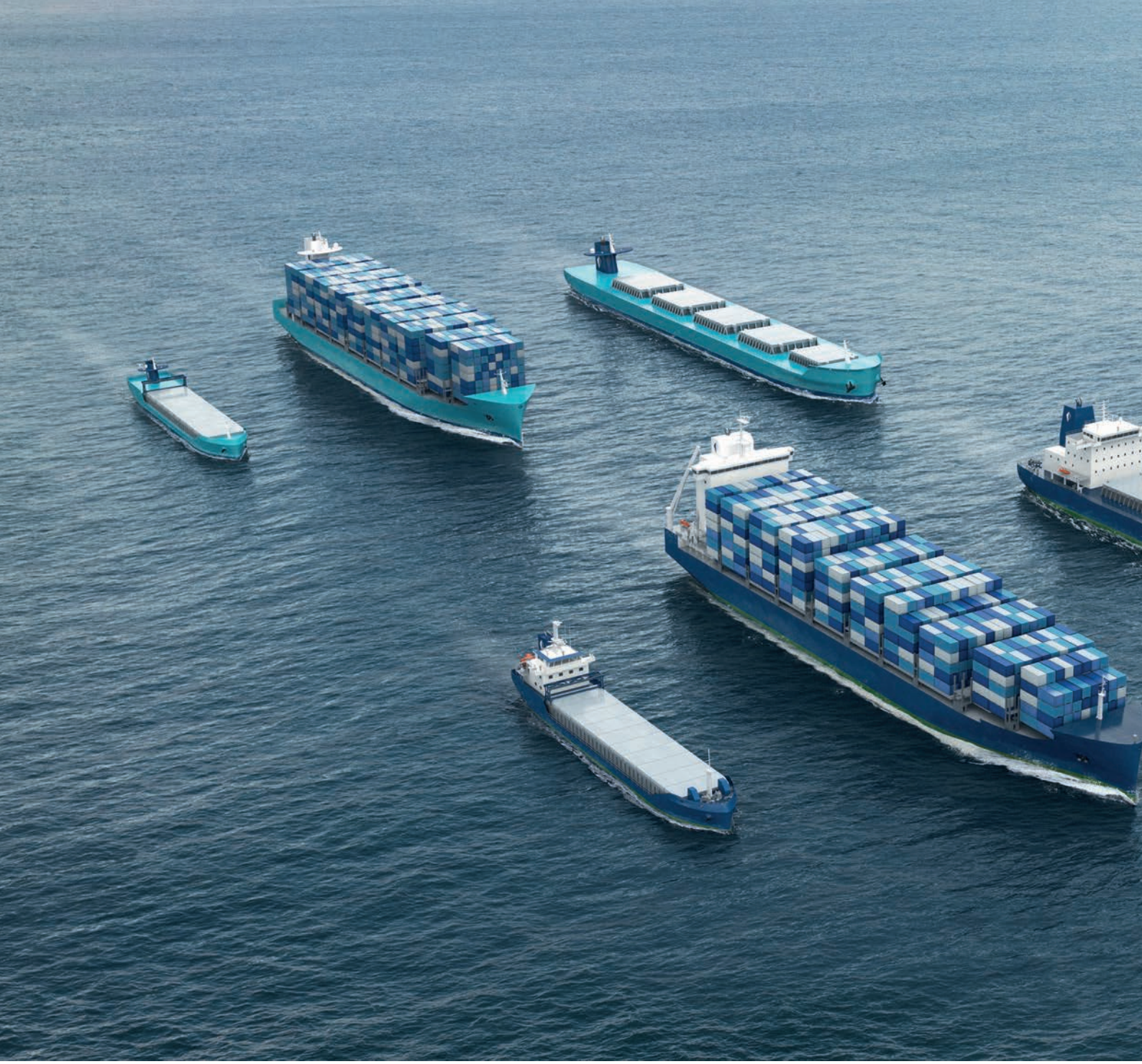
"Onboard automation has existed for many years already but its use is constantly increasing. This does not mean that ships would need to be autonomous or remotely controlled. The first step and the main priority is that technological innovations should be taken into use to assist seafarers in decision-making by e.g. offering improved situational awareness."

Many potential technologies already exist and could be taken into use, but it is important that their safety is ensured by further tests and pilot projects.

"The shipowners wish to promote and participate in projects that will help to understand the potential of the automation and how it could best be used in a safe and secure way," Hartonen points out.

ENVIRONMENTAL EFFORTS

According to recent research by One Sea alliance, shipowners could make good use of autonomous technology to support maritime decarbonisation efforts, now that the need for preventing the adverse effects



of climate change is becoming increasingly urgent.

International Maritime Organisation's Fourth IMO Greenhouse Gas Study in 2020 projected a 90 to 130 percent increase in greenhouse gas emissions from shipping by 2050. One Sea notes that this prediction contrasts sharply with the IMO's target to halve maritime emissions by the same year.

Furthermore, One Sea alliance member Wärtsilä has estimated that maritime autonomy solutions can yield fuel savings of at least 10 precent on longer voyages by optimising vessel routing and speed. Even a short reduction in docking time can cut fuel consumption by two to three per cent per minute. Various other fuel-saving techniques are also currently under research.

Against this background, One Sea recommends that the shipping industry should act swiftly and decisively to reduce the environmental impact of maritime traffic on the climate. Automation technologies could significantly help these efforts.

Maritime incidents – such as collisions at sea – can have a serious impact on the environment. The situation could be improved by improving situational awareness onboard ships. Autonomous technology can prevent ships from performing dangerous and potentially harmful actions and keep vessels away from particularly hazardous sea areas altogether.

PROMOTING CYBER SECURITY

With the rapid increase in automation and other maritime digital systems, cyber secu-

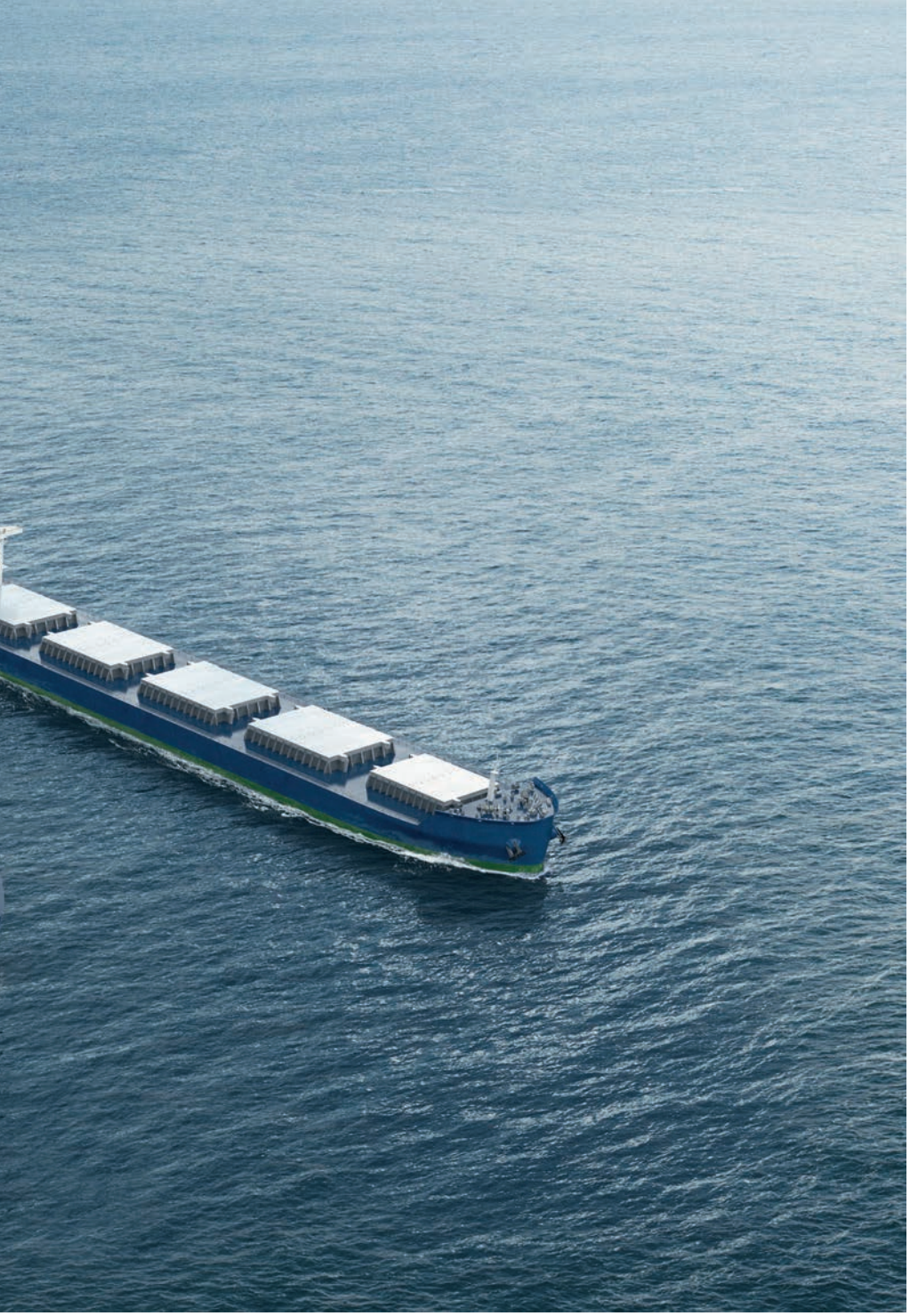


photo: ONE SEA

rity has not necessarily kept pace with the progress.

There has been an increase in cyber-attacks since the onset of the Covid-19 pandemic. Experts warn that the cyber challenge is bigger for existing ships than it is for newer vessels that are purposely built to withstand cyber-attacks.

According to a recent One Sea report on ship automation and safety, maritime cyber security is affected by factors including – but not limited to – connectivity, artificial intelligence, situational awareness, sensors, digital health management, energy management and the environment, and the adoption of digital twin technology. A clear understanding of how data is transferred is essential for recognising and limiting potential risks.

Some shipping companies have been known to have adopted rigorous cyber security strategies and even to employ a team of hacking specialists, working round the clock to identify weak points in their systems. However, many other companies have more casual attitudes towards cyber security, resulting in weak links in the cyber protection firewalls.

Cyber-attacks on the guidance systems of autonomous or remotely controlled ships might result in entire vessels with their cargo being hijacked by modern-day pirates. Alternatively, such attacks might cause navigation errors possibly resulting in shipwrecks or serious oil leaks.

SERIOUS THREATS

Apart from these obvious motives, there are other reasons for current maritime cyber-attacks. Organised criminals are known to have utilised ransomware attacks to close down the computer and data systems of various kinds of companies, in order to extort money in exchange of opening up the systems again.

Shipping companies can be highly vulnerable to such attacks. In the case of container ships carrying perhaps 20,000 or more containers each, the loss of data detailing the contents, owners and positions of on-board containers could obviously cause a lot of confusion, or even lead to disruption of shipping operations. Many ransomware attacks are not being reported to authorities since negative corporate publicity could lead to loss of customers.

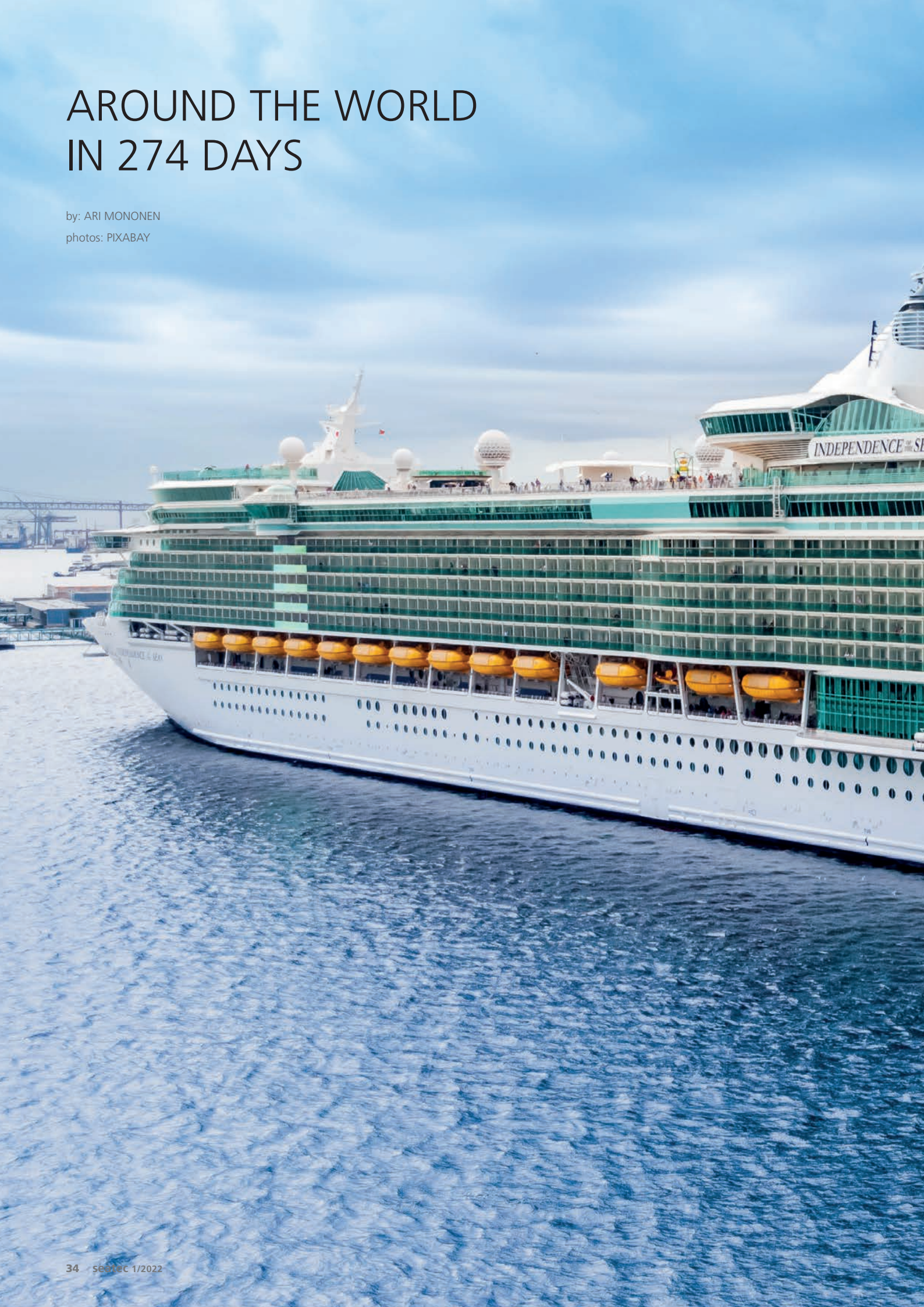
Furthermore, hostile states resorting to various kinds of hybrid warfare have increasingly become "the usual suspects" in sophisticated cyber-attacks of all sorts, possibly targeting the control systems of cargo ships, offshore oil-drilling platforms, or even warships of other nations.

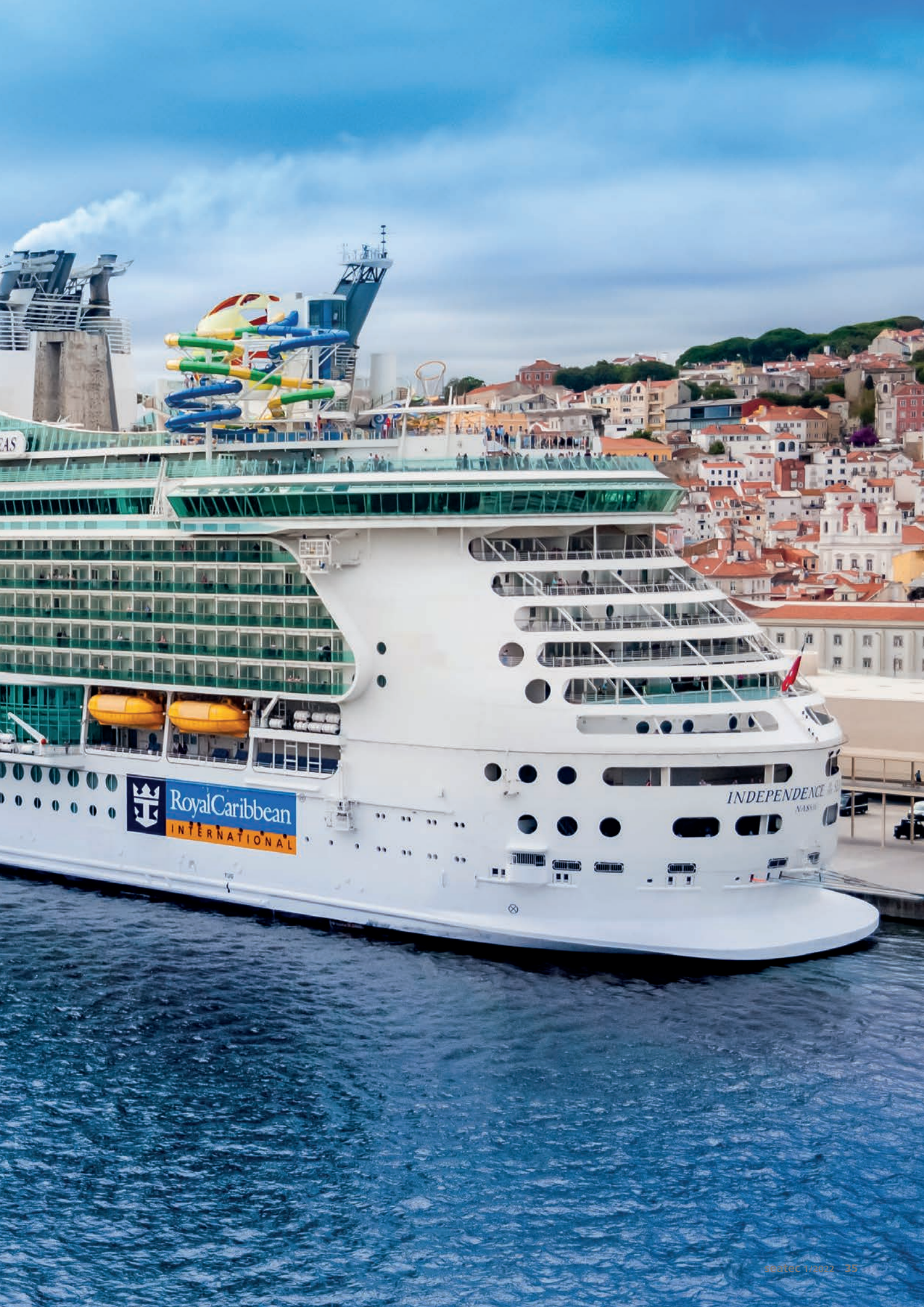
In the words of the recent annual report from the Finnish counterintelligence: clandestine operators of non-democratic states tend to have a wider range of operational tricks at their disposal than the more legitimate military and intelligence services of democratic countries usually have. ■

AROUND THE WORLD IN 274 DAYS

by: ARI MONONEN

photos: PIXABAY




RoyalCaribbean
INTERNATIONAL
INDEPENDENCE

In days gone by, Jules Verne's literary heroes managed to travel around the globe in 80 days. To celebrate the end of the pandemic (hopefully, at least) in 2023, the cruise line Royal Caribbean intends to break the record in a different way, offering a 9-month around-the-world luxury cruise. Finland will be one of the countries along the itinerary.

The global Covid-19 pandemic is bad news for everybody's business and health. It has proved to be particularly problematic for cruise lines.

Cruises have been cancelled worldwide for lengthy periods of time. In some cases, inaugural sailings of new cruise ships have been delayed after crew members have shown symptoms of the disease.

Among other cruise lines, Royal Caribbean International volunteered to pause operations on account of the pandemic, in the first instance until mid-September 2020. Several further pauses followed as the pandemic raged on. In January 2021, only one of the company's ships was sailing. Another one resumed service in July.

Still, Royal Caribbean – the proud operator of the four largest passenger ships in the world, with also 20 other cruise ships in the fleet plus six additional ships on order – is not giving up. The company is already planning a highly impressive comeback.

A HISTORY OF HUGE SHIPS

Royal Caribbean International was founded in 1968 as Royal Caribbean Cruise Line. The founders were three Norwegian shipping companies: Anders Wilhelmsen & Company, I.M. Skaugen & Company, and Gotaas Larsen.

Since 1997, the cruise line is a wholly-owned subsidiary of Royal Caribbean Group and is based in Miami in the United States. Known as the world's largest cruise line by revenue and second largest by the number of passengers, Royal Caribbean is also a partial owner of some other cruise lines, such as TUI Cruises.

Royal Caribbean has a long common history with the Finnish maritime industries. The Wärtsilä shipyard in Helsinki built the company's first cruise ship M/S *Song of Norway* in 1970. She became the world's first Caribbean cruiser.

Even later on, the Finnish shipyards in Helsinki and Turku have built a large number of giant cruise ships for Royal Caribbean. Amongst them are the five Voyager-class cruise ships designed to carry more than 3,000 passengers.

At the time of construction, they were the largest ships of their kind in the world. But even larger-sized luxury cruise ships followed.

Royal Caribbean's Oasis-class ships are the largest passenger ships ever built, with a maximum capacity of 6,296 passengers. The first two were built at STX Europe's Turku shipyard in Finland in 2009 and 2010, while the third and fourth ships in the class were later built at Saint-Nazaire shipyard on the Brittany coast of France.

ULTIMATE CRUISING

One particularly noteworthy Royal Caribbean's cruise ship right now is the *Serenade of the Seas*, a Radiance-class ship built at Meyer Werft shipyard in Papenburg, Germany. She was completed in 2003.

Serenade of the Seas is a gas-turbine vessel, yielding higher efficient speeds than other types of cruise ships and lower emissions than diesel-powered cruise ships. The two gas turbines are each able to produce up to 25.25 MW of power, giving the ship a regular cruising speed of 25 knots.

The ship's length is 293.2 metres. With a capacity of 2,476 passengers and 891 crew members, the ship is equipped with 12 passenger decks and nine passenger elevators.

In October 2021, Royal Caribbean announced that Serenade of the Seas will sail a 274-day itinerary around the world, starting in late 2023. It is the longest cruise offered by any cruise line, named the Ultimate World Cruise.

In the years before the pandemic, around-the-world cruises used to be quite popular, but their duration was generally only around five months.

"Royal Caribbean's Oasis-class ships are the largest passenger ships ever built, with a maximum capacity of 6,296 passengers.

IN SEARCH OF LOST TIME

The *Serenade of the Seas* is scheduled to depart from Miami on 10 December 2023. According to a statement by Royal Caribbean's CEO Michael Bayley, the special voyage has been planned to help people regain some of the cruising time that was lost during the pandemic.

First, the ship will set course for the Caribbean, then she will proceed to sail around South America. In the course of her voyage, the ship will visit all continents and a total of 65 countries, including Brazil, Australia, China, India, Egypt, and Morocco.

The voyage will be divided into four sections, so that passengers can select individual sections or the whole package. Ticket prices range from US$ 61,000 to US$ 112,000 (56,000 € to 96,000 €).

The port of Helsinki in Finland will be visited as one of the final destinations of the cruise. If you happen to be on board, be sure to visit the White City of the North! ■

Finnish Marine Industries

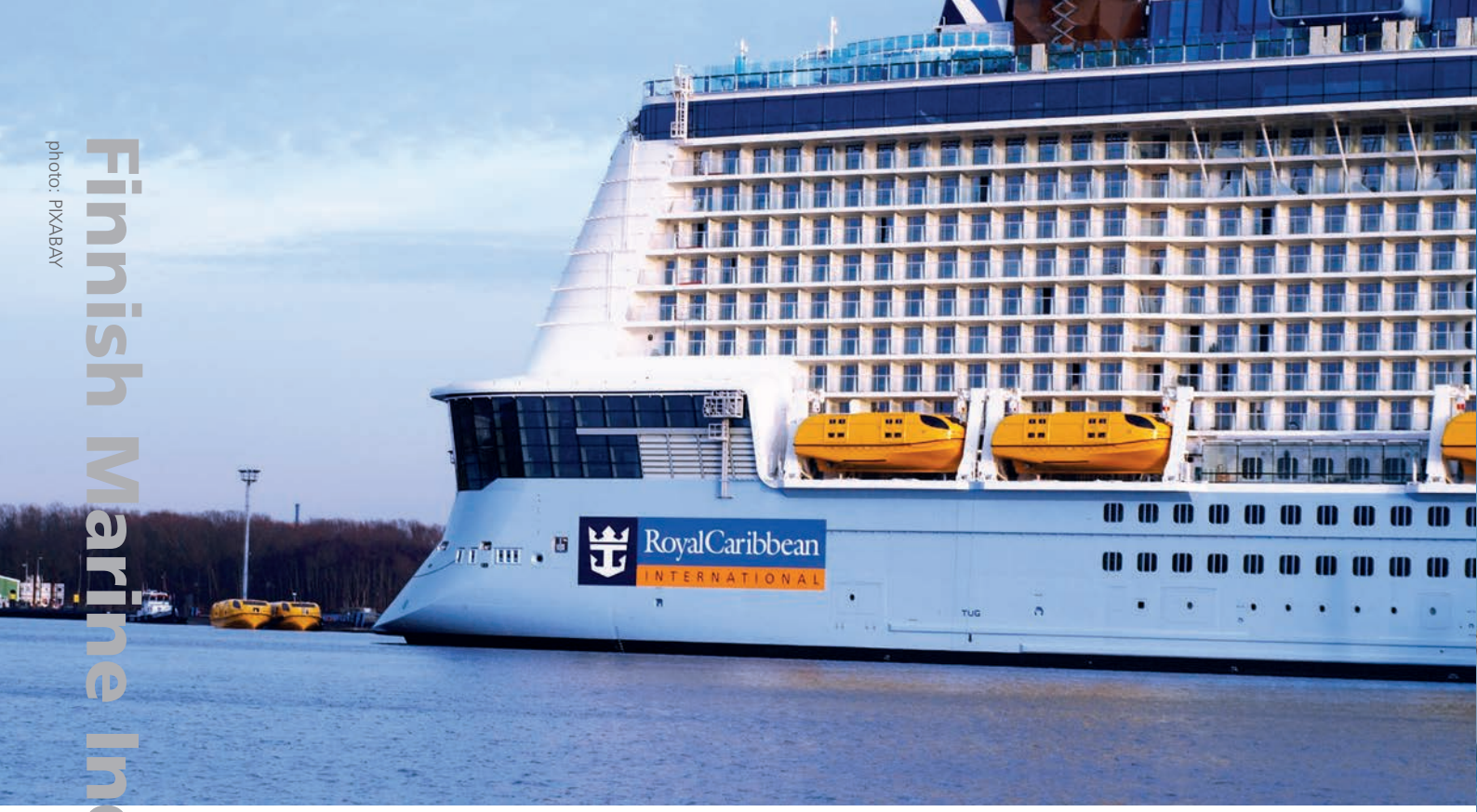


photo: PIXABAY

ABB Oy
Adwatec Oy
Aker Arctic Technology Oy
Alfa Laval Aalborg Oy
Allstars Engineering Oy
ALMACO Group Oy
Antti-Teollisuus Oy
Apex-Marine Oy
AQ Trafotek Oy
Atexor Oy
Auramarine Oy
Beacon Finland Ltd Oy
Bertel O. Steen Power Solutions Finland Oy
Bluetech Finland Oy
Cadmatic Oy
Comatec Industrial and Marine Oy
Deltamarin Oy
EIE Maskin Oy
Elcoline Group Oy
Elomatic Consulting & Engineering Oy
Emmanoa Oy
Enersense Offshore Oy
Etteplan Oyj
E.U. -Adhoc Project Oy
Evac Oy
Foreship Oy
FSP Finnish Steel Painting Oy
Furuno Finland Oy
Groke Technologies Oy
Halton Marine Oy
Helkama Bica Oy
Helsinki Shipyard Oy
I.S. Mäkinen Oy
ISOVER (Saint-Gobain Finland Oy)
Insinööritoimisto Comatec Oy
Jalmare Oy
Jukova Corporation Oy
Kaefer Oy
Kavika Oy
Kemppi Oy
Koja Oy
KONE Hissit Oy
Koneteknologiakeskus Turku Oy
Kongsberg Maritime Finland Oy
Kvaerner Finland Oy
Laivasähkötyö Oy
Lamor Corporation Ab
Oy Lautex Ab
LED Tailor Oy
MAN Energy Solutions Sverige AB, Finland Branch
Marioff Corporation Oy
Merima Oy
Mesekon Oy
Metalliasennus Huuhka Oy
Metos Oy Ab
Meyer Turku Oy
Mobimar Oy
Napa Oy
Nora flooring systems Oy
Norsepower
Oy NIT Naval Interior Team Ltd
Oilon Oy
Onninen Oy
ORSAP Oy
Parmarine Oy
Paroc Oy Ab
Pemamek Oy
Piikkio Works Oy
Pocadel Oy
Promeco Group Oy
Rauma Marine Constructions Oy
Rauman Meriteollisuuskiinteistöt Oy
Reddal Oy
R&M Ship Technologies Finland
RR Site Service Oy
Saajos Oy
S.A. Svendsen Oy
SBA Interior Oy
SeaKing Oy
Shipbuilding Completion Oy
SSAB Europe Oy
Steerprop Oy
Oy Stellio Ab
Suomenlahden Telakka Oy
TEVO Lokomo Oy
The Switch Engineering Oy / YASKAWA
Turun Korjaustelakka Oy
Uudenkaupungin Työvene Oy
Vallila Marine Oy
Valmet Oyj
VTT SenseWay Oy
Wiima Logistics Oy
Wärtsilä Oyj Abp

company directory

photo: TALLINK GRUPP

1 4 6 7

AB-MARINEL OY

Konsantie 30, FI-21260 Raisio
Finland
Phone +358 2 444 11
info@ab-marinel.fi
www.ab-marinel.fi

Contact Person
Tommi Niemi
Henry Lindström

Facts & Figures
Turnover: EUR 5 million
Personnel: 50
Established: 1986

Specialty Areas
- AB-Marinel Oy supplies comprehensive delivery of the electrical materials, -equipment and spare parts for all kind of ships and represents several manufacturer of the electrical control-, alarm and communication systems.
- Specialized in turn-key-deliveries for newbuilding ships, including design, installations, material and equipment.

8

ABLEMANS OY

Härjänkurkuntie 46
FI-21250 Masku
Finland
Phone +358 2 439 6500
ablemans@ablemans.fi
www.ablemans.fi

Contact Person
Marko Ruostekivi
Managing Director
marko.ruostekivi@ablemans.fi

Facts & Figures
Turnover: EUR 6,3 million
Personnel: 10
Established: 1987

Specialty Areas
Steel and Aluminium structures.
Shipbuilding – Shiprepairing – Conversions – Outfitting.

2 6 7

AT-MARINE OY, AUTROSAFE

Uranuksenkuja 10, FI-01480 Vantaa
Finland
Phone +358 9 5494 2600
sales@atmarine.fi
www.atmarine.fi

Contact Person
Antti Pihlajamäki, antti.pihlajamaki@atmarine.fi
Jussi Kujanpää, jussi.kujanpaa@atmarine.fi

Specialty Areas
Services:
- Sales, maintenance, manufacturing, commissioning and planning.

Equipment:
- Navigation and communication systems.
- Machine and fire alarm systems.
- Engine room equipment, sound and light alarms, alarm panels and centers.
- Temperature and pressure sensors.
- Machine automation.
- Escape and emergency lighting including special signs for exterior and interior decks.
- LED lamps, searchlights and window wipers.
- Liquid Handling Equipment.
- Special Electronic Devices.

1 3 8

JTK POWER OY

Teollisuustie 6
FI-66600 Vöyri
Finland
Phone +358 20 781 2300
Fax +358 6 361 0383
info@jtk-power.fi
www.jtk-power.fi, www.jtk-power.cn

Contact Person
Timo Viitala
Managing Director
timo.viitala@jtk-power.fi

Facts and Figures
Turnover: EUR 26 million
Personnel: 93 in Finland, 22 in China
Established: 1998

Specialty Areas
Large Diesel and Gas engines exhaust and intake silencers
Offshore-, paper- & pulp and other process industries large silencers
Also Valve seat inserts are manufactured for exhaust and intake valves, of both large and small diesel engines.

2 6 7

KOJA MARINE

P.O. Box 351 (Lentokentänkatu 7)
FI-33101 Tampere
Finland
Phone +358 3 282 5111
marine@koja.fi
www.koja.fi

Contact Person
Esko Nousiainen, Director
esko.nousiainen@koja.fi

Facts & Figures
Turnover: EUR 100 million
Personnel: 350
Established: 1935
Parent Company: Koja Group

Specialty Areas
Air conditioning systems, air conditioning units. System design and material delivers. Cargo ventilation systems. Air Conditioning turn-key deliveries, HVAC electrical / automation systems.

4

OY LAUTEX AB

Ojakkalantie 13, FI-03100 Nummela, Finland
Phone +358 9 224 8810
sales@lautex.com
www.lautex.com

Contact Persons
Jukka-Pekka Tuominen, Sales Manager,
jukka-pekka.tuominen@lautex.com, Phone +358 44 704 6353.
Antti Holappa, Sales Manager,
antti.holappa@lautex.com, Phone +358 50 386 1213

Facts & Figures
Personnel: 53
Established: 1951
Parent Company: Teknoma Oy

Specialty Areas
Ceilings for ship accommodation and public spaces, such as metal panels, profiles, tiles and gratings in aluminium or steel. The product range includes also B-0 and B-15 fire classified ceilings, domes, beams and special ceilings. All ceiling materials are possible to coat on different materials.

1. Consulting
2. Equipment
3. Machinery
4. Materials
5. Safety
6. Systems
7. Turnkey Deliveries
8. Yards
9. Other

2 3 6 7

MARINE DIESEL FINLAND OY

Eteläkaari 10
FI-22420 Lieto
Finland
Phone +358 20 510 6900
Fax +358 2 253 9121
marine.diesel@wihuri.fi

Contact Persons
Jukka Uitto
Mika Aaltonen

Facts & Figures
Turnover: EUR 6 million
Personnel: 48
Established: 1992

Specialty Areas
Main- and auxiliary engine repair and service. Total overhaul of all type of engines. Turbocharger service and repair. On-site machining. Fuel injector testing also for solenoid operated devices. Well-equipped workshop in Lieto. John Deere authorized service and repair, Kemel seals and bearings

3

OILON OY

P.O. Box 5
FI-15801 Lahti
Finland
Phone +358 3 857 61
Fax +358 3 857 6239
www.oilon.com

Contact Person
Jani Kurikka
jani.kurikka@oilon.com

Facts & Figures
Turnover: EUR 70 million
Personnel: 360
Established: 1961

Specialty Areas
Burners for various liquid and gaseous fuels. For example, for HFO, MGO, methanol, natural gas, biogas, LPG and H2.

4

ONNINEN OY

P.O. Box 109
FI-01301 Vantaa
Finland
Phone +358 20 485 5111
Fax +358 20 485 5500
www.onninen.fi
www.onninen.com

Contact Person
Martti Lehti, Area Sales Director
martti.lehti@onninen.com

Facts & Figures
Personnel: 3000
Established: 1913

Specialty Areas
Onninen provides comprehensive materials services to contractors, industry, public organisations and technical product retailers. Onninen is member of Kesko Group. We have 3 000 employees in our Finnish, Swedish, Norwegian, Polish, Russian and Baltic operations.

9

PEDRO OY

Tehdastie 4-6
FI-15560 Nastola
Finland
Phone +358 3 873 900
Fax +358 3 873 9010
info@pedro.fi
www.pedro.fi

Contact Person
Juha Lehtonen
Managing Director
juha.lehtonen@pedro.fi

Facts & Figures
Established: 1988

Specialty Areas
PEDRO has over 30 years expertise of furniture to luxury cruisers, hotels and homes. Theatre seats and sofas to cruisers AIDA, Carnival, Color Line, Costa, Hapac Lloyd, RCCL & TUI Cruises.

2 9

POCADEL OY

Korpelantie 229
FI-21570 Sauvo
Finland
Phone +358 50 435 2638
pocadel@pocadel.fi
www.pocadel.fi

Contact Person
Maria Perrakoski
maria.perrakoski@pocadel.fi

Facts & Figures
Established: 1997

Specialty Areas
Light weight B15 – A60 fire rated glass doors and partitions for marine and offshore use. Product range includes hinged doors, sliding doors, extra wide tandem doors, glass walls and partitions.

2 7

PORKKA FINLAND OY

P.O. Box 127
FI-3310 Tampere
Finland
Phone +358 20 555 512
contact@porkka.com
www.porkka.com

Contact Person
Petri Hiilloste
petri.hiilloste@porkka.com

Facts & Figures
Turnover: EUR 30 million
Personnel: 170
Established: 1962
Parent Company: Festivo Finland Oy

Specialty Areas:
Provision stores. Walk-in rooms in galleys/pantries. Insulated doors. Insulated fire doors A60, for cold stores. Marine cold cabinets and counters.

1. Consulting
2. Equipment
3. Machinery
4. Materials
5. Safety
6. Systems
7. Turnkey Deliveries
8. Yards
9. Other

1 4 5 7

RENOTECH OY

Sampsankatu 4 B, FI-20520 Turku, Finland
Phone +358 10 830 1600
rt@renotech.fi
www.renotech.fi

Contact Person
Bob Talling
+358 50 558 1806,
bt@renotech.fi

Facts & Figures
Turnover: EUR 1,5 million
Personnel: 10
Established: 1994

Specialty Areas
MED Certified products, B + D. GRG decorative wall and ceiling elements, mouldings and sculpture work. DGG light-weight gypsum board. Renopur decorative surface finishes, paint effects, marbling, wood graining, gilding, paintings and art work. Stonemix textured mouldings and finishes. Renofix non-combustible glues. Fireshield acoustic and fire proofing. RenoImage silk printing and 3-D release films. Acoustic flooring and floor screeds.

2 4 9

SBA INTERIOR LTD

Hangontie 940, FI-10300 Karjaa
Finland
Phone +358 19 32771
info@sba.fi
www.sba.fi

Contact Persons
Thomas Pökelmann, Sales Manager, thomas.pokelmann@sba.fi
Johan Fagerlund, Technical Director, johan.fagerlund@sba.fi

Facts & Figures
Turnover: EUR 18 million
Personnel: 110
Established: 1985

Specialty Areas
SBA Interior is specialised in accommodation panelling and different types of beds for marine applications.
Latest development is an only 16mm B-0 class panel and a 50 mm A-60 class light weight box; wall and ceiling as well as a B-15 class Extension Screen. Digital printed panels available.
Another branch of SBA is subcontracting for metal industry.

9

SEASIDE INDUSTRY PARK RAUMA

Suojantie 5
FI-26100 Rauma
Finland
www.seasideindustry.com

Contact Person
Timo Luukkonen
+358 40 550 1942
timo.luukkonen@seasideindustry.com

Specialty Areas
Seaside Industry Park is the hub of the maritime cluster in Rauma. Successful principal companies in shipbuilding and marine production with wide and efficient supplier network operate in the park. The region is utilizing versatile infrastructure and comprehensive common services. Seaside offers an efficient manufacturing environment and cooperation network that also enables smaller companies to participate in major projects and achieve competitive advantages and added value. Additional information: www.seasideindustry.com

7

S.A. SVENDSEN OY

Särkiniementie 3 B
FI-00210 Helsinki
Finland
Phone +358 9 681 1170
Fax +358 9 6811 1768
www.sasvendsen.com

Contact Person
Kimmo Räisänen, Managing Director
kimmo.raisanen@sasvendsen.com

Facts & Figures
Turnover: EUR 5,7 million
Personnel: 5
Established: 1981

Specialty Areas
Complete turnkey deliveries for cruise ships and ferries. Interior materials and custom made interior modules. Refurbishments and refits for cruise ships and ferries

4 7

SPT-PAINTING OY

Rälssitie 6
FI-01510 vantaa
Finland
www.spt-painting.fi

Contact Persons
Tomi Hulmi
+358 40 548 3898
tomi.hulmi@spt-painting.fi

Facts and figures
Personnel: 30
Established: 1990

Specialty Areas
- Decking systems for the cruise industry
- Indoor- and outdoor-floorings to shipdecks
- Balcony floorings
- Epoxy- and acryl-floorings

2 4 6 7

TELESILTA OY

Telakkatie 6
FI-23500 Uusikaupunki
Finland
Phone +358 28 485 500
telesilta@harjuelekter.com
www.telesilta.fi

Contact Persons
Joonas Puustelli, CEO
Jarkko Myllyniemi, Rauma Site Manager

Facts & Figures
Personnel: 35
Established: 1978
Parent Company: Harju Elekter (listed)

Specialty Areas
Marine industry electrification works. Challenging turnkey projects for the electrical, automation and navigation systems including design, system deliveries, project management, installation, commissioning and maintenance. Expertise working in every major shipyard in Finland.

1. Consulting
2. Equipment
3. Machinery
4. Materials
5. Safety
6. Systems
7. Turnkey Deliveries
8. Yards
9. Other

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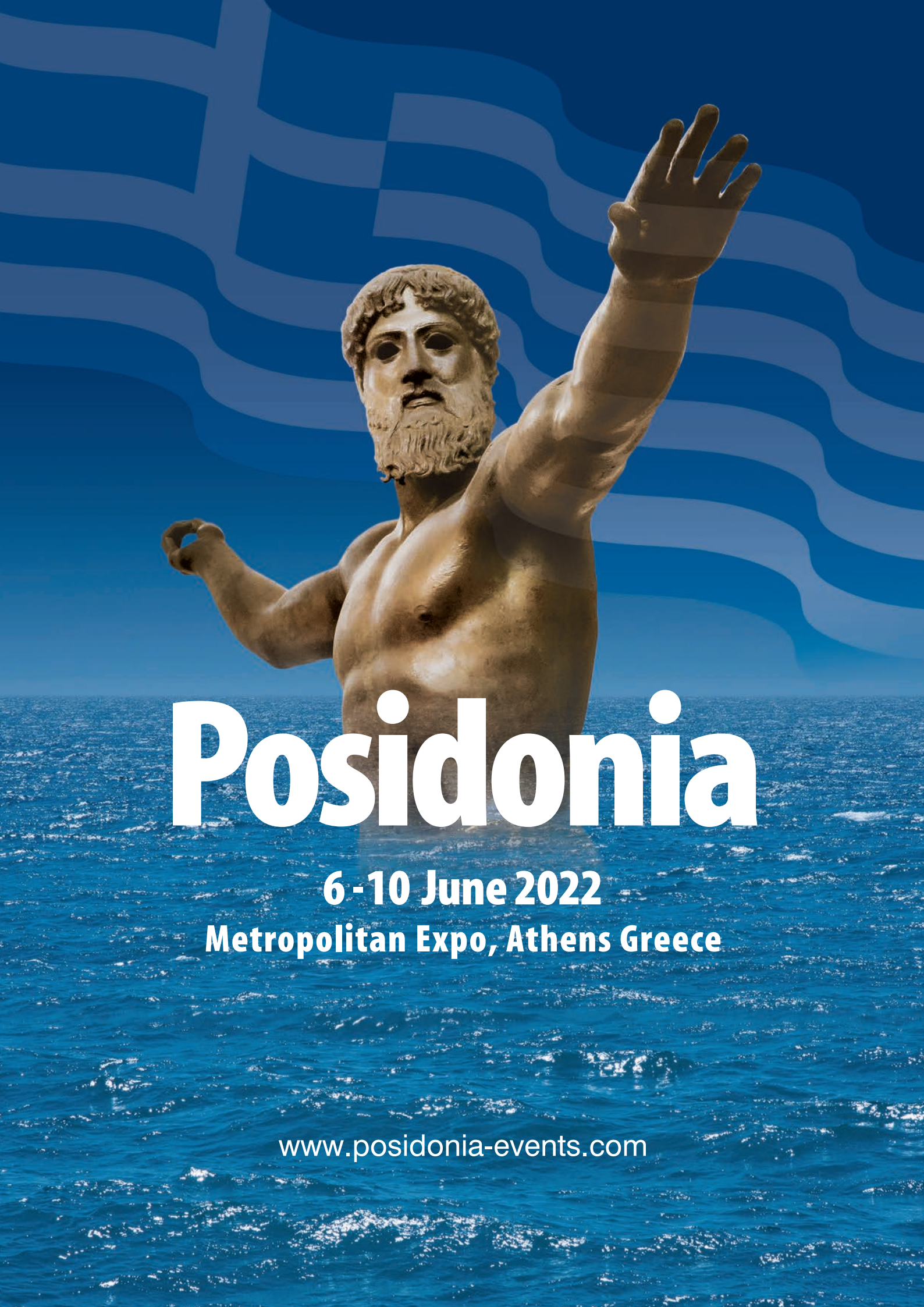
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